



ImGame Project: A Comprehensive Theory of Immersive Aesthetics and Innovation in Serious Gaming

Ieva Gintere, Vidzeme University of Applied Sciences, Latvia


Emmanouel Rovithis, Ionian University, Greece

 <https://orcid.org/0000-0001-7404-4063>

Ágnes Karolina Bakk, Moholy-Nagy University of Art and Design, Hungary

 <https://orcid.org/0000-0003-4036-256X>

Alvis Misjuns, Vidzeme University of Applied Sciences, Latvia

 <https://orcid.org/0009-0003-4841-9302>

ABSTRACT

The study presents the authors' research for the purpose of designing ImGame, a virtual environment inviting users to playfully learn about the concept of immersion and its historical antecedents. The authors describe ImGame's current pre-production stage and examine the basic characteristics of the feeling of immersion. They intend to deepen the current understanding of the immersive experience in art, taking into account its broad cultural connotations. The article suggests that the aesthetics of immersion can be classified into two psychological modes that have not been explicitly defined in the discourse of immersivity: a calm reflection and one of awe. From the technical standpoint, the project offers a simple handling of triggering animations and events of the game as well as storing of their state in order to create gamification elements, interactions for quizzes and other activities for ImGame or any other game using the a-frame framework to create WebXR experiences.

KEYWORDS

Contemporary Theory of Culture, Digital Edugaming, Immersive Aesthetics, Serious Games, WebXR

INTRODUCTION

The goal of the ImGame project is to develop a digital educational tool aimed at increasing creativity by sparking the interest of students in the current cultural paradigms, triggering their imagination as well as experiments of thought, and leading to a desire to create new, personalized artifacts. ImGame will be an innovative virtual environment that strengthens interdisciplinary education involving the areas of arts, philosophy, and the history of modern culture. The concept of ImGame is focused on the aesthetics of immersiveness, one of the most visible contemporary phenomena of digital art.

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*Corresponding Author

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We explain the preproduction stage of ImGame. It is focused on innovation concerning the notion of immersiveness and on the technological knowledge of WebXR. At the current stage of the project, we have created only a theoretical model of ImGame, which will be empirically tested in the future. Because all the researchers of the ImGame project work at institutions of higher education, they will use the demo version of the virtual environment at their classes. Thus, the creators of ImGame who are at the same time researchers and teachers, will transfer knowledge of this research using modern media of gaming. The project activities will last during 2023–2025 period, and the empirical study (interviews with players and/or a survey) will be initiated in 2024, facilitating our research upon the feedback of learning experience. This is a research-based project, so it requires serious theoretical research that serves as a fundamental framework for the project's design. The research work has resulted in a detailed description of the immersiveness term that will be represented in this article and in the ImGame virtual environment as a double-sided feeling of awe and calm reflection.

The ImGame platform is based partly on the results of a research project that has been carried out at Vidzeme University of Applied Sciences from 2018 to 2021. In the framework of the post-doctoral project, a digital platform named Art Space was created in a collaboration between the humanities researcher Ieva Gintere and new media artist Kristaps Biters. Art Space is a virtual environment with game elements proposed as a basis for future new media creations intended to strengthen the currently underdeveloped educational potential of art games and to support young artists through the educational platforms where their creative works are presented. The virtual environment Art Space and ImGame project (2022–2025) as its offspring both serve as prototypes that can be used in future projects where other countries can be added, too. This modular structure allows a constant update and facilitates the work to serve as a selection of artworks on a European scale.

BENEFITS OF IMGAME: CREATIVITY AND IMMERSIVENESS IN ARTISTIC EDUCATION

Researchers have broadly demonstrated the importance of creativity in contemporary education (Laal et al., 2014; de Cassia Nakano Primi et al., 2018; Belén Calavia et al., 2021), and yet the interdisciplinary ideas of culture and art in the 21st century that can stimulate the creative thinking have not been used in serious gaming to date. The ImGame project is focused on the modern aesthetics of immersion and aims to educate users about its conceptual issues as well as initiate their creative fantasy. The idea of the project is related to the fact that the educational curricula for the general public (with an exclusion of some specific schools of art and culture) do not teach the historical and interdisciplinary ideas of cultural thought inherited by the art of the 21st century from previous eras. Consequently, this cultural matrix with its rich background is not being used to stimulate deep thought and facilitate students to generate new concepts. Not as much the cultural facts, but creativity itself is actually the central benefit of artistic and cultural education for young people and other enthusiasts because it can help open fresh horizons of thought and lead to innovative approaches that are important for the modern society to solve challenges, such as pandemic, poverty, war and global ecological problems. Such challenges require intellectual capacity that we need to enhance, and cultural education is one of the ways to stimulate it.

Researchers have also highlighted the positive impact of immersive technologies in the educational process (Merchant et al., 2014), which has a long history taking into consideration the concept of serious games (Abt, 1970). By means of 3D visualizations on computer displays, digital augmentations of physical objects, and fully virtual surround representations, immersive environments can realize simulations, games, and virtual worlds that engage users in the learning experience and lead to learning gains. As a result, immersive technologies are increasingly integrated in formal and informal educational settings. However, there is a dearth of research regarding the use of immersive

technologies in higher education (Hutson & Olsen, 2022a), particularly in the teaching of art- and culture-related courses (Hutson & Olsen, 2022b). Until now, technology-facilitated immersion has been used in art education mostly by museums, which have been digitizing their content and offering their visitors virtual interactive tours. Even though the design of a virtual museum shares a similar orientation with the design of an art-related learning activity, it does not focus primarily on the pedagogical affordances, whereas educational art gaming tends to adhere to contemporary learning theories, address modern learners' needs and characteristics, and provide a holistic approach to art within the broader context of historical changes.

