

Application Of VR In the Field of Education

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Abstract. VR in virtual reality and augmented reality technology is a new technology applied in the field of education in recent years. This paper combs and analyses the educational application research from three aspects: educational games, art education and political education. First, starting from education, the author expounds that virtual reality education is based on the teaching concept of "interesting" games and takes education and teaching objectives as the design concept. Then, it introduces the performance of virtual reality technology in the field of art. This part explains the important role of virtual reality technology in the field of art education. It mainly expounds the practical exploration of VR in teaching, the value of VR in art design teaching, the content of VR in the new path of art design curriculum reform, and the innovation of VR teaching. Finally, the application of virtual reality technology in ideological and political education is proposed. At the end of this paper, the application of VR in these three aspects is summarized and prospected..

Keywords: VR, Educational games, Art education, Political education.

1. Introduction

With the advent of the 5G era, VR virtual reality has gradually penetrated our lives. With the continuous development of social productivity and science and technology, the demand for VR technology from all walks of life is becoming more and more vigorous. VR virtual reality devices are not only used in games. VR technology has made great progress and is gradually becoming a new field of science and technology.

In recent years, educational games have become the study of technology for teaching one of the hotspots. Researchers are committed to the design of learning activities from teaching principles. And the application of technology and other aspects of educational games to promote to use. The combination of VR technology and educational games not only combines the teaching content with the game, but also considers the students' sense of learning experience, to truly combine teaching with fun, so as to more effectively improve children's enthusiasm for learning, better optimize the teaching effect and improve the teaching efficiency.

Besides, VR plays a powerful role in the field of art education. For art design, more real and vivid teaching display can make learners intuitively feel the charm of art. In the traditional teaching mode, teachers are usually the dominant teaching mode. Teachers teach some theoretical knowledge or stimulate students' creative inspiration through multimedia courseware and playing video images [1]. On the one hand, it is difficult for teachers to teach in a three-dimensional or real way. On the other hand, students' design only stays in the plane. This teaching mode is difficult to meet the needs of students in art design.

This paper will research and analyse the application of VR in education from three aspects (education games, art education and political education) in recent years. First, the teaching application of the game is described, with education and teaching objectives as the design concept. Then, it summarizes the performance of virtual reality technology in the field of art. We analyse the important role of virtual reality technology in the field of art education. This paper focuses on the practical

exploration of virtual reality in teaching, the value of virtual reality in art design teaching, the content of virtual reality in the new path of art design curriculum reform and the innovation of virtual reality teaching. Finally, the application of virtual reality technology in ideological and political education is analysed.

1.1. Current situation analysis of VR educational games

1.1.1. Embodied cognition and VR educational games

VR education is a way that trying to make teaching and learning an easy-going game, such as VR, AR technology for cigarettes Support, instead of learning step by step boringly, interactive games achieve physical and mental and cognitive together for the purpose of the learning services and improve the students' learning efficiency. Embodied cognition theory encourages students' feeling during classes. Many fields such as AI, psychology, and ethics apply this theory and proved it's a possible educational method. Specific cognitive is put forward for further development in the field of VR education game provides a strong theoretical support, makes the education game design should not only consider how to embed the education cognition content certain game background, the environment, the game play, and the rules of the game, and to consider how to achieve the perfect naturally physical movement and body of students. From the previous examples and other VR education application all around the world. If we can improve the physical body of the students, VR education will be even more efficient (Fig.1).



Figure 1 VR chemistry game “Tablecraft” makes learning periodic table fun.

1.1.2. VR educational games promote interesting teaching progress.

The immersion and interactivity emphasized by VR educational games exactly support the body-constructed cognitive world in embodied cognition theory. Qian-qian xu of east China normal university based in the body feeling type and cognitive education game design and development of research, proposed in [2] a VR education based on the theory of the cognition and game - "safe city" respectively by the learners' cognition, emotion and action targets were analysed, and design a as the main body of the magic English learning games, and through a series of complex interactive design to achieve fun learning English teaching objectives. Researchers have carried out many attempts in the field of educational games, but there is little guidance for educational games based on embodied cognition [3]. “Sanitation Fighter” is their answer for educational interactive game. This game is based on Unity 3D and EGEC framework which is an educational interactive project framework. Literature [4] has stated VR education is highly recommended attractive and efficient teaching. Teachers need to put a lot of hard work to make a class fun and efficient. But with more and more achievement in VR education games, this will never be a problem anymore. Embodied cognition theory is usable in psychological health education. This kind of theory-based teaching is hard to impress students. However, combining embodied theory with the classical teaching will be valuable for these subjects.

