

# Positive Psychological Intervention Mechanism of VR Technology in Public Health Emergencies in Universities

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**Abstract:** Public health emergencies in colleges and universities refer to public incidents that occur within or outside colleges and universities, but are quite related to people or events in colleges and universities, which are difficult to predict beforehand, and have a certain impact on the school's teaching, work, and life order. It has the characteristics of suddenness, groupness, and unpredictability. This article aims to analyze the common problems in the management of public health in colleges and universities, propose specific measures to strengthen the management of public health emergencies in colleges and universities, and maintain the harmonious, stable, healthy and sustainable development of colleges and universities. This article uses VR technology to conduct psychological interventions on public health emergencies in colleges and universities, integrate more complete biological individuals into the virtual system, and let the individual's various perception activities such as sight, hearing and touch, as well as emotions such as joy, tension and fear. Reactions will be fully expressed, realistic effects, and immersive interactions. The experimental results of this paper show that after the application of VR technology in the positive psychological intervention mechanism, people's attention to public emergencies in colleges and universities has increased by 13%, and the frequency of public emergencies has also been reduced by 20%.

**Keywords:** VR Technology, College Public Health Emergencies, Positive Psychology, Intervention Mechanism, Dijkstra Algorithm

## 1. Introduction

From the expansion of university enrollment to the present, Chinese universities have gradually become places where young people concentrate. This particularity of institutions of higher learning is combined with the complex contradictions that emerged during the period of social change, especially the continuous exposure to safety issues such as natural disasters, confrontations of accidents, and public health. The survival of universities, especially my university, is facing unprecedented challenges. Due to insufficient public health prevention knowledge and prevention skills of primary and middle school students, colleges and universities are often places where emergencies occur. According to a report from the Ministry of Health of China, there were more than 120 cases of student poisoning nationwide in 2010. Poisoned people in collective canteens accounted for up to 32% of the total. According to the data analysis of the Ministry of Health, the main place of university food poisoning incident is the school cafeteria. The cause of large-scale poisoning in canteens is the deterioration and contamination of food in canteens due to improper storage or handling of food.

Colleges and universities are the birthplace of cultivating high-quality talents, and they are also places where talents are concentrated. In addition, because public health is prone to emergencies, various crises can be avoided in a timely and effective manner, and countermeasures to prevent crises can be actively taken, and it is particularly important to control the damage to the minimum. Therefore, it is necessary to strengthen the university's awareness of public health crisis management, build a crisis event handling mechanism for universities, minimize the possibility of crisis events and the harm caused by crisis events, and maintain the overall safety and stability of the university as much as possible. This has become a profound and important strategic issue that universities in our country must face squarely.

The public health education proposed by Zhang L plays an important role in the health education of non-medical colleges in my country. However, health education in non-medical university hospitals shows that the emphasis on medical education is usually ignored. To this end, he proposed innovative

publicity and education methods, and provided a series of good suggestions for implementing relevant medical knowledge and skills. However, the implementation process of these methods is too long, making some parts not updated in time [1]. Haddad H discussed the main layout and countermeasures of scientific research projects during the COVID-19 public health emergency. He used the literature survey method to collect all the countermeasures released by the state since January 20. In addition to determining the priorities of emergency response and key research agendas, he also guided the national science and technology authorities and scientific research institutions at all levels to deploy a series of new measures. The scientific method. But because the object of the survey is not very large, the result is not very accurate [2-3].

The innovation of this paper is to propose early warning and early warning mechanism management mechanisms for public emergencies, university health, emergency response mechanisms and post-event restoration and reconstruction mechanisms. The focus is on the establishment of organization, establishment of systems, monitoring and early warning, incident prevention mechanism and early warning emergency management and prevention training; reporting during the event, petition mechanism and stable ideological education, and recovery mechanism after the event.

## **2. Research Methods of College Public Health Emergencies under VR Technology**

### ***2.1 Research Methods of Public Health Emergencies In Universities***

Literary research. This article refers to many external documents, including journals, graduate schools and doctoral dissertations, books, policy documents, etc., and is driven by research on various public health emergency management and handling mechanisms, university public health emergency management mechanisms and crises. In order to understand the current situation of emergency management of public health emergencies in our country, emergency management methods inside and outside the university, and understanding of research results, research methods, research ideas and other research status of various researchers. This will be an important foundation for the completion of this project [4].

