# A Study on the Immersive Communication Mechanism of Artistic Experiences in the Context of Technology-Mediated Interactions

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**Abstract.** The digital technology deeply rooted into cultural behaviors gives way to a new form of artistic communication defined as "immersion" in place of "seeing." This work proposes a technology-mediated perspective, which integrates media ecology, embodied cognition and technology-mediated theory. This produces a 3D analytical framework which can be identified as "sensory-symbolic-social", and shows how technology clusters stimulate the generation of immersive art experience through multi-modality and sensorial recognition, narrative reconstruction and social relational re-definition. It further proposes a closed-loop mechanism model of input-mediation-output-feedback, explaining the dynamic synergy among art communication, technological systems and users. Furthermore, a randomized controlled experiment in which there were 60 subjects revealed how highly interactive mediation considerably enhances spatial presence, emotional awareness and social presence. A process of evolution transforms the user from 'spectator' to "co-creator" where the meaning of art is written through algorithmic interaction or embodiment. A model of theoretical inspection from this work, verifiable and empirical, should give an understanding as to how technology reshapes the power structures and mechanisms of value determination involved in the artistic communication sphere.

**Keywords:** Immersive Communication, Artistic Experiences, Technology Intermediaries.

## 1. Introduction

In the chaotic current of digital technology, art communication is the subject to a silent but great disruption [1]. Digital technology is creating artistic realities that formerly existed only in the mind. A device such as a VR helmet can quickly transport an audience to the Louvre. An AR application can translate a Dunhuang fresco to the screen of a mobile device. Even artificial intelligence has begun to compose symphonies on its own. These are not inventions of a future time, but cultural practices that are occurring now [2]. This process is not fortuitous. From McLuhan's prediction that "the medium is the extension of man" to Baudrillard's discovery that "simulacra and simulation" govern the postmodern world, to the present concern of the convergence of virtual and real worlds, prompted by the notion of the metaverse, mankind has been concerned with expanding the boundaries of perception through technological media [3].

In the domain of art, this research creates a peculiar double tension: on the one hand, the new technologies of holograms, motion capture and spatial sound are continually breaking through the doors of physical space into the multidimensional sensory feast of such experiences; while on the other, algorithmic recommendation systems, user-generated content (UGC) and viral social mechanisms deeply invade the processing of artistic reception, shifting the distribution chain from one of unidirectional indoctrination to networked interaction [4-5]. In this state of affairs, mere reference can be made to "how technology transforms art". What is now required is a systematic description of how clusters of technologies functioning as intermediaries modify power structures, cognitive systems and mechanisms of value generation in the process of artistic dissemination.

In this chapter we will focus on the core phenomenon of "immersive communication": something different from passively watching a static exhibition in a museum, or browsing different fragments on the web. The aim is a deep conversation with the viewer and the artwork via participatory physical interaction, where the body becomes the interface; emotion becomes the glue binding together; and

cognition becomes the means of transport. Why is this so attractive to Generation Z? What are the neuroscience and social psychological causes for this type of phenomenon? What does it mean if the technology is being used as the hub connecting creators and audiences: are we witnessing a fundamental change in the essence of the art experience? These are the questions I will examine in this research.

Although the current literature considers parts of this realm, it is still lacking in micro-level mechanistic consideration in a systematic account of the role of "technology intermediaries" in art diffusion. Most research remains at the level of particular instances giving case descriptions, and has not furnished a testable theoretical account; those few quantitative studies by way of example, have laid so much stress on physiological indicators as to avoid giving sufficient consideration to the cognitive phase of cultural symbol interpretation. This paper offers to fashion an interdisciplinary frame of analysis of this matter which shall be concerned with making clear how technological mediation acts on the diffusion ecosystem of contemporary art through the three mechanisms of sensory stimulation, cognitive restructuring and guidance of behavior.