Finally, games are media that can effectively address the young generation and help foster values. The influential theoretician Mary Flanagan has suggested the term of critical play. She speaks about games created not only to entertain but also to teach social awareness and positively reshape our attitudes (Flanagan, 2009). ImGame follows this perspective and intends to have an impact on creativeness and imagination of players and disseminate ideas of artists, such as ecosystems' preservation and ways of meditation.

OUTLINE OF THE PROJECT: THE CONCEPT OF IMMERSIVENESS, GOALS, AND TARGET AUDIENCE

The ImGame project examines the contemporary phenomenon of immersiveness in a large cultural context rooted in Greek mythology, the philosophy of Enlightenment, and artistic modernism. Immersive aesthetics is one of the subfields of the modern cultural world that belongs to this matrix incorporating an impressive background of philosophy, music, cinema, literature, and mythology.

The term immersive aesthetics has been used in this project to describe the mental experience of metaphorically diving into an artistic environment. We suggest that the immersive experience includes two intertwined psychological modes or a dominant mixture of:

- Daydreaming, a calm, contemplative reflection
- A breathtaking, momentary amazement

The term immersiveness can be described more precisely taking into account that there is loss of one's self-consciousness, but also a rational observation; thus, immersion is something in between those two conditions. We use the term to describe the experience of contemplation, sublimity, and wonder—the overwhelming moments when one feels fully involved in an audiovisual reality, yet maintains the ability to concentrate.

The target audience is mostly college and university students and other enthusiasts who are able to comprehend the rather complicated nature of modern art and its historical links to other cultural disciplines. The ImGame project intends to answer the question of how we can indirectly teach about modern art and demonstrate its cultural heritage in digital aesthetics. The reason for learning about artworks and theoretical concepts of culture today is actually not so much related to knowledge as such, but more to intensified cognitive processes in general that can lead to new ideas and improve critical thought.

The first, second, and third sections of this article demonstrate the fundamental design principles of the ImGame project; they establish the theoretical basis and facilitate planning for its practical implementation. We discuss three key issues:

- The innovative concept of serious art game
- The conceptual reconsideration of the immersive experience via the notions of calmness and awe
- Aspects of the technological knowledge gained during the first phase of the project

BRIEF SUMMARY OF THIS SECTION

The introduction explains the project's research-based and educational profile as well as the intention to stimulate players' creativeness. The section describes the notion of immersiveness taking into account its theoretically innovative aspects presented in the paper, and discusses the results of research concerning education of modern art, immersiveness, and gaming.

ImGame Creation: View on the Theoretical Model and Technical Aspects

User Experience

Users first enter the Introductory space where they are exposed to historical aspects of immersive aesthetics and become briefly acquainted with its antecedents (Myth of Medusa, Narcissus and the notion of sublime defined by Immanuel Kant). They can follow a nonlinear path and study the available material at their own pace. At the end of their tour, users have to prove that they have perceived and understood correctly the information at hand by completing a gamified objective: They must solve a puzzle to progress to the next space.

The Exhibition space is where the digital audiovisual works of the participating artists are presented. The Exhibition space is divided into zones that represent two perspectives in the immersive art field: Meditation and Ecosystems. (The zones are chosen on the basis of analysis of the recently created artworks that may be classified under those two internally linked trends.) Users are free to browse the Exhibition space at will. In parallel, they are invited to participate in a treasure-hunt game, by searching the virtual space to collect special tokens. These come in shape and form as glitchy items similar to the exhibited artworks and/or their details, and they are necessary for users to unlock creative tools in the last space, the Studio.

The Studio space is where users can create artworks by using the ImGame's creative engine. The more treasure they have mustered, the more tools they can use. The creative possibilities focus mostly on the creation and processing of glitches.

Immersiveness in Serious Art Gaming

The ability to boost motivation is the most widely recognized characteristic of games related to the learning process. Games offer a variety of ways to engage players in the targeted activities through compelling storylines, challenging mechanics, and promising rewards. Yet, the engagement factor should not be treated as a certainty. The ways in which gamification elements interact to motivate learners are diverse and still under-researched (Sailer et al., 2017). Hamari et al. (2016) conceptualize engagement as "the simultaneous occurrence of elevated concentration, interest, and enjoyment encapsulating the experience of flow." Players become absorbed in the process of completing tasks and construct meaning by taking the required steps toward reaching their goals.

The flow theory proposed by psychologist Mihaly Robert Csikszentmihalyi suggests that in a state of mental absorption challenging tasks result in higher skills (Csikszentmihalyi, 1996). Players' enjoyment refuels the process of improving their skills to meet new challenges through a cycle of accomplishment, which gradually fosters learners' self-acknowledgement and autonomy, thereby immersing them deeper in the experience. When the distance between learners and the instructive medium is diminished, learning becomes intimate.

