



# The Charm of Visual Media: Research on Immersive Experience in the 5D Art Exhibition of Floating World Dream

Guanbao Liu<sup>1</sup>, Qihuan Chen<sup>2</sup>, Yannan Liu<sup>2,\*</sup>

<sup>1</sup>Shanghai Lida University, Shanghai, China.

<sup>2</sup>Department of Education, Sehan University, Yeongam County, South Jeolla, South Korea.

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\***Corresponding author:** Yannan Liu, Department of Education, Sehan University, Yeongam County, South Jeolla, South Korea.

## Abstract

The Dream of the Ukiyo Art Exhibition is the world's first super-large-scale Ukiyo-e 5D immersive art exhibition in the 21st century. The immersive experience it creates is more realistic and has received a better response. However, there are still some issues regarding sensory experience and audience-work interactive experience. This study proposes improvement suggestions based on website evaluation and audience interviews. For instance, virtual reality technology can enhance the interactive experience, data glove devices can enrich the tactile experience, taste experience items can be included, smell devices can be integrated with dynamic digital images for display, and the spatial layout can be designed following the principle of unifying form and content. Additionally, a non-linear narrative work design can be adopted, the professionalism of cast and crew commentators can be enhanced, an intelligent explanation system can be established, and interactive projects' challenges and interests can be improved. The findings of this study can assist organizers in enhancing customers' exhibition experience and expanding brand awareness.

## Keywords

Experience, immersive experience, immersive experience of art exhibition

## 1. Introduction

The immersive experience is to give products new content forms through technological means such as virtual reality, augmented technology, infrared sensing, and data gloves. A short-term stimulating feedback that enables people to interact with products, mobilize their senses and thinking, and fully immerse themselves in the scene to achieve a state of selflessness. In art exhibitions, immersive experience design includes not only hardware equipment such as lighting, sound, projection, and scent installations, but also software content such as works, performances, and interactive programs. The ultimate goal is to make the audience recognize and think. When discussing the influencing factors of the immersive experience of art exhibitions, we cannot do without the three dimensions of exhibit presentation, space layout, and audience sensory experience.

## 2. Literature Review

### 2.1 Experience

The term experience was first proposed by W. T. Kruger (1838) in "Encyclopedia of the History of Contemporary

Literature and Philosophy". He believes that experience means people's personal experience, including feelings, thoughts, memories, functions, requirements, and everything else. It was Dilthey (1955) who truly gave this vocabulary concept its function. "The so-called experience is the process of personal experience. It is not a destined way of existence, but a specific situation that people pursue". Both W. T. Kruger and Dilthey elaborated on experience from a philosophical perspective. With the passage of time and the deepening of research, the definition of the concept of experience has derived from two major perspectives—psychology and socioeconomics. Vasilyuk (1989) "Experiential Psychology" pointed out that "the result of experience is an internal subjective activity, and experience is closely related to experience". Wang Yichuan (1999) distinguished between the definitions of experience and experience in the "Theory of Aesthetic Experience". He believes that experience is a superficial daily sensory impression, and experience is a deep or indescribable momentary feeling. He elaborates on experience from a psychological perspective. American Kimmel's (1998) "Experience Economy" believes that, "Experience is related to an individual's acceptance level of emotion, physical strength, intelligence, and spirit. It is a beautiful feeling generated in consciousness". The immersive experience is explained from a socioeconomic perspective. At the end of the 19th century, experience was introduced into marketing, and concepts such as customer experience, consumption experience, brand experience, and emotional experience were derived.

