ADVANTAGES AND CHALLENGES OF VIRTUAL REALITY TECHNOLOGY IN COLLEGE PSYCHOLOGY TEACHING

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Abstract: With the rapid development of technology, psychology teaching has begun to combine with virtual simulation technology, mainly involving aspects such as psychotherapy, cognitive psychology, human factors psychology, educational psychology, and experimental teaching. This combination has many advantages: creating an immersive learning environment, enhancing the external validity of psychological experiments, and improving teaching effectiveness; the virtual technology is diverse, has a high degree of freedom, and can reduce costs; teachers and students can experience a strong sense of reality, thus being more likely to engage in teaching; using modern technology to record real-time data, ensuring the authenticity, accuracy, and convenience of teaching data; having higher openness and sharing. However, when applying it, some issues need to be noted: the application of virtual reality technology should have real teaching needs; virtual reality teaching should be operable, and efforts should be made to increase the cultivation of relevant talents; attention should be paid to ethical issues such as the impact of virtual reality technology on relevant personnel; virtual reality technology faces the dilemma of cost-effectiveness and sustainable development. Finally, in view of the advantages and problems of virtual reality technology in psychology teaching, suggestions and research directions are proposed.
Keywords: Virtual reality technology; Psychology teaching; Advantages; Challenges

1 INTRODUCTION

Many countries around the world have explicitly stated their intention to promote the deep integration of new technologies with education and teaching [1]. This has pointed out the direction for the reform of psychology teaching in universities. Especially in today's era of rapidly advancing science and technology, new technologies are constantly being integrated into psychology teaching. These new technologies, particularly the integration of computer technology, have played a significant role in promoting the convenience and scientific nature of psychology teaching. In recent years, researchers have also applied virtual reality technology (VRT) to theoretical and experimental teaching in psychology. This application has played a huge role in promoting psychology teaching and the development of the psychology discipline. Virtual reality technology refers to the combination of computer technology and virtual simulation technology. It uses computer simulation technology, sensing technology, three-dimensional graphics technology, display technology, etc. to generate a realistic three-dimensional sensory world including hearing, vision, smell, and touch.

Psychology, as a modern science, studies human cognitive, emotional and emotional, willpower and other psychological processes as well as the occurrence, development and changes of personality. Based on its disciplinary nature, virtual reality technology can be utilized to make up for the deficiencies in traditional psychology teaching. The application of virtual reality technology has advantages such as visualization and interactivity, which can complement the shortcomings of traditional psychology teaching. Virtual reality technology has been developed abroad for several decades and has had a significant promoting effect on the development of the psychology discipline, especially in the fields of psychological therapy and cognition. The application of virtual simulation technology in psychology teaching in China has just begun. We should recognize the advantages of virtual reality technology and continuously promote the integration of virtual reality technology and psychology teaching. Of course, we should also identify the existing problems and pay attention to them in future development.

2 APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN PSYCHOLOGY TEACHING

Virtual reality technology is profoundly transforming the landscape of psychology teaching in universities. The traditional psychology teaching process is limited by factors such as equipment, venue, and safety, making many important experiments difficult to conduct in the classroom. VR technology, by constructing virtual laboratories, enables students to freely carry out various psychological experiments. Researchers in psychology around the world have mainly applied virtual reality technology in five areas: psychotherapy, cognitive psychology, human factors psychology, educational psychology, and interpersonal relationship psychology [2].

2.1 Psychotherapy Teaching

This mainly occurs when treating psychological disorders such as phobias and anxiety disorders. Virtual reality

technology can simulate individual fear and anxiety scenarios, and then combine psychological treatment methods (such as systematic therapy, full immersion therapy, etc.) to treat individuals. For example, when treating acrophobia, the virtual reality technology can simulate different levels of high-risk situations according to the treatment stages of the therapist, which is something that traditional methods cannot achieve.

2.2 Cognitive Psychology Teaching

Mainly focuses on neural network research and general cognitive research. The research content involves facial and verbal cognition, spatial cognition, perception, cognitive load, etc. It can simulate the required materials, experimental scenarios, and experimental conditions for experiments using virtual reality technology.

