

Snap to Grid: An Immersive Audiovisual Experience for Meta Quest 2

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ABSTRACT

This report summarizes the artistic conceptualization, design process, and main findings in the use of the Meta Quest 2 headsets for creating Snap to Grid, an immersive exhibition that explores music visualization, audiovisual narrative, transmedia museography, and VR speculative architecture. The production processes integrated the work of students and teachers from diverse creative disciplines, generating practice-based teaching and learning experiences. This report aims to open a conversation about the use of immersive technologies among creative professionals, to demonstrate how the exhibition production process is a medium through which to create learning experiences around the metaverse and to document and share the achievements of a transdisciplinary artistic creation process that enhances the metaverse adoption. Also, to demonstrate through artistic creation the metaverse's esthetic possibilities and using the exhibition format as a medium to engage with diverse audiences.

1. Introduction

The metaverse is not even an overlay upon our image of the world, but is beginning to fuse so intricately that we can, in a single moment, experience a mutant, plural hybrid of multiple realities entwined.
(Kia Yee, 2021)

Ang Kia Yee

Over the years, artistic practice has sought to reconcile contemporary technologies and the human experience in terms of the creation, appreciation, and consumption of artworks. This helped the adoption of these technologies through the exploration of innovative aesthetic experiences; although various typologies of artistic immersion already exist, in this paper we refer to immersive art in the virtual space. The development of an art installation gives us the potential to create and exhibit contemporary art related to digital settings, specifically in the process of constructing the metaverse. *Snap to Grid* was an immersive installation by the artists Malitzin Cortés (CNDSD) and Iván Abreu, which analyzed the boundaries between physical and virtual spaces. An immersive audiovisual experience explored the synergy between the temporality of music, the spatial quality of speculative architecture in virtual reality, and their interaction through immersive technologies.

This text summarizes the conceptualization, design processes, and technological development, as well as the findings related to the use of the Meta Quest 2 virtual reality headset for creative ecosystems that involve music visualization, audiovisual narrative, transmedia museography, and VR speculative architecture. The production processes encouraged a transversal and collaborative approach between students and teachers from different creative disciplines, creating a practice-based learning experience.

In the context of a collaboration between CENTRO and Meta through an immersive learning program, the development of an exhibition program on various creative practices is included. In this case visual arts centered on XR technologies, to reveal the value of a multidisciplinary collaborative project as a learning experience. The *Snap to Grid* project and its respective documentation has achieved its objectives by a) documenting and communicating the results of a transdisciplinary artistic creation process for the adoption of the metaverse and the use of immersive technologies for professional creatives; b) revealing the aesthetic possibilities of the metaverse; c) positioning the use of technologies and devices in contexts of education and creative production focused on the metaverse; c) contributing to the construction of knowledge and skill-based pedagogy to develop the metaverse; d) showing how the exhibition can be a tool to involve a wide range of audiences in the metaverse, and finally, e) reporting data about visitors' experience with immersive technologies. *Snap to Grid* gives material shape to the importance of a transdisciplinary approach and specialist technological knowledge as part of contemporary creative practices.



FIGURE 1
Installation view

2. Background

Before defining their work's concept, the artists had carried out prior research to integrate various narratives arising from the inter-relation between sound, algorithmic music, generative art, language, creative code, data and process visualization, post-humanism, speculative architecture, video games, virtual reality, inhabitable space, and new, non-linear ways of arranging audiovisual impulses.

2.1 Hyper D | el confinamiento anticipado

Author: Malitzin Cortes

VR Immersive Experience and 360 Video. 2019

Supported by Mexico City's Digital Culture Center's Immersion Laboratory, this project was a navigable immersive experience in virtual reality on a 1:1 scale. Its fiction includes the experience of a journey toward

¹ **Timothy Morton** coined the term "hyperobject" to refer to mass-distributed items in time and space relating to humans. A black hole, the biosphere, and the solar systems are hyperobjects, as are long-lasting human-made objects such as polystyrene.

some Hyperobjects¹ and their consequences, which occupy such a disproportionate spatial phase that they are largely invisible to humans. Examples include everything from microplastics, solid waste, global warming to the housing phenomena that are forcing inhabitants in various cities to subdivide spaces to extremes.