In the specific field of teaching art, we have found only a few examples dealing with the relationship between immersive technology and learning outcome. Recent research on the impact of virtual reality (VR) on the learning experience in Western architectural history courses has concluded that immersing oneself in the historical setting by means of realistic, surround visualization enhances the general understanding of the subject and the detailed exploration of the learning material (Ben Ghida, 2020). Other research investigating the integration of VR in art history courses from the perspective of both students and faculty has reported similar results. Regarding students, there appears to be a positive link between the use of various immersive technologies and deeper learning

coupled with increased enjoyment, whereas educators agree on immersive technologies' ease of use and usefulness (Hutson et al., 2022a).

Still, the question in the community of researchers remains, does the immersive design of an educational virtual environment affect learners' cognitive presence, and how much do they learn? About a decade ago, authors have stated that the intensive immersive gaming environment can be too mind-blowing and thus lead to decreased learning (Schrader & Bastiaens, 2012). However, other authors believe that immersiveness is a benefit to education because it reduces psychological distance and raises awareness (Bekoum Essokolo & Robinot, 2022). We are planning to investigate why immersiveness can be a benefit. We will use an indirect mode of learning via slow gaming.

Specific Aspects of Serious Art Game: Slow Gaming and Design Science Research

The teaching method of ImGame presupposes a moderate, reflective interaction with the virtual environment, also called slow gaming. This name also refers to Juul's (2004) statement according to which abstract games do not have a separate "event time," only "play time" (event time refers to the time taken in the game world, whereas play time means the time the player takes to play). ImGame can also be considered abstract because it invites the user more to wander in the virtual space and not so much to act in teleological play that results in gaining points. The game is characterized by an unhastened rhythm of play aimed at contemplation and deepened attention, and thus to a better insight into the learning material. In comparison to a purely entertaining game, the user of ImGame will need more time to reflect upon the messages and atmosphere of the digital environment. We believe that this type of game-based work has the potential to raise cultural awareness and to develop disciplines in the humanities through gaming. Slow gaming stimulates thought, shapes experience, and thus opens "better opportunities for deepened thought" (Marsh, 2016).

The main methodological goal of ImGame is to spark the creative thought and interest of users about modern cultural ideas as well as show their relation to the historical concepts such as sublimity, Medusa, and Narcissus. The innovative approach of artistic environment with personalized art experience of users and mode of slow gaming will be used to support an interactive education of modern intertextual culture.

Because ImGame is partly an art game, the team has used the method of design science research during its creation process (Vaishnavi & Kuechler, 2008; Pohl & Hadorn, 2007). This approach does not always require a structured plan of activities, but rather, an experimental style of work. We have used imagination to a great extent leading to unexpected results. The aforementioned method suggests fusing distant, seemingly unrelated areas – for instance, ecosystemic thought and meditation. ImGame will be partly based on these audiovisual tendencies and moods characteristic to the works created by Rasa Šmite & Raitis Šmits (Latvia), Eva Papamargariti (Greece), Flora Borsi (Hungary,) and other artists from the project consortium countries. Creative activities of players will be linked to the tradition of glitch, which is one of the heralding trends in the modern digital culture that represents today's imperfect world. As an indirect successor of punk counterculture, glitch also communicates an aspiration for freedom and intention to break through some of the existing aesthetic stereotypes.

The Situation of Educational Games Related to Contemporary Art

ImGame's idea refers to the ancient Wunderkammer born in the Renaissance—a diverse, carefully constructed collection of oddities that embodied the era's thirst for exploration and knowledge. The classic Wunderkammer emerged in the 16th century, although simpler collections existed earlier. It is a repository of information and images as well as texts, a place in which to cultivate, preserve, and display the artifacts that bear "an emphasis on the concept of curiosity, of wonder" (Pellegrini, 2021).

The niche of serious art games dedicated to the art styles of the last decades has been left with almost no attention (Gintere, 2020). On a global scale, only a few games teach contemporary art; however, these games do not represent the examples of immersive aesthetics as such. Grenfell (2013) has created a three-dimensional environment with the aim to interact with digital artifacts. The users

could represent themselves through avatars, communicate with other participants, and engage in collaborative art learning. Work-based learning was enhanced through the creation of digital artifacts; for instance, one of the exercises was to explore the concept of personal identity using a photomontage technique developed by the artist David Hockney.

The digital role-playing game *Kronos* educates on concepts of electronic music. By choosing different roles and paths and completing acoustic challenges, players focus on different aesthetics and techniques and receive music creation modules as rewards. This game is one of the few that are connected to contemporary art (Rovithis et al., 2014).

There are some other examples of educational games in the artistic field created during the first two decades of the 21st century. They are conceptually close to the idea of *ImGame* that is being created by the team of this project, and yet none of them are specifically related to contemporary aesthetics.

The game demo *Art Thief* (Kinkley, 2009) “incorporates content from art history” and implements constructed learning in a first-person, immersive mystery set within a virtual art museum. *ThIATRO* is a multiuser virtual platform for studying art history (Froschauer et al., 2012), that “immerses the player into an exhibition and helps students learn about art history.” Gamification elements are used to support the acquisition of information pertaining to the exhibited artworks. The virtual environment has the form of a city, in which different buildings represent different eras in art history. Players navigate through the virtual space in first-person perspective, while following knowledge-related clues to locate targeted items. In 2018, a mobile game-based educational approach was created for teaching Greek art and culture for secondary school education (Michala et al., 2018). In 2015, the game *Panic in the Gallery* was created with the following goal:

The aim of this study is to evaluate the effectiveness and enjoyment of a game created for art history learning, on adults of various ages, with a different art history background and game experience and to hopefully help educational game creators get closer to a balance between fun and learning (Tseloudi & Tsiatsos, 2015, p. 1).

