

Exploration of the Educational Design Path for Integrating VR and AR Technologies into Art Teaching from the Perspective of Immersive Aesthetics

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Abstract: Currently, art education has significant problems of superficial aesthetic experience and lack of context. Virtual Reality (VR) and Augmented Reality (AR) are capable of creating high-sense, real-life virtual or extended environments. Based on the theory of immersive aesthetics, this paper studies the concepts of flow and present-perception, and investigates teaching design strategies for VR/AR in art classes. Based on the experience of building first-class virtual simulation courses by the Ministry of Education, drawing inspiration from the assertion that active practice is better than passive listening in the Learning Pyramid, and incorporating feedback on the use of resources such as "Panoramic Forbidden City" and "Digital Treasure Cave" in the classroom, four design principles have been proposed: contextualisation, embodied interaction, emotional mapping and aesthetic distance. Based on this, a three-stage progressive framework of "sensory envelopment—interactive narration—aesthetic creation" is established. The study also indicates that teachers' skills in new technologies are lacking, and the assessment system emphasizes memorisation of knowledge too much. There is a demand for an improved system of evaluation in art education. It is not merely an addition of technical tools in this design; rather, the goal is to cultivate the sense of aesthetics in students. The implementation will be based on the convenience of technology, the aesthetic value of the content, and the ecological support of co-construction by teachers and students.

Keywords: Immersive aesthetics; VR/AR technology; Art teaching; Educational design approach; Aesthetic experience.

1. Introduction

The goal of art education has always been to make students more active participants in life. In the traditional art appreciation class, when the students view the A Thousand Li of Rivers and Mountains on the projection screen, they are only able to imagine the layered and extended green mountains and waters based on what their teacher has said. There is no sense of distance or roughness of the paper in a flat picture. VR and AR are gradually changing the situation. Students can put on a head-mounted display to step into a digitally reconstructed environment of the Song Dynasty, walk slowly along the mountain path, observe flowing waterfalls and clouds, hear the sound of rustling pine trees, and listen to birds singing. A multi-sensory experience will be very different from a slide show. Immersive aesthetics seeks to make people feel as though they are present in life.

Immersive aesthetics does not only refer to the sensory immersion achieved by technology but also encompasses an extended, involved state of aesthetics [1]. In this space of blending reality and virtuality, learners are able to use their sight, hearing and other senses at the same time to feel emotions and gain knowledge. Thus, they will have an all-encompassing awareness of beauty. In recent years, the Ministry of Education has continuously promoted the construction of first-class virtual simulation experimental teaching courses, and an increasing number of them are related to art. Digital resources such as "Panoramic Forbidden City" and "Digital Sutra Repository" have been brought into classrooms from the online exhibition halls. A number of national virtual simulation experimental teaching centres have been successively built, and the resources for art design courses have been gradually expanded. The above practices have created the conditions for the application of immersive

aesthetics in art education. However, with the hardware available, the actual problem lies in the Design of teaching paths.

Currently, some art classes have only been using VR for panoramic viewing at most. Students are essentially being carried along in a sightseeing car through a scenic area, and after a while, their aesthetic cognition will not improve much. Truly educational immersive experiences should be able to turn aesthetic ideas into practical teaching activities. Based on the above, this paper will start with the perspective of immersive aesthetics to analyze the design strategies of VR/AR in art education, clarify which immersions have aesthetic and educational values, and examine the conditions for their implementation in the classroom.

2. The Intrinsic Connection between Immersive Aesthetics and Art Teaching

Immersive aesthetics aims to achieve genuine "presence" of perception by overcoming all defences against the outside world and concentrating all attention on the present moment. Mihaly Csikszentmihalyi referred to this condition as "flow": when the difficulty of the task is in line with one's skills, timely and unambiguous feedback is obtained; at this time, a person can be absorbed in an activity without losing all sense of time and even forgetting one's own existence, enjoying deep pleasure. This is exactly what art education is lacking. When observing sculptures and oil paintings, if students are unable to reach the emotional level of these works, then all explanations of style and technique will be barren concepts. Immersive aesthetics has opened a specific way for art teaching that prioritises perception and experience.