## 2. Theoretical basis and analytical framework

This study is rooted in the intersection of the following three core theoretical contexts:

(1) Media ecology theory

According to McLuhan's assertion that "the medium is the message," this perspective emphasizes that it is the medium itself, rather than simply its content, that determines patterns of human perception, thought, and social form [6]. Technological media are not neutral channels but rather active "environments" that have the effect of transmuting the meanings of what is real and of artistic experiences. This gives us a meta-theoretical perspective from which to consider how such technologies as VR, AR, and interactive installations are transforming the area of artistic experience — from physical environments to mixed reality environments — and altering perceptual logic — from passive viewing to embodied participation. It allows us to turn our attention to how the innate characteristics of technology itself influence the essence of art.

(2) Embodied cognitive theory

Contrary to the traditional "disembodied-cognition" view, which holds that cognition occurs as abstract calculations in the brain, the embodied cognitive view holds that it is the result of the body-environment interaction [7]. Mind, body, and environment form one dynamic whole, and our somatosensory-motor system is the basis of cognition. This is the key to understanding how immersive experiences are possible. It enables us to rise above mere sight and sound, and develop the multi-sensory channels through the body such as touch, kinesthesia, and vestibular equilibrium, rather than just the formal analysis. Therefore, artistic experience is not merely "intellectually understood," but is also an experience of "physical feeling." Thus, for example, in the VR art the movements of the head and the movements of the hands become part of the cognitive and aesthetic experience of the user.

(3) Theory of technology intermediation

Emerging from the Science and Technology Studies (STS) field, it states that technologies are "not just tools," but that they "mediate" (do not just transmit) relations between human beings and the world [8]. Mediation is not mere transmission but transformation. It transforms the object that is transmitted, the relations of the actors, and the meaning of the action itself. This is what it is all about semantically. It makes concrete "technological intermediaries," as technical agents that perform important different roles in the dissemination of art. The distinct roles they play: perceptual interfaces as intermediaries (VR headsets, motion-sensing devices), creation of content as intermediaries (AIGC algorithms), and interaction as intermediaries (e.g., UGC-publishing sites, virtual players avatars). It leads to the question of which of the dimensions of art are transformed by these different technological intermediaries respectively.

Bringing together the concepts mentioned above, an analytical framework is developed here for analyzing techno-mediated immersive art communication that incorporates sensory, symbolic and social dimensions (figure 1).

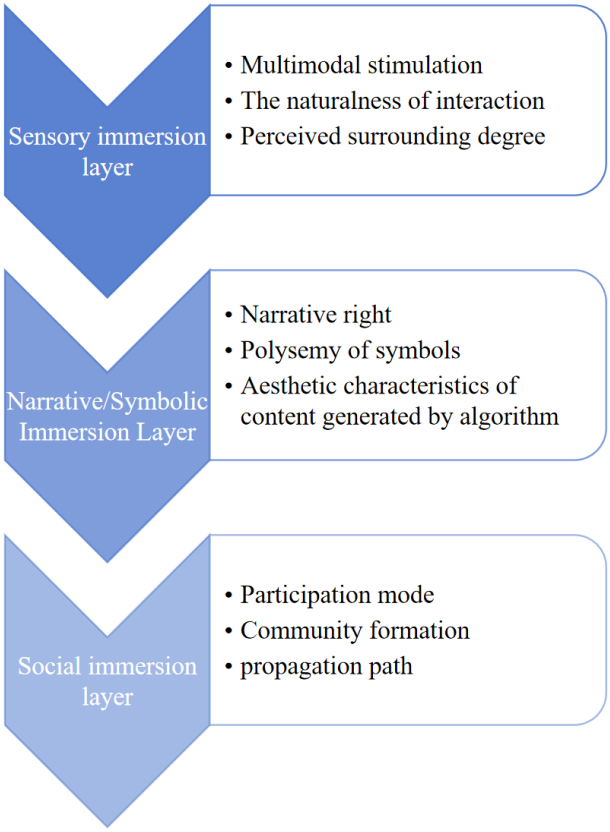


**Figure 1.** An analytical framework that includes three levels: senses, symbols and social interaction

1) The first dimension: sensory immersion layer-"How is the body involved?"

How technology intermediaries extend and alter users' sensory pathways to create presence. Variables of interest include multimodal stimulation (the combining of visual, auditory, tactile, and olfactory stimuli), naturalness of the interaction (latency, precision), and perceptual immersion (field of view coverage, spatial audio). This analysis is grounded in embodied cognition and media ecology and examines the novel "body-environment" relations created by technology.

