Impact of Mental Health Education with Digital Virtual Simulation Technology on the Health of College Students

Jie Liu

Center for Psychological Health Education of College Students, Wuhan University of Engineering Science, Wuhan, Hubei, China
1769353342@qq.com

Abstract: In the context of "Internet plus", the progress of science and technology has brought more possibilities and new opportunities to the teaching environment and methods. Among them, the development and maturity of virtual reality (VR) technology have brought a new way of teaching to schools, and its role is becoming increasingly apparent, especially in experimental teaching. It can effectively solve the problems of small teaching space, high cost, and low efficiency in traditional teaching. This article establishes a virtual laboratory that can achieve resource sharing and real-time monitoring, enhance interaction, immersion, and experience, thereby enhancing students' learning interest, enhancing the fun of courses, and maximizing the effectiveness of teaching. Therefore, in recent years, many mental health educators have been trying to introduce VR technology into campus mental health education to promote the mental health of college students and their physical and mental health. Based on the above issues, this article explores the impact of digital virtual simulation technology on mental health education for college students. The research results showed that the average scores for evaluation, planning, implementation, evaluation, and total score in the observation group were 30.19, 16.32, 48.3, 21.63, and 116.44, respectively, which were 6.76, 5.61, 4.57, 4.75, and 21.69 higher than the control group. The overall health education score of the observation group was higher than that of the control group.

1. Introduction

Digital virtual simulation technology is a new type of technical means combining computer technology, virtual reality (VR) technology and artificial intelligence technology, which can simulate a variety of real-life scenarios and allow users to immerse themselves in the experience. In the field of mental health education, digital virtual simulation technology can simulate a variety of mental health problems by simulating the scene, so that students can experience and learn in the virtual environment, so as to better understand and know their own mental health, and cultivate a healthy mental literacy. Currently, virtual simulation technology has been widely used in nursing practice courses and other fields, but it is rarely used in psychology teaching. This article applies virtual simulation technology to the teaching of mental health education and has achieved good

results, thereby promoting the progress of the project and playing a certain role in promoting the construction of resources.

In Chapter 3, this article introduces VR technology, virtual simulation technology, and the establishment and implementation of appropriate learning scenarios and virtual simulation platforms. In Chapter 4, the results and analysis of the questionnaire survey are presented, and a summary of the entire article is made.

2. Related Works

Experts have long conducted specialized research on mental health education. Maiese M particularly noted the government's recommendations on changing mental health services for children and adolescents. In this suggestion, he can discuss the opinions of the public on the proposed initiative. From the survey results, this measure encouraged teenagers and their families to take on greater responsibilities, ignoring the fundamental economic reasons for these issues, as well as how neoliberalism has given rise to a mode of thinking and social tendencies, and how these modes of thinking and social tendencies have emerged [1]. Ma K K Y studied children and adolescents aged 4-18 with the goal of improving their mental health knowledge and reducing their sense of social shame. A randomized controlled trial was conducted to evaluate its effectiveness. He used the EPHPP (Effective Public Health Practice Project) scale to evaluate the quality of the study, and explored the research findings related to the research topic in a digital abstract and narrative format [2].

O'Sullivan O P took personal experience as an example and hopes to assist others in better adapting to online mental health simulation teaching. The implementation of online mental health simulation teaching has a certain impact on the psychological safety of students [3]. Di Malta G found that low levels of well-being were associated with low emotional intimacy, high loneliness, and low academic achievement by analysing students who had achieved a threshold of clinical attention. Anxiety was associated with lower emotional intimacy, stronger relationships and poorer academic achievement. All of the methods were contextualised by triangulating the students' exposure experience [4]. Salimi N aimed to explore in depth other issues that COVID-19 may affect the mental health of college students, as well as how mental health workers can address these issues in practice. The impact of these issues and possible strategies to address them are discussed [5]. Arday J is attempting to address the issues faced by minority faculty members in the college in accessing mental health services in universities. The conclusions drawn and recommendations proposed advocate for providing more diverse mental health support systems for black, Asian, and minority faculty and staff in universities [6].

Mahdavi P focused on the level of psychological well-being, the relationship between motivation and academic achievement, and academic performance of university students in different cultural contexts. He used two scales, the General Health Scale and the Achievement Motivation Test, for measurement. The results of the study found that there was a significant positive correlation between the level of mental health and achievement motivation of college students, while there was no significant relationship with academic achievement [7].

