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SPECIAL SECTION ON GIGAPIXEL PANORAMIC VIDEO WITH VIRTUAL REALITY

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Application and Practice of VR Virtual Education Platform in Improving the Quality and Ability of College Students

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ABSTRACT The competition among countries in the world is becoming more and more fierce, among which the most important is the talent competition with core competence. Therefore, it is a top priority for the world education to cultivate talents who can master the core competence in line with the world development trend. The purpose of this study is to make a beneficial practice for the application of virtual reality technology in students' education and for the teaching points at this stage, so as to open up the ideas for further research. Based on VR virtual education platform, this paper first introduces the current research status, some important concepts of virtual reality technology, and clarifies the importance of education and some disadvantages under the traditional education mode. Then, through the collected literature and survey data, the feasibility of combining virtual reality technology with education is analyzed to provide theoretical basis. The subjects were selected from a key university in our city, and the questionnaire survey was conducted among freshmen to juniors by random sampling. The survey of quality education activities in colleges and universities, the survey of students' favorite education methods, the survey of virtual education platform curriculum arrangement and the comparison of quality and ability were carried out. The experimental results show that the traditional course learning is still the main mode of quality-oriented education in Colleges and universities, but lectures, publicity and social practice are also used to educate students, but the proportion is not very high. All three-degree pupils tend towards the traditional way of school education, which represents more than fifty%. The proportion of young students is the highest of the three grades, which corresponds to 62.3%.In addition, the quality and ability of students improved significantly after learning the virtual learning platform.

INDEX TERMS Virtual reality technology, education platform, students' quality and ability, quality education.

I. INTRODUCTION

A. BACKGROUND AND SIGNIFICANCE

In the past, the education platform matched the traditional education in schools, and started with online education using information technology. Traditional education changed traditional education and upgraded education platform by integrating with emerging technologies, such as developing digital teaching materials. On the other hand, under the influence of VR virtual technology, traditional education will have a new structural change. At present, domestic VR technology companies are entering the field of education. At first, each training company actively tried to implement VR technology, while large Internet companies such as Baidu and Wang Yi, have also begun to accept VR training, while at the same time introducing VR laboratories in each university, they have also introduced several VR products. Although compared to the development of foreign VR education, the implementation of VR education in China is relatively slow, There are still approximately 200 million primary and secondary schools supporting VR technology education. VR training still has great prospects in China.

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B. RELATED WORK

Taking the exhibition of ''aircraft carrier virtual experience'' in China Science and Technology Museum as an example, Sultana elaborated the design of multi person interactive exhibits based on virtual reality technology, including the game content, interactive mode, software architecture, virtual reality technology, etc., functions of software system modules, software development tools, hardware systems and required equipment [1]. In order to explore the attitude of elderly people who are prone to fall to fall prevention exercise with or without VR, Donghui randomly divided 281 cases into experimental group (TT + VR, n = 144) and control group (TT, n = 137). Two questionnaires were used to measure the attitude of virtual reality (AQ) and user satisfaction (USQ) to fall prevention. AQ was assessed at baseline and after intervention, and USQ was measured only after intervention [2].

With the transformation of health service psychology training to competence culture, it is necessary to establish a relevant assessment culture to ensure competence. Li conducted a survey of the training programs, examined which competencies were considered important, and assessed the relationship between the wishes and values of supervisors and instructors in terms of training capabilities and the content of their assessments and the achievements of trainees. In addition, it also assessed which capabilities are most difficult to achieve and what form of remediation plan to adopt [3]. This document examines the relationship between quality education and educational influence. As regards methodology, the research literature is summarised in the database on the basis of the search for keywords (including results and learning) and the materials targeted; in the actual content assessment. Chen evaluated the empirical evidence of the results of competence training, as policy makers envisage, and gave some explanations on how to address this issue in the political process [4].

C. INNOVATION

1) METHOD INNOVATION

In the same survey, this study examined the current state of student capacity development through a questionnaire.Through frequency analysis, We can see the factors that affect the basic quality of Chinese college students. Specifically, we can see which skills are important for students and which are insufficient. In this way, the solution is more objective.

