

Original Paper

Inquiry Teaching of Chinese Traditional Painting Based on Virtual Reality Technology—Take Han Xizai’s Banquet as An Example

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Abstract

Due to its immersion, interactivity and other characteristics, virtual reality technology has been tentatively applied as an auxiliary tool in the field of education. It can change the previous education mode of one-way knowledge output to a certain extent and enhance the autonomy and personalization of teaching. The application of virtual reality technology in Chinese traditional painting teaching is not to bring Chinese painting into reality, but to bring students into the aesthetic thinking of Chinese painting. Through virtual simulation experiment teaching, students can better understand the beauty of Chinese painting. In the teaching method of traditional Chinese painting, the teaching idea of using virtual reality technology lies in the stimulation of individual characteristics based on commonness. With the support of virtual reality learning environment, teachers and students interact in the learning environment through virtual reality equipment and platform, which constitutes the process of teaching and learning. Students are naturally immersed in learning. Teachers use the immersion and scene characteristics of virtual reality technology to lead students into the cultural depth behind Chinese painting images, and use its interactive and imaginative characteristics to explore and try modeling, composition and techniques in observation methods and expression methods. Taking the famous Chinese painting “Han Xizai’s banquet picture” as an example, this paper carries out inquiry teaching combined with virtual reality technology to explore new ideas for the teaching method of Chinese traditional painting, in order to be helpful to the reform of Chinese painting teaching.

Keywords

Virtual reality technology, Traditional painting, Educational research, Internet

1. Introduction

In recent now, there are an endless stream of new educational methods, and virtual reality education has become a hot topic of discussion. The development mode of education is from traditional teaching (five stage teaching method: organizing teaching, reviewing old courses, explaining new courses, consolidating new courses and arranging homework) to audio-visual teaching (using a variety of media to give full play to the function of audio-visual organs and purposefully transmit educational information to optimize education), and then to multimedia teaching experimental operation teaching (using a variety of media and carrying out teaching activities with the help of pre-made multimedia teaching software), the new virtual reality technology is infiltrating into the field of education [1]. Virtual reality technology is a computer technology constructed by human beings to experience the virtual world and simulate the environment. Compared with traditional interactive operation, this technology can give users a more cordial human-computer interaction experience from multiple angles of vision, hearing and touch. Through the combination of virtual reality technology and existing traditional art, it can make the form of traditional art more intuitive to communicate and interact with users, and enable viewers to obtain the corresponding logic dimension logic and dimension information in the multi angle experience [2]. Due to its kind, interactivity and other characteristics, virtual reality technology has been tentatively applied as an auxiliary tool in the field of education. It can change the previous education mode of one-way knowledge output to a certain extent and enhance the autonomy and personalization of teaching. Construcmeans theory holds that knowledge is not obtained through teachers, but learners actively construct knowledge in situations similar to real life or real situations [3]. Virtual reality technology constructs a new learning environment for learners. [(Figure 1 to Figure 2)]



Figure 1. to FIG 2. Application of Virtual Reality Technology in Art

In traditional teaching, there are few opportunities to be close to every historical scene in a limited classroom, not to mention the cultural landscape in the painting can not be reproduced. Therefore, in the traditional Chinese painting teaching classroom, when explaining an ancient painting, teachers usually need to use similar real scene comparison, multi angle analysis of painting composition and other methods to assist students in understanding and learning. This process transformation of picture extraction, analysis and reproduction is the difficulty in teaching [4]. In addition, in the past teaching, one-way transfer of knowledge is often the main method, the interaction between teachers and students

is not strong, and is limited to the closure of time and space. This dilemma may also be well resolved by means of virtual reality. Virtual reality technology can provide help in restoring the original appearance of history, assisting appreciation teaching, strengthening ancient and modern comparison, guiding composition paradigm analysis, refining technique analysis and serving individual practical problems [5].

Virtual reality technology makes it possible to expand traditional painting teaching methods and enrich teaching modes. It is easier for students to understand the traditional and perceptual activities in the form of intuitive and perceptual image, and even make it easier for students to present the traditional and perceptual knowledge in the classroom [6]. The introduction of virtual reality technology into Chinese traditional painting teaching will help to consolidate the dominant position of students, enable teachers and students to complete teaching and learning in a more intuitive and visual way, and improve teaching quality and efficiency. At the same time, students no longer rely solely on teachers to carry out learning, but can learn anytime and anywhere, and their autonomous learning ability has also been improved.