Ramluggun P explored health and social care teachers' interventions for university students with mental health problems. His study found that giving help to students with mental health problems can be physically and energetically challenging for teachers, especially when their responsibilities and expectations are unclear [8]. Lawal A M investigated the effect of factors such as gender, marriage, race, religion, education, employment status on mental health indices (successful coping, stress, self-esteem). He conducted the survey study by random sampling through internet. The findings showed that master's degree holders showed higher levels of coping; students with

secondary education faced higher levels of stress; and those with a first degree had higher self-esteem [9]. Curran T investigated the mental health status of secondary school students. He used pre-post controlled single sample and pre-post experimental data to examine changes in children's knowledge, attitudes, self-confidence and shame about mental health problems and counselling for their mental health problems. It was found that students' knowledge, attitudes, self-confidence and need to seek support increased after being tested [10]. In order to analyze and synthesize the knowledge gap and learning needs of primary healthcare nurses in providing mental health care, McInnes S used a mixed method evaluation tool to evaluate the quality of the paper. The study identified four themes: preparatory work, addressing knowledge gaps, educational plans, and promoting factors and obstacles [11].

Russell A E proposed a quantitative feasibility study of the Peer Education Program of the Mental Health Foundation, evaluating the psychological measurement characteristics of lost follow-up, questionnaires, a series of signs of improvement in outcomes, and the sample size required for effective and robust trials. The results showed that the existing previously validated measurements had good psychometric characteristics, and two new questionnaires showed reasonable reliability [12]. Asbury K conducted a longitudinal qualitative content analysis using data to investigate the stability and changes in the mental health of these adolescents and their parents/caregivers during the first six months of the COVID-19 pandemic. Research has found that the anxiety of students with autism remains stable over time, while the anxiety of other students with special education needs and disabilities decreases [13]. To identify the psychological and behavioural effects of trauma, Hall N A examined the role of trauma on PTSD (post-traumatic stress disorder). Most of the studies have shown that there is a significant positive correlation between the level of mental health of students and their psychological well-being as well as their behavioural health [14]. Brimblecombe N studied the changes in the mental health nursing workforce, the implementation of new nursing roles/skills, and alignment with national policies. It was found that the number of nurses decreased from 2011 to 2017 and then returned to levels close to 2011, but still below the national target [15]. The above mental health research and survey are only based on data statistical analysis, and the research on the topic is not in-depth enough.

3. Methods

3.1 VR Technology

VR technology is based on computer information technology, utilizing various new technologies such as perception technology, augmented reality technology, wearable technology, human-computer interaction technology, etc., to organically integrate interactive hardware devices and software systems, constructing realistic and immersive 3D scenes. It highly simulates highly interactive scenarios, allowing users to have a full experience [16-17]. Immersion, presence, and interaction are the three main characteristics of VR. Immersion is the sensitivity of perception to actions, which refers to the degree to which external environmental stimuli affect sensory movements. It is closely related to the neural pathways of individual perceptual activities, the intensity of sensory stimuli, and the response behavior to stimuli (such as limb responsiveness) [18-19]. Previous studies have found that increasing the quantity and intensity of visual, tactile, auditory and other stimuli, as well as providing multidimensional and rich sensory stimuli, can effectively improve the user's immersive experience. "Immersion" originates from "immersion", which refers to the psychological feelings people experience when simulating physical stimuli in VR. It can be measured by corresponding objective indicators or personal self-evaluation, mainly used to evaluate the credibility and effectiveness of simulated scenarios. Interactive is the biggest feature of VR technology, which involves both individuals and the virtual world [20].

3.2 Virtual Simulation Technology Establishes Appropriate Learning Scenarios

Virtual simulated learning scenarios are virtual worlds created through the combined use of virtual reality and simulation technologies. It can simulate senses such as vision, touch, and hearing, allowing users to observe and experience things in the virtual world as if they were in person, in a timely, effective, and unconstrained manner. Virtual simulation technology has advantages that cannot be replaced by other methods. It can reflect and experience the experiences of doing and observing well, which helps to understand abstract experiences, improve learning efficiency, and better achieve "learning by doing". For example, in the "fire extinguishing" section of the fire prevention system, students can be placed at the scene of a fire and choose appropriate fire extinguishing equipment to extinguish the fire. For example, in the understanding section of fire equipment, students are asked to observe the storage locations and uses of various types of equipment, which is an observation experience. For example, in the study of fire safety signs, students can discover the relationship between fire signs and fire equipment, enabling them to combine concrete and abstract elements. This learning experience is closely related to constructing learning contexts.

3.3 Establishment and Implementation of Virtual Simulation Platform

Step 1: Install suitable virtual simulation software on the computer and select appropriate virtual simulation software according to specific teaching requirements.