2) PERSPECTIVE INNOVATION

It focuses on interviewing current students and front-line teachers, and referring to the research results at home and abroad. Because in the past studies, when putting forward suggestions on the cultivation mode of students' ability and quality, they were often based on their own research, thinking or reference from foreign countries, ignoring the experience of the training mode or the feelings, opinions and evaluation of students.

II. THE APPLICATION AND PRACTICE RESEARCH OF VR VIRTUAL EDUCATION PLATFORM IN IMPROVING THE QUALITY AND ABILITY OF COLLEGE STUDENTS

A. VIRTUAL REALITY

Virtual reality (VR) is an integrated technology. The principle is to build a virtual three-dimensional space world through computer tools. When users wear special eyes, helmets, gloves and other devices, users may receive sensory simulations such as real vision, hearing and touch in the virtual world. The computer can monitor, calculate and send the corresponding changes to the three-dimensional scene in real time. With the user's experience in real time of the interaction of emotions, users can observe the whole three-dimensional space at will. With the user's real-time experience of interactive feeling, users can observe the whole 3D space at will. The technical fields mainly involve computer graphics, sensor technology, human-computer interaction technology, artificial intelligence and science and technology. The key to combine these technologies is advanced simulation system. In short, virtual reality is a new way of interaction between human and computer. As a 3D space created by computer graphics, ''virtual'' is not a real thing, which means that people can see, hear, touch and have a strong sense of reality in the virtual environment [5].

The application of virtual reality technology in popular science education has the following three advantages: first, it can show the fields that traditional popular science education can't display well. Due to the limitation of communication mode, there are many knowledge that can't be conveyed to learners intuitively and vividly, but virtual reality technology is used, Learners can experience all kinds of fun of popular science knowledge intuitively and unrestricted. Second, interactive, immersive learning of popular science knowledge, the traditional popular science education model learners are often passive to accept knowledge, unable to mobilize the enthusiasm and enthusiasm of Learners [6]. Virtual reality technology is the most advanced science and technology. It combines the interactive and immersive mysterious experience into the communication education, bringing unparalleled freshness and curiosity to learners. This can greatly stimulate people's learning enthusiasm for communication education and greatly improve the dissemination efficiency of knowledge [7]. Virtual reality technology can greatly improve the accuracy of educational knowledge by making full use of the Internet platform to update the content quickly and conveniently.

B. SECI KNOWLEDGE MANAGEMENT MODEL

The model is used to describe the transformation between external knowledge and internal knowledge. The transformation of knowledge consists mainly of four processes: socialisation, externalisation, combination and internalisation.

''Psychisation'' is a process of converting direct experience into tacit knowledge through the exchange of experience, observation and imitation [8], [9].The term ''eradication'' refers to the conversion of existing knowledge into external knowledge. Combination is the process of combining external knowledge with external knowledge. The reorganisation and processing of external knowledge is the stage of the formation of mathematical symbols and language. The structuring and integration of knowledge is promoted by visual tools such as thought teaching, skeletal design, etc. and internalisation and external knowledge are transformed into internal knowledge, which is the process of eliminating knowledge. Through practice, external knowledge is absorbed and converted into more stable internal knowledge [10].

The fourth stage of knowledge transformation is a continuous and unchangeable whole, a process of knowledge creation and a process of knowledge transformation. The purpose of communication education is to improve learners' scientific knowledge and scientific literacy [11]. However, the learning of communication knowledge is not in-depth learning. Learners' knowledge mainly comes from the direct experience of experiential learning, from sharing, extracting and processing with colleagues [12]. In addition, through the design of communication tools and collaborative relationships, learners must realize the sublimation of perception and cognition through cooperation and conversation.

