



Application and Exploration of Virtual and Augmented Reality Technology in the Practical Teaching of Art Brokerage in Higher Vocational Colleges

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Abstract. With the increasing maturity of virtual and augmented reality technology, the reform of practical teaching mode applied to this technology is also one of the development trends of college education in China in the future. This paper mainly analyzes the application of virtual and augmented reality technology in practical teaching activities in Colleges and Universities from the perspective of teaching design of art design major, and discusses the path of integrating virtual and augmented reality technology from the teaching contents of the core curriculum design, planning and operation management of the major. This paper also puts forward corresponding suggestions on the application of practical teaching and the improvement of the teaching effectiveness.

Keywords: virtual reality · augmented reality · art brokerage · practical teaching

1 Introduction

Virtual and augmented reality technology refers to the combination of reality and virtualization through computers to create a human-computer interactive virtual environment. It includes VR (virtual reality), AR (augmented reality) and MR (hybrid reality) technical means to integrate virtual content and natural scenes, bringing a “sense of immersion” between the virtual world and the natural world to the experimenter. Above technologies have incomparable technical advantages over traditional teaching. Especially in the post epidemic era, these technologies will play an increasingly important role in the application of practical teaching in Colleges and universities. For the teaching practice of culture and art majors in Colleges and universities, the application of VR and AR technologies have an important impact on the improvement of core skills of related majors, such as art creation, exhibition interaction, project planning and marketing promotion. It will also have positive practical significance to explore the development, implementation path and requirements of practical teaching projects in related majors.

2 Research and Application of Virtual and Augmented Reality Technology in the Practical Teaching of Colleges and Universities

Virtual and augmented reality technology started early in foreign countries. “virtual reality theory” was first proposed by Professor Ivan Sutherland of the University of Utah in 1963. Sutherland not only invented Sketchpad, the first system that supports the graphical interaction between users and machines, but also developed the first virtual reality helmet. Due to technical reasons, VR technology developed slowly. Until the late 1980s, the rapid development of information processing technology promoted the progress of VR technology. In the early 1990s, there was an upsurge of VR technology, and VR technology began to become an independent research and development field. Presently, the domestic research on the integration of virtual and augmented reality technology with education and teaching mainly focuses on four aspects: design and development, educational games, vocational education and medical education. For example, the “VR/AR education” laboratory research team of Caisu of Beijing Normal University has been committed to the application research of virtual reality, especially augmented reality education since 2009. The achievements mainly include: Educational app based on AR technology, interactive educational game based on Kinect and leap motion somatosensory recognition technology, information navigation design and development based on LBS, stem education, etc. Guoqiang Hu (2017) developed a three-dimensional virtual library, which is convenient for users to find and read books, is conducive to preserving ancient texts and precious manuscripts, and provides users with navigation, timely push, intelligent consultation, and other services with the help of AR technology [1]. Tao Wu (2019) developed a campus roaming navigation system for Yangzhou University in combination with VR technology, which can be used for school teaching, enrollment and other work [2]. Shengwei Qin (2019) designed a campus roaming interactive AR system, which uses AR technology to make indoor three-dimensional models achieve dynamic interaction, and combines GPS technology to gain users’ outdoor GPS campus roaming and indoor positioning [3].

In the development and application of application software, there are relatively few virtual and augmented reality software for practical teaching of Art Majors in Colleges and Universities. The developed software, such as the VR virtual simulation experiment software of Peking University, is mainly used in 3D interactive marketing, AR marketing and other VR vocational training, the software function is relatively limited for art major of colleges and universities. As the country attaches great importance to digital technology, more and more attention will be paid to related research and application in the future. The universal application of virtual and augmented reality technology is also one of the development trends of practical teaching in Colleges and universities [4].