2.3 Human Factors Psychology Teaching

Mainly involves aerospace engineering, automotive and aircraft driving, human-computer interaction, and game psychology. It can simulate driving scenarios, machine interfaces, game interfaces, etc., which are difficult to obtain or costly to acquire, thereby saving costs and achieving research goals.

2.4 Educational Psychology Teaching

Virtual reality technology in the educational psychology field mainly involves learning psychology and teaching psychology. The research content includes verbal information, cognitive strategies, intellectual skills, motor skills, etc. For example, it can simulate various teaching scenarios to see which teaching scenario is rated higher by students, or to see in which teaching scenario students show better learning interest and motivation, and have a better learning state, etc.

2.5 Interpersonal Interaction

Mainly involves interpersonal relationship psychology, interaction expressions and actions, body language, and crowd behavior, etc. For example, the interaction performance of the subjects in the virtual crowd environment, helping behavior, etc. can be observed, which can be used as independent variables or dependent variables for certain experiments.

3 ADVANTAGES OF VIRTUAL REALITY TECHNOLOGY IN PSYCHOLOGY TEACHING

3.1 Creating an Immersive Learning Environment, Enhancing the External Validity of Psychological Experiments, and Improving Teaching Effectiveness

In theoretical teaching, virtual simulation technology can be utilized for the production of courseware, demonstration of principles, and other virtual simulation teaching designs. This immersive learning environment enables students to better understand certain psychological theories and principles [3].

In experimental teaching, two concepts are involved: internal validity and external validity. Internal validity refers to the degree of revealing and explaining the causal relationship between experimental variables, indicating the accuracy of the experimental research; external validity refers to the extent to which the experimental research results can be generalized to real situations, indicating the effectiveness of the experimental research. There is often a trade-off between internal validity and external validity. The stricter the control of additional variables, the greater the gap from the real situation, and the less the experimental research results can be applied to real scenarios.

Traditional psychological experiments strictly control additional variables and examine the influence of independent variables on dependent variables, ensuring internal validity. However, the problem is that this manipulation of the subjects weakens the generalization, promotion, and effectiveness of the experimental research results. The ultimate goal of psychological research should be application, which leads to the ineffectiveness of traditional psychological experiments. The emergence of virtual reality technology can precisely solve this problem. Through virtual reality technology, experimental scenarios that are infinitely close to the real situation can be simulated. The experimental conclusions obtained in this scenario naturally have greater external validity and can improve teaching effectiveness.

3.2 Virtual Technology is Diverse, has a High Degree of Freedom, and can Reduce Teaching Costs

From the current combination of virtual reality technology and psychology teaching, it can be roughly divided into four types of virtual simulations: virtual simulation of psychological processing, virtual simulation of special subject groups, virtual simulation of brain structure and function, and virtual simulation of specific experimental scenarios. These simulations mainly depend on computer technology and data simulation, mainly involving personnel and technology investment. Compared with the large-scale instruments and equipment required by traditional teaching, virtual simulation technology can not only achieve flexibility and freedom while ensuring teaching effectiveness, but also has a relatively lower cost.

Traditional psychology teaching requires actual experimental instruments and equipment, which need to be purchased and used repeatedly, resulting in high costs [4]. However, virtual reality technology is only a technological

transformation, and multiple virtual reality experiments can be conducted on the same computer, and the same software or system can be used infinitely. On the other hand, traditional laboratories also require the organization, maintenance, and preparation before experiments, while virtual reality technology experiments are all computer programs, which are convenient to organize and greatly reduce the cost of experiment operation and management.

3.3 Using Modern Technology to Record Real-Time Data to Ensure the Authenticity, Accuracy, and Convenience of Teaching Data

The traditional teaching process often occurs before, and the export and analysis of teaching data often occur after. This is not conducive to real-time monitoring of data during the teaching process, making it difficult to promptly identify errors that occur during the teaching process, ultimately resulting in low teaching effectiveness. Virtual reality technology experiments can overcome this defect. During the teaching process, data generation can be monitored at any time, and data can be exported immediately after the experiment is completed for data analysis.