C. VIRTUAL REALITY TECHNOLOGY SYSTEM

According to the different functions and implementation methods of virtual reality system, it can be divided into three types

1) DESKTOP VIRTUAL REALITY SYSTEM

Desktop virtual reality system is also known as simple virtual reality system, which makes computer monitor become a window for users to observe virtual scene and simulate it through computer and low-end workstation, thus allowing users to fully interact with virtual reality world through input devices. These input devices include stereo glasses, sensors, mouse, 3D controller, torque, etc. [13], [14]. These types of systems allow users to freely select, observe and manipulate the virtual objects in the virtual scene, but they lack immersion because they are affected by external environment factors in the learning process. The biggest drawback of desktop virtual reality system is the lack of real reality experience. However, it has been popularized and popularized due to its low price, simple structure and flexible operation. It is a set of economic and practical system [15]. The application of this system in medical teaching is mainly reflected in the making of virtual courseware and virtual learning environment.

2) IMMERSIVE VIRTUAL REALITY SYSTEM

Immersive virtual reality systems, also known as ''wearable'' virtual reality systems, provide a much higher sense of immersive experience than desktop virtual reality systems [16]. Some display devices are used to close the vision, hearing and touch of the participants to avoid the interference of external factors. Trackers, data gloves and other hand-controlled input devices are used to immerse the participants, providing them with a completely virtual and closed new space. The biggest advantage of this type of system is that the participants are completely immersed in the virtual reality scene, but the price is expensive. This kind of expensive and large-scale supply is difficult [17].

3) SHARED VIRTUAL REALITY SYSTEM

Shared virtual reality systems, also known as network virtual reality systems or distributed virtual reality systems, are based on the network connection of immersive virtual reality systems and distributed interactive simulation [18], [19]. Through the Internet, multiple users can join a virtual scene or space, experience the scene of virtual reality together, and promote the virtual reality to a higher level. In a virtual scene, the same object or model can be manipulated and observed by different users to achieve the purpose of common learning and experience. Those who receive education and learning in other places can learn the whole process of virtual operating room through the Internet [20].

D. COMPETENCY MODEL

The competitiveness model is a unique concept in the management of human resources, with the aim of strengthening competitiveness and improving the effective needs of the organisational development strategy [21]. As a possible characteristic, has a significant causal relationship to the effective or high performance of behaviours related to the performance of an individual at work or in a particular situation. It can express and predict the behaviour and persistence of a particular situation and time. Capacity and quality can be divided into five dimensions [22].

Knowledge comes from human social practice and is the result of human recognition. Its basic form is practical knowledge, and its advanced form is theory. the science of the system. The methods of acquiring it can be divided into direct knowledge and indirect knowledge. Global knowledge is continuously accumulating and developing as it continues social practice [23].

Skill is a kind of movement system, which can perform some tasks acquired through practice. Skills can be divided into primary skills and technical skills according to their skill levels. Primary skills indicate unskilled, and the primary skills are purposeful, and through repeated practice to automate operations and achieve skill level [24]. According to the different characteristics, it can be divided into writing, cycling and other motor functions and arithmetic, writing and other intellectual functions. In the process of forming skills, various skills and actions affect each other. It can be said that if skills promote the formation of new skills, it is called skill movement. If an established skill hinders the formation of a new skill, it is called a skill disturbance.

Self concept refers to one's experience of one's own existence, including one's experience, reflection and feedback

from others, so as to improve their understanding of themselves [25]. It is an organic cognitive mechanism composed of attitude, emotion, belief and values. It runs through the whole experience and behavior, and is composed of various specific habits, abilities, thoughts and opinions expressed by individuals. It consists of three parts: reflective assessment, social comparison and self perception.

Characteristics are adjectives that describe personality traits, such as being active, serious, kind, selfish, pretending, self abased, strong and self reliant. The existence of characteristics shows that the behavior of human individuals is permanent and different. There are no two people with the same characteristics in the world, and there are no two identical leaves in the world. In addition to the differences in growth environment and life experience among individuals, different people will make different responses under the same stimulation. The response of a person with an open mind to a strange environment must be different from that of an introvert.