1.2. Virtual reality and augmented reality education game applications and comparison

1.2.1. Virtual reality educational games based on head-mounted devices

Virtual reality technology based on head-mounted devices can be subdivided into the following two types: head-mounted device immersion system and environment immersion system. Head-mounted device immersion system completely relies on a head-mounted virtual environment display device, which displays different pictures and sounds to achieve an immersive experience effect for learners. However, such a head-mounted device is easy to produce visual vertigo and is not suitable for long-time wearing. The immersion system in accordance with the environment projects multi-angle heads of objects on the four walls of a room, and users can achieve a fully immersive 3D three-dimensional virtual reality experience by wearing polarized glasses [5]. Virtual reality technology based on head-mounted devices makes learners' hands and other body parts relatively free and can be fully combined with creation, movement, model understanding and other knowledge content for design. Paper [6] 's head-mounted virtual reality educational game can help learners practice dance skills and is a typical case of promoting learners to learn motor skills. Learning the dance skills from virtual teacher's movement is sufficient for the following reasons. Correction for wrong movement immediately, ranking system for learners to practice based on the skills of learners, and interesting feedback of game elements. This kind of teaching is making learners more willing to learn rather than just watching some tutorial videos. The virtual reality immersion system with the environment can make the external space environment become an important part of the virtual learning system. Limniou and Roberts et al. designed a virtual reality system adapted to the environment to help learners understand the chemical reactions at the molecular level of acid rain, providing a fully immersive experience environment for learners to learn intelligent skills. It was found that students who studied in a 3D learning environment performed significantly better in answering relevant chemistry questions than those who studied in a 2D environment, and the learners evaluated the 3D environment more positively. Compared with traditional classrooms, learners believe that using a 3D learning environment can help them better understand the occurrence of chemical reactions (Fig.2).



Figure 2 VR headset promoted students to study.

1.2.2. Augmented Reality educational game

Augmented Reality (AR) is a new technology developed from virtual Reality technology. It presents virtual text, pictures, 3D models, and the real world all in one screen. It's a technology to show unseeable connection of virtual and real world [7]. CAI Su systematically combed the foreign application cases of augmented reality in teaching and the educational applications designed by his team [8]. Augmented reality-based educational games can integrate the real world and the virtual world into a fun and highly interactive ubiquitous learning environment (Fig.3).



Figure 3 Augmented Reality apps for education provided by Digital Trends.

Augmented reality-based educational games have different types named by their characteristic. Such as character storytelling, physical position based virtual world, and mission-based games [9]. Augmented reality technology now is mostly separatable from camera equipment because AR needs camera to make augmented videos based on it [10]. When analysing educational games based on augmented reality, this paper will analyse the different emphases emphasized in game design. The comparison for VR education and traditional education as shown in Table 1.

Table 1 Comparison for VR education and traditional education

Traditional education	VR and AR education
Not attractive to all students but sufficient	Easy to attract students’ attention and easy to understand the new concepts through fun ways.
May cause students having pressure or anxiety problems	Able to solve anxiety and stress reduction
Limited to safety and preparation, there are several risky labs/experiments can’t show in classroom.	Due to virtual world conditions, there will be no safety problems for risky operation

2. VR In APPLIANCE IN Art Education

This part mainly describes the value of using VR in teaching art and design, VR in the new path of curriculum reform in art design content the innovation point of VR teaching. The above three aspects will continue to expand and extend to introduce the presentation of VR in the art field in detail.

2.1. The value of using VR in teaching art and design

2.1.1. Set up a simulated teaching environment using VR technology.

Applying VR virtual technology to art design teaching can help teachers build a more realistic virtual environment. Teachers can realize timely interaction with students in this virtual environment, help students feel the characteristics and design concepts of art design more intuitively in this virtual teaching environment, find new problems in the process of students' feeling, realize communication teaching and effective communication between teachers and students, improve mutual understanding between teachers and students, and effectively promote students' participation in the process of art design learning, Deepen students' understanding of the process of art design, so as to achieve the purpose of more intimate experience of art[3].

2.1.2. Using VR to help students improve their self-learning ability.

In the original art and design teaching system, the teaching mode is based on the teacher as the main part, and the students practice continuously, this teaching mode reflects the characteristics of paper, students often passively accept the knowledge, but it is difficult to understand other theoretical knowledge, so the overall art and design process may not meet the actual needs. The full use of VR technology can break through the original boring and incomprehensible teaching mode and help students enter a simulated situation more directly. At the same time, the full application of VR

technology in the art design teaching process can also help to achieve effective communication between teachers and students [4].