## 2.2 Immersive Experience

The concept of "immersion theory (Flow)" was first proposed by Hungarian psychologist Mihaly (1975). Mihaly believes that "people automatically block all irrelevant intuitions during activities and fully engage in the situation, that is, the immersion state", which is also called the flow state, and built a measurement dimension model. Jackson and Marsh (1996) conducted experiments based on Mihaly's (1975) theory and proposed a nine-factor scale: A sense of control, spontaneous purpose, focus, immediate feedback, a fusion of action and awareness, a balance of skills and challenges, a diminished sense of self, clarity of purpose, and a sense of time and space distortion. Schiefele (2013) believes that the interaction between different factors can cause misleading biases in the measurement of immersion. Even when attention is highly concentrated, individuals may not necessarily enter an immersive state. If an individual is extremely fond of and focused on the task, he or she does not necessarily need to trigger high-challenge factors to achieve an immersive state. Burns and Fairclough (2015) emphasize the connection between technology and user perception of immersive experience. Donghee Shin (2019) measures immersive experience from the dimensions of memory, attention, emotion, cognition, senses, and perception. The first person to talk about the concept of "immersive experience" from a design perspective in an important Chinese journal was Guo Hong (2000). In his article "VRML: Bringing you an immersive experience", he started from the perspective of interaction design, participating in the information processing environment through sight, hearing, touch, smell and body, gestures or passwords to gain an immersive experience. Since then, Xie Yanjun (2005) improved the flow channel model by adding two major measurement indicators: "expectation" and "feeling" in the article "Research on Tourism Experience". Wu Fan (2021) believes that immersive experience mobilizes the audience's attention through technical techniques such as environmental rendering and scene shaping, and to create a sense of intimacy and connection in a limited space.

## 2.3 Art exhibition immersive experience

There are many studies on the immersive experience of art exhibitions. Lianna Obrist (2017) pointed out that immersive experience is closely related to sensory stimulation. He believes that among the five sensory stimulations, sound and taste signal feedback are the most obvious. Molly Kyle (2020) believes that the immersive experience of art exhibitions is the ever-changing perspective and sensory experience generated by the audience's movement and walking process when watching the immersive exhibition. In the article "Analysis of Factors Influencing the "Emotions" of Visitors to Archive Exhibitions", Han Feng (2018) divided the influencing factors of the immersive experience of art exhibitions into three dimensions: display content, presentation form, and exhibition hall style. Hua Jie (2019) pointed out in the article "Research on a New Business Perspective on Art Exhibitions: Immersive Art Exhibitions" that the immersive experience of art exhibitions creates a theatrical space through the display of works, and viewers derive the missing content of the art space through imagination. Gao Yunpeng (2020) proposed an innovative path for immersive experience in art exhibitions from three perspectives: work connotation, audience synaesthesia, and equipment technology. Ouyang Shijia (2021) believes that immersive exhibitions tend to use artificial technical devices to create an experiential atmosphere, often integrating lighting, music, performances, movies, smell devices, check-in, and other aspects...

### 3. The immersive experience effect presented by the Dream of the Floating World 5D art exhibition

From December 2022 to December 2023, the Dream of the Floating World 5D Immersive Art Exhibition will be on display. The exhibition consists of three major sections: "Dream", "Dream", and "Dream Like". The "Dream" section uses digital light and shadow technology and holographic projection technology to display the masterpieces handed down from generation to generation in the more than 300 years of Ukiyo-e history. It introduces the origin and history of Ukiyo-e art, as well as the inseparable connection between Ukiyo-e culture and Chinese Tang and Song culture. The "Fantasy" section gathers original classics and brings together more than 150 collection-level works by representative painters from various major schools. The "Like a Dream" section features a wealth of interactive arts and cultural programs, including printmaking workshops and tea-scented "Sanya Tao" experience courses.

#### 3.1 Evaluation Dimension

The immersive experience of art exhibitions is divided into sensory experience and interactive experience. The interactive experience can be divided into the interaction between the audience and the space, and the interaction between the audience and the works. This paper uses online comment analysis to further determine the influencing factors of the immersive experience of art exhibitions. And summarized the immersive experience effects and existing problems presented by the 5D Dream of the Floating World art exhibition.