Comprehensive analysis method. This article will explain the concept, characteristics, types, and causes of public health emergencies in Chinese universities, and analyze the current situation. Case studies on emergency management of public health emergencies in universities, identifying existing emergency management problems, and proposing targeted solutions. In the analysis process, combined with empirical analysis and restriction analysis, trying to make the discussion more convincing [5].

Case analysis method. The research objects of this article are two public health emergencies in universities in recent years. One is a food poisoning case that occurred in a university cafeteria, and the other is a national case of infection by famous teachers and students of Tohoku University Medical Department who were infected with infectious diseases through animal experiments. Through the study of these two cases, the management status and existing problems of public health emergencies in universities in our country are analyzed, and countermeasures for establishing and completing the management of public health emergencies in universities are proposed, improving the emergency management capabilities of universities, and improving teachers and students. Physical and mental health to ensure safety. Promote the harmonious and stable development of universities [6].

### ***2.2 VR Technology Algorithm***

The best priority search algorithm is the heuristic algorithm. During the path search, the Eurotag function should be used to estimate the distance from the current node to the target node. It is called a heuristic because it does not know the exact cost from the current node to the target point. This is only an estimated predicted value, because obstacles may be encountered on the road, which will lead to inaccurate estimates. Therefore, the choice of Euclidean function is very important for Euclidean algorithm [7].

The Fs algorithm is executed according to the same algorithm process, the difference is that as a genetic algorithm, it can estimate the cost from any node to the target point. Unlike the algorithm that selects the node closest to the original node, it selects the node closest to the target. So the algorithm cannot guarantee to find the shortest path, but it is much faster than the algorithm, because it uses a Euclidean function, so it can quickly reach the target node [8].

However, it only considers the distance from the target point and ignores the cost from the initial

node to the current point. If it encounters an obstacle on the map, it is likely to take a lot of wrong paths, and the route will not be good. In other words, the European method usually produces an approximate solution without guaranteeing the best solution [9].

The algorithm invented in 1968 is an algorithm that combines new methods (such as BFS) and traditional methods (such as Dijkstra's algorithm). The magic of the  $A^*$  algorithm is that although it is based on a European method and cannot guarantee the best solution,  $A^*$  can guarantee that it will find a shorter path. The  $A^*$  algorithm is one of the most famous path detection algorithms. Most games use algorithm-based detection solutions because they are effective and easy to develop. It can also track trajectories in barrier-free terrain. The  $A^*$  algorithm can be regarded as a genetic algorithm. He used genetic functions. In the pathfinding process, the F value of the node is continuously calculated, and the minimum node is selected to insert the selected path until the target node is found[10].

### 2.3 Dijkstra Algorithm in VR Technology

Dijkstra's principle is to treat the entire search path as a tree. The tree defines the starting point as the root. The search path from each node to the root is called the shortest path for that node. When the Dijkstra algorithm detects the shortest path tree, since the network using the algorithm has no negative weight problem, the distance between each node and the specified starting point and the relationship between the points will affect the path tree generation process. Add step by step to the tree [11].

Dijkstra algorithm is an effective algorithm for solving short distances between points. The starting point of the algorithm is to start from a fixed node and move from one node to another. Each transmission node must find the first fixed starting point. The shortest path always finds the shortest path from all nodes to the original fixed node. The advantage of this algorithm is that as long as the value of each short path is not negative, the shortest path of each node can be found from the fixed node. However, his disadvantage is that he must ask questions to calculate all the results. This is a waste of time [12]. If the shortest path between two points is found, there is no need to continue to calculate the distance between other points. This is because as long as the shortest path between the destination node and the specified starting point is found, the improved algorithm is over.

Among them, the weighted directed graph is:

$$G = (V, E) \quad (1)$$

Assuming that V contains two nodes, set as s and f, their paths are:

$$D_{sf} = \{V_1, V_2, \dots, V_n = f\} \quad (2)$$

Use  $EV(D_{sf})$  to represent the weight sum, as follows:

$$EV(D_{sf}) = \sum_h (V_i, V_{i+1}) \quad (3)$$

Finding the shortest path in the weighted graph is actually calculating the route from the specified starting point to the fixed minimum weight. If the arc length is used to represent the weight, the smallest path is from the start point to the end point. The sum of the smallest zero arcs. In order to further explain the principle of the Dijkstra algorithm, we can analyze it from a unique source. Calculate the starting point P and the weighted graph  $G = (V, E)$  (the shortest distance between the given starting point P and the other nodes contained in V [13]. For this type of problem, Dijkstra algorithm proposes a method of increasing the path length, that is, calculating the shortest path in the sequence Methods.