Motivation is regarded as a psychological factor related to the initiation, direction, intensity and continuity of behavior. The definition of encouragement in organizational behavior is a psychological process that stimulates human motivation. By encouraging people to develop in the direction of imagination, motivation is the driving force to stimulate and maintain internal psychological processes or individual activities under the guidance of goals. Motivation is an internal psychological activity that can not be directly observed, but usually refers to human external behavior. Observing a person's behavior choices, efforts and emotional changes can determine the size of a person's motivation. Motivation must have a goal, which drives the individual's behavior and direction, and it must provide driving force. Motivation has four functions: activation, orientation, retention and coordination. As one of the main aspects of action, it is the trigger of action, which can promote individuals to carry out specific activities, so as to change them from static state to active state. Once the activity is stimulated, whether it can persist in the end is also subject to the control of motivation.

III. THE APPLICATION OF VR VIRTUAL EDUCATION PLATFORM IN THE IMPROVEMENT OF COLLEGE STUDENTS' QUALITY AND ABILITY

A. RESEARCH OBJECT

The samples for the construction of the student quality and competence model are selected by a major university in our city, and students' understanding of quality education activities from first year to first year is randomly investigated. Students' quality and ability before and after their experiment Quality education in the virtual education platform are compared. Those asked for a comprehensive evaluation include teachers of various subjects.

B. EXPERIMENTAL STEPS

In the design of the questionnaire, in the interview of students, all the basic abilities of the students' competency model are classified. That's knowledge, skills, personal characteristics and motivation. Through the effective sample analysis, we can see that both teachers and students, the choice of cultivating students' skills is all focused on knowledge and skills, and the scope of selection is relatively small. Knowledge and skills include teamwork, communication, problem-solving, leadership, expertise and responsibility. Secondly, personal characteristics include business agility and self-learning ability, motivation and other ideological behaviors, such as language communication and interpersonal relationship.

By randomly interviewing students in three stages, the dimensions of the faculty model of college students are obtained. questionnaires are distributed to randomly selected classes, including 50-teachers and 200-pupils, the ability to discipline, hard work, learning from others, a healthy mindset, care, flexibility and adaptability, the right attitude, initiative, speciality, generous tolerance, personality, collective sense of honour, obedience to execution, self-determination and self-improvement are less frequent, which are therefore abandoned to the final model of the faculty and quality of college students, High-frequency competence and quality are selected as a standard of competence and quality for college students.

C. BAYESIAN CLASSIFIER

When constructing the model, Bayesian classifier divides the samples into two categories, one is training set, the other is prediction set. The classification model is constructed by training set, and the classification model is tested by prediction set. The quality of prediction model can be evaluated by means of average absolute error, relative absolute error, root mean square error and so on.

1) ABSOLUTE ERROR AND RELATIVE ERROR

Let y be the true value and y 'be the predicted value, then E = Y-Y' is the absolute error, and the relative error is expressed as follows:

$$E = \frac{Y - Y'}{Y} \tag{1}$$

2) MEAN ABSOLUTE ERROR

$$MAE = \frac{1}{n}\sum_{i=1}^{n}|Y_i - Y'| \tag{2}$$

3) MEAN SQUARE ERROR

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(Y_i - Y')^2 \tag{3}$$

4) ROOT MEAN SQUARE ERROR

$$RMSE = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(Y_i - Y')^2} \quad (4)$$

IV. THE APPLICATION EXPERIMENT ANALYSIS OF VR VIRTUAL EDUCATION PLATFORM IN IMPROVING THE QUALITY AND ABILITY OF COLLEGE STUDENTS

A. QUALITY EDUCATION ACTIVITIES OF COLLEGE STUDENTS

Each pupil is unique, born with creativity, with personal needs and abilities. Students must be regarded as independent and valuable persons. According to the students' ability, talent and level of learning, education strategies can be designed to respond to different needs in order to achieve the goal of teaching students according to skills; In the teaching process, we should introduce the theory of learning psychology and the theory of multiple intelligence as a guide to teaching theory, the evaluation of students should change the traditional single measurement standard and apply the individual measurement standard. The evaluation of students should change the traditional unified measurement standard and implement the personalized measurement standard. The development of literacy education includes curriculum education and activity development. Through various activities, the school effectively uses the resources of the second classroom, enabling students to gain knowledge from extracurricular practical learning, and improve their literacy and sense of responsibility. According to the survey results, the results of school activities are shown in Table 1.