2) The second dimension: narrative/symbol immersion layer-"How is meaning constructed?"

How technological intermediaries (such as video games, VR, AR and mixed media) shape narrative logic, interpretive modes and the aesthetic quality of artistic symbols. Key variables include narrative authority (moving from linear to branching or emergent narratives), the polysemy of symbols (interpretability allowed by the interactive content), and the aesthetic properties of algorithms of the artistically generated content (aesthetic styles of AIGC plus "black box" property). Integrating media ecology (the new media gives rise to narrative forms) into this entire analysis, alongside technological mediation theory (how do algorithms, as the intermediaries of content, affect the way meaning is generated).

3) The third dimension: social immersion layer-"How are relationships connected?"

How technological intermediaries restructure the power dynamics and interactive networks among artists, artworks, and audiences. Key variables include participation scaffolds (which range from viewing to co-creation), community formation (social behaviors occurring in virtual galleries), and avenues of dissemination (the "information silo" effect under algorithmic recommendations versus "break out" effects). The analysis, primarily grounded in technological intermediation theory, focuses on how technology, as both a platform for social interaction as well as arbiter of rules for social discourse, affects the ecosystem of dissemination for artworks.

## 3. Mechanism model construction

On the basis of the aforementioned framework, the dynamics of the immersive dissemination mechanism for art by technological mediation will be constructed in this part of the text. This is intended to provide a visual depiction of the active interrelationships existing between the constituent elements of the dissemination mechanism. It is identified as a circular closed-loop system consisting of four major units (see Figure 2).

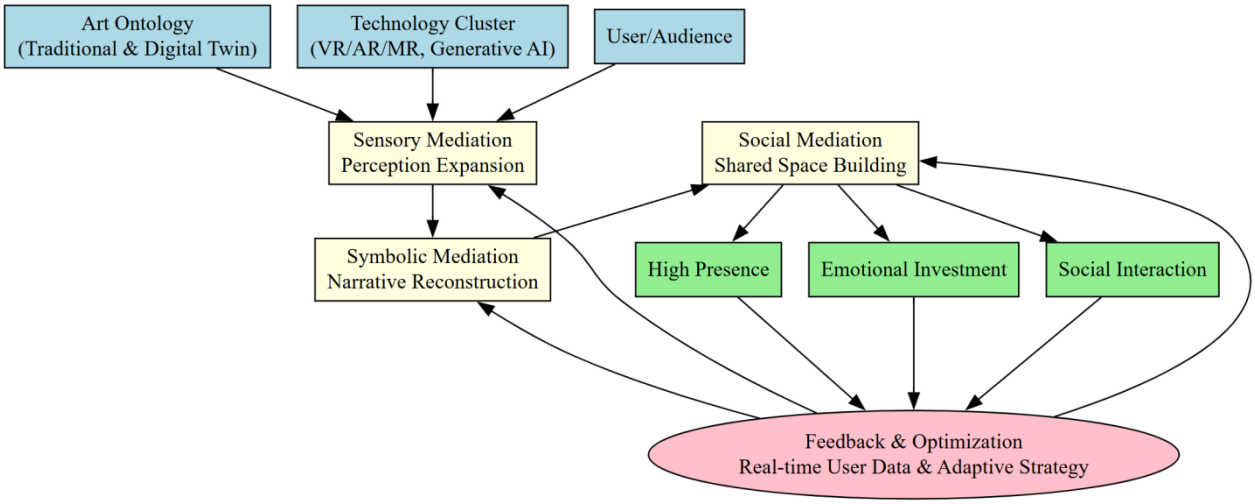


**Figure 2.** Model of art immersion communication mechanism under the intermediary of science and technology

This model can be regarded as a closed-loop system with input, core processes, output, and feedback systems. The input part corresponds to the artistic entity (traditional works of art and their digital twins), technological clusters (VR/AR/MR, generative AI), and users/audiences. The core processes are to be understood as three concentric rings of various processes, sensory mediation, symbolic mediation, and social mediation, which extend perception, reconstruct meaning, and create shared spaces respectively. The output circle is to be understood as the immersive artistic experience process in which the various works of art are experienced as an environment with greater sense of presence, emotional involvement and social involvement. The feedback and optimization loop is dynamic to the degree that the various mediation strategies are continuously altered in real time, given the user experience data, in order to optimize the mediation experience and consequently the dissemination experience of the various works of art. It is here that the flexibility and intelligence of the system become evident. What is emphasized here is the bidirectionality and agency of technological mediation in artistic communication.