Our research makes it seem clear that the field of digital art and its tendencies, particularly in the 21st century, is underutilized in serious gaming. To support literacy in relation to contemporary aesthetics, the *ImGame* project intends to demonstrate immersive artworks and teach their stylistic features as well as their intertextual context. Furthermore, our research on related projects has revealed some interesting patterns to be considered in the *ImGame*’s design process. Different thematics, moods, and stylistics can be distinguished in virtual rooms, and they prompt an experiential connection via the act of exploration. Lastly, having multiple players participating simultaneously enhances the simulation of a real visit and boosts motivation via social communication.

Additionally, we believe that a new term “serious art game” should be added to the terminology of digital gaming where “serious” and “art game” have been used only separately. We suggest the development of serious art gaming that promotes contemporary art and produces educational outcomes. The proposed definition of serious art game is as follows: a digital environment with (slow) gaming elements and educational scope manifesting as an artwork itself, incorporating artistic phenomena and connecting artistic trends. Ideally, it should have the specific aim of teaching contemporary art as a part of an intertextual paradigm to help the general public recognize modern artifacts as cultural signs with a significant historical background and stimulate their imagination by creating new artifacts.

BRIEF SUMMARY OF THIS SECTION

The section presents *ImGame*’s overall design, user experience, and methodological approach of slow gaming as well as the used method of design science research. It describes results concerning immersion in artistic education and serious gaming that seem to be scarcely represented to date yet have caused discussions of how immersiveness can impact the learning outcome. The authors of *ImGame* consider the experience of immersiveness an educational benefit that helps gaining a deeper

understanding of artistic phenomena. To enrich the discourse of gaming, the section suggests a novel definition of serious art gaming.

Results and Discussion: A Novel Approach to Immersive Experience

Adding New Aspects to the Concept of Immersive Aesthetics

Immersion is a current trend in cultural fields such as music, sound art, stage art, cinema, gaming, and new media art. It is considered a prominent aspect in regard to interactive digital art (Seo & Corness, 2015). The term was first mentioned in the aerospace research project where VR was used to enhance the illusion of being in cosmic space for the astronauts (Curtis, 2008). Immersion is followed by a sense of wonder (Bakk, 2023; Hickman, 2023). Although the users know that the experience is fictitious, paradoxically, they believe in the unreal world and feel to be present in it. Historically, this captivating psychological mode was described in 1946 in the essay by the French film theorist André Bazin, “The Myth of Total Cinema,” where he speaks about the feeling of presence. Cinema, says Bazin, is the experience of being totally in the here and now, “a perfect illusion” (Calleja, 2011). Minsky’s (1980) notion of telepresence, later identified as just “presence,” also demonstrates this realness (though actually an illusion of it) in art that is frequently repeated in the aesthetics of the 20th century.

The definition of immersiveness could be generally divided into two scopes:

- Technical approach (HMD and AR)
- Subjective feeling of immersiveness

Slater provides the following description for the technological approach concerning the sense of immersion: “Let’s reserve the term ‘immersion’ to stand simply for what the technology delivers from an objective point of view” (Slater, 2003). The more systems preserve fidelity in relation to their equivalent real-world sensory modalities, the more it is “immersive.” Slater (2009) defines immersion as “an objective property of a system.”

The second scope, subjective feeling of immersiveness, is related to the concept of flow—that is, a momentary loss of self-consciousness, forgetting the everyday reality for a short while, with a certain immobility. Immersion can be understood as a psychological state in which the experiencer perceives “oneself to be enveloped by, included in, and interacting with an environment” (Witmer & Singer, 1998). This interaction can enable the subject to sense a certain flow that transports the user in another type of reality.

This article is devoted to the second scope, cognitive understanding of immersiveness. It is a situation of engagement similar to a reader who gets wrapped up in a good novel. It is not an illusion, but a mental diving into an artistic creation that is real enough to suspend our disbelief in its artificial nature so that a participant’s awareness oscillates between being under the spell of an artwork and being aware of the artificial construct (Bolter & Gromala, 2003). The raised sense of immersion created by this experience can also be very similar to perceiving magic (Smith et al., 2016).

Two Modes of Immersiveness

The double experience or shifting from being rational and partly “cast away” has been explicitly described by Harri Mäcklin, who stated that immersiveness is not a complete self-forgetfulness even for a short while, but rather, an altered state of the perceiver’s involvement. The subject passively lets the artwork lead one’s mind, but there is still a retrospective awareness of the self being a subject of the experience, even if the object has momentarily taken possession of the perceiver (Mäcklin, 2021). In his very interesting article, Mäcklin (2021) gives a hint that there are theoretically two modes of immersiveness: the self-consciousness must be intact to some extent because the subject registers its own state of self-forgetfulness during the aesthetic experience, but there is a feeling that the subject

is floating in the atmosphere dictated by the object at the same time. Thus, we see two modes of experience: a level of conscious reflection on the one hand; a psychological weightlessness, so to speak, or some wandering of the mind on the other because the subject has become a platform for the manifestation of the object and the subject's capacity to actively control the object is suspended.