2. Immerse Yourself in China and Understand the “Chineseness” of Chinese Painting Culture

Chinese painting advocates the unity of objective nature and subjective aesthetics. Aesthetic thinking determines that Chinese culture has the nature of painting [7], which is reflected in the pursuit of charm. Gu Kaizhi's theory of “vivid portrayal” in the Eastern Jin Dynasty extended from figure painting to landscape painting and flower and bird painting. He opposed the realistic copying of objective images advocated by naturalism for a long time and required spiritual refining of objective images, that is, starting from the commonness of objective images, refining individual characteristics in order to express their charm characteristics.

In order to deeply understand Chinese culture with the help of technology, many institutions and groups have made many attempts in recent years. In 2018, the British Museum converted Xiang Shengmo's painting of reading in the autumn forest of the Ming Dynasty into a 3D image, which made the viewer immersed in the painting: birds crossing the forest, firewood choppers slowly returning and cattle. The old man on his back is carefree, the waterfall in the depths of the jungle flows straight down into the flowing stream and river, and the scholar in the hut is sitting in danger [8]. It seems that there is a voice of “those who are too old”; Looking up in the mountains is the towering rocks; The angle of view turns to the hillside, which is filled with clouds, like entering a fairyland; Standing on the top of the mountain overlooks the continuous mountains. [(Figure 3 to Figure 4)]



Figure 3. Reading in Autumn Forest VR Video of British Museum

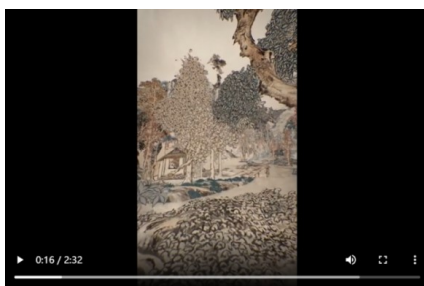


Figure 4. VR Part of the Painting of Reading in Autumn Forest

The observation method of Chinese painting is to look up and down and seek for distance and proximity in feeling the natural time and space. This comprehensive observation and examination also coincides with the way of 3D virtual presentation. Due to different cultural contexts, it is difficult for modern people to understand Chinese painting. Through the transformation of virtual reality technology, the environment in the painting is simulated into a vivid mood world, which can promote students' experience of cognitive methods such as responding to things with heart, sensing things with heart and feeling when touching the scene in the teaching of Chinese painting. The same attempt can be made in figure painting and flower and bird painting. The China Pavilion of the 2010 Shanghai World Expo exhibited the electronic dynamic version of the picture of the river during the Qingming Festival [9]. Developers use computer technology to make animation, and combine the integration of sound, light and electricity to present a raw animation volume. Therefore, the modality and dynamics of the characters expressed in the vivid scenes in the ancient classic figure paintings are also displayed through virtual reality technology. In 2017, the animated short film "beautiful forest", directed by Yang Chun and produced by a collection of famous historical paintings, with reference to the famous paintings of the Song Dynasty, showed various natural scenes such as birds jumping and grooming, chirping, birds competing for food, wind blowing leaves, flock migration and so on. Such attempts to integrate virtual reality technology with traditional painting have brought feasibility and valuable reference experience to the new teaching method of Chinese traditional culture teaching [10].

In 2019, a "New Media Art + cultural heritage" exhibition of "all living things · cultural heritage

protection and innovation achievements of Tsinghua University” officially opened in Shenzhen Gaobei 16th creative park. Dunhuang, located in the windy sand city of the Silk Road, is a spiritual oasis yearned for by countless people. The virtual reality Museum of digital research results of China’s Dunhuang Cultural Heritage in this exhibition area uses AR, VR and other technologies to truly reproduce the high-precision virtual cave built based on the current situation of cave 159 of Mogao Grottoes. Through image display, interactive exploration and virtual roaming, it provides people with a new Dunhuang virtual experience. Let people visit the solemn pure land of Buddhism and feel the blissful world of tiangongji music, dance clothes and scattered flowers. Feitian music and dance takes you to immerse yourself in the beauty of Dunhuang dance [11]. Through three-dimensional character reconstruction, dynamic design and production, and with the help of special holographic glass, the image presentation is realized, bringing Dunhuang Flying music into the real space to dance with the audience, and the people on the wall can no longer only watch on the wall. [(FIG 5. to FIG 6.)]