3 Exploration of the Way of Integrating Virtual and Augmented Reality Technology into Practical Teaching in Colleges and Universities – Taking Art Brokerage as an Example

The following is a case of exploring of the art brokerage major in our college on the application of virtual and augmented reality technology. We will analyze the application of virtual and augmented reality technology in practical teaching activities from the

perspective of professional curriculum teaching design. The major built a virtual reality training platform for colleges and universities in 2018, and developed four sets of virtual reality software, including 3D modeling to create virtual media and exhibits, immersive experience of venues and activities, virtual exhibition arrangement, interactive experience of venue facilities functional software. The training platform is mainly used for the training of relevant courses in design, planning, and operation management [5]. The software application is as follows:

3.1 Using VR as a Tool for Artistic Creation, Display, and Interaction

Create immersive images and videos, such as VR movies, VR music MV, VR documentaries, VR video clips, etc. Among them, one is to generate ideas by computer, and the experimenter can feel the strange world created by the VR system with a helmet. The other is the creation method based on actual shooting. By shooting virtual reality MV, the experimenter will have the feeling of being on the scene with his helmet on.

VR interaction of exhibition projects, With the help of VR helmets and operation handles, students can carry out virtual exhibition arrangements according to the planning content and understand the effect of exhibition arrangement in advance. You can shorten the distance between the displayed works of art according to your needs, view them from all angles, and interact with some pieces. VR can also be used as a material for artistic creation. Such as performance art, helmet display, etc. Or take VR as the theme content for artistic creation.

VR online exhibition viewing, Such as virtual online display and interaction of venues and artworks. Without visiting well-known pavilions and exhibition sites at home and abroad, students can easily roam through various pavilions and activities in the VR databases and browse works of art with the help of helmets. With the development of virtual reality technology, online display and viewing are no longer limited by time and space.

3.2 Using AR as a Tool for Art Augmented Reality and Interaction

Deep comprehension of works of art. With the help of virtual enhancement software, students can enjoy the works of art from the world-famous contemporary galleries, art fairs, and museums, enlarge the details of the results, get a feeling that the naked eye cannot experience, and deeply interpret the displayed works of art, bringing more open thinking and perspective to the audience. At the same time, with the help of the software, you can also understand the information related to the work, including the artist, artistic creation theme, age, material, collection place and other information, and give users accurate, and relevant recommendations.

The combination of virtual reality and reality increases the exhibition experience. AR is used in art exhibitions, and the variety of virtual and real exhibition methods is used to turn the passive visit into an interactive multi-sensory experience, making the show more intuitive and visual, and improving people's understanding of the exhibits. For example, the physical works in the regular exhibition are superimposed to form a "hidden Exhibition" embedded in the museum. The on-site visitors need to scan the

pieces in the venue through the designated app to summon the hidden exhibits and enhance the mystery of the exhibition.

3.3 Using MR as a Tool for Hybrid Reality Display and Interaction

Students can superimpose images on the natural objects using modern mixed reality technology and MR intelligent glasses, so that the displayed objects are presented to the audience intuitively and grounded, which is conducive to the audience to better understand the artworks. In addition, with the help of hybrid reality technology, students can give full play to their imagination, carry out bold innovation, cultivate their comprehensive analysis, design, and planning ability, and improve their innovation awareness.

It can be seen that the application of virtual and augmented reality technology enriches the external form of practical teaching content to a great extent, optimizes the internal structure of teaching content, promotes the scientific and efficient development of teaching means, and plays a significant role in cultivating personalized and high-quality comprehensive talents.

3.4 Teaching Designs on Virtual and Augmented Reality Practical

3.4.1 Practical Teaching Design of Design Courses

VR technology can be applied to the modeling practice teaching of virtual media and shows. According to the needs of art exhibition projects, students will establish 3D models of venues and exhibits through unity software, from the design, layout, and construction to adjustment, optimization, and improvement of 3D scenes, use virtual reality equipment to reproduce the venues and works of art in front of the audience perfectly, and take visitors through time and space through virtual reality equipment to roam the exhibition hall. VR has played a vital role at multiple time points in the whole process of project design and production. In the preliminary work, the panoramic camera is used to collect video data in the exhibition hall space, during which the operation interaction between students and video collection equipment; During the design process, the VR vibe helmet is used for virtual simulation experience of the design scheme, and real-time adjustment and optimization of the design vision and display problems are carried out; In the process of panoramic video data acquisition and specific design, teachers and students have real-time interactive communication based on project-based teaching. The application of VR technology can better assist in solving the repeated construction problems caused by modeling defects in 3D space design. This technology can find design problems and reduce planning errors; In addition, VR technology also improves the speed and efficiency of design work; In addition, VR virtual simulation also observes and presents the scheme in a more intuitively and comprehensively way. After the design scheme is formed, it does not need to use chevron board and other materials to make a certain proportion of reduced models to observe the system, which saves cost, time, and effort. It is a good choice for keeping optimization.