Mäcklin (2021) underlines that in the first mode, "I remain conscious of myself, but assume an observational stance," whereas in the second, "more intense mode," "I 'dissolve' or 'disappear' into the aesthetic object." Csikszentmihályi (1996) has pointed out that in this kind of experience, the subject acts effortlessly and automatically, yet it is a focused state of consciousness at the same time. Flow, as Csikszentmihályi calls it, is a match between concentration, loss of self-consciousness, and transformation of time (Jin, 2012). Hence, one can see the two sides of the coin here:

- Reflexive concentration
- Affected state, a passivity or an altered state of the subject's agency

Regarding the experience of sound, musicologist Will Schrimshaw uses the metaphor of acoustic immersion to state that an immersive experience is much like listening to music or any captivating sound. He examines the view that sound wraps the listener up in the acoustic space better than the visual object, because the latter, he says, presupposes a binary opposition between the observed and viewer (Schrimshaw, 2015). Although Schrimshaw (2015) does not speak about VR, this principle can be, of course, applied to the VR experience as well. He calls it "a post-conceptual condition of contemporary art": "to be immersed in sound frequently implies an embodied, affective experience [...] opposed to rationality, differentiation, critical thinking and decision." The immersive in this case has "the enveloping and encircling qualities" [...], and this sonic sensibility centers the listening subject, "surrounded, encircled by propagating waves" (Schrimshaw, 2015). Others have named it a sense of being surrounded or bathed in sound (Voegelin, 2010; Cox, 2013).

Yet, this specific sonic sensibility, as Schrimshaw (2015) succinctly puts it, leads to a tuning out, a willful blurring or lack of focused attention. To find a solution and exit from these "measures that are not very respectable," Schrimshaw (2015) refers to Erlmann's (2010) bidirectional notion of "reasonance," a coupling of reason and dreamlike resonance that comes with the immersive experience. Resonance is "unchecked" and affective, a forced connection to the object, an unfree selectivity. On the contrary, reason is capable of "critical selectivity of conscious thought" (Schrimshaw, 2015). Erlmann (2010) suggests interactions of reason and resonance, or even their nesting within each other—a shifting from reason to resonance. This term is important when speaking about the two intertwined modes of immersion. In the next two sections, we will look closer at both of them.

The Calm, Reflexive Immersiveness

In modern musicology, immersiveness refers to the term "timespace." It is represented, for instance, in the chrestomathic oeuvre *Stimmung* (1968) by Karlheinz Stockhausen. With *Stimmung*, Stockhausen showed the meditative, submerged-in-type of perception. Listening to the piece resembles praying or taking part in a mystic ritual. This sort of musical composition is called "timespace" (Christensen, 1996; Gintere, 2014) because the musical material is developed as a space of acoustic elements slowly changing, yet perceptible as a totality. In other words, to describe this acoustic impression, there is a constant frame of sound because the musical expression is being modified so gradually that its outline is rather static. Hence, one can hear slow transitions only in layers of the inner structure. The piece is not constructed horizontally as a linear sequence of events, but rather, can be compared to a cloud of sounds moving forward almost imperceptibly as if the time was suspended. This monotone structure may affect the listener in a meditative way. In digital art, this concept has been embodied by Vinci Weng as a mixture of photography and painting. It is an animated image—a continuous, extremely slowly moving surface or a "stillness becoming" (Weng, 2014).

The esoteric textural nature of timespace is reminiscent of the notion of death in the ancient Greek orphic mythology. Once having departed from the world of the living, people would languish away in Hades, an extremely remote, subterranean place, experiencing neither distress nor pleasure (Graf et al., 2013). After these people drank from the river of oblivion (Lethe), their memory would be suspended. Yet, their reasoning perseveres, and they are occupied with playing board games (Garland, 2001). Time has not stopped; instead, the dead are immersed in its passing, engaged with the internal variations of its constant frame. They are also not alone, but play together participating in a collective contemplation, a reminder of their old social life. The counters and dice found in offerings from their living loved ones testify that death was hoped to be not a violent change into nonexistence, but rather, a smooth transition into a state of calmness and contemplation.

Also, the so-called stream of consciousness in literature—for instance, works by Virginia Woolf—are related to immersive feeling. Woolf depicts a deep immersion into one's thoughts resulting in a narration with multitudinous and spontaneous images passing through the mind. This first version of immersiveness is close to being lost in the book. It is rather calm and reflexive compared with the second, the feeling of awe.

Medusa: Awe Combined With a Certain Psychological Inability

The second mode of immersive feeling can be explained by the theory of feminism in cinema. Mulvey (1975) refers to a man as the traditional viewer in cinema who desires a woman. A man sees a woman as an idol, an amazing being on the screen. The man as a movie director keeps our attention on her and makes us follow her without being able to avert our eyes. This light trance state, at least for a while, is the very essence of the affective immersiveness defined by the pioneering immersive artist Char Davies, who used a metaphor related to scuba diving (submerging in water)—a feeling of being absorbed and engaged.

The momentarily affective mode of immersion that stipulates a certain psychological inability is connected to the experience of the sublime. In the *Critique of Judgment* (1790), Immanuel Kant speaks about an experience of a great power of nature—for instance, a sea in the storm or huge edgy rocks. While observing it, we can think about a magnificent energy called alternatively God; however, says Kant, there is no exact image and correct name of it. It is a purely mental concept that has a point of reference in nature, but has no precise shape in the physical world or language. An observation about an amazing happening in nature is combined with the person's inability to rationally identify the sublime as it is too large to be seated in an image or any other form of signification. It lies beyond our rationality. Edmund Burke in his treatise written in 1757 described it as an astonishment held in suspension that precludes any constructive activity: "The mind is so entirely filled with its object that it cannot entertain any other" (Ouditt, 2019).