3.4 Higher Openness and Sharing

The combination of virtual simulation technology and network technology can break the limitations of time and space, and as long as there is a network, learning and experiments can be conducted anytime and anywhere through computer terminals or mobile phone terminals. Moreover, as long as the server has sufficient storage and network traffic, theoretically, it can infinitely meet the learning and experimental needs of countless students. This can make virtual reality teaching projects have higher openness and sharing, thereby reducing the cost of virtual reality technology.

4 ISSUES TO BE NOTED IN THE APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN PSYCHOLOGY TEACHING

4.1 The Application of Virtual Reality in Teaching should have a Genuine Demand

One must truly understand the core purpose, internal basic principles and logic of the psychology teaching content. There is indeed a necessity to apply virtual reality technology in the teaching process. What are the advantages and disadvantages of virtual reality technology teaching compared to traditional teaching? How does the cost of virtual reality technology teaching compare to that of traditional teaching? These factors should all be comprehensively considered. For example, some psychological experiments have no necessity for virtual simulation. One should avoid following trends or policies blindly.

4.2 Virtual Reality Teaching should be Operable and Efforts should be made to Increase the Cultivation of Relevant Talents

The development of educational technology should take into account the level of educational technicians and teaching personnel. The development of virtual simulation equipment should be made into automatic and easy-to-use types to make it easier for psychology teachers to operate. At the same time, efforts should be made to cultivate talents in virtual reality technology, especially those with interdisciplinary expertise between virtual reality technology and psychology. This will facilitate the deep integration and professionalization of virtual reality technology and psychology teaching, promote the development of the psychology discipline, and facilitate the faster and better application of the discipline.

4.3 Ethical issues such as the impact of virtual reality technology on teachers, students, and subjects should be noted.

Sometimes, teachers apply virtual reality technology in psychology teaching due to ethical issues, but it is necessary to be aware that new ethical issues may arise during the application. Because virtual simulation experiments have high simulation and high involvement, some virtual simulation technologies may bring negative impacts to teachers, students, and subjects. For example, experiments simulating theft and murder (similar to the "Grand Theft Auto" game), subjects may suffer serious physical and mental damage after participating in the experiments [5].

4.4 Cost-Effectiveness and Sustainable Development Dilemma

The initial investment for VR teaching projects is huge, including hardware procurement, software development, and site renovation. The unit price of high-performance VR workstations is between 20,000 and 50,000 yuan. Building a 20-station VR laboratory requires investment of several million yuan. In addition, the development cost of customized psychology VR teaching content is usually 30,000 to 50,000 yuan per class, and the development of a complete course system requires several million yuan [6]. Such high costs have deterred many universities.
From the perspective of maintenance costs, VR equipment updates and replacements are fast, and a comprehensive upgrade is needed every 3 to 5 years; the license fees for professional software are high and require regular renewal; VR classrooms require a dedicated operation and maintenance team, and the human cost is considerable [7]. These continuous investments place pressure on university finances. A case from a certain university in the central and western regions shows that the annual operation and maintenance cost of its VR psychology laboratory accounts for 35% of the

total budget for teaching equipment in the college, seriously occupying other teaching resources [8].

The imperfect sharing mechanism also affects cost-effectiveness. Theoretically, VR resources can be shared across universities through the network, but due to factors such as inconsistent technical standards, intellectual property protection, and network bandwidth, the actual sharing is limited. The phenomenon of each school acting independently and repeating construction is widespread, resulting in resource waste. The establishment of a regional or national psychology VR teaching resource sharing platform requires top-level design and policy support.

5 CONCLUSION AND OUTLOOK

5.1 Research Conclusion

This study systematically examined the current application status, advantages, and problems of virtual reality technology in the reform of psychology teaching in universities, and reached the following main conclusions:

Firstly, VR technology has brought revolutionary changes to psychology teaching. By constructing immersive learning environments, VR technology effectively solved the problems in traditional psychology teaching such as the difficulty in understanding abstract concepts, limited experimental conditions, and insufficient practical opportunities. It demonstrated significant advantages in enhancing learning motivation, promoting deep understanding, and cultivating practical abilities, which are highly consistent with the development trend of higher education informatization.