A typical case is the art appreciation class. Slides only use

the visual channel, and what students see are cut and modified "second-hand images"; the thickness of the material and the distance of the space are all flattened. Over the years, researchers in psychology have observed that several senses can create stronger emotional memories and form a richer sense of identity. Immersive Environments integrate sight, sound, and sometimes touch to reduce the sense of distance and emotion caused by physical separation. In the VR exhibition hall, students can walk around the restored sculptures, get close to observe the rotation of the shapes and textures, and the act of looking itself is a work of art. Some teachers have introduced the panoramic Forbidden City into the art class and found that students are more eager to ask questions and have made more connections with symmetry and rhythm [2]. Being conscious of one's body can help people better learn to appreciate the beauty of nature through observation.

Another condition for the continuity of the narrative dimension in immersive aesthetics is immersion. Behind a picture is an era, and a cave complex holds a system of belief. AR technology is used to have students point their tablets at parts of the murals, and then celestial beings with flowing robes and music-and-dance sound effects appear dynamically. Images, animations and sounds are combined to create an all-encompassing work that can arouse people's interest in learning through imagination. Some schools have found that in the digital Dunhuang expansion courses, after using AR to explore the images of musical instruments in the murals, students can remember the details and creative intentions of these images more reliably. This is "contextual entanglement"; beauty is not recognized but rather unexpectedly experienced in life.

In the end, the link between immersive aesthetics and art education is not an external addition. Both hope to reach an all-encompassing sense of being and true feelings in harmony with one's life. Therefore, in designing lessons, artworks should no longer be seen as passive objects for analysis but as meaningful worlds to be explored [3].

3. The Immersive Aesthetic Mechanism of VR/AR Technology in Enabling Art Teaching

VR/AR create a sense of immersion by substituting our sense organs with artificial ones and deceiving the brain into believing that what it senses is a real place. Most of the current popular headsets have a 4K resolution, a 90-120Hz refresh rate, and about a 105° field of view. PICO 4 and other models use a pancake-optical structure to reduce size and weight. Resolution is the level of detail in an image; refresh rate determines how smoothly movement looks; field of view is the area that can be seen at one time. When the head turns, the picture updates very quickly; thus, the conflict between sight and balance is minimal, motion sickness is reduced, deep immersion in the work can be maintained, and a good physical state is conducive to extended observation.

Spatial audio reproduces the direction and distance of the sound field for hearing. In the Gothic church in VR, organ music is performed by a far-off choir, footsteps echo in the stone floor, etc.; thus, the sound environment is relatively realistic, and the space feels more solemn and majestic. Aims to be precise in coordinating all the signals of perception and therefore consistent. The brain automatically adjusts to this corroborating visual and auditory information, and the digital

environment reproduces this consistency to activate the sense of presence that says "I am here".

The initiative power conferred by interaction should not be overlooked either. AR places virtual information in the real physical space and shows students both the brush in their hands and virtual reference lines at the same time [4]. Perspective auxiliary lines and the human skeleton are shown in a three-dimensional way suspended above the model during the teaching of sketching. Learners can move around to see, drag and rotate, and change the space repeatedly. Real-time and reversible operations overcome the restriction that the original work cannot be modified; thus, the degree of cognitive immersion can be increased. Many teaching examples have shown that after introducing AR structure demonstrations in the basic modelling course, students' ability to build the spatial structure of complex shapes has improved significantly. Promotion Effect of Embodied Interaction on Spatial Intelligence Has Been Shown.

Emotional resonance is the final goal that immersive aesthetics hopes to achieve. Combine Scene Narration and Character Immersion to create an emotional effect. In the "Digital Treasure Cave" project, students will take on the role of Tang Dynasty painters, light lamps and mix colours in the virtual cave, and personally paint murals. This is not merely an add-on for the game; rather, it will use a self-projection mechanism to transform students into participants who can personally experience the aesthetic judgment and labour difficulties of the ancients. The Strength of emotional stimulation provided by technology is relatively high compared with traditional classroom teaching [5]. VR/AR can promote learning about art through the senses, and more significantly, it can build a whole-round system of experience that involves emotions.

4. Principles for Art Teaching Based on Immersive Aesthetics

To avoid making VR/AR about technical performance in art classes, several ideas from the aesthetics of immersion should be drawn to ensure that technology serves aesthetic education [6]. Based on actual operations and theoretical analysis, the following four rules serve as the general basis for path design.