TABLE 1. Quality education activities in schools.

Questions	Options / Number of people / Proportion			
How does the school carry out quality education?	Course learning	Lecture learning	Promotional video	Social practice
	1856	1345	998	805
	58.2	42.3	31.5	25.6
Has the school carried out quality education activities?	Regular	Occasionally	Never	Unclear
	793	1640	528	186
	24.8	51.3	16.5	5.8

There are two main questions in this questionnaire survey, one is how the school carries out quality education, the other is whether the school has carried out practical activities related to quality education, and the answer has also set four ranges. It can be seen from the data in the table that the school still attaches great importance to quality education, mainly through course learning and lecture learning to carry out quality education activities, while the time for carrying out relevant education activities is mainly regular classes and occasional lectures, only a few people are not very clear about the quality education situation.

The quality education of students in Colleges and universities is still based on traditional course learning, but it will also use lectures, publicity and social practice to educate students, but the proportion will not be very high. The percentage of students who like quality education in different grades is shown in Figure 1.

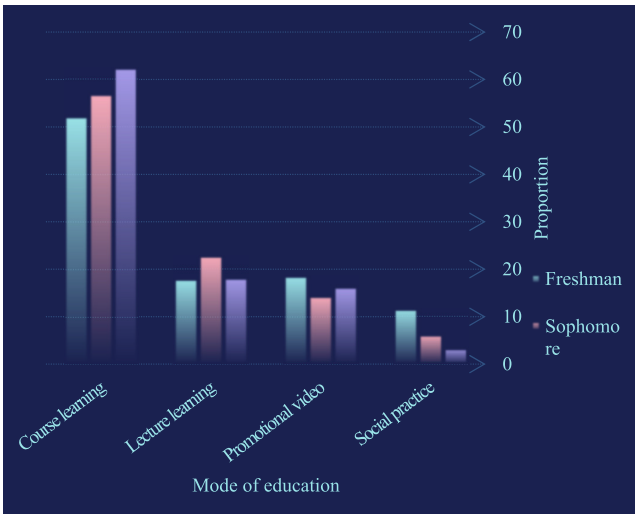

FIGURE 1. Percentage of students in different grades who like quality education.

From the data in the figure, it can be clearly seen that the students of the three grades tend to the traditional curriculum education, accounting for more than 50%. Among them, the proportion of junior students is the highest among the three grades, accounting for 62.3%. The second popular way of education is lecture, which can improve the quality of students. Compared with the other three education methods, the popularity of social practice activities is very low, the average value is only about 7%.

B. CURRICULUM ARRANGEMENT OF VIRTUAL EDUCATION PLATFORM

In the whole person education thought, the concept of ''integrity'' is one of the core of the education process. In the process of education, each subject has its own value and is an indispensable part. The purpose of education is to promote the all-round development of human beings, and the knowledge structure model oriented by disciplines and specialties makes students form one-sided and single level of knowledge structure. Curriculum education is the core part of school education, and the setting of quality curriculum is very important. Generally speaking, the model can be divided into two categories. One is multi-disciplinary mode, which aims to achieve the goal of quality education through the core idea of quality education and the whole content of other departments, as well as the teaching of different courses. The other is to combine the content related to quality education to develop it into an independent course. There are relatively few courses related to quality education in the surveyed schools, and there are imbalances in each course, as shown in Figure 2.