This immersive experience narrates a moment of life, as lived by any of us within this fictional world, where object recycling, biohacking, urban hunting, and impossibility are the norm, offering a glimpse of global confinement, without suspecting that a year later, confinement and hyperdigitalization² were to materialize through another hyperobject: the global COVID 19 pandemic.



2.2 Desierta

Authors: Iván Abreu and Malitzin Cortes

Live Immersive Coding, Audiovisual VR Concert, and Live Coding. 2021

Streaming | Mutek Japan, Mexico, Barcelona and Argentina Edición 17

Desierta was presented as a live immersive coding event of hybrid sound aesthetics that combines the body in action and the written word in real time using virtual reality and music programmed generated through Tidal Cycles live coding.

The concert takes place in parallel in the physical and virtual world through an ensemble. The narrative takes place within spaces generated through photogrammetry and 3D models of some parts of real cities digitally modified to be fictitious, and which are normally very busy and yet were extra-ordinarily deserted due to the

² **Hyperdigitalization** refers to a phenomenon of accelerated and global digitalization to meet the needs for socialization, entertainment, and ways of working as a result of social distancing after COVID-19, the mass development of remote working, the development of platforms for interconnectivity within and beyond social networks, as well as virtual reality spaces for various activities.

³ **Live Immersive Coding:** *A term coined by the artists Malitzin Cortés and Iván Abreu which combines audiovisual practice through immersive tools (XR, non-goal-oriented video games) with live coding to generate music, live sound design, and the real-time modification of virtual reality.*

COVID-19 pandemic. This created an impossible, weightless fiction where it is possible to create instruments and synthesizers within these settings, which were created in Blender and transferred to the PatchWorld environment, a tool for creating new digital instruments and operating them with an avatar.



FIGURE 4
Installation view

2.3 AUTO{}Construcción

Authors: Iván Abreu and Malitzin Cortes

On the Fly Residency: Using Code as an Expressive Musical Instrument.

ZKM | Center for Art and Media Karlsruhe. 2021–2022

AUTO{}Construcción is a Live Immersive Coding and Virtual Reality concert in a video game setting that uses real, self-built housing as the subject for research and speculative narrative, mainly in Latin America, Asia, India, and some peripheral areas of Europe. The concert visits various settings created using 3D imagery, from algorithms and collaborations with artificial intelligence, and through machine learning⁴ the phenomenon is expanded through StyleGAN (style generative adversarial network) whose inputs are the artists' aesthetic questions and findings, generating a depoliticized process of visual exploration, confronting learning directly with information extracted from the image: geometry, asymmetry, order or lack thereof, materials and colors, pixels.)

⁴ **Machine or automatic learning** is the subfield of computer sciences and a branch of artificial intelligence, whose aim is to develop techniques that can allow computers to learn (Russell & Norvig, 2009).



The works presented in this section reflect the collaborating artists' areas of interest and questions, and they were conceived on the basis of the media that enabled and justified their development, using a specific stack of technologies. Each of them contains an intention to employ the possibilities of the metaverse in the search for a more integrated experience, blending the physical and virtual worlds in a more intimate and fluid way. In each process, the perception of being in "two realities" becomes diluted to give way to a sense of hybridization, where the speculative is not an experience cut off from our physical reality of "meatspace" through synesthesia and immersive art in the broader sense, encompassing the sound, visual, haptic, and environmental spectrums. An essential way of conceiving the *Snap to Grid* experience.