The aesthetic essence and technological clusters, operating under the “technological intermediary,” interconnect with users through three successive and interrelated modes, the sensory, the symbolic and the social, thus generating immersive artistic experiences. At the same time users’ feedback information is, on a real-time basis, fed back into the technological system, which ceaselessly adapts its intermediary operations, in a spiraling closed loop eco-system which is continually optimized.

## 4. Empirical research design

### 4.1. Research problems and methods

Core Research Questions (RQs):

RQ1: How do mediators of technology at different levels (high interactivity versus low interactivity) considerably influence the users’ sensory immersion (presence) and emotional reactions?

RQ2: Which new patterns of cognitive interpretation (symbolic immersion) can be observed in users during artistic experiences mediated by technology? To what extent does the technology mediate the process of meaning construction?

RQ3: How do mediators of social interaction (shared experiences, UGC features) affect the depth of engagement and cultural identification users have?

The effects of technological mediators will be examined quantitatively through strict variable control (mainly RQ1). Supplementary method: semi-structured interviews. After the experiment in question, in-depth interviews will be conducted with participants selected to gain insight into their experiences (mainly RQ2 and RQ3). A representative work by the famous immersive art collective teamLab or a VR art application which employs similar principles was selected as the experimental stimulus. This work is characterized by a high level of sensory immersion, interactive narrative and potential social spaces. It thus fits perfectly into the framework of this study.

### 4.2. Experimental design

A total of sixty volunteers aged 18–40 were recruited from the general public and randomly assigned to two groups, experimental and control, with 30 subjects in each group. There were no significant differences between the groups in terms of sex, age, interest in the arts, or experience in VR. The experimental group experienced the fully interactive version of the artwork. Participants could move freely, touch virtual flowers to make them bloom and alter their growth trajectories, and see other participants' avatars along with their interactions. The control group experienced the restricted interactive version. Participants could only stand in place for 360-degree viewing, were unable to interact with the artwork elements, and did not see other participants' avatars in their field of view.

The experiment consists of three phases: pre-test, experience, and post-test. The pre-test questionnaire collects demographic information, VR usage experience, and an art interest scale. Key behavioral logs are recorded during the experience phase. The post-test questionnaire (core quantitative tool) employs a validated 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree) for measurement. Primary constructs are shown in Table 1 below.

**Table 1.** Measurement structure and example items of post-test questionnaire

| **Measurement dimension** | Measurement construct | Example Item |
|---|---|---|
| **Sensory immersion** | Spatial presence | I felt as though I were truly immersed in that artistic world. |
| | Sense of reality | I felt that what I saw and heard was real. |
| **Symbolic/cognitive immersion** | Emotional input | This artistic experience resonated deeply with me. |
| | Cognitive participation | I have been reflecting on the work's meaning and what I can do next. |
| **Social immersion** | Sense of social existence | I felt like I was sharing this artistic space with others. |
| | Synaesthesia | I could sense how the actions of other participants influenced my experience. |
| **Overall evaluation** | Enjoyment | Overall, it was a thoroughly enjoyable experience. |
| | Cultural identity | This experience has sparked a deeper interest in the cultural themes behind the work. |

After the experiment, 10 participants were randomly selected from each group for approximately 20-minute interviews. Questions included:

“Please describe one of the most memorable moments in your experience—what you were doing and how you felt at that time?” (Exploring sensory and symbolic immersion);

“To what extent do you believe your actions altered this artwork? How do you interpret this ‘alteration’?” (Exploring narrative agency and meaning construction);

“How did seeing or sensing other participants influence your experience?” (Exploring social mediation).

### 4.3. Data analysis and results

#### 4.3.1 Quantitative data analysis (taking RQ1 as an example)

SPSS was used for independent sample T-test, and the differences between the two groups in various indicators were compared.