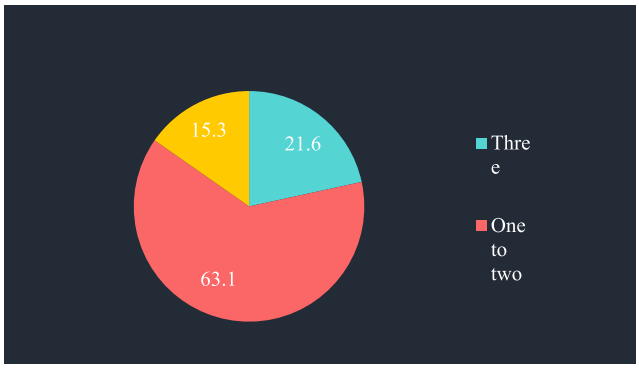

FIGURE 2. Comparison of the number of related courses.

From the perspective of single subject courses, when asked about the number of subjects related to quality education, most of them answered 1-2 subjects, accounting for 63.1%. Only 21.6% said there were more than 3 subjects, and the rest of the students said that there were no relevant courses at all. But generally speaking, there are few courses related to quality education, which means that in most subjects, the penetration between subjects is relatively shallow and there is imbalance.

C. COMPARISON OF QUALITY AND ABILITY OF VIRTUAL EDUCATION PLATFORM BEFORE AND AFTER LEARNING

The ideological and moral level of modern college students is generally good, relatively healthy, with lofty ideological and moral character. At present, China is in a society with rapid economic development and rapid cultural integration. The ideological concepts and value trends at home and abroad will affect the school students. In the face of various choices and temptations, students are abandoning traditional prejudice and old concepts, actively pursuing advanced ideas and consciously improving their ideological concepts and moral quality. The values of modern students are diversified and differentiated significantly. In some aspects, there is a trend of comprehensive regression, which is developing towards a more realistic and rational direction, self realization and social service integration.

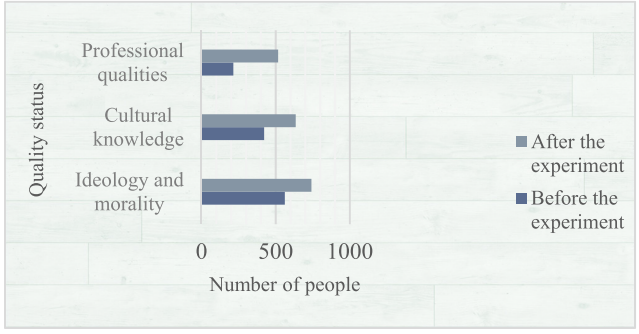

FIGURE 3. Comparison of quality and ability before and after.

As shown in Figure 3, contemporary students are a group with higher comprehensive quality, and their performance in cultural quality is more obvious. Contemporary students are trained under the relatively perfect education system since the reform and opening up. The educational conditions are superior and the education methods are scientific. Therefore, their overall cultural quality is relatively high. Most students agree with the basic position of quality education in personnel training, and many students agree with the urgency of further developing quality education. After learning based on VR virtual education platform, it is obvious that the quality of students has been improved, and the number of students has a significant upward trend.

D. IDEOLOGICAL AND MORAL QUALITY OF COLLEGE STUDENTS

Students' Ideological and moral quality has declined, students' attention to personal interests has gradually increased, and they pursue self-development and independence in spiritual and practical life. Although their personal values play a role in people's subjective initiative to a certain extent, the burst of personal interests leads to their indifference to other people's and public interests and to the weakening of national feelings, Collectivism and sense of service are not taken seriously. If we do not pay attention to it, the growing individualism will certainly affect the overall moral level of students. The changes of Ideological and moral quality of college students are shown in Figure 4.

