

Research on Curriculum Development of Collaborative Development of Red Cultural Resources and VR/AR Technology—Take Hulishan Fort in Xiamen as an Example

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Abstract: *At present, the most basic competitive culture in China is red culture, and the red cultural resources of Hulishan Fort are the inheritance and innovation of China's excellent culture. Since the "first year of virtual reality" in 2016, various VR/AR technologies have emerged one after another. Relevant research proves that "virtual reality+education" can produce the effect of "1+1>2". This paper develops the course of red cultural resources of Hulishan Fort by using VR/AR related technologies.*

Keywords: *VR; AR; Huli Mountain Fort; Red cultural resources*

1. Introduction

The combination of red culture and modern media technology will greatly promote the inheritance and development of red culture and promote the progress of Socialism with Chinese characteristics. Xiamen red culture is one of the important manifestations of Fujian red culture. Xiamen has rich and diverse bases of red cultural resources, such as Hulishan Fort, Chen Jiageng Memorial Hall, Heroes Mishima Warrior Sightseeing Hall and Xiamen Revolutionary Martyrs Cemetery. As a product of the Westernization Movement, Hulishan Fort in Xiamen has been built and well preserved through difficulties and obstacles. At present, it has become an important patriotic education base and tourist attraction in Xiamen. It has unique red cultural resources and is a precious historical site for studying China's coastal defense and westernization movement.

2. Definition of core concepts

2.1. Red cultural resources

"Red" can be understood as one of the three primary colors of color from a macro perspective and as "revolutionary" from a micro perspective. Culture is a historical phenomenon formed in the long-term historical development of society and a historical deposit.^[1] The so-called red culture refers to the material and spiritual wealth created in the process of realizing national rejuvenation and pursuing a happy life under the guidance of Marxism. Hulishan Fort in Xiamen is the product of Westernization Movement. The Westernization Movement, with the general policy of "combining Chinese and Western", introduced advanced western technology and military equipment, promoted China's military modernization, stimulated the rise of capitalism in China, opened up the modernization of education, changed the social atmosphere, and put forward the slogan of "constantly striving for self-improvement", which was the turning point of China's awakening in modern times. Therefore, Hulishan Fort is also a part of red cultural resources, and it is also a continuation and inheritance of patriotism.

2.2. VR technology

Scholars related to VR (Virtual Reality Technology), Grigol Boddy and Philip Coffert, pointed out that virtual reality has three characteristics, namely "3I" characteristics of virtual reality.^[2] VR technology and science and technology have jointly created a highly similar digital environment in terms of vision, hearing and touch. In classroom teaching, students use virtual reality devices such as

helmets and handles to combine vision, touch and hearing to achieve the effect of “being there”. With the continuous development of technology and hardware equipment, China’s virtual reality technology has developed into many fields such as “virtual reality+military”, “virtual reality+education”, “virtual reality+medical treatment”, “virtual reality+film entertainment” and “virtual reality+simulation”.

2.3. AR technology

AR (Augmented Reality Technology) is an extension of VR technology. It is a technology that combines virtual reality on the basis of the real world, and superimposes virtual information and real scenes into the same picture.^[3] As a branch of —VR technology, one of the current research hotspots, AR technology can create a scientific inquiry environment for students.^[4] Compared with the fully virtual scene of VR technology, AR technology allows users to see the real world scene, which can enhance the user’s experience, instead of completely replacing reality. AR technology does not need top computer hardware equipment, 3D modeling is relatively simple, and the implementation process is easier. Compared with the application field of VR technology, AR technology can be embedded in the software of smart devices, and its application field is more extensive.

3. Analysis of Red Cultural Resources of Hulishan Fort

3.1. Material level

3.1.1. Film and television media

Hulishan Fortress 4D Cinema combines many senses, such as vision, smell, hearing and touch. By combining reflection special effects equipment, sound photoelectric technology, various environmental special effects equipment and well-designed three-dimensional movies, visual impact and physical and mental impact, it gives students a unique feeling of being there.