Step 2: Organize teachers in each class to train on the relevant knowledge of virtual simulation software.

Step 3: According to the curriculum outline, design the teaching content of the "virtual simulation" experiment;

When using virtual simulation software for teaching, attention should be paid to the following issues. First of all, to standardize and optimize the current network implementation system, teachers should have a good understanding of the corresponding virtual simulation technology software applications, failure analysis, troubleshooting and so on. In response to the needs of the network operating system, the expansion of different types of servers is accomplished to realize the handling of different situations. Better work needs to be done to better utilize the setup and management of the operating system.

Step 4: Implement effective protection of its network composition environment.

It not only needs to effectively utilize various technological content, but also ensure safety and practicality during the execution process. The virtual simulation system utilizes the most effective network security tools such as databases, network firewalls, antivirus software, network sniffing, intrusion detection, and data encryption. By installing these devices, the security, integrity, and efficiency of the experimental platform can be ensured, reducing unnecessary interference and damage.

4. Results and Discussion

4.1 Basic Content of the Questionnaire

Whether teaching staff agree with virtual simulation technology determines its scope and frequency of use in mental health education. At the teacher level, appropriate teaching methods should be selected to improve teaching effectiveness and quality. The application of virtual simulation technology in teaching can be analyzed from the aspects of teaching content, teaching methods, etc. From the perspective of a group, as a social individual, professional teachers can be

infected by the environment and social groups they are in when a large number of virtual simulation technologies are used for education, which is known as the "social effect". In addition, funding, equipment, teaching policies, etc., can also have a certain impact on the application of virtual simulation technology.

On this basis, a questionnaire survey was conducted on students from four universities, with a total of 213 responses and 207 responses, resulting in an effective rate of 97.18%. The survey mainly covers two aspects: first, the basic overview, and second, the application of virtual simulation technology. Among them, the usage of virtual simulation technology is divided into four categories: performance evaluation, technical difficulty, social effects, and other factors. Finally, a questionnaire survey was conducted on how to apply virtual simulation technology to teaching. The survey data, except for general data, are all rated using the Likert Five Scale.

4.2 Evaluation of Intervention Effects

① After the examination (intervention), a self-designed questionnaire was used for the survey. The survey results include the effectiveness of health education and student cooperation. Students can be divided into three levels of cooperation: good cooperation, average cooperation, and poor cooperation The comparison of the effects of psychological problems between two groups of students after intervention, divided into cured, improved, and unhealed The Symptom Check List 90 (SCL-90) is used to measure the psychological state of students, which includes anxiety, fear, hostility, depression, and somatization. This article sets up an observation group and a control group. The observation group receives mental health education through virtual simulation technology, while the control group receives traditional education.

(1) Comparison of Health Education Ability Scores between Two Groups of Students
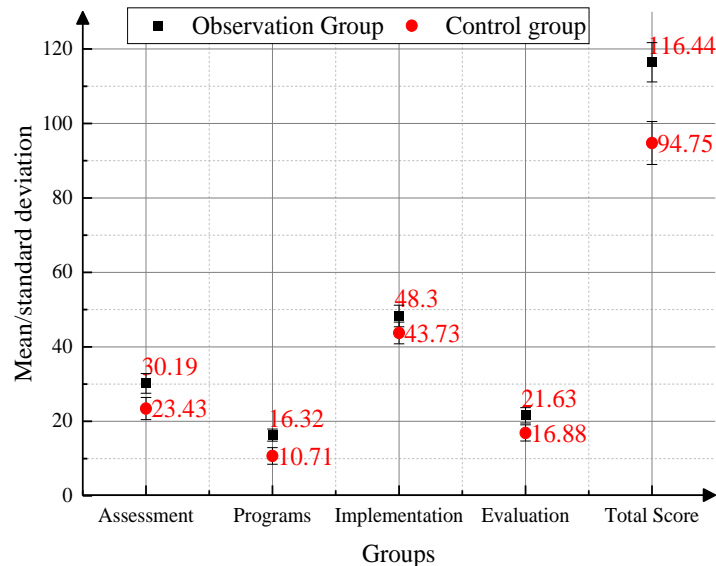

Figure 1: Health education ability scores of two groups of students ($\bar{x} + s$)

From Figure 1, it can be seen that there are differences in the average and standard deviation of evaluation, planning, implementation, evaluation, and total scores between the two groups of students. The average scores for evaluation, planning, implementation, evaluation, and total score in the observation group were 30.19, 16.32, 48.3, 21.63, and 116.44, respectively, which were 6.76, 5.61, 4.57, 4.75, and 21.69 higher than those in the control group. The above data indicates that the overall health education score of the observation group is higher than that of the control group.