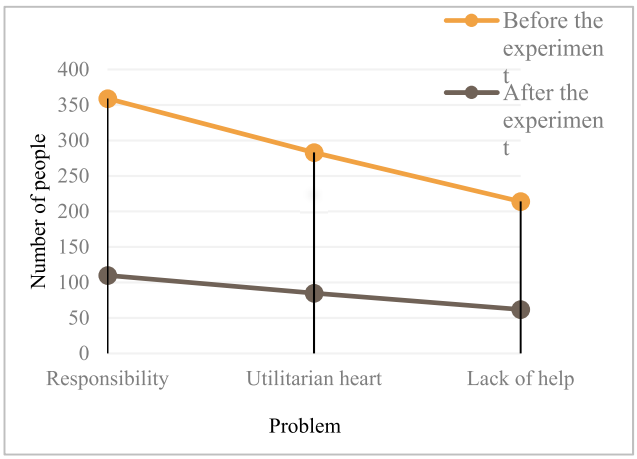

FIGURE 4. Changes of Ideological and moral quality of college students.

Under the influence of market economy advocating diversified personality, the moral values of contemporary students are quite different from the traditional moral values advocated in the past. For example, when dealing with the "contradiction between collective interests and personal interests", the vast majority of students think that the concept of "giving priority to collective interests and giving consideration to individual interests" should be "giving priority to collective interests", rather than "unconditional obedience of individual interests to collective interests"; on the issue of how to treat the relationship between "demands and contributions", many students think that the concept of "no matter what

you ask for, and strive to contribute'' is not in line with the current era, According to the situation at that time, we should ''give more and get more, and give less and take less''. These phenomena show that, on the one hand, the personality of contemporary students is quite distinct, which is quite different from the stereotyped way of thinking in the past, and they have the consciousness of independent thinking; on the other hand, it also shows that the negative thought of ''extreme individualism'' has risen and the spirit of dedication and dedication has been weakened. After the quality education, most of the students' Ideological and moral quality problems gradually reduced, and the quality and ability of students have been improved.

V. CONCLUSION

With the rapid development of science and technology, from the original blackboard, chalk to the present multimedia teaching, the education methods are constantly improving and improving, and gradually diversified. However, such a teaching method still can not get rid of the teacher-centered mode, there are students' learning enthusiasm is low and learning efficiency is low. The application of VR technology provides a new possibility to make up for these defects. With the development of virtual reality technology, it has been widely used in education, entertainment, military, real estate, industrial design and manufacturing industries and fields. The application in the field of education is also widely used in virtual campus simulation, knowledge learning, virtual experiment, skills training and so on. With the progress of technology and the decline of hardware cost, virtual reality technology will be applied to more fields, and make more people understand and use it. In particular, communication education has broad prospects for development and will play an obvious role in improving the quality of the whole people.

The progress of science and technology provides many possibilities for future people to create value, and has a significant impact on education. In the future, education will be full of more imagination and innovation. Learning is productivity. Virtual reality technology provides ''holistic education'' service for the cultivation of students' quality. In order to establish the sense of social responsibility and mission for students, in order to develop the quality and ability of students, both schools and teachers should have a profound understanding of the social economy, and be full of imagination for the future society, so we need to pay attention to and look forward to the future. Progress in science and technology has always been the driving force behind educational reform. However, teachers must have a clear understanding of the implications of the new technology. They should not stop all kinds of changes brought about by the new technology, nor blindly worship technology. Instead, they should make the development of technology a universal antidote to all educational problems. Although virtual VR technology has changed the traditional interaction between man and computer, and has enhanced the sensory experience of machines that use humans, many teachers still need to think deeply about how to use VR technology well. Moreover, most teachers need to think further at the same time, regulators should improve policies and regulations as soon as possible and establish a safety support mechanism.

At every stage of the learning process, parents and students must have the opportunity to make a real choice, because real education can only be done in freedom. In the teaching process, we should inspire students to enjoy free research, to cultivate the capacity for free expression and their independent choice, and become aware of their free development. However, the current education system severely restricts the right of students to choose freely, such as the curriculum, teaching methods etc. In the future, the direction of education development should have more opportunities for pupils to choose freely, so that they can actively participate in the teaching process in accordance with their own abilities, fully express their views and proposals and bear the corresponding responsibility for the success or failure of learning.

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