AR technology can be used in art exhibitions effect enhance practice teaching. Students can better understand art exhibitions and works through plane, three-dimensional and relevant video information, to make exhibitors understand them better and improve

the exhibition effect. AR technology can vividly, stereoscopically, and intuitively add the boring teaching knowledge in textbooks to the real world, and can improve students' study interest. Through the experiential operation, students can master knowledge more firmly. At the same time, we will cultivate students' independent innovation ability through applying theory to practice, learning ability, inquiry ability, and logical thinking ability.

3.4.2 Teaching Design of the Course Practice of a Plan

3.4.2.1 Publicity of the Virtual Exhibition by AR Technology

Students can make exhibition posters and promote them through augmented reality technology. Augmented reality material production includes information inside and outside the art exhibition hall, introduction of the curator to the exhibition, introduction of the artist, artist's introduction to the work, art creation theme, age, material, collection place, art derivatives, art investment, and other information, etc. Students can interaction experience through an app or QR code. And simulate Artists' pages and gallery pages according to artworks, design virtual derivatives, etc.

Users can have a situational experience related to the exhibition. They can do some art with it and create art derivatives, etc.

3.4.2.2 Virtual Exhibition Arrangement and Navigation by VR Technology

Virtual exhibition arrangement: Students can use the VR platform to select venues and arrange virtual art exhibitions through handle operation.

Art Exhibition Guide: Students can have an immersion experience, and artists will take you to the exhibition, in which collect holographic videos of artists' introduction works in advance, and have an immersion experience of on-site activities, in which there are opening reception, Academic Salon and other interactive projects.

Scene restoration display: students can experience with artists' artistic creation experience, art derivatives development, etc.

During the project training, students use VR technology to conduct virtual exhibition arrangement, view the effect, and make adjustments according to the modified scheme, to truly feel the final impact of the planned exhibition arrangement, and make clear the problems, to facilitate the modification and improvement of the scheme.

3.4.2.3 Create and Interact with Art Derivatives by MR Technology

Using MR technology and combining art design and programming, the art derivatives are displayed to the audience with interactive holographic visualization content, The on-site environment and physical objects are combined and superimposed to display art derivatives in an all-round way, so that users can experience and understand the design scheme of products more naturally, improve the display effect of design works, and accelerate the intellectual development of design works.

Interaction with MR technology. The image is displayed through interactive model animation. The content is virtualized to make it closer to the required environment by combining art design, and can be superimposed with physical objects to assist the public in understanding the creative ideas of the art design.

3.4.3 Practical Teaching Design of Operation and Management Courses

3.4.3.1 Application of VR Technology in Project Operation and Management

First, in the early stage of the exhibition, the simple VR cardboard glasses can be used to warm up the show outside the venue and promote it, so that the visitors can feel the contents and highlights of the exhibition in advance and stimulate their expectations and enthusiasm.

Second, during the operation of the show, the VR vibe helmet can be used to conduct a virtual simulation experience for the show, and the story behind artistic creation will be experienced through virtual reality. Interpret works of art from the perspective of artists.

Third, after the exhibition, the online panoramic video can be reviewed without glasses equipment. 360 dramatic interactive video, which can be experienced online after the show, can be completed through PV and mobile phones without the help of glasses and other devices.

3.4.3.2 AR Technology Application

The first is the production of exhibition posters and the promotion of Augmented Reality. Something can be made such as the production of augmented reality materials such as information inside and outside the art exhibition hall, the introduction of the curator to the exhibition, the introduction of the artist, the introduction of the artist to work, the theme of artistic creation, age, material, collection place, art derivatives, art investment, and other information, etc. interactive experience through an app or QR code. Artists' page simulation and gallery page simulation can be carried out according to artworks; Design virtual derivatives, etc.