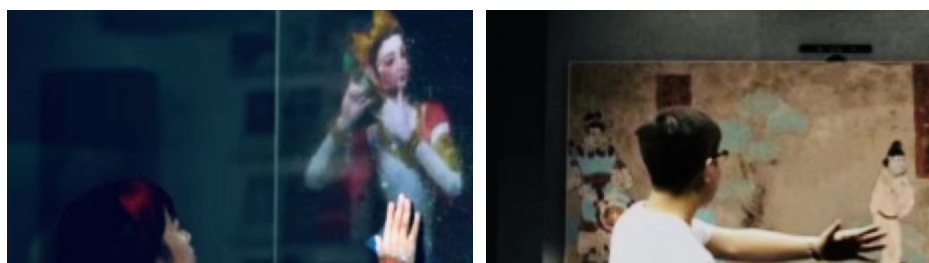


Figure 5. Flying Music and Dance in Dunhuang, China (VR)

In the teaching method of Chinese painting, teachers can use virtual simulation experiment teaching to introduce students into the situation depicted by ancient Chinese painting. On the one hand, the presentation of virtual reality technology can turn Chinese painting into an immersive experience scene; On the other hand, we can make full use of interactivity in pictures, images and even reality, create new scenes in the real world and adjust our thinking by establishing models [12]. At the same time, the immersion experience of the scene is more authentic and infectious than the description of language. Presenting the pursuit of charm in the cultural concept through the immersion of virtual reality technology can not only improve the acceptance of the works, but also help students better understand Chinese culture.

3. Feasibility Analysis of Virtual Reality of Chinese Traditional Paintings

Virtual reality technology should not only stay in the in-depth exploration of its technology, but also collide with all kinds of art fields to create new sparks. Through the integration of technology and art, we can better show the validity and value of virtual reality technology. In the art field, many practitioners have applied virtual reality technology to art research, art exhibition, art appreciation, art creation and other aspects to varying degrees, or made theoretical discussions. These new technical

means have also brought new opportunities for Chinese traditional painting teaching [13].

Compared with traditional Chinese paintings that only present the form of image, digital virtual reality technology can achieve a breakthrough in two aspects of artistic logic. First, virtual reality technology breaks the limitation of traditional painting in three-dimensional space. This media form can accurately perceive the location and corresponding actions of the experimenter, and can also enhance the information feedback of single or multiple senses, so as to produce a feeling of making users feel in their environment. Second, through the application of virtual reality technology, the experimenter no longer passively receives information from the outside world, but can interact with the virtual objects in the scene. This behavior not only refers to the degree of interaction between users and paintings when they are in the simulated environment, but also the authenticity of the feedback obtained from the environment. Virtual reality is an all-round “experience” mode [14]. The practice scene of traditional painting needs to be based on the form of the objective world, and the virtual space of virtual reality can provide a broader imagination space for the creator.

The emergence of virtual reality technology makes Chinese traditional painting get a more comprehensive analysis. At present, virtual reality technology has been applied to build a digital world cultural heritage. For example, restore the scene of China’s Forbidden City in the ancient environment and simulate the production and life scene of ancient characters. At present, the research on virtual reality of painting has been explored from different angles. For example, famous paintings such as Van Gogh’s night cafe, Leonardo da Vinci’s Mona Lisa and Japanese ukiyo painting Shinagawa surfing have successfully realized a good experience of virtual reality simulation [15]. More software that uses gestures to create in the virtual reality world appears. In 2019, the digital art exhibition “picture of thousands of miles of rivers and mountains 3.0” opened in Macao, China. When the original work was displayed in the Palace Museum, it triggered a large-scale upsurge of viewing the exhibition. In this immersive exhibition, the technical team made the “picture of thousands of miles of rivers and mountains” live. The audience can walk into the three-dimensional sensory world, step by step and enjoy the mountains, rivers and waves, It can even interact with the scenery in the painting in real time. With the help of virtual reality technology, students can better appreciate the scenery and characteristics of the times, understand what ancient art creators saw, thought and did, learn the logic of their artistic thinking, transformation and Realization of works, and then apply it to their own learning and creation. All these prove the feasibility of applying virtual reality technology to Chinese traditional painting. [(Figure 7 to Figure 8.)]