First is the Environment. Immersive Sensing originates in real life. It is not sufficient to bring the famous works into a VR exhibition hall. Each learning time and place are fixed. For an Impressionist appreciation class, VR could create a scene of a 19th-century Paris street café with dim lights and soft music. In this light, students will be able to experience Impression, Sunrise more profoundly and feel the awe that the public felt at that time. The Quality of the context directly affects the Depth of the experience. Many schools have added "Panoramic Forbidden City" to the curriculum of art classes and found that, without cultural context, students lose interest quickly. Given this context, there should be questions, hidden tasks and characters.

Secondly, embodied interaction. Immersive aesthetics refers to the incorporation of the body in cognition. It needs students to use their bodies to think. In an AR calligraphy class, the students raise their wrists to hold the pen and then take a picture of the pen tip with the tablet camera. A real-time layer of the skeleton of the Song or Gothic script is overlaid for reference. Turn the wrist and change the speed at which you draw. Cooperative Operation of Muscle Movement and

Visual Feedback Provides Solid Support for Learning Static Calligraphy Sheets. Based on the Learning Pyramid, the retention rate after active practice is relatively high compared with that after passive learning. Embodied interaction advances art education by shifting it towards doing and experiencing [7].

Thirdly, emotional mapping. Aesthetics inherently contain emotions, and in design, we should offer students a way to feel these emotions. All the emotional devices in VR are audio-visual effects and camera speed. In the work *Guernica*, the surroundings are gradually darkened and muted; at the same time, there are sharp and disjointed sounds and pictures. The students' bodies first experience tension and depression, and then they begin to be aware of questioning the war. The feeling of the body is much deeper than a teacher simply stating that "this picture is about pain". Some teachers have reported that after VR art classes, the students are more willing to talk about their own feelings and have developed a deeper sense of emotion.

Fourth, aesthetic distance. Immersion does not mean there is no distance; it means one can still think. If the senses are too restricted, the students will be unable to gain knowledge through experience. A good Design will appropriately interject questions or change the angle of comparison. In the demonstration of AR skeletal animation, a single click can be performed to switch to a pure-line structure diagram and, thus, break immersion and engage in form analysis. The "deep entry and external emergence" rhythm can truly achieve immersion for the aim of aesthetic cognition and is not just a low-cost form of entertainment.

5. Multi-path Integration: Design Path from Sensory Encapsulation to Aesthetic Creation

Based on the above reasons, a three-level progressive path can be set up: sensory encapsulation, interactive narration and aesthetic creation. The contents of the above stages are not the same, nor is their technical support.

The first stage is Sensory immersion and context activation. Therefore, the learners can enter a state of aesthetic preparation promptly. Lightweight VR panoramic or high-precision AR models are used by the teacher to build a wrapped visual space. Take "the colours of Dunhuang murals" as an example and put on headphones to enter the virtual cave. The colours of the murals are different in the various lights, and there is the sound of sand and camel bells in their ears. Indigo and ochre will not be shown for now. Students freely watch and use the intuitive words that come to mind to name the pictures, revealing emotional strands. After some minutes of immersive browsing, the students have become more sensitive to colour layers and textures and are more willing to speak in class. A certain place has a historical significance and is thus more appealing [8].

The second is interactive narration and deep interpretation. Build a foundation of sensory education, then add interactive elements to help students learn better through hands-on experience. AR shows murals gradually: erase the surface outlines and sketches, click on the musical instrument patterns to hear the restored ancient music, and drag the virtual brush to add colours. The whole process is a kind of archaeological excavation for knowledge. Carefully draw the work with a pencil after observing how an artist makes his work. Many cases have been solved successfully using this

way [9]. In the "Digital Dunhuang Caves" campus activities, many teachers have noticed that the rhythm of class has shifted from teaching to student-led inquiry, and students work in groups to explore in depth.

The third is the creation of art and meaning. Immersive Aesthetics stimulates the senses and encourages people to alter their behaviour. After the first two rounds of immersion, have the students work independently. In the VR sculpture tools, mould a "cave guardian" or create a new dynamic for the flying figure. The teacher steps back and asks the students why the lines are arranged in that way. What does this posture want to express? Some middle schools also begin by using AR to dissect the brushwork techniques of the Song Dynasty landscape paintings and then create works on paper with real brushes. A tablet serves as the form reference. Mixed Reality does not need to show things accurately and can help create a personalized sense of beauty. Immersive Technology should not replace traditional skills but rather offer an additional space for creative expression.