**Table 2.** Comparison of immersion between experimental group and control group (M±SD)

| Measured variable | Experimental group (n=30) | Control group (n=30) | T value | P value |
|---|---|---|---|---|
| Spatial presence | 5.82 ± 0.76 | 4.23 ± 1.05 | 6.87 | < .001 |
| Sense of reality | 5.45 ± 0.91 | 3.98 ± 1.12 | 5.78 | < .001 |
| Emotional input | 6.02 ± 0.68 | 4.55 ± 1.24 | 5.90 | < .001 |
| Sense of social existence | 5.90 ± 0.88 | 3.05 ± 1.33 | 10.45 | < .001 |
| Enjoyment | 6.20 ± 0.59 | 4.82 ± 1.01 | 6.67 | < .001 |

As shown in Table 2 above, the experimental group scored significantly higher than the control group in spatial presence, realism, emotional engagement, social presence, and enjoyment ($p < .001$). This strongly demonstrates that higher-level technological mediation (complete interactive and social functions) significantly enhances users' sensory immersion, emotional responses, and overall enjoyment, preliminarily validating the causal pathway from “technological mediation” to “immersive experience” in the model.

#### 4.3.2 Qualitative data analysis and triangulation

Thematic analysis of interview transcripts identified core themes that corroborated and complemented quantitative findings.

Theme 1: “From Observation to Dwelling: The Body as a Medium for Exploration” (corresponding to the sensory immersion layer)

Interview Excerpt (Experimental Group): “When my hand swept through the air and flowers blossomed and danced, I felt I was not just seeing with my eyes, but also that my entire body was entering the painting. "This was a totally different experience from seeing art in a museum before”. This anecdote illustrates embodied cognition, the degree to which technological mediation makes the experience of art experiential, shifting itself from a visual-dominated experience into a whole body "dwelling."

Theme 2: “I Am One of the Authors: The Transfer of Narrative Authority and Co-Creation of Meaning” (Corresponding to the Symbolic Immersion Layer)

Interview Excerpt (Experimental Group): “I recognized that my path among them differed, and that the floral paths I formed were distinctive enough too. This made me feel that part of this 'painting' belonged to me – that I was co-creating it with some artist whom I was collaborating with.” This illustrates how the users are not only passive spectators to the system because of the technological mediation, but are active co-creators with it, which leads in consequence to a change in both the meaning of the artistic symbols, and furthermore in respect to the question of ownership of the latter.

Theme 3: “The Magic of Sharing: How Social Interaction Amplifies and Interferes with Immersion” (Corresponding to the Social Immersion Layer)

Positive quote (experimental group): “When I saw my friend's avatar in touching distance of my view creating an extraordinary vista of flowers in the distance, I had a lovely sense of magic—as though we were casting magic together. This produced etc other magic.” Negative feedback (individual experimental group): “Sometimes other people’s avatars obscure one’s view suddenly which can be quite disconcerting.” This tells us that social mediation, is a two-way sword. It was intended to increase, principally, empathy, experience and create “social immersion.” If the design is poor it can de-hance immersion. This provides nuanced information for model working.

## 5. Conclusion

This study systematically assesses the role of technological intermediaries on the immersive communicative mechanisms of artistic experiences through the construction of an interdisciplinary analytical framework. The results of this study show that technological intermediaries significantly increase users' sensory immersion, emotional response, and enjoyment, but also modifies narrative logics and interpretative approaches to artistic symbols, and the nature of the interactions between artist, object and audience. Highly interactive technological intermediaries are capable of delivering increasingly immersive experiences and transforming users from passive viewers into active co-creators. Socially interactive intermediaries increase empathic attunement with and between audiences and collective engagement through shared experiences. Lousy designed implementations will however undermine the experience of immersion. The results validate the active and bi-directional operation of technological intermediaries in the dissemination of contemporary art, clarifying the neuroscientific mechanisms and social psychological motivations underlying immersive art experiences. Future research may further establish optimalisation strategies for the different kinds of technological intermediaries and the possible maximum enhancing function of technology for art keeping it true to its nature.

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