Figure 7. VR Partial Drawing of Thousands of Miles of Rivers and Mountains



Figure 8. VR Partial Drawing of Thousands of Miles of Rivers and Mountains

4. Take “Han Xizai’s Banquet Picture” As an Example to Realize the Inquiry Teaching of VR Technology

The starting point of this topic is to explore and prospect a new teaching method in the inquiry teaching of Chinese traditional painting by using virtual reality technology. The famous Chinese traditional painting “Han Xizai’s banquet” is combined with virtual reality technology to simulate the digital immersion experience, and the students are guided to feel the charm of Chinese traditional painting by using multiple senses of vision and hearing. And further use the surround sound source as the navigation mode of auxiliary interactive guidance to enable students to carry out virtual roaming in the works of Han Xizai’s banquet map, and trace back to the dream banquet scenes of the Five Dynasties and Ten Kingdoms period [16]. The advantage of integrating virtual reality technology into teaching is that it can copy various natural scenes and strengthen students’ feeling of nature. For example, time-lapse photography allows students to see the rapid changes of natural time and space in a short time, while three-dimensional interactive films can better integrate the interaction of smell, touch, hearing, vision and other senses. Virtual reality technology can not only lead students to shuttle between ancient and modern time and space in a large space-time scale, but also lead students to feel the changes and circulation of the four seasons in a relatively small space-time scale, so as to further immerse students in nature and go deep into nature, so as to improve students’ understanding and feeling of the beauty of artistic conception in traditional Chinese painting.

The painting of Han Xizai’s banquet, also known as the twelfth hour of Jinling, is a work of Gu Hongzhong in the Southern Tang Dynasty of the Five Dynasties and Ten Kingdoms, and now exists in

the Forbidden City in Beijing, China. This work has exquisite and rigorous modeling, neat and smooth lines, gorgeous and elegant colors. There are 46 different characters in the whole picture. Han Xizai himself appeared five times, with different shapes each time. The use of pen and ink for different characters is delicate and full of changes, and the color application is more rich and harmonious. The beautiful ladies in Chinese clothes form a sharp contrast with the male guests and visitors in plain and elegant blue clothes. The depiction of dark furniture such as chairs, tea tables and so on permeates the high-grade and elegant taste of the host Han Xizai, and the embroidery patterns on the curtain, curtain and pillow cushion are colorful and meticulous [17]. Through the interweaving and integration of the differences between colors, the whole picture reflects the noble and elegant style of the banquet in the Five Dynasties and Ten Kingdoms period.

Gu Hongzhong recorded the ancient scene of Han Xizai, Prime Minister of the Southern Tang Dynasty, setting up a family banquet and inviting guests to sing and dance. This painting volume consists of five segments: listening to music, watching dance, resting, blowing and seeing off guests. The painter skillfully uses the screen to create five scenes with different times and themes. Han Xizai appears in every scene, and his clothes change with the scene. The fluidity of time allows the viewer to get a virtual reality experience of “going deep into his environment”. [(Figure 9. to Figure 14.)]



Figure 9. “Han Xizai’s Banquet Painting”



Figure 10. Chapter I listening to Music



Figure 11. Chapter II Watching Dance



Figure 12. Chapter III Rest



Figure 13. Chapter IV Blowing



Figure 14. Chapter V Seeing Off

Han Xizai's banquet painting contains a large number of cultural elements of ancient Chinese history, which can not be directly presented to the viewer from paper products. Therefore, teachers use virtual reality technology to show the profound philosophy, composition, composition and other elements of traditional Chinese painting through three-dimensional space, with the help of visual sense in new media art. The synthetic experience and real experience of listening sense enable students to break through the inherent limitations of time and space, fully understand the sense of the times and art behind traditional paintings, and experience the essence of traditional culture [18]. Interpret the expression of Chinese traditional painting through virtual reality technology. The whole work needs three-dimensional reconstruction to pass through the picture scroll and real scene, connect the physical space and virtual space, and make the traditional painting more vivid, three-dimensional and close to the normal of life.

Students can watch the scenery 360 degrees around through the screen, or choose a specific perspective to embark on a virtual journey. On the one hand, if teachers and students live in the classroom, they can

view the famous mountains and rivers loved by ancient literati through the square screen. At the same time, they can develop the classic paintings that can assist teaching into virtual reality art works, assist the real scene virtual reality technology, view the scenery of the ancients, feel the situation of the ancients, and subdue the painting plans of the ancients, It must be able to assist the analysis and teaching of traditional paradigm and composition principle, and also increase the logical dimension and ideological depth of students' appreciation of Chinese traditional paintings.