In addition to the 4D cinema, Hulishan Fort also has the Phantom Imaging Theater, which, as its name implies, uses phantoms to realize imaging. It combines various multimedia forms, and uses the storyline and optical images of Xiamen Port Fortress to jointly interpret the scene of “going to the country and casting the key again”.

3.1.2. Historical materials

Mr. Zhang Rongguang provided a large collection for Hulishan Fort and established the Rongguang Treasure Museum. The treasure of the town is the 2.5-ton how the Yellow River's waters move out of heaven, a strange stone from Myanmar. Hulishan Fort still preserves historical materials such as Zhu Pi's memorial in Guangxu Dynasty and the newspapers that sank in the historical museum.

3.1.3. Military affairs

Hulishan Fort East can support Baitoushi Fort; South and Zhangzhou are adjacent to the sea; The photos of the west and Gulangyu reflect each other. “Wangguitai” and “Panguitai” were built in front of Hulishan Fort, where you can use binoculars to watch the Golden Gate Island in Taiwan Province. Krupp cannon, the king of cannon, was once listed in the Guinness Book of World Records because of its huge size, and it has been well preserved so far, and its longest range can reach 19,760 meters.

Leading students to experience the battles experienced by Hulishan Fort with VR/AR technology is conducive to cultivating students' national defense awareness and patriotism.

3.1.4. Buildings and sculptures

The wall and various buildings of Hulishan Fort in Xiamen are made of granite strips and made of “three-clay” made of brown sugar, glutinous rice paste and black camphor tree juice.

There is a large-scale wall sculpture “National Soul” in the courtyard of Hulishan Fort. Besides, we can see all kinds of sculptures when we walk on the road of Hulishan Fort.

3.2. Spiritual level

3.2.1. Practical

Pragmatism is an important characteristic of the Chinese nation, and it is also a concrete manifestation of the Confucian thought of “applying the world to practice”. Every nation should

develop, be down-to-earth, seek truth from facts, respect reality and be vain, and not live up to its reputation. Zeng Guofan got rid of the psychology of “defending the summer” and set off a vigorous Westernization Movement with the pragmatic spirit. Bian Baodi raised money to buy cannons for Hulishan Fort, and Tan Zhonglin intercepted the donation of new coastal defense for the purchase of cannons; Under the background of Westernization Movement, Hulishan Fort advocates buying and manufacturing machines and pays attention to cultivating talents who manufacture machines.

3.2.2. Strive to be stronger

Self-improvement is a tenacious spirit, which enables countless people who have been repelled by difficulties to stand up and bravely walk towards the door of success. The Westernization Movement was the historical starting point of China’s transformation from blind arrogance to national self-improvement.^[5] The Westernization Movement came into being under the background that various forces impacted the declining foundation of the late Qing Dynasty. This activity of introducing advanced western science, technology and equipment existed in the second half of the 19th century. China sank the Indocalamus in the defending war against Japan, which recorded the first time that China sank a Japanese warship. Since then, China people’s self-improvement consciousness has become the common consciousness of the whole nation.

3.2.3. Love one’s country

Patriotism is a fine tradition of the Chinese nation. We should attach importance to national defense education, starting from the construction of national defense education and cultivating the national defense consciousness of every citizen.^[6] National defense education should not only be popularized in military, military schools or relevant departments, but should be widely spread to every citizen, making it a national defense system with national consciousness and participation.

4. Based on VR/AR technology, develop the fine arts course of red cultural resources of Hulishan Fort.

4.1. Feasibility of curriculum development

4.1.1. Feasibility of VR/AR participating in teaching

During the development of the fine arts course of red cultural resources in Hulishan Fort, many historical events will be involved, such as the Battle against Britain (the Battle of Stone Wall), the “Xiamen Incident” and the dismantling of Krupp Western Artillery, etc. Virtual reality can be used to reproduce reality, help students participate in historical events again, and explore fine arts theories and skills in the process. The historical scenes reproduced by VR/AR are very situational, and they can even interact with some people or things, so that students can participate in historical events, let them realize the importance of historical civilization of Hulishan Fort and improve their learning efficiency.