In the theory of culture, this captured mind is connected to the ancient myth of Medusa (Baumbach, 2010). The Greek myth tells about the monster Gorgona, who can turn a person looking at her into a stone. Here, immersion means a powerful experience (it can be visual, textual, acoustic, etc.). It is a state of a fixed attention and emotional attachment combined with certain inability. This mode of immersive experience is found, for instance, in Lars von Triers' movie *Melancholia* (2011) in which a woman stares at the blue planet approaching Earth and feels so much affected by its power that she gradually loses an ability to take part in activities of life.

The Medusian idea has been popular in the theory of culture since around the 1960s. French author Lacan (2014) has described it as a moment of "gazing." A gaze is a type of close look at an object when one does not realize its identity, but wonders irrationally about it for a while. Afterward, the gazing will be most likely stopped by the logical mind of the viewer to rationalize the object or happening. Lacan says in his 11th Seminar that when the person identifies the object (one might say, realizes its meaning in the context), the object dies, turning into a skull. The reason for dying is a loss of magic; the object loses its undefined beauty beyond words. That means, as soon as the thing can be named, it is no longer the object of wonder and close looking. Alternatively, one might say

that the object causes the immersive experience as long as it is reflected without mediation through our cognition.

It is basically the same Kantian moment of intellectual loss during the experience of something amazing. For instance, when a breathtaking sight in nature reminds one about a divine power, one can only stare at it in awe. The words are always slightly incorrect if we try to describe the sublime experience in language. As soon as we fix its identity in words, it will lose its enchantment. This is to say, this feeling of greatness or spectacle cannot be exactly registered (even though Kant has himself named it as a sublime feeling, it is only a work term and cannot be taken as an accurate signification).

Lyotard (1986) argues that abstract art in modernism, for instance, the Black Square by Kazimir Malevitch, is an example of this blindness or inability to represent the sublime idea because it is only intuitively accessible to our minds, not through language or our eyes. The black canvas underlines the role of the spectator who looks, but is literally unable to see; on the visual level there is only a black screen. In other words, we are not able to transfer our sublime feeling into a visual image, or sound, and it has no accurate linguistic signification. This indirect or intuitive way of perception is also illustrated by Luis Buñuel in his famous movie *Un Chien Andalou* (1929). The film starts with a terrifying episode where a woman's eye is being cut with a razor. To put it symbolically, the spectator of this movie is blind. It is an intellectual or cognitive blindness as the story is so fuzzy and has no constructive narrative.

Referring to Greek mythology once again, we find the myth of Narcissus useful as well to explain the mode of immersiveness that lacks rationality. Narcissus is looking at his own breathtaking image. Lacan, Kant, Buñuel, the myth of Medusa, and Narcissus have the same element in common: a way of looking in awe without rationalizing. The Narcissus motive has been mentioned in the research literature as related to VR. It is “a deeply narcissistic medium, where you are hermetically sealed in the media environment with your own reflections” (Bakk, 2019). For instance, Vito Acconci in his work *Centers* (1971), has filmed himself pointing at himself in a video monitor, as a mirror, for 20 minutes.

The immersive experience presupposes moments of wonder and magic; hence, it can lead to an awe that cannot be stated in words. This immersive feeling can also result in “a loss of self-consciousness” (Nakamura & Csikszentmihályi, 2014) and thus leave the user in an amorphous mental state for seconds. Yet, the first, reflexive and meditative mode of immersiveness does not contain the moment of mental paralysis, to use an odious metaphor.

It is important to underline this difference in the two kinds of immersive feeling that is missing in the vast field of educational games' theory as well as in digital arts' research. The two modes of immersive feeling can be distinguished only theoretically and can be largely experienced as their combination (Table 1). There is a shift from meditative, but still rational reflection to the loss of self-consciousness, and the affected state that has been called “gazing” by Lacan.

Table 1. Theoretical model of the feeling of immersiveness

Mode of immersiveness	Effects
Calm, reflexive immersiveness	Awareness of artificiality of the aesthetic object Concentration Meditative mood
Medusian state	Awe: Psychological immobility caused by an affect Psychological “weightlessness”: The subject “dissolves” into the aesthetic object

BRIEF SUMMARY OF THE SECTION

The second section analyzes the phenomenon of immersion in the research literature and underlines its binary structure: It contains awe that can be close to shock and a meditative contemplation. These two modes of immersion are correlated and appear mostly in an intertwined form.

WebXR Technological Approach

On a technological level, ImGame is being created using the WebXR approach. It is a standard that allows the delivery of immersive content through the web browser on cross-platform devices, such as tablets, personal computers, and other devices; hence, a game can be created to work on a smartphone or a head-mounted display.

Some concepts are easier to understand when viewed in 3D, and the WebXR standard allows for interactive 3D content to be accessible just through a link to a web page. There are WebXR use cases in visualization and immersive educational content demonstrating that WebXR has great potential. The Rzeszewski urban planning WebXR project was judged positively by the test users, and it presented new possibilities in collaboratively visualizing data in virtual or augmented reality (Rzeszewski & Orylski, 2021). In Luigini et al.'s (2020) case, a WebXR immersive serious game was created for distance learning. During online sessions, users could collect analytics to see how the students performed as WebXR enabled the content to work on different student devices.