2.1.3. VR-based technology to showcase art and design works.

In the original art design teaching, the display of students' works is usually in the form of two-dimensional screen, this form of display in its specific application process shows a certain flatness, the vividness of the picture is not enough, and the combination of VR technology can effectively compensate for this shortcoming, to achieve three-dimensional display of students' works, so that students' works in the display process with a higher degree of vividness and realism, so that others This allows others to better understand the students' designs, thus increasing the students' sense of accomplishment in the design process, stimulating their interest in creation and design, and making them more engaged and enthusiastic in the future learning process. The display of art and design works based on VR technology can effectively convey the spirit and connotation of students' design works, and allow teachers to offer their opinions and understanding of the shortcomings of students' design works, and timely discover the merits of students' art creation process, while students can make corresponding modifications according to the teachers' opinions and requirements, further enhancing students' The students can make corresponding modifications according to the teachers' comments and requirements, and further improve the students' comprehensive level of art design [5].

2.2. VR in the new path of curriculum reform in art design content

VR technology art and design digital platform can spread art and design culture, open paths for achieving creative transformation of art and design culture and expand the input and use of art and design in commercialization [6]. The details are as follows.

(1) Establishment of investigation team.

The team members of the VR Art and Design Education Professional Material Resource Center join hands with partners, other universities and teaching management institutions (such as the Department of Education, university teaching committees, publicity departments, etc.) to organize field visits, cultural research, targeting The team members, together with partners, other universities and teaching management institutions (e.g. education department, university teaching committee, publicity department, etc.) Finally, we will build a file and establish an art and design material centre. This is conducive to This is conducive to the sharing of art and design education resources.

(2) Establishing an online VR art and design education dissemination platform.

The teachers set up a virtual simulation dissemination platform for art and design on the Internet in the early stage, and later expanded to mobile Internet App. In the first stage, teachers establish a virtual simulation dissemination platform for art design on the Internet, and later expand it to mobile Internet App, and further expand the dissemination channels. Students can login to the platform to experience the virtual simulation subsystem, and the platform will record various login The platform will record all kinds of login data and provide a solid data foundation for the subsequent big data centre.

(3) Establish offline VR art and design education and dissemination platform.

Schools can hold offline exhibitions in conjunction with their partners and local organizations. The offline exhibition can combine three aspects of realistic art exhibits, wearable devices for VR technology, and live production to carry out related activities, thereby enhancing students' visual, auditory, and olfactory sensory experiences so that participants can participate wholeheartedly. Establishing an offline VR art and design education dissemination platform also enriches the art and design teaching program The project also enriches the communication channels of art and design teaching programs.

The fig.4 is a simple example of VR art teaching. People create paintings through VR equipment, and a vivid art painting is presented in front of them.

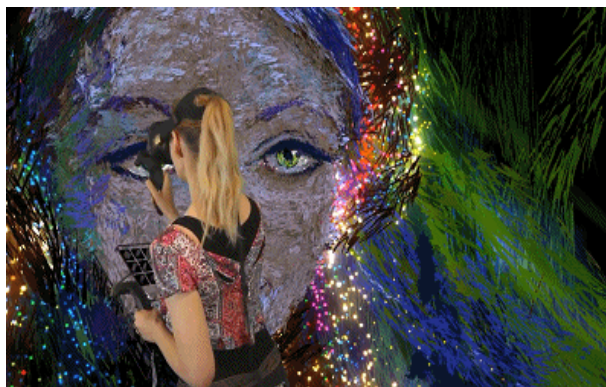


Figure 4 VR art creation

2.3. Innovation of virtual reality in Art Teaching

After establishing a digital platform for art and design, teachers can use VR technology to display art and design works that are interactive and have a sense of technology, immersion, and fun, thus allowing art and design to be more authentically communicated in a more convenient, systematic, and intuitive channel. The digital system is based on the reduction of virtual simulation technology, behavioral intelligence analysis technology, multi-data compatibility technology, and physics-based rendering technology development, teachers can apply VR design software Unity 3D technology and other modeling software 3ds Max, Maya and other technologies, using Substance Painter software, Photoshop software to draw models The teacher can apply Unity 3D technology and other modeling software such as 3ds Max and Maya, use Substance Painter software and Photoshop software to draw models and make PBR materials, and build a digital resource library for art design together, and establish VR display system, VR scene simulation system, VR process system under the support of the material library. etc.