#### 3.2 Presentation Effect

This study mainly selects tourist reviews on Damai.com and Dianping for quantitative analysis. According to statistics, as of March 2024, 224 reviews have been collected on the two platforms. Excluding some reviews where the system defaults to positive reviews or reviews that are too short to extract key information, there are a total of 193 reviews that can be used as samples for quantitative analysis.

On the Damai.com platform, the Dream of the Floating World 5D Art Exhibition received a performance reputation of 8.8 points, with a total of 119 performance reviews, a favorable rate of 87%, and 101 valid information; The rating of Dream of the Floating World 5D Art Exhibition on the Dianping platform is 4.8 (out of 5), with a total of 105 reviews, a favorable rate of 96%, and 92 valid information.

##### 3.2.1 Sensory Experience

Of the 193 valid pieces of information, 99% were related to visual experience, and 83% of the comments were positive. The audience generally believes that the holographic projection effect is good, the colors of the works are gorgeous, and the light and shadow shown are shocking. A few viewers pointed out that the lights in some digital imaging exhibition halls were too bright and the projection effect was average. 62% of audience evaluations related to auditory experience, of which 78% were positive feedback. Most viewers felt that the combination of surround sound and holographic projection helped them understand the artistic expression of the work. Some viewers also pointed out that the intervals between the exhibition halls are too small, the sound insulation effect is not good, and the speakers are too loud. When viewing works in one exhibition hall, you can hear the speakers in another exhibition hall, which affects the viewing experience. Few people mentioned tactile experience, accounting for only 23%. Many viewers said: "I hope to add some interactive devices. The prints in the exhibition hall are placed in cabinets and can only be looked at but not touched. After visiting an exhibition, you basically just stand and watch videos and paintings". Reviews mentioning taste were similarly rare, accounting for only 9%. 31 of the comments were related to olfactory experience, accounting for 16%. Most of the audience gave positive comments, saying that the woody fragrance in the incense performance was light, pleasant, and relaxing.

##### 3.2.2 Interactive Experience

96% of the audience mentioned their own interactive experience with the space. Some viewers thought that a large number of ukiyo-e elements were used in the exhibition hall layout. The cats, monkeys, and skeletons in the paintings came to life through projection, and many scenes were suitable for taking pictures. In terms of navigation, the "Koi Overflowing Colors" work is very unique, and the swimming fish guide the way, making people feel like they are on the scene. However, 17% of the audience also expressed dissatisfaction with the exhibition space layout and route planning: the movement lines are not clear and it is easy to get lost; some corridors are not decorated with "safety

exit" signs at all; the messy sofas are confusing wait.

98% of the audience mentioned their interactive experience with the work, but the praise rate was only 57%. Audiences who gave positive comments were mainly satisfied with the experiential courses and felt that displaying Edo culture in this way was highly interesting and educational. Another part of the audience who gave positive comments felt that the display method of combining authentic paintings and wall projections was novel, some interactive installations are more interesting; live real-life performances are more sincere, and actors will wear kimonos to complete singing, dancing, and Sanya Tao performances. But there are also a large number of people who think the exhibition is not very interactive. There are also a small number of viewers who feel that the performance is superficial, the course process is simple, and the games are too simple, making it impossible for people to fully immerse themselves in it.

To sum up, in terms of sensory experience presentation, the audio-visual effect is good, while the touch, smell, and taste are average. Only a small number of viewers can perceive the resonance of touch, smell, and taste experiences. In terms of interactive experience, spatial layout, route planning, interactive devices, game activities, explanations, etc. have also been questioned to a certain extent by the audience.

## 4. Results and Discussion

### 4.1 Problems in sensory experience

The main problems in the sensory experience of the Dream of the Floating World 5D art exhibition include: unreasonable lighting design in the first exhibition hall and poor visual experience; The sound insulation between the second exhibition hall is poor and the acoustic effect is average; the third tactile interactive device is less; the fourth taste experience course is mainly teaching and lacks interactivity; the fifth olfactory experience project layout is unreasonable and the smell is single.