Yet there are still very limited tools for artists to intuitively build complex visuals in WebXR. The development process for artists of quality immersive web-based content is still expensive and cumbersome (MacIntyre & Smith, 2018); this process also relies on experienced JavaScript programmers. The situation is improving owing to the emergence of visual editing tools, such as nodetoy, playcanvas, rogue engine, and others, but it is still necessary to use JavaScript and know how to set up and configure the server. The A-Frame framework is one of the easiest solutions for artists to create WebXR content without needing to know programming. A-Frame allows for nonprogrammers to develop simple WebXR experiences using HTML and community-developed JavaScript components.

ImGame is based on A-Frame and during the development, custom components will be made that will be accessible to the community. We will use a similar approach as the Vartiste toolkit that documented and made accessible all the components created for the project.

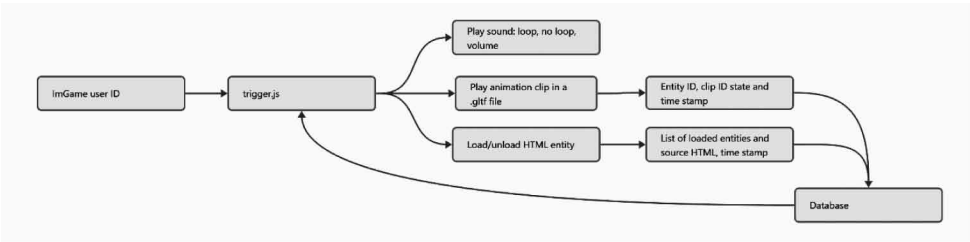
ImGame features components that allow multiplayer user profiles and progress saving. The goal when developing these custom components is to make them as simple, but universal as possible so that they could be used in educational institutions as a part of creative programming. These developmental solutions will contribute to the WebXR community—the enthusiasts developers as well as art students in high schools and academia.

The multiplayer component is based on the slightly modified networked-A-Frame component, which allows for real-time object movement synchronization and voice and video communication. In ImGame, the multiplayer component is intended for the exhibition part to create the feeling of a shared space.

The user profiles and progress saving component is important for the creative part in the Studio space of ImGame. The component allows ImGame to store the artifacts created by the users and remember the progress made. Progress data can be saved in various ways, but most examples are temporary and are stored in the web browser (for instance, the A-Frame-state-component), so there are limited options to switch a device and continue the progress. An important aspect here is that all the data in ImGame are attached to a user profile that is stored on the server. This storage was achieved by creating a docker of two containers—one for the ImGame and the other for the database. They are being communicated through the component named “trigger.js” with the following options, as shown in Figure 1:

- To load specific entities from specific HTML files

Figure 1. ImGame trigger.js component



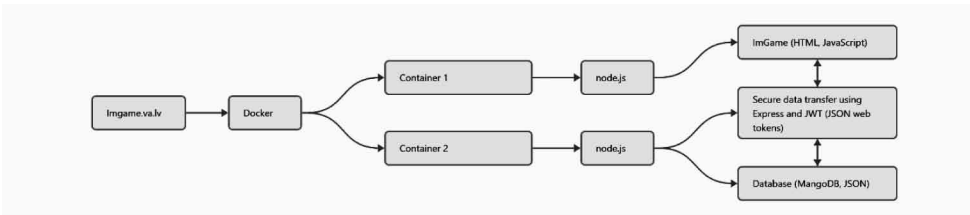
- To trigger animation clips embedded in .gltf files
- To enable saving status of loaded files and animation clips

The multiplayer and progress saving components are still being simplified. HTML and JavaScript components are accessible via the web browser’s debugger tools and are not suitable for sensitive data handling when operating with the database. To protect the data, a docker with two containers has been created. One handles the ImGame HTML and components, and the other is for the database. A secure data transfer app is being used to encrypt the data coming from ImGame, as shown in Figure 2.

The user profile progress and creations can be accessed on different devices. Some basic interaction data will be collected that will allow debugging and enhance the user experience. For now, the intended data planned to be collected are the time stamps of user-activated key triggers that will be enough to make the basic assessments.

An important aspect in developing ImGame is shader programming. A shader is a set of instructions on how to render the scene elements. Shader programming is unintuitive and thus requires an abstraction layer to make it available for artists. The best way so far to program shaders is using node-based (flow-based) visual programming as seen in popular examples, such as Unreal Engine Material Editor, Unity Graph Editor, and Blender Shader Editor, as well as in the emerging node-based shader programming web apps nodetoy and shaderfrog. For now, nodetoy is being used by exporting to OpenGL Shading Language (GLSL) code and adding it in A-Frame with a custom component. The process is not optimized, and a more robust system is being worked on. An obvious way would be to create a custom node-based system that integrates more smoothly with A-Frame, and thus open the possibility to also enable logic visual programming similar to the Unreal Engine Blueprint visual scripting system. In that case it is important to make it modular to keep the ImGame development simple and accessible when developing core components. There are two paths outlined for further node-based tool development:

Figure 2. ImGame server setup



- To research and develop a node-based tool written in JavaScript that is usable as a component in A-Frame
- To create a plug-in for 3D modeling software Blender that would export a 3D model in .glTF file format with the in Blender programmed shader

BRIEF SUMMARY OF THE SECTION

The established system on the server side allows a secure data transfer and storage. The custom component “trigger.js” presupposes also a simple handling of triggering animations, events, and storing of their state to create gamification elements, interactions for quizzes, and other activities for ImGame or any other game intended to be created with the WebXR solution. The workflow and components are being documented and will be published on GitHub (<https://github.com>).