Teachers can effectively solve this challenge by combining VR technology with virtual simulation, which can achieve the effect of ignoring the objective environment and reducing costs. Teachers can also present key professional knowledge content according to the needs of the professional course required to be presented [7], and this format also enhances the students' participation This format also enhances students' participation.

The following table shows the forms of VR technology integration into learning courses at different learning stages (Tab.2).

Table 2 Available functions of VR in the field of Art Education

Stage	Type	Concrete embodiment
Primary school period	VR experience course	Let students experience VR in class but limit their use time and be led by teachers.
Junior and senior high school	VR experience course	Students can feel VR visual enhancement independently with the help of teachers.
University period	VR workshop	The workshop is equipped with VR equipment, which students can use freely with the permission of the teacher, if the equipment is not damaged.

3. VR In APPLIANCE IN political education

3.1. Integrate VR technology with teaching organization activities.

For the ideological and political education of party building in colleges and universities, the ideological and political theory classroom is a more important part [9-10]. Therefore, in the process

of applying VR technology, you can try to integrate VR technology with classroom teaching. Organize students to participate in the real scene created by VR technology in combination with specific teaching content, to perceive relevant knowledge content, deepen their understanding of the content of party building ideological and political courses from different perspectives, strengthen students' ideals and beliefs, and cultivate students into high-quality talents. For instance, teachers can take the "Yan'an Spirit" as a key direction, use VR technology to restore the key historical events of the party in the Yan'an period, and organize students to participate in the virtual reality space in order to play a leading role in party building and support the overall optimization of ideological and political courses. Students' feelings of involvement and substitution were improved during the Yan'an Revolution. Based on this, teachers set up their classes so that students may study course material in a way that allows them to have unique understandings and perspectives. This encourages students to continually raise their degree of ideological awareness when engaging in learning activities. Specifically, VR technology is an emerging information technology method. If it is organically combined with the content of ideological and political education (Fig.5.), it will enable students to deepen their understanding of the educational content in the virtual reality space, and also feel the experience in the learning practice.



Figure 5 VR use in class

In order to create a thorough comprehension of the pertinent course material and enhance personal comprehensive quality, you should have a tailored experience. However, using VR technology allows students to experience the significance of epidemic prevention and control, encouraging them to take part in these efforts. (Fig. 6)



Figure 6 VR in political lecture

3.2. Combine VR technology with social practice

Social practice is an important part of ideological and political education for party building. In order to build a long-term working mechanism for party building ideological and political education, it is necessary to expand and extend the educational content from the perspective of social practice according to the growth of contemporary college students, combined with the application of VR technology, and implement active and effective party building ideological and political education guidance for students. So as to improve the effectiveness of education, ensure that students' party

building ideological and political education can show a new development trend, and enable students to have a personalized understanding and understanding of educational content in social practice. For example, in order to cultivate the struggle spirit of college students in the ideological and political education of party building, colleges and universities can organize and carry out social practice activities. First, the application of VR technology is used to simulate the situation of social practice activities, so that students can understand the main points and main activities of social practice. direction, etc., can accurately locate their own tasks and requirements in participating in social practice, and can enrich their experience in participating in social practice projects in the virtual reality space.

3.3. Practical effect of VR technology in political education

First, from the ideological and political education of party building students who received VR technology support. In terms of performance assessment and ideological and cognitive evaluation, in the absence of virtual technology. In this case, 20% of the students with excellent evaluations, and 28% of students with good evaluations [11].

Compared with 28%, 44% of the students who got a passing evaluation, and 8% who got a failing evaluation accounting. While the introduction of VR technology to support the party in the situation of constructing ideological and political education, students' performance has been considerably enhanced, and they have won. The general assessment level of students is poor. 28 percent of pupils received outstanding evaluations, a rise of 8 percentage points from the previous year. 38 percent of pupils received a positive assessment, a rise of 10 percentage points. The percentage of pupils that were reviewed was 30%, a fall of 14 percentage points, and they were given a failing grade. Only 4% of the population are students. VR's practical impact on party building's ideology and political education (Fig.7)