Secondly, the application of VR technology shows a diversified feature. In experimental teaching, VR technology expands the scope and accessibility of experiments through virtual laboratories; in theoretical teaching, three-dimensional visualization makes abstract concepts intuitive and tangible; in skill training, simulation environments provide students with safe repeated practice opportunities. These applications are reshaping the teaching ecosystem of psychology and promoting the transformation of teaching paradigms from knowledge transmission to experiential learning.

However, the in-depth application of VR technology still faces multiple challenges. The insufficient maturity of technology limits the full display of teaching effects; the shortage of teaching staff leads to insufficient integration of VR teaching with the curriculum system; ethical risks and management issues require the establishment of new norms; the high cost restricts the popularization and promotion of VR teaching. These issues need to be addressed through systematic strategies.

5.2 Future Outlook

With the continuous progress of technology and the update of teaching concepts, the application of VR technology in psychology teaching in universities will present the following development trends:

From the perspective of technology, lightweight and intelligent will be the development direction. Future VR devices will be more lightweight and comfortable, eliminating the current problem of dizziness; the integration of artificial intelligence technology will enable VR systems to have stronger interaction capabilities and adaptability, able to adjust teaching content and difficulty in real time based on students' performance. The popularization of 5G networks will support cloud rendering, reducing the performance requirements of terminal devices, making VR teaching more widespread [9].

In terms of application models, mixed reality (MR) and augmented reality (AR) technologies will be combined with VR to create more flexible learning experiences. Students can interact with virtual objects in the real classroom, achieving seamless mixed learning. This model can retain the social interaction advantages of face-to-face teaching while obtaining the immersive experience of the virtual environment, possibly becoming the mainstream form of psychology teaching in the future.

From the perspective of educational ecology, VR technology will promote the in-depth development of cross-university collaboration and resource sharing. Blockchain technology-based resource certification and trading platforms may emerge, enabling universities to safely and efficiently share VR teaching resources. A national virtual simulation experiment teaching alliance for psychology is expected to be established, setting unified standards and coordinating resource development to avoid redundant construction.

In terms of talent cultivation, interdisciplinary collaboration will be deeper. More universities will establish interdisciplinary majors of psychology and information technology to cultivate compound talents who understand both psychological principles and VR technology [10]. Closer cooperation between enterprises and universities will be formed, creating an integrated talent cultivation ecosystem. This trend will fundamentally solve the problem of shortage of VR psychology teaching talents.

5.3 Research Suggestions

Based on the findings of this study, the following suggestions are proposed for the reform of psychology teaching in universities:

Produce VR technology applications in stages. Universities with mature conditions can fully build VR laboratories and systematically develop corresponding teaching resources; universities with limited conditions can start from individual courses as a pilot, gradually accumulating experience. Different universities should choose suitable application paths based on their own positioning and characteristics, avoiding blind following.

Attach equal importance to teaching research and technological innovation. Encourage teachers to conduct action research on VR teaching effects and explore best practices. The research topics could include: the impact of different VR teaching designs on learning outcomes; the interaction patterns between teachers and students in the VR environment; the appropriate duration and frequency of VR teaching, etc. Such research will provide empirical evidence for the optimization of VR teaching.

Establishing a quality assurance system is of vital importance. This includes technical standards for VR teaching resources, teaching design norms, ethical review mechanisms, and effect evaluation plans, etc. Professional organizations such as the Psychology Teaching Guidance Committee can take the lead in formulating relevant standards and guiding the healthy development of VR teaching.

In conclusion, virtual reality technology provides a powerful impetus for the reform of psychology teaching in universities. However, its application is a systematic project that requires the joint efforts of educators, researchers, technicians, and managers. Only by adhering to the "student-centered" concept and balancing technological innovation with educational laws can the transformative potential of VR technology be truly exploited, and psychology talents who can meet the demands of the digital age be cultivated.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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