Ancient Chinese figure painting occupies an important position in the history of Chinese traditional painting. Therefore, the subject selects Han Xizai's banquet picture, one of the top ten famous paintings handed down in China, for a detailed analysis. Teachers use virtual reality technology to generate three-dimensional space of works, and improve students' ability to appreciate and understand Chinese traditional painting through real scene interactive simulation of painting works. Through the previous study, high school students have some basic aesthetic and evaluation abilities, and have a preliminary understanding of ancient Chinese painting. The focus of this course is to use virtual reality technology to improve students' clear understanding and understanding of traditional paintings. Students can learn independently in a realistic learning environment, stimulate their interest in learning, and experience the artistic characteristics and charm of Han Xizai's banquet.

The classroom Professor first shows the 3D video and dynamic diagram of Han Xizai's banquet generated by virtual reality technology for students to enjoy and lead to the topic. After watching and appreciating, students have a preliminary understanding of the works. The three-dimensional dynamic scene realized by virtual reality technology can make students instantly immerse themselves, as if they were in the banquet of five generations and ten countries. Next, ask students to discuss and complete the following questions in the form of group cooperation.

Question 1: what does Han Xizai's picture of a banquet depict? In what form? (guide the students to understand the composition of the work: long volume form.)

Question 2: who is Han Xizai in the painting? What is he doing? Why does he have such an expression? (the important characteristics of ancient Chinese figure painting: both form and spirit.)

Question 3: how many parts is the painting divided into? (five parts in total)

Question 4: what are the main modeling methods in the picture? (guide students to understand that the modeling method of ancient Chinese painting is to draw the static outline of characters with lines to express the emotions of characters.) [(Figure 15. to Figure 17.)]

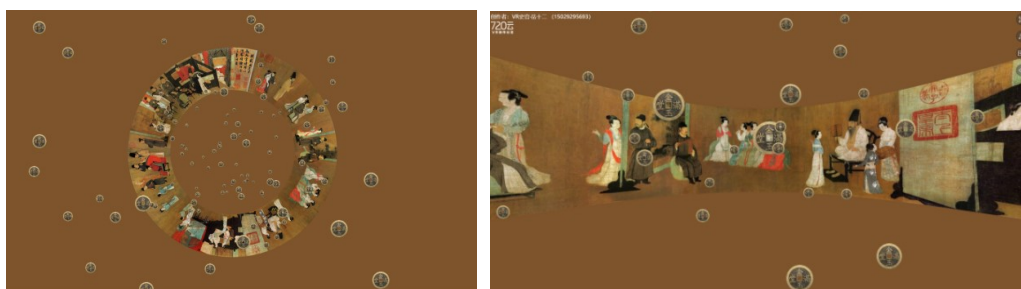


Figure 15. to FIG 16. Part of VR Vision of Han Xizai's Banquet



Figure 17. VR Video QR Code of Han Xizai's Banquet

Students have high learning enthusiasm in class, are willing to take the initiative to learn and explore problems, express their opinions, and continue in-depth discussion in combination with the opinions of the students in this group, so as to finally improve the group's views and understanding of Chinese traditional figure painting. Through the use of virtual reality technology, students' cognitive ability and appreciation ability have been significantly improved. "Han Xizai's banquet painting" is no longer a static long scroll painting, but a vivid and realistic reproduction of the scene of the banquet. Students deepen their exploration ability of traditional Chinese painting through discussion, comparison and appreciation.

In short, students learn Chinese traditional painting with the help of virtual reality technology, can more fully understand the lines, colors and shapes in Chinese traditional painting, and can think and analyze around the characteristics of Chinese ancient figure painting. The application of virtual reality technology in art teaching breaks through the limitation of time and space, makes the traditional paintings rich in changes and gorgeous colors, and makes the characterization in the works lifelike with both form and spirit. At the same time, it breaks through the limitations of limited and unclear pictures in traditional teaching materials, and deepens students' ability in art performance and cultural understanding.

5. Questionnaire Survey Based on the Course of “Han Xizai’s Banquet Picture”

In view of the exploratory teaching of the application of virtual reality technology to the Chinese traditional painting “Han Xizai’s banquet picture”, the author conducted a questionnaire survey on the first grade students of Taiping middle school in Tianfu new area, Sichuan Province, China. The total number is 84, with 55% of boys and 45% of girls. All students completed the questionnaire. The results show that students pay great attention to virtual reality technology, and think that the integrated teaching of virtual reality technology makes them better understand and appreciate the characteristics and value of Chinese traditional painting.