4.1.1.1. Teaching equipment

There is a big gap between virtual reality devices. The best products in the industry mainly include HTC VIVE, Microsoft HoloLens and Google glass, but the cost of such devices is slightly higher. At present, head-mounted VR is widely used in the classroom and its price is low. Users only need to insert a mobile terminal with VR software into VR equipment to participate in classroom teaching.

4.1.1.2. Senior High School Students

In the process of developing the red cultural resources of Hulishan Fort, we can hire college teachers or graduate students who specialize in VR/AR technology and Hulishan Fort to go deep into middle schools, develop art study courses of Hulishan Fort, and cultivate students' patriotism around socialist core values. The “Senior High School Students” project integrates the cultivation and practice of socialist core values into the whole process of teaching and activities of Hulishan Fort.

4.1.2. Feasibility from the perspective of resources

4.1.2.1. Multiple red material and cultural resources to cultivate students' spirit of inquiry

The red cultural resources preserved so far in Hulishan Fort in Xiamen, from the material level, such as the historical materials of sinking Japanese ships, various kinds of warheads, memorials, etc. These rich red cultural resources, combined with modern educational technologies such as VR/AR, make students feel vivid, thus developing students' inquiry spirit and stimulating students' interest in

visiting and learning the red cultural resources of Hulishan Fort.

4.1.2.2. The spiritual and cultural resources of Hulishan Fort promote the comprehensive development of students

With the profound cultural heritage of Hulishan Fort as the carrier, students' thoughts and feelings are cultivated. From the ideological level, it is manifested in the fusion of Hulishan red cultural resources and Hulishan spiritual culture, and it is presented in various artistic forms such as literary publications, military exercises and AR (4D cinema). By explaining the history of Hulishan Fort, we can inspire students' pragmatic, self-improvement and patriotic spirit. By excavating the spiritual connotation of the red culture of Hulishan Fort, the comprehensive quality of students can be improved.

4.1.2.3. Conform to the trend of urban planning, which is conducive to curriculum extension

Under the construction of the government, the red culture of Hulishan Fort has become the representative of the red cultural base in Xiamen, a national 4A-level tourist attraction and a national key protected cultural relic unit, which provides favorable conditions for the development of art courses. With the support of government policies, the development of the fine arts curriculum of the red cultural resources of Hulishan Fort in Xiamen will be continuously improved.

4.2. Development value

The main value of the red cultural resources of Hulishan Fort in Xiamen in middle school art courses is to inherit and carry forward the red culture of Hulishan Fort, which embodies both rich and unique artistic charm. Hulishan Fort in Xiamen is the product of Westernization Movement. It has experienced all kinds of difficult founding history, passed through the noise of war and been honed by blood and tears, and promoted Xiamen's coastal defense military. It is one of the most precious spiritual wealth of Xiamen people. In order to better develop the red cultural resources of Hulishan Fort and inherit the red spiritual core, it is an essential step to study its time value in a deeper level.

4.2.1. Spirit leads value

Hulishan Fort is the product of Westernization Movement, which has experienced several battles. Therefore, the red resources of Hulishan Fort are the most direct and vivid carrier of pragmatism, self-improvement and patriotism. Integrating the red cultural resources of Hulishan Fort into the middle school art curriculum, reappearing the artistic elements of the red theme through VR/AR technology, telling the historical stories of the 19th century, and reflecting the difficult creation history of Hulishan Fort and the patriotic feelings of revolutionary martyrs with strong visual feelings and positive artistic emotions, which is conducive to students' perception of "red" beauty in the red art classroom; Improve the expressive force of "red" emotion.