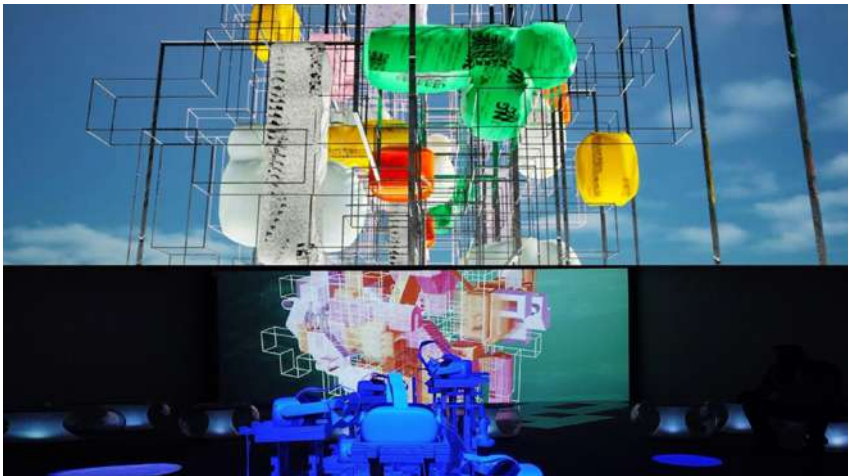
Moreover, we can add as a background that humans have largely become metaversal beings through the impact of the hyperdigitalization of the post-pandemic-lockdown world, which has also transformed the forms of digital artistic creation, as well as the teaching of creative technologies. Given the possibilities within the metaverse that we are building, where we exist in a fluid space-time continuum, we believe that we will only be able to have full experiences through metamorphosis.

⁵ **Meatspace** is the ironic term coined by William Gibson in his cyberpunk novel *Neuromancer*, which refers to the real (non-virtual) world, the world of meat and bones, as opposed to cyberspace.

⁶ **Immersive art** allows spectators to immerse themselves in an artwork. In this way, the spectator not only looks at the work but forms a part of it by using all their senses, through sound, light, images, simulation, digital or hybrid experiences, to create a new entity, producing a vital experience of art.

What we do know is that we will soon be forced by technological advances to develop a new morality. We will need to build a new moral structure that will give people a framework of how to deal with the enormous choices they can make in terms of the digital...The limits of life will no longer be something that can be taken for granted. We will have to create a new moral vision to cope with them. In the future, artists may no longer be involved in just redefining art. In the post human future artists may also be involved in redefining life.
(Deitch, 1992)

Jeffrey Deitch



3. Project description and amplified concepts (conceptual and esthetic)

As mentioned at the beginning of this text, *Snap to Grid* was conceived as a large-scale immersive installation to analyze the limits between physical and virtual space. Visitors could experience the fiction of virtual reality or alternatively contemplate events in the gallery space from a panoramic perspective. The installation had three levels of perception: an audiovisual atmosphere where a large-format projection explored the architectural space of virtual reality from a cinematographic angle; a second level, with sculptural and dynamic elements that contain the Meta Quest 2 headsets to explore the limits of digital corporeality; and the final level, which provides an immersive visualization of music, where organic relations are activated between the speculative architectural spaces and the sound discourse through the spectator's interaction within the virtual space.

This installation was designed by artists in collaboration with students on the following study programs: Digital Media and Technology, Textile and Fashion Design, Interior Architecture, and Marketing and Advertising. This innovative learning experience forms part of a project to develop new methodologies through art in the design of virtual spaces and to expand the scope of creative professions.

At a methodological level, the work uses various processes. Firstly, it is a project of **(Indoor) site-specific art**, since it involved the scale and possibilities of CENTRO's gallery, creating a large-format video-installation, a lighting narrative, and a sound-space project, all specially created; it is also tech-specific art devised to

explore the narrative, real-time possibilities of immersion within the Meta Quest 2 headset using a video game engine; finally, the objective synthesized both methodologies: to hybridize the physical immersion within the architectural inhabitable space, and the VR digital immersion (X-specific art).