In order to ensure that the audience can fully appreciate the original paintings in the "Like a Dream" exhibition hall, the lighting in the exhibition hall is relatively bright, which weakens the display effect of the projection. The "Dream" exhibition hall is adjacent to the "Three Hundred Years of Ukiyo-e" exhibition hall. The sound insulation effect between the exhibition halls is not good. If the audience stands close to the aisle to view the art exhibits, it will cause hearing disorders and affect the viewing experience. At the exhibition site of the Dream of the Floating World 5D art exhibition, when the audience passes the exhibition hall floor, the shock-sensing device under their feet will cause slight vibrations. In the "Camellia Scent-Xunying" exhibition hall, "Tea Tasting" appears in the form of an experiential course and fails to become part of the interactive installation to interact and resonate with the other four senses. For the incense performance, the organizer only set up an experience course to stimulate the audience.

### 4.2 Problems with interactive experience

The problems existing in the sensory experience of the Dream of the Floating World 5D Art Exhibition mainly include: (1) The artistic tone of the first preface hall cannot reflect the theme of the exhibition; (2) The second tour route is single and the spatial layout is unreasonable; (3) The display forms among the three exhibition halls are fragmented and the visual effects are incoherent; (4) The playback time of the original digital video is long and the pace is slow; (5) The actors and staff are not very professional; (6) The explanation and navigation method is single; (7) The content of the experience course is not very challenging.

Except for the projection effect, there is no brief introduction to the exhibition in the exhibition hall, and the display design does not incorporate elements related to Ukiyo-e. The preface hall has no other function except for the audience to check in and take photos. In the space planning of the exhibition hall, a fixed tour route of "preface hall, digital imaging experience hall, traditional art gallery, digital imaging exhibition hall, and experience course interactive area" was adopted. This kind of "quick-start" browsing makes it difficult to continuously capture the audience's attention. The guidance signs between the exhibition halls are not obvious. In the aisle connecting the "Dream" exhibition hall and the "Dream" exhibition hall, there are even safety passage signs and inappropriate benches, which make the audience "confused". The four exhibition halls of "Koi Yicai", "Fantasy Forest", "Flower Sea of Four Seasons" and "Camellia Fragrance-Xunying" occupy a small area. The exhibition hall area is about 30 square meters, and the audience's field of vision is small, which makes to Not very immersive.

The original digital images played in a loop in the "Dream" exhibition hall are too long and too slow. The exhibition hall does not have any interactive equipment except for the holographic projection. The audience can only passively

receive the audio-visual effects and cannot subjectively interact with the scene. There is a shortage of explanation and performance personnel, and the "lecture-style" explanation mode also greatly reduces the audience's immersive experience. There are only two methods of explanation and navigation at the exhibition: manual explanation and online electronic explanation. The explanation emphasizes professionalism and education but lacks interest. Some viewers lose interest in the process of listening to the explanation and reading the text tour. Because electronic explanations mostly use recorded and broadcasted voices, when in close contact with exhibits, magnetic field interference may occur, affecting the auditory content and audience experience.

### **4.3 Strategies to enhance sensory experience**

In terms of sensory experience, it can be optimized from the following aspects: (1) Use virtual reality technology to optimize the interactive experience; (2) Use sound devices that combine background music with natural sound effects; (3) Use data glove devices to enrich the tactile experience; (4) add taste experience items; (5) smell devices are combined with dynamic digital images for display.