6. Implementing the Reconfiguration of the Challenge and Support System

At the same time, there are also very real problems in the teaching area. The teachers lack digital literacy, and this is a serious problem. Although the "Teacher Digital Literacy" standard released by the Ministry of Education in 2022 has listed virtual reality teaching as one of the capabilities, several local surveys have shown that the proportion of teachers proficiently using VR/AR for art teaching is relatively small. Some teachers are afraid of new technology and worry that equipment failure will disrupt the class, so they have gone back to using PowerPoints. Some teachers only use VR resources as an addition at the end of the class and have not been integrated into the main teaching content. Training should focus on the general design of teaching activities, enabling teachers to experience the whole immersive aesthetic learning process firsthand and understand why it is related to curriculum standards, rather than just learning how to turn on and switch the software.

Consider the constraints on hardware configuration and resource availability at the same time. The distribution of VR equipment in schools is uneven, and a few all-in-one units are insufficient to meet the demand for regular classes. The development cost of large-scale VR content is high, and there are no high-quality artistic resources available on the public platform [10]. Lightweight AR applications and web-based panoramic browsing are also relatively simple to use. Students can use their own mobile phones or tablets to access the digital resources of the Palace Museum and Dunhuang. A number of virtual simulation materials have been added to the National Smart Education Public Service Platform. If the interface can be opened, and teachers are permitted to re-edit and add task lists according to the learning circumstances, then the matching degree of the resources with the classroom will be improved.

The other is a slow-response evaluation system. At present, most assessments of art teaching are chronological judgments, author recall and style classification; immersive learning, on the other hand, focuses more on aesthetic experience, emotional expression and creativity. If the evaluation mode cannot be adjusted, there will be no continuous motivation for the teaching reform. Some advanced schools have used

qualitative methods, such as "aesthetic experience diaries" and "creation process archives", to record students' viewing time and interaction paths in VR, combined with self-reports and peer evaluations, and thus mapped changes in aesthetic literacy. By integrating the collected experience data and subjective reflections, it is hoped that the demands of immersive learning will be met.

Too many technologies will also make the work lose its charm; this should be avoided. Intense Sensory Stimulation does not equate to profound aesthetic emotion. If the immersive environment is too rich, students may lose their desire to explore actively and be reduced to passive recipients. Designers want to achieve a harmony of immersion and void. Every time technology is employed, one must ask whether it helps the students reach the core of the task more effectively [11].

7. Conclusion

The value of VR and AR in art education is not determined by the age of the equipment, but rather by whether they can break through the invisible barrier between students and the works of art. Traditional classrooms present art through slides and standardised answers, and aesthetic experience is reduced to knowledge memorisation. Immersive Technology can be said to offer a new model.

The three stages of this paper are sensory immersion, interactive storytelling and aesthetic creation, and they are related in sequence. The situation prompts a desire to experience; interaction helps us learn how to learn; and creativity integrates both experience and learning to create a personal work of art. The classroom feedback for "Panoramic Forbidden City" and "Digital Buddhist Canon Repository" suggests that this way is feasible. The frequency of the students' questions has increased; their learning of details has improved; and they are more willing to take part. Immersive aesthetics can be used to improve the quality of art education, and it is hoped that they will serve as an internal motivation, but many problems still need to be addressed first.

The equipment is not uniformly distributed across the schools, so most cannot be used regularly. The teachers' teaching design ability is weak, and training is still at the operational level; it has not advanced to design thinking. The evaluation system still focuses on knowledge points, and the perception, emotion and creativity fostered by immersive learning have not been included in the scope of assessment. If the above problems are not solved, even the best solution will only stop at the performance stage of public classes.

Resource development should be oriented towards lightweight and open-source methods to reduce the cost of classroom access; the focus of teacher training should shift to scenario design, enabling teachers to first complete an all-encompassing immersive aesthetic learning experience. Add process records, experience logs, interaction data and self-assessment to the evaluation system. At the same time, one must be cautious; immersion should light up the work, not cover it. Every technical measure is a question: Will this step

bring the students closer to the work? If the classrooms in the future can reserve a space for students to calmly feel and focus on hands-on activities and freely imagine between the digital and the real, then the contribution of immersive aesthetics to art education can be fully realised.

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