A convenient and accessible solution for visual graphics programming for WebXR is a must, and node-based shader integration is a future-proof solution that is being used in the popular game engines, such as Unity and Unreal Engine.

CONCLUSION

This study presents the educational virtual environment ImGame that hosts artworks in the field of digital audiovisual art of the last decade with the aim of informing the society about the newest trends in art as well as its ideological aspects, such as meditation and ecology of environment and mind. The project intends to develop the genre of edutainment in the area of modern aesthetics and strengthen the methodology for creating virtual environments that reflect a strong research basis, recent artworks, and their intertextual references.

ImGame proposes demonstrating immersive aesthetics in an educational platform dedicated to cultural knowledge capital and documentation of artworks. The ImGame project underlines the theoretical context of immersiveness that merits a particular attention to learn about its heritage.

We have defined serious art gaming as signifying learning about contemporary art via educational games in a playful manner and experiencing the environment created itself as an artwork. They analyze the psychological sense of immersiveness and claim that there are two related, yet different modes of immersive experience. There is a shifting from reflective observation to a Medusian condition; this shift deepens the theoretical context of immersive experience that has received little attention in the philosophical literature and modern theory of art.

The article explains the specific concept of Kantian sublime reinterpreted by Lyotard, as well as the Lacanian gaze that has influenced contemporary aesthetics of immersion. The mythological figures Medusa and Narcissus from antiquity have helped better illustrate these difficult concepts. Thus, the paper shows the basic outline of related ideas that form the understanding of immersion today and their distinct appearance in different eras—Antiquity, Enlightenment, and Modernity. However, the study has been conducted without an aspiration to describe the history of immersiveness in a comprehensive continuity. The references to Kant and other authors function solely as explanations of the phenomenon from different angles that cannot nevertheless cover all the discourse of immersiveness. With this article, we hope to enrich the theory of immersiveness, a phenomenon with an impressive historical heritage that has had – and most likely will have – long lasting consequences on modern cultural theory.

From the technical point of view, this project will offer easy-to-use components and tools for artists, scholars, and enthusiasts that use the A-Frame framework to create immersive WebXR experiences.

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Ieva Gintere (PhD) is a researcher with international and interdisciplinary academic and research work experience. The results of her previous research in modern aesthetics and serious gaming have been published internationally since 2014. She has been a postdoctoral researcher at ViA, and currently leads a course in modern aesthetics at the Latvian Academy of Music. Ieva holds a PhD in contemporary musicology and has studied at the Paris-10 Nanterre University (France) on a scholarship from the French government. She has lectured in modern aesthetics in Georgia, Romania, Albania, Armenia, and Latvia. Ieva is currently the leading researcher and coordinator of the project supported by the European Commission, program Creative Europe, ImGame – An Innovative Digital Environment Based on Research with Elements of Immersive Aesthetics and Serious Gaming (2022–2025). She is a scientific supervisor and a team leader of the MSCA4Ukraine project CineGame4Ukraine (2023–2025). Her interests are modern education, ways of cross-cutting and interacting the fields of modern technologies, and theories of contemporary art.

Emmanuel Rovithis works in the intersection of gaming and modern aesthetics. Holding a PhD in electronic music composition, an MA in music composition, and a strong background in the design of serious games and audio-interactive software, he blends new art in gaming. He currently serves as laboratory teaching staff at the Department of Audio & Visual Arts of the Ionian University on subjects related to art and technology in education. As a post-doctoral researcher, he focuses on audio games and augmented reality audio in the contexts of education, entertainment, and artistic creation.

Ágnes Karolina Bakk is a PhD researcher at Moholy-Nagy University of Art and Design (MOME), Hungary. She is the producer, curator and founder of the immersive storytelling conference Zip-Scene (zip-scene.com), which was held for the third time in March 2021. Ágnes is also the cofounder of Random Error Studio, a lab that supports various VR productions, and she is the curator of the Vektor VR section of the Verzio Film festival. She also teaches escape room design, immersive and VR storytelling and speculative design at MOME. Ágnes has presented her research results on immersive theater and VR at various conferences and platforms internationally.

Alvis Misjuns (mag.art., mag.comp.) is a doctoral student in VR and smart technologies at Vidzeme University of Applied Sciences. Alvis obtained a master's degree in audiovisual and media art at the Latvian Academy of Arts in 2015. A multidisciplinary artist, he works in 3D computer graphics and VR. Alvis has participated in the exhibitions "Smart Garden" (RIXC gallery, 2018), "Greenhouse" (LMA centenary exhibition, 2019), and "100 percent" (symposium Sensoria, RIXC, 2020). He designed rooms and lighting for the LMA exhibition "Virtuaal" and assisted in placing students' 3D works in the virtual exhibition. Alvis participates in the ImGame project of the "Creative Europe" program as an expert in VR experience and new media design in a leading role.