3.1 The grid as the amplified concept and inspiration

The grid is like a cage in which there is a lion [...] eventually, in order to survive, even the best trainer must get out of the cage or the lion will eat him up [...] The designer [needs to know] when it's time to go in and out of the cage—when it's time to use the grid or to leave it behind. (Vignelli, 1976)

Massimo Vignelli

The physical context of the project's production and exhibition, a higher-education institute for the creative professions, led to the idea of established concepts in the field of design to revise them and re approach them in the light of the development of these new technologies. The grid was the concept chosen to explore ideas, and Snap to Grid lent its name to the work and the research. The theme pays homage to an essential concept in the history of design processes, the use of grids is a method of aesthetic design to confer sensations within a rigid visual order and total chaos or compositional freedom, perhaps the most fascinating and bold visual solutions are somewhere in between these two extremes, but grids are not only spatial but also temporary when implemented in the field of music, this analogy between music, design, and architecture to organize its materiality, whether sound-related or visual-spatial, constituted the narrative axis of the entire proposal: an immersive visualization project of algorithmic music, where music organizes an experience within a space of speculative architecture in the virtual setting.

The Grid's two-dimensional discipline also creates undreamt-of freedom for three-dimensional anarchy. (Koolhaas, 1978)

Rem Koolhaas

3.2 CutScene

The inspiration for the audiovisual narrative of Snap to Grid comes from in-game cinematic⁷ cutscenes, because it's a freely inhabitable and therefore interactive VR animation. However, the narrative is linear, and the 6.20 minutes of music guide the visual history and the experience, therefore it's a "music video" in the form of a navigable immersive animation.

⁷ Cutscene refers to sequences or moments in video games that are less interactive or non-interactive, interrupting gameplay to tell a story in a way that is closer to the world of cinema and animated films, when these moments retain some aspect of interaction they are usually called in-game cinematic, which is the narrative resource within the META Quest 2 headset in Snap to Grid.

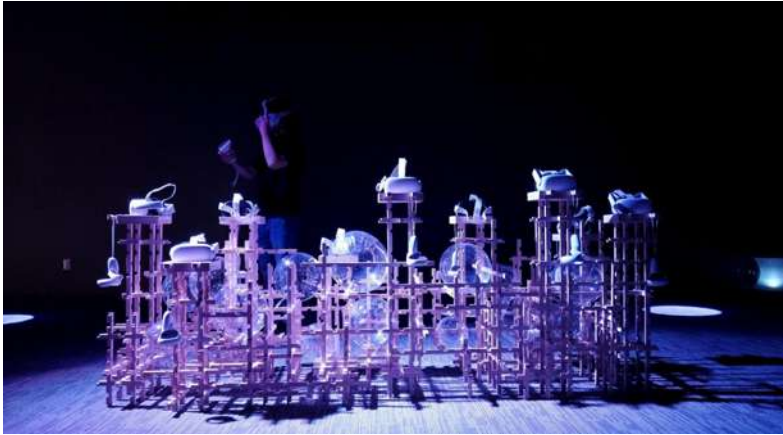


FIGURE 8
Installation view

3.3 Blurring the boundary between the museographic furniture and the work

Led by CENTRO industrial designer and professor, Heriberto Olguín and the artist Malitzin Cortés, supported by students on the Industrial Design, Interior Architecture, and Textile and Fashion Design courses, a solution was designed to position the nine Meta Quest 2 headsets, in order to blur the perception of the divide between museography or sculptural work, and also provide an ergonomic solution for picking up and returning the headsets. The aim was inspired by the graphic imagery of the soft animated bodies, digital materials, and the architecture of the virtual surroundings, as well as of the basic concept of the grid, helping ensure aesthetic and narrative continuity within and outside the virtual world.



FIGURE 9
Installation view

⁸ Informational lighting is the use of recognizable lighting patterns for orientation in different types and moments of uses of a space.