First, an auxiliary quantity D is introduced, where each component  $D(i)$  represents the shortest path length currently found from the starting point V to each node  $V_i$ . The initial state of the quantity D is: if there is an arc from V to  $D(i)$ , then  $D(i)$  represents the weight of this arc, otherwise let:

$$D(i) = \infty, i > 0 \quad (4)$$

In this case, the length is:

$$D(i) = \min\{D(i) | V_i \in V\} \quad (5)$$

In the formula,  $D(i)$  may be the weight of the arc  $\langle V, V_i \rangle$ , or the sum of the weight of the arc [14].

Through the above analysis of the principle of Dijkstra's algorithm, its biggest feature seems to be that the search algorithm has strong randomness in the process of solving short distances, and it is extended to all problems at any time, basically taking the starting point as the starting point. A circle expanded along the connected target point as a radius is used as the search area.

### 3. Positive Psychological Intervention Experiment on Public Health Emergencies in Colleges and Universities

#### 3.1 Subjects of Positive Psychological Intervention

Sample size estimation: Estimated based on 6 times the variable item provided by Kendall, this experiment is 10 times the variable item, that is, calculated under 250 cases. In addition, taking into account the insufficient questionnaires and invalid questionnaires in the sample collection, the questionnaire was expanded by 10%, and the two samples were added together. First, the sample size was determined to be 300 cases: Refer to the formula  $\gamma = (A - B)C$ . A is the average of the control group, B is the average of the intervention group, and C is the combined standard deviation. With reference to statistical benchmarks, the duality C of this study is 0.05, and  $1 - D$  is 0.08. The result of the experiment is formula=0.7, and a lookup table with N=28 persons, A=13, B=8, and C=7. Taking into account the loss of research subjects, the number of samples increased by 11%, and the final two groups were set as N1=N2=30[15].

Inclusion criteria: Firstly, volunteers who have the ability to register through recruitment; secondly, those who have not participated in psychological treatment or consultation in the recent period; and thirdly, those who have no mental problems and normal intelligence.

Exclusion criteria: First, you cannot withdraw halfway, and second, you cannot find various reasons to lose contact.

Finally, the 38 volunteers were numbered and a random number table was used to assign a two-digit random number to each nursing student. The random numbers are sorted from small to large, with the first 19 being the control group and the last 19 being the intervention group[16].

#### 3.2 Evacuation Simulation Experiment in Colleges and Universities

School is the main place where students gather, and it is also a place where student groups often need to be evacuated. Using the simulation program developed in this paper, the evacuation of student groups under different conditions in the conference room was simulated and some analysis was made on the data obtained. The simulation space is defined as an open space with the size of an entity, and simulation is performed according to different outputs and group densities.

The simulation will be classified and simulated according to the distribution of outlets and the density of students. The export classification will be divided into three situations: one exit, two exits on the same side, and two exits on the other side. In any case, four outlets with different widths will be set up, and different student densities will be adjusted for simulation. Each simulation will record the time it takes for all groups of students to completely escape the space, and observe the overall state of evacuation, crowdedness, etc. [17].

In addition, it is planned to classify according to the different layout of corridors and classroom doors. The runway exit classification will be divided into two situations, one exit and one double exit. In any case, four types (1,0 mm, 1,5 mm, 2,2 mm, 2,5 mm) and different width outputs will be adjusted. In each of the above cases, class exports are divided into two types: exports and exports. In each category, two outlets with different widths (1,0 mm, 1,5 mm) will be adjusted. Each simulation will record the time it takes for all student groups to leave the space completely, and observe the entire evacuation state, the degree of crowding, etc. [18].

### **3.3 VR Technology Experiment**

Virtual reality technology has been widely used in the field of psychotherapy. For the application of virtual reality technology in psychological intervention, we can set the intervention goal in the virtual environment, and then leave the intervention to interact with the characters in the virtual world through the virtual world; the overall environment affects the emotions and thoughts of the intervention object, from Fundamentally eliminate the patient's bad thoughts, so as to achieve the purpose of intervention treatment [19].

In addition, the three characteristics of virtual reality technology are very suitable for psychotherapy: immersion, interactivity and imagination. The immersion style can fully integrate the target of intervention into the virtual world, as if it is standing in the real world; interactive, the target of intervention will naturally communicate and act in the realistic virtual world created by the computer. Imagination means that in the virtual world, people can freely construct a cognitive structure and bring it into the real world.