The second is the additional enhancement of exhibition works. Something can be made to understand the exhibition, artists, artworks, relevant background stories, art derivatives, and other information.

The practical teaching content design of the above three courses, due to the integration of virtual and augmented reality technology, brings rich sensory experience and interactive effects, which can attract students' interest and concentration, improve the practical teaching effect, and give full play to students' innovation ability.

Although the application of VR, AR&MR technologies has technically reduced the communication barriers between ordinary visitors and the displayed works of art, and improved students' interest and creativity, there are still some limitations in its application scope and effect. For example, the interactive promotion of digital navigation is restricted, and the relevance of exhibition guidance information is not strong; The augmented reality app has limited promotion content and lacks the virtual and real interaction function. In addition, due to the restriction of the location of augmented reality image recognition, it is easy to cause the congestion of visitors in the exhibition hall during the period of large passenger flow, which affects the use feeling of the navigation system; In addition, VR technology is mainly used for immersive experience during the exhibition, which has limited promotion effect before and after the exhibition, especially for art exhibitions such as contemporary art, which are not easy to be understood by ordinary audiences. At the same time, due to equipment problems, long-term use will cause dizziness, fatigue, nausea, and other phenomena, resulting in poor experience;

The practice of teaching design also brings challenges to the promotion of virtual and augmented reality technology due to the combination with the virtual environment and the lack of unified specification.

4 Suggestions on the Application of Virtual and Augmented Reality Technology in Practical Teaching in Colleges and Universities

4.1 Build a Training Function Base with Interdisciplinary and Multi-technology Integration

We will improve the innovation of multi-technology integration training platform and enhance the training platform function of “combining inside and outside classes and integrating inside and outside schools,” creating a multi-disciplinary cross-training function base, which will stimulate students’ learning interest and research potential, and improve students’ comprehensive knowledge application ability and team cooperation ability. At the same time, we will expand the social serviceability, promote the development of school-enterprise cooperation in creative projects, guide students to use virtual reality to make and operate creative projects, and improve students’ comprehensive professional skills.

4.2 Improve Virtual and Augmented Reality Software and Relevant Teaching Assessment Standards

With the deepening of the concept of “virtual and augmented reality education,” the development of educational resources based on virtual and augmented reality technology will be a new starting point for education. Although the application of virtual and augmented reality technology seems to be full of temptation, the teaching effect of practice is closely related to equipment, data accuracy, the design of practical teaching content, and assessment indicators. Therefore, how to identify whether the students are learning and what the effect is, it is necessary to systematically design and improves the software, combine big data and cloud computing technology, design a reasonable course practice scheme and incentive assessment indicators, give play to the team cooperation and innovation spirit, and complete the virtual teaching evaluation. Only in this way, students’ digital technology application ability and practical effect can be improved, which is also an effective way for virtual and augmented reality technology teaching application in the future.

4.3 Enhance the Matching Degree Between the Virtual Training Environment and Training Projects

In designing virtual and augmented reality training projects, it is necessary to consider the balance between the construction level of the professional virtual reality training environment, the cognitive ability to be achieved by professional curriculum practice, and the projects that inspire in-depth learning. The training equipment and material library shall be updated as soon as possible to reduce the learners’ difficulties in adapting

to new technologies. In terms of specific details related to skill operation, it is necessary to present the instruction manual or teaching plan of training steps particular, and provide intelligent guidance of virtual teaching in combination with artificial intelligence and Internet of things technology.

5 Conclusions

With the growing maturity of virtual and augmented reality technology, more and more professional teaching in Colleges and universities will be applied to the technology for corresponding teaching activities, so as to reduce the limitations of the traditional teaching model. For art majors, virtual and augmented reality technology can be used to improve their core skills, such as art exhibition planning, design and marketing management. At the same time, virtual reality and augmented reality project development and training can be carried out in combination with actual school enterprise cooperation projects, so as to improve the students' comprehensive application ability. In terms of improving the utilization of the school training room, we should try our best to build a multi-disciplinary interdisciplinary training function base, and design reasonable incentive and assessment indicators in the development of relevant training software. At the same time, the platform material library is constantly improved and updated to meet the changing environment and needs of the industry.

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