3.4 Lighting synchronization as a narrative and museographic tool

Another layer that contributes to the hybridization of virtual and physical spaces is the implementation of some gallery lighting accents that are synchronized with animation. This process was implemented with the collaboration of the creative technologist and director of technology programs at CENTRO, Dr. Roberto Cabezas. Blurring the boundary between the gallery's physical lighting and transitions in the immersive settings made it possible to shift the attention toward various points of the inhabited space, accentuating the sense of non-digital immersion. This implementation also enabled the information lighting⁹ as the use of a lighting pattern for the wait before the experience begins.



FIGURE 10
Installation view

3.5 Third-level observation: the theatricality of interaction

When behaviors requiring participation with the interactive work become sufficiently expressive, these behaviors become extensions of the work, and this produces a situation of the members of the public viewing other members of the public. This becomes more marked because each headset user is a graphic avatar in the large-scale projection in the gallery.



3.6 Pictographic avatar

Participants' presence within the virtual space is represented by a 3D icon inspired by the wind rose used in architectural plans. Therefore, corporeality does not seek a human shape but to belong to the imaginary of the representation in architecture, although the gestures from the sense of movement of the head in the Meta Quest 2 headset offers an illusion of life through movement of animation. This representation allows the collective rite of joint presence within VR speculative architecture.

4. Technologies involved in the *Snap to Grid* production

The installation's development presented **challenges of integrating and developing technologies**, evidently for this kind of project creative skills and/or narratives with digital media are insufficient; development abilities and integration with diverse technological surroundings are required. The work has many technological layers. The installation is created by a network consisting of one computer and nine Meta Quest 2 headsets. The computer executes the animation in the real-time 3D environment, an animation projected life-size within the architecture, and it also reproduces the sound art on 5.1 channels and performs synchronized lighting accents in the gallery. This computer synchronizes the nine Meta Quest 2 headsets so that the participants within the VR space and the public in the gallery can share the same experience at the same time. This required the use of various software programs and programming languages, and a complex workflow that we can divide into production resources and installation resources.

Software platforms used for creation and production:

- Tidal Cycles, Super Collider, and Ableton Live 11 for musical composition
- Blender for 3D modeling and rendering
- Unreal Engine for interactive animation, development, and general integration
- APK Android for compiling the executable app in META Quest 2
- META Quest2 headsets in developer mode

Programming languages used for creation, production, and distribution or installation:

- Haskell for music programming
- C++ (Unreal Engine)
- Node programming (Blueprint Unreal Engine)
- Node programming (TouchDesigner)

Software and hardware platforms used for gallery installation:

- Executable videogame
- TouchDesigner patch for video mapping and DMX lighting control
- 5.1 audio system
- Short-throw BARCO project BARCO (7000 lumens).
- Eighteen META Quest 2 headsets, nine active and nine replacements, and charging dock.

- A computer with a high-capacity graphic processing unit (Quantum with NVIDIA graphics card).
- Dedicated router for local computer traffic
- OBS for sharing screens between platforms
- DMX lighting technology, interface, and ten lamps

The video game experience is integrated in people. The experience from the video game perspective, testing, and artwork. The Snap to Grid work proposes that new narrative functions can be explored through immersion as a collective experience that is not simply about video game violence. Even non-gamers understand the imaginary and languages, and that these themselves can be transferred into artistic experiences.

Another important finding within the cinematographic aspect of the piece exists in connection to the **theme of the tracking shot, involving the journey during which the person is also the camera.** It is a challenge when a filmmaker makes an extensive tracking shot; it's very difficult to achieve without cuts. The montage is a natural part of cinematographic language; however, when the person is the camera, the take is continuous and this opens up some possibilities while closing others.