Question 1: How do you feel about the learning mode of Han Xizai’s banquet?

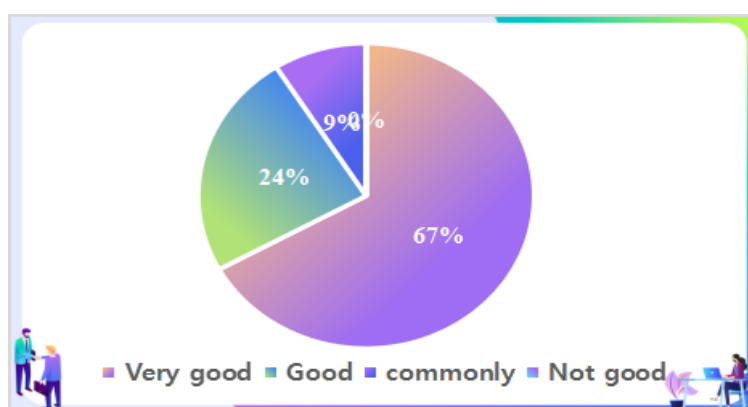


Table 1. Survey Results of Students’ Perception of the Learning Mode of Han Xizai’s Banquet

Question 2: Are you willing to participate in more of these courses?

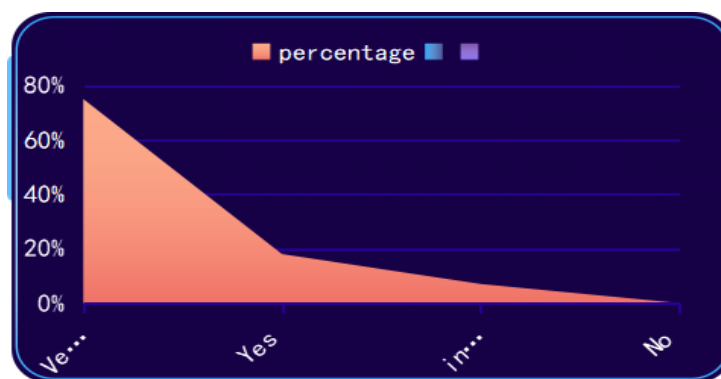


Table 2. The Survey Results of Whether Students Are Willing to Participate in More Such Painting Courses

The results of the above questionnaire show that students are very interested in virtual reality technology and are full of enthusiasm and exploration in learning Chinese traditional painting. And full of expectations for the follow-up courses, hoping to continue to explore Chinese traditional art in more Chinese traditional paintings.

6. Deficiencies

Through the implementation of this course, we can see that there are still some limitations and deficiencies in the application of virtual reality technology in Chinese traditional painting teaching. There is no doubt about the convenience of virtual reality technology, but everything has a double-edged sword. If “virtual reality technology + education” wants to develop in the longer term, there are still three difficulties to be solved. First, wearing virtual reality devices will cause dizziness, ghosting and low degree of simulation, which will affect the experience. Second, due to the hardware resolution image, the picture size in the immersive virtual reality display device cannot be equivalent to the human perspective in normal life, which leads to the viewer’s visual still unable to completely immerse in the virtual space. Third, virtual teaching is operated through the handle or computer input equipment, which can not completely replace the actual hands-on operation. Therefore, compared with the painting learning with strong requirements for operation skills, it also has great limitations.

7. Conclusion

Through the application of virtual reality technology in the inquiry teaching of Han Xizai’s banquet picture, it can be proved that the traditional painting form of virtual reality has the possibility to broaden the diversified development of traditional art teaching, and the great potential of virtual reality picture scroll real scene experience in art exhibition in the future. At the same time, it also proves that actively exploring the collision and combination between virtual reality technology and traditional painting can play an obvious role in promoting the protection of traditional painting. However, in order to realize the close connection between the teaching process and nature and ancient Chinese culture, teachers still need to make more ideas and Explorations: on the one hand, they should use the existing technology and display means to assist teaching; On the other hand, we should increase cross cooperation with technical teams, museums and other disciplines, and even set up special research topics. This teaching method is not only conducive to the dissemination of Chinese culture, but also conducive to improving the teaching methods of Chinese painting and displaying the teaching results, which also brings new opportunities and challenges to Chinese traditional painting.

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