## **4. Analysis of Positive Psychology Mechanism of Public Health Emergencies in Universities**

### **4.1 Analysis of the Causes of Sudden Public Health Incidents in Universities**

#### (1) Inadequate understanding

Inadequate understanding is a more prominent and fundamental problem in the process of dealing with emergencies of public health in universities. Although the frequent occurrence of public health emergencies in colleges and universities in recent years has attracted people's attention, due to the habits and methods of people handling emergencies for a long time, people are concerned about the public health emergencies that occur in the special social environment of colleges and universities. The awareness of the incident is still insufficient, which directly affects the establishment of emergency mechanisms for public health emergencies in colleges and universities and the ability to respond to public health emergencies. In summary, the following aspects are the main reasons that lead to people's cognitive defects [20]. First, the influence of traditional methods of dealing with emergencies in universities. For a long time, people have become accustomed to the "fire fighting after the fact" and "flocking" methods of emergencies in colleges where crowds of people gather. They focus on the aftermath of emergencies and lack conscious prediction and prevention beforehand. , Lack of active and scientific prevention strategies, and passive response. Second, there is insufficient understanding of the breadth and depth of the impact of public health emergencies in colleges and universities during the social transformation. At present, our country is in a period of social transformation, and all aspects of social life have undergone profound changes. However, society lacks sufficient vigilance on the breadth and depth of public health emergencies in colleges and universities during the social transformation period. Third, it lacks a scientific attitude of seeking truth from facts. Due to the driving and influence of many complex factors such as practical interests, after a public health emergency occurs, the first thing that some responsible persons think of is not how to do their best to deal with the public health emergency, but to calculate whether they are responsible. Whether it will affect one's own interests and future, adopting "covering" and "fulling" treatment methods often occurs, which also weakens the ability to respond to public health emergencies[21].

#### (2) The system is not perfect

Another reason for the low efficiency of handling public health emergencies in universities is the lack of effective, standardized and complete emergency response mechanisms. On the day of the year, the State Council promulgated the "National Overall Emergency Plan for Public Emergencies", which marked the initial formation of my country's emergency plan framework. This makes the call for establishing a sound emergency mechanism for public health emergencies in colleges and universities increasing. From the perspective of universities, it is not enough to deal with emergency public health incidents. A relatively complete emergency response mechanism for public health emergencies in colleges and universities should include an early warning mechanism for public health emergencies, a plan for handling public health emergencies, a system for regular analysis of the stable situation and research countermeasures. A good system should also include scientific procedures. Unscientific procedures are another important reason for the problems in the emergency mechanism. The procedures here mainly refer to emergency plans. For example, the emergency plans of some colleges and universities often only emphasize that the relevant leaders must rush to the scene as soon as the

incident occurs. However, what kind of work the staff should do before the leader arrives is not specific. It is true that it is indispensable for relevant leaders to rush to the scene as soon as possible, but how other staff should carry out effective response work during this period also needs to be clarified in the plan. Another example is how the organization of the emergency mechanism should operate in a scientific and orderly manner after various public health emergencies, which is also an important content that should be stipulated in the plan [22].

### (3) The hardware does not pass

First, there are deficiencies in the construction of campus environment. In recent years, many public health emergencies in colleges and universities have been caused by environmental problems. Due to the rapid expansion of enrollment scale, many colleges have scattered campuses in the expansion, and the cost and difficulty of management have increased. The catering and entertainment business points around the campus are dense and the situation is more complicated. The surrounding environment of the campus is likely to become an important "stimulus source" for public health emergencies. Second, there is a lack of necessary emergency equipment and facilities. The sudden "SARS" epidemic in 2009, during which many students "abandoned" behavior and isolation problems in many universities in Guangzhou and Beijing, reflected the inadequacy of emergency equipment and facilities in universities. Third, there is a lack of special emergency funds. The lack of special emergency funds makes it difficult for colleges and universities to respond to the emergence of public health emergencies because of the lack of funds to implement many pre-plans and effective treatment measures. If special funds are prepared before the incident, the response to public health emergencies will have corresponding support.

## 4.2 Analysis of Positive Psychological Intervention

The study included 38 subjects, including 19 boys and 19 girls. There was no statistical difference in sociodemographic data between the two groups. At baseline, the SDS, SAS, MHC, life satisfaction, and happiness index scores of the intervention group and the control group were in accordance with the normal distribution. The t-test results showed that there was no statistically significant difference in the scores between the two groups. Details are shown in Table 1.