The staff of Ukiyo no Yue 5D Art Exhibition can use dynamic face recognition technology to realize the transformation of virtual space, set up dynamic water curtains, and integrate the classic elements of Ukiyo-e into the design so that the experience will have a sense of identity change. Virtual helmets and data gloves can also be used to improve the problem of unsatisfactory lighting effects in the "Dream" exhibition hall. You can also optimize the sound equipment, control the sound volume in each major exhibition hall, and strictly supervise on-site personnel to avoid loud noises that affect the sense of hearing. You can also experience the works through physical actions such as touching, pressing, and writing. Temperature-changing devices can also be set according to the content of the work to create a tactile interactive screen. You can also place small tea break items at the entrance of the exhibition hall to stimulate synesthesia of vision and taste and enhance the immersion of the work. The exhibition also needs to rely on some technological means and device assistance to complete it and combine it with dynamic digital images to create a sense of reality and immersion in the sense of sight and smell. Scent devices can also be added to deepen the audience's sense of immersion...

### **4.4 Interactive experience improvement strategies**

In terms of interactive experience, it can be optimized from the following aspects: (1) determine the artistic tone of the prologue hall in line with the exhibition theme; (2) coordinate the spatial layout based on the principle of unifying form and content; (3) design non-linear narrative works; (4) improve the professionalism of cast members and commentators; (5) establish an intelligent commentary system; (6) make interactive projects more challenging and interesting.

In the design of the preface hall, it is not advisable to pile up too many elements. The exhibition introduction should be displayed simply and clearly, and relevant elements should be used to name the exhibition theme. Therefore, Ukiyo-e elements should also be added to the preface hall to clarify the theme and color and determine the exhibition theme and artistic tone. The guidance signs in the exhibition hall can be projected using digital projection, and simple dynamic images can be used to indicate the route forward. In order to solve the problem of "drama" in the aisles between exhibition halls, the aisles can be transformed into a 360° phantom imaging time tunnel. When planning the space, try to create a closed-loop, theater-style space pattern. The Dream of the Floating World 5D art exhibition should add more dynamic video interactive devices instead of just playing images. The professionalism of the performers and commentators in the exhibition program is particularly important to the entire work, and can even determine whether the work is successful. Professionals with professional performance experience and interpretation experience should be recruited. During the recruitment process, virtual scenes are set up to test the candidates' abilities and qualities. During the training stage, employees are required to have an in-depth understanding of the history and culture of Ukiyo-e in different exhibition halls.

For commentators, boring and scripted explanations will reduce the audience's immersion. The explanation should stimulate the audience's thinking through vivid explanations such as historical stories. In terms of explanation and navigation methods, firstly, the problem of content carrying capacity should be overcome and the back-end information reserve should be expanded; secondly, text content needs to be innovated and interactive explanations should be strengthened. Various forms of content such as text, pictures, images, and audio can be added to make the explanation more comprehensive. It is attractive; third, it can be combined with digital virtual technology to replace the traditional QR code voice guidance form, and a VR navigation system can be added to bring a more intuitive experience to the audience; fourth, it can be combined with digital virtual technology to add touch, infrared sensing, etc.

Technology allows the audience to receive automatic responses and detailed introductions when they approach the framed work, and the sound follows the person's movements, just like a shadow.

## 5. Conclusions

How to provide audiences with a better immersive experience in art exhibitions has become a topic of common concern among academia and industry. This study takes the Dream of the Floating World 5D art exhibition as the research object, identifies the evaluation indicators and influencing factors of the immersive experience of the art exhibition, collects online comments, and conducts on-site visits to the exhibition.

This paper summarizes the current status and existing problems of the immersive experience evaluation of the Ukiyo no Yume 5D art exhibition, and on this basis proposes a path strategy to improve the immersive experience of the Ukiyo no Yume 5D art exhibition. Through research, it was found that the audience's sensory experience, the artistic context creation of the exhibition space, and the narrative design of the works are all factors that affect the audience's immersive experience.

The Dream of the Floating World 5D art exhibition should enhance the audience's immersive experience through the application of interactive equipment, shaping of the environment, staff service facilities, and the design of participatory activities. The research results of this study have certain reference significance for organizers to improve customers' exhibition experience and expand brand awareness.

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