Table 1: t-values and p-values of health education abilities of two groups of students

Group	Assessment	Program	Implementation	Evaluation	Total Score
t	8.49	7.68	7.79	6.64	26.3
P	0.018	0.0186	0.0238	0.0193	0.0243

Table 1 shows that the health education ability scores of the observation group students are significantly better than those of the control group, and the difference is statistically significant (P<0.05).

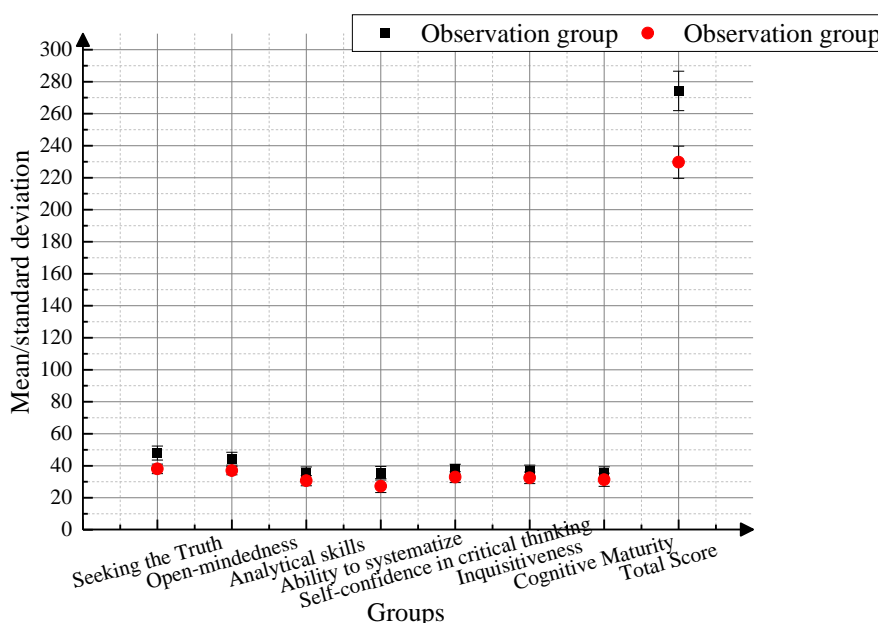(2) Comparison of Critical Thinking Ability Scores between Two Groups of Students

Figure 2: Comparison of critical thinking ability scores between two groups of students ($\overline{x} + s$)

From Figure 2, it can be seen that there are still differences between the two groups of students in terms of seeking truth, open thinking, analytical ability, systematization ability, critical thinking confidence, thirst for knowledge, cognitive maturity, and overall score. Students who receive mental health education through virtual simulation technology have higher critical thinking abilities than those who receive mental health education in traditional classrooms.

(3) Total score of SCL-90 factors after intervention

Table 2: Comparison of total scores of SCL-90 factors between two groups of students after intervention

Group	Number of cases	Anxiety	Fear	Depression	Hostility	Somatization
Control group	69	21.2	14.7	14.8	14.4	18.6
Observation group	65	11.4	7.4	9.3	8.6	12.3

It can be found in Table 2 that the scores of various factors in SCL-90 in the control group were higher than those in the observation group. This indicates that the psychological health of the students in the observation group is better than that of the control group, with lower levels of anxiety, fear, depression, hostility, and somatization. Virtual simulation technology can provide more specific and vivid scenarios in mental health education, making it easier for students to engage

and participate. This interactivity and immersion can stimulate students' interest and curiosity, prompting them to think more deeply and explore mental health issues. In addition, virtual simulation technology can provide more diverse learning resources and tools to help students understand and analyze mental health issues from different perspectives.

5. Conclusions

Digital virtual simulation technology plays an increasingly critical role in today's society, especially in education. As technology continues to develop, digital virtual simulation technology is broadly utilized in diverse fields, including mental health education. This article explores the impact of digital virtual simulation technology on mental health education for college students and analyzes its positive effects on their health. Digital virtual simulation technology provides college students with a novel and vivid way of learning. Through digital virtual simulation technology, college students can experience various situations firsthand, thereby better understanding mental health knowledge. Compared with traditional classroom teaching, digital virtual simulation technology can stimulate students' interest in learning, enhance their learning motivation, and thereby improve the effectiveness of mental health education. Digital virtual simulation technology has a positive impact on the mental health education of college students. Through digital virtual simulation technology, college students can gain a more vivid, interactive, and personalized learning experience, enhance their learning interest and motivation, better understand and solve their mental health problems, and thus improve their mental health level.

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