The world of culture and art is not a world of substitutions but of accumulation; things arrive and possibilities expand; in this case, a video exists where artists take decisions about what shots to use, where to cut, and how to link that to musical moments. However, users or visitors direct the entire experience, since they are the ones equipped with the camera and record reactions as they circulate through the artwork. These are reactions to objects in 3D, color, effects, post-production, etc. Some immersive experiences can be defined, so that users do not have control. For Snap to Grid, some prior decisions were made in the grid's design, but the user's gaze moves forward and makes its own decisions in that space.

Another important exploration for developing this installation was based on the notion of architectural scale as part of the experience of the space as well as the possibility of "icon-izing" the spatial presence without recreating a body.

Humanization takes place through movement, and movement is also based on will. Meta Quest 2 gives an experience of inhabiting a space, in a way that establishes various relations with scale. For example, although users may be looking at a landscape, the landscape gives the sense of scale—not a bodily scale but rather on a conceptual level. Visitors involved in the immersion have a different relation to the visualization of music. The artwork generates two moments to experience it: one through the headsets and the other once outside, through the projects. Both moments produce emotional, affective, and conceptual experiences.

During the modeling process on screen, the jump into the VR world revealed the challenges in terms of scale and proportions that forms a substantial aspect of this kind of immersion experience.

The presence and development of icons as an abstraction of architectural plans

The visitor is a kind of coordinate within the experience without the body being completely inserted. Another interesting point during the production process is the issue of user synchronization. From the outset, the project avoided the idea of generating a “humanoid avatar,” in other words one that had human characteristics. The idea was to generate an abstraction of their presence as an icon, to communicate through graphic design that more than nine people are located in the artwork, without recreating a body in the traditional sense. Therefore, icons were created that were humanized by the visitors’ movement. In this way, the notion of presence in the artwork remains abstract. The design of the icon within the artwork is formally related to the architectural plans. When one sees an architectural plan, north is always indicated, which means that the construction can be rotated, but north will always remain in the same position. The icon is a graphic abstraction of an architectural plan and in this way visitors act as another set of coordinates within that plan but without possessing a body.

Social and technological trends redefined our concepts of the self and of social behavior which has developed a strong influence on artists. There is an artistic interest in the body and in the presentation of the self through different spatial and time conditions. Much of today's artistic practice involves new concepts of the figure and new approaches to the figure. [...] The interest in figuration, in keeping with the social and technological trends that are inspiring it, is conceptual rather than formal.

Jeffrey Dietch

5. Narrative of the production process integrating the insights of the artists and the students’ learning

My experience from this large-scale and important project is the possibility of collaborating among the different disciplines involved, despite being more focused on the visual and technological, all the careers are involved to create a product.

Alexia Altamirano, 5th semester, Textile and Fashion Design

Just this project has the collaborative and transdisciplinary focus of CENTRO. Seeing how we can merge all knowledge with an output of technology and art, becomes a sensory exhibition in all senses: because it is sight, touch, and hearing, and at the same time an awareness of the environment that transmits this experience.

Lorenza Heredia, 6th semester, Digital Media and Technology

5.1 Description of staff roles and production process

During the creation process, each program had a main role for its participation; however, the transdisciplinary nature of collaborative work at CENTRO allowed the students to explore different activities to better comprehend how their core skills could be integrated and combined with those of their peers. The overall idea for encouraging these experiences in CENTRO’s community is to nurture and expand traditional

workflows of how the creative industry has handled collaborative work, considering that immersive experiences and creative technology in general demands the adaptation of current skills to digital contexts in a holistic way.

Student roles:

- Industrial Design and Textile and Fashion Design (material exploration for the design of wooden sculptural elements)
- Interior Architecture (assistance in the assembly of wooden sculptural elements and general design of the space)
- Digital Media and Technology (sound design, Unreal Engine video game platform support, and 3D modeling)
- Marketing and Advertising (assistance in content development for main campaign messages, focusing on social networks)
- Film and Television (video documentation and photography)

To create this installation it was relevant to create a collective and organic construction methodology:

- One part of the team works on developing events happening inside the “grid” and works from lines and abstractions up to architectural elements.
- Then, other parts of the team design sound elements driven by interaction. The result is two types of sound experiences: the gallery’s surround sound experience and the experience through the use of the headsets.