Students have a variety of aesthetic experiences on the red resource carrier through VR/AR, which enriches their imagination. Under the teaching mode of VR/AR, while cultivating students' learning, we should improve students' artistic quality, aesthetic quality, purify students' hearts, establish students' red feelings and guide students to establish a correct sense of three views.

4.2.2. Inheriting the value of education

As an indispensable part of China's excellent red culture, the red cultural resources of Hulishan Fort are the concentrated expression of the historical records and cultural spirit of the whole Hulishan Fort and the material and spiritual wealth preserved and passed down by the Chinese nation. The middle school stage is the key stage to cultivate students' self-awareness of red culture. The development of fine arts courses in middle schools with patriotism as the educational focus will help students deepen their understanding of the patriotic spirit of red cultural resources in Hulishan Fort. Carry forward the patriotic spirit, inherit the educational value, at the same time influence the educators' ideas and promote the development of art curriculum and teaching.

4.2.3. Promote students' all-round development

On September 10, 2018, the General Secretary pointed out in the National Education Conference: "Adhere to the road of education development in Socialism with Chinese characteristics and cultivate socialist builders and successors with all-round development in morality, intelligence, physique, beauty and labor".^[7]The integration of red cultural resources of Hulishan Fort into middle school art curriculum can promote the development of students' aesthetic education and other education. For example, by visiting the material and spiritual culture of Hulishan Fort to edify students, "Lide Shuren"

promotes the cultivation of moral education of middle school students; Promote the development of students' moral education by teaching relevant knowledge of red art. Therefore, schools should give full play to the regional characteristics and advantages of Hulishan Fort, and dig deep into the red cultural resources of Hulishan Fort, so as to cultivate students' national defense education and patriotism and create distinctive red cultural resources of Hulishan Fort.

4.3. Evaluate

No matter what kind of curriculum development, it is inseparable from the curriculum evaluation system. Curriculum evaluation is an indispensable part of curriculum development, which aims to judge whether the curriculum achieves the expected goal and is also a key factor to further improve and improve the quality of curriculum development. The construction of scientific curriculum evaluation system should consider the following aspects. (See *Table 1*)

Table 1: The construction of scientific curriculum evaluation system should consider the following aspects

<i>Evaluation stage</i>	Evaluation project	Evaluation subject	evaluation methodology
Planning stage	resource appraisal	Teachers, students, parents, curriculum experts, red culture researchers, teachers who participate in senior high school and primary school.	Investigation, symposium, diagnostic test
	Consideration of Curriculum Development Scheme of Red Education in Huli Mountain	Higher education administrative department	Text analysis, forum, interaction analysis.
Design phase	Audit of Curriculum Outline	Curriculum development expert	Discussion and questionnaire
Implementation phase	Evaluation of students' learning process	Teachers, students, peer review, parents	Observation, performance evaluation, portfolio evaluation, subject report
	Teacher's teaching evaluation	Students, teachers, Mutual evaluation, experts and scholars	Observation, interview, questionnaire and reflection
Achievement stage	Evaluation of students' learning results	Teachers, students and parents	Portfolio evaluation and test method
	Evaluation of teachers' professional development	Curriculum Development Committee, Parents, Teachers	Portfolio evaluation, reflective evaluation, questionnaire
	Course satisfaction evaluation	Students, teachers, experts and scholars	Questionnaires and interviews
	Cost and load evaluation	Teachers, students, curriculum development committee, parents.	cost accounting

5. Conclusions

This paper focuses on the application of red cultural resources of Hulishan Fort combined with VR/AR technology in middle school art teaching. From the perspective of the core literacy of art discipline, it is a re-creation of aesthetic form to organically apply red cultural resources of Hulishan in the field of art teaching. Through the application of VR/AR technology, students can be immersive and stimulate their creative imagination. In this process, students' basic artistic literacy in the fields of aesthetic perception, artistic expression, creative practice and cultural understanding will also be effectively improved. In addition, the application of "VR/AR+ Education" in Hulishan Fort has effectively improved the curriculum experience of traditional art.

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