Table 1. Comparison of results at baseline

project	Intervention group	Control group	t	P
SDS	47.11	46.36	0.375.	0.709
SAS	40.98	40.55	0.228	0.821
MHC	3.13	3.29	-0.793	0.431
Life satisfaction	4.06	4.03	0.106	0.916
Happiness index	7.06	7.39	-0.596	0.553

Repeated measures data analysis of variance was used to analyze the mental health scores of the two groups of nursing students at different time points (T1, T2, T3, T4, T5, T6, T7). The Mauchly sphere test did not satisfy the spherical symmetry of the covariance matrix, so The correction result of Greenhouse-Geisser is used. As shown in Figure 1:

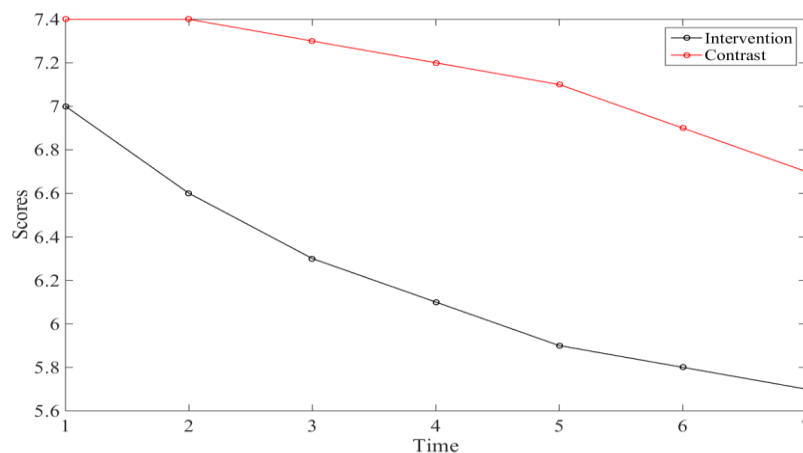


Figure. 1 Interaction diagram of happiness index score intervention and time

#### 4.3 Analysis of Psychological Crisis Intervention of College Students

In the student survey, when faced with psychological problems, only 13% of students chose to seek psychological counseling from a psychological teacher, while as many as 38% of students chose to bear it on their own. When asked under what circumstances would they choose psychological counseling, 33% of the students said they would go for psychological counseling only when they had psychological problems, and only 10% of students would choose to go for psychological counseling even if they had no psychological problems, And the majority of students (49%) said that no matter whether there are psychological problems, they will not go for psychological counseling [23]. As shown in Table 2:

Table 2 Measures to face psychological problems

Options	Number of people	Percentage
Tell a friend	292	28%
Communicate with elders	172	19%
Self bear	393	40%
Find a psychological teacher for help	116	13%

In the teacher interview, when asked "As a mental health education worker, what do you think there are still problems in school mental health education and psychological crisis intervention that need to be resolved?", most of the interviewed teachers said that they should actively improve mental health education institutions and renew Position the psychological crisis intervention target, strengthen the mental health of college students and the popularization of psychological crisis knowledge, and guide the mental health education methods of college students [24]. as shown in Figure 2:

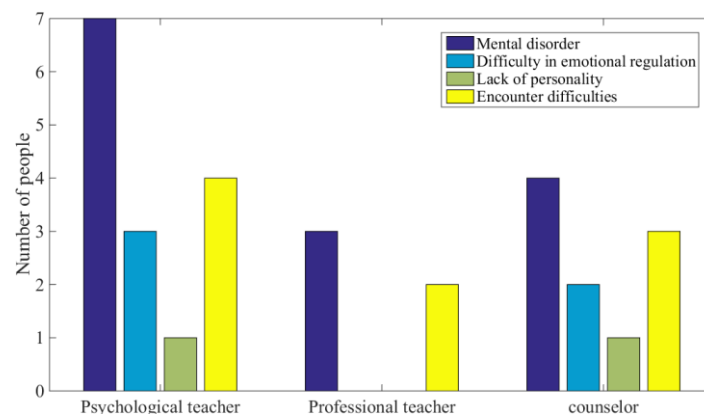


Figure 2 Targeted by active psychological intervention mechanism

From the results of questionnaire surveys and interviews on mental health education in colleges and universities, it is found that both students and teachers believe that the positioning of psychological crisis intervention in colleges and universities has a certain deviation and is limited to students with psychological problems. Solving psychological problems, eliminating psychological crises and psychological barriers has become the main task This is not conducive to the development of students, and it is difficult to achieve good intervention effects [25].