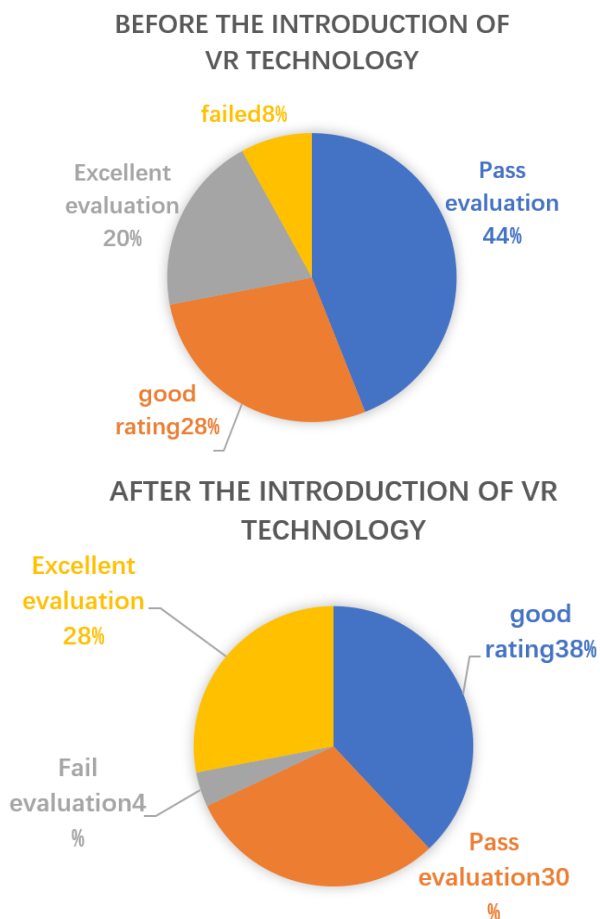


Figure 7 Student mark chart of VR technology

Students' ideological awareness will be enhanced with the use of VR technology, and party-building ideological and political education will have a substantially greater impact. Secondly, from the analysis of experts' evaluation of the practical effect of party building ideological and political education supported by VR technology, the application of VR technology can be supported and affirmed by experts and scholars. After an integrated analysis of the evaluation results, it was found that in the expert group evaluation, 78% of the experts believed that the application of VR technology can enhance the vividness and image of the ideological and political education content of party building, and can promote the expansion of the scope of education [12]; Experts said that the application of VR technology can innovate teaching methods and improve students' enthusiasm for participating in learning; 95% of experts said that the application of VR technology can enable students to obtain an immersive experience, thereby activating students' emotions and deepening students' ideological and political understanding of party building. understanding of educational content. The application of VR technology has extremely important value, can effectively promote the improvement and innovation of ideological and political education of party building, and is worthy of promotion and application in college education practice.

4. Conclusion

This paper mainly explores VR from three aspects. First, start with education, expounds that VR education is based on the teaching concept of "interesting" games, and takes the education and teaching objectives as the design concept. Among them, a detailed introduction is given to the application and comparison of virtual reality and augmented reality educational games, as well as an analysis of the present state of VR educational games. The presentation of VR in the sphere of art is then discussed. The use of virtual reality technology in the study of art is illustrated in this section. This section focuses on the useful applications of virtual reality in education and the significance of VR in the study of art and design. the VR content in the new course of art design curriculum reform, and the innovation of VR teaching. Finally, the use of virtual reality in political education is proposed. This part summarizes: in the process of comprehensively promoting the ideological and political reform and innovation in colleges and universities, consciously exploring the effective application of virtual reality technology can reasonably organize the ideological and political education of Party building under the new background.

First, in the field of educational games, compared with the traditional education model, VR education is not yet mature. On the one hand, VR technology cannot deeply explore the specific causes of psychological problems, so the current technology cannot fundamentally solve psychological problems and provide tailored guidance and help. Now it can only be used as an auxiliary means to combine with traditional therapy. However, with the continuous development of science and technology, VR will be more and more widely used in our life, and VR technology will also be improved and improved to a certain extent, VR technology, as an educational field, will become more and more popular. It must be recognized by the education industry soon and bring more help to the education industry.

Secondly, for the art field, VR not only needs to be in place in technology, for example, it can make works of students' imagination and try to restore students' ideas as much as possible, but also needs some construction in environment construction, such as the establishment of VR art studio in schools. VR has certain particularity in the art field. Art students are often creative. The trend of future development must be that VR technology will become more and more accurate, providing higher value for art. Future VR technology will help students better hone their innovative and autonomous learning skills during the art design learning process, raising the overall standard of art design instruction at colleges and universities.

Finally, actively researching the practical applications of VR technology in the political sphere can rationally organize the political and ideological education of Party building against the new backdrop and make the ideal and belief education and ideological guidance education produce a steady and

silent voice. To achieve this, colleges and universities must actively promote intellectual and political change and innovation. Immersion teaching and interactive teaching can deepen students' thinking, activate students' emotional experience, enable students to actively learn the ideological and political knowledge of Party building, and gradually cultivate college students into all-round high-quality talents.

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