#### 4.4 Analysis of the Evacuation of Emergencies in Universities

Through observation, when performing the evacuation simulation of the three exit distributions, when the exit is narrower, the congestion at the exit spends most of the evacuation time, and the greater the population density, the time spent on all evacuation obviously becomes longer. As shown in Figure 3:

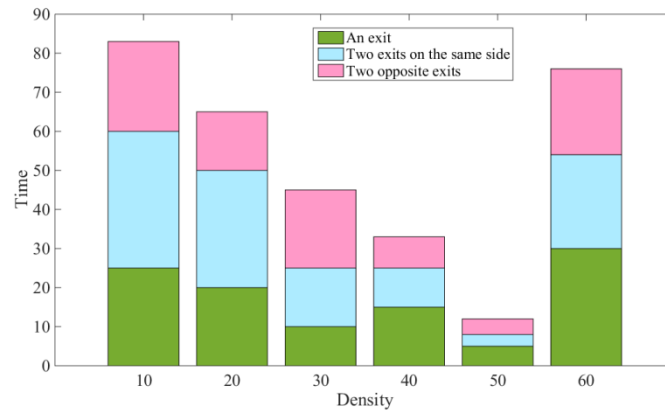


Figure 3 Comparison of evacuation time from three exits

Through the analysis of the above figure, it is easy to get the following general conclusions: in the case of the same exit distribution and the same student population density, the narrower the exit, the longer the evacuation time is required. In the case of the same exit distribution and the same width, the greater the student population density, the longer the evacuation time [26].

#### 4.5 Analysis of Public Emergencies in Universities

Colleges and universities are densely populated, activity venues are concentrated, personnel are complex, and students come from all over the country. Various public health emergencies are very easy to occur. In addition, universities lack corresponding preventive and early warning mechanisms, so various public health emergencies are more frequent. The Ministry of Health and the Ministry of Education issue early warning notices on the prevention and control of public health emergencies in schools several times a year. The published data show that public health emergencies above the country occur in schools. The proportion of health incidents is shown in Figure 4:

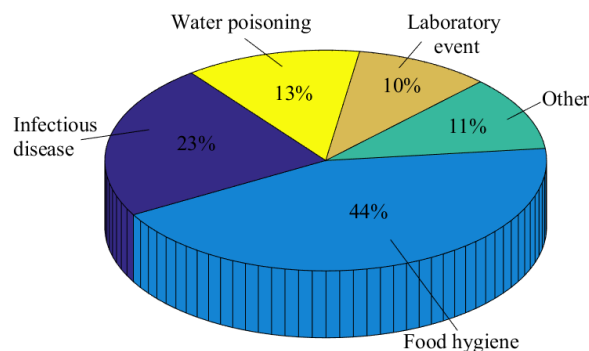


Figure 4 Proportion of public health emergencies in universities

According to the analysis of the data in the figure, it can be known that food hygiene and safety accounted for the largest proportion of public health incidents, accounting for 44%, which is close to half. This will cause a great blow to students' psychology. In fact, the proportion of laboratory safety is the smallest, which also shows that the laboratory is a place where students go less, but it also needs to be controlled [27].

## 5. Conclusions

The virtual reality technology used in this article has been used in psychotherapy for more than ten years and has achieved fruitful results in the treatment of mental illness. When diagnosing depression,



patients can switch roles in a virtual environment, play the role of an adult, and take care of their children in the virtual world. When you become a child, you will find comfort from adults in the virtual world. In the treatment of autism, virtual reality technology can place patients in a virtual environment, will not make patients feel nervous, and constantly stimulate their imagination to keep them excited [28].

This article studies the prevention and intervention of college students' psychological crisis from the perspective of positive psychology. Taking positive psychology as the research perspective, it analyzes the current situation of the mental health of college students in our country, and systematically analyzes and summarizes the ideas and content of positive psychology. The article discusses the application value of positive psychology in college students' psychological intervention [29].

This article is not very mature yet, and there are many shortcomings. For example, the basic theory of the thesis is not very stable, and it is not enough to analyze the reason for the problems in school emergency management in public emergencies, and it is not mature on the whole. In the future study and life, continue to study the emergency management of public health emergencies in schools, in order to enrich and continuously extend the inner boundary of this research [30].

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