Description of the industrial design processes.

1. Research into furniture and materials to generate the elements inside the gallery. Premise: Design of sculptural islands to contain soft structures within the grid as a starting point for the material experimentation. An initial phase to investigate the materials’ performance (lycra and polyurethane foam).
2. A briefing sessions on the concept of the grid, and transparency, allowing for a continuation of the linearity of the screen to the exterior. Therefore, the virtual and audiovisual became transferred to the analog element.
3. Material exploration and prototyping. The first idea was for expansive materials (for example, polyurethane foam) within the grid using prismatic and triangular designs. The sculpture was made out of plywood owing to its suitability for CNC router cutting.
4. A scale model was used to present the final model, inspired by the Meccano morphology (a system of self-assembly that can be expanded and worked on in modules). This supports the idea of modular, expandible construction processes and the assembly of the different parts.
5. Rhino and Rhino CAM computer aided manufacturing were used to make the files. The scale composition was adapted to the exhibition space and ended up being self-constructing.

6. Symmetry was not a defining value for the design of this sculptural furniture. To move away from the functional aspect, height was the only pre-set measure for access to the Meta Quest 2 headsets. However, the dimensions were expanded in a modular fashion.
7. The assembly took place within the space itself. Some transparent elements were added between the grid that entered into dialogue with the gallery's inflatable furniture to create a sense of transparency and reflection of light on these elements.

New Media students worked on hybrid strategies during the process:

1. Technological development: Technologies | Spark AR, Blender for VR environment, Ableton Live for sound elements, shaders programming (GLSL) for VR environment design, immersive narratives technologies, immersive sound design with Tidal Cycles, data-driven applications for VR environments, cloud integration and database modeling, Unreal Engine and TouchDesigner for custom software development.

- Programmer: General advice for the compilation of the application in Meta Quest 2, Integration and development of the multi users system for Meta Quest 2 and audiovisual content.

5. The relevance of Snap to Grid for the creation of the metaverse can be summarized in four aspects:

The immersive living space at a physical and digital level: While the metaverse seeks to explore remote digital spaces, the on-site living space is a new approach to enhance social coexistence and amplify human relationships.

The synchronized narrative experience: A controlled timeline for all participants allows the preservation of some traditional cinematographic techniques that have proven perfect to drive emotional responses. Massive VR events pose the challenge of orchestrating the emotional curve for millions of participants with too much freedom and visual incentives unsuited to the characteristics of digital worlds. In this sense, synchronous experiences may be the future of immersive entertainment on a mass level, as semi-free spaces that lead the audience through a linear narrative where the collective gaze activates part of the essence and meaning in the experience.

Lighting synchronization as a narrative tool: External stimuli in the form of light—from the screen and lighting fixtures—establish a new dimension of immersive exploration for VR experiences. The synchronization of the lighting with the interactive experience and the audiovisual material indirectly connects different senses to the experience; this introduces a different way of drawing attention to the piece's main narrative, as a subtle but continuous provocation that also directs the focal point of the collective experience.

Exposes the issue of control complexity for non-gamers: For those who have never used video game controls, mobility within the experience clearly becomes a problem; non-specialists' audiences do not fully grasp the possibilities of action through the device controls, and the viewing public needs longer to

internalize the conventions established at the start of the experience. However, the automated use of a camera as a general point of view and scene changes—a traditional audiovisual editing technique—make it possible to enjoy and appreciate the immersive experience.

The sense of freedom in physical-digital movement is fundamental for the early adoption of the metaverse outside the field of art or entertainment. This need calls for a more detailed path where skeuomorphism generates the initial trigger for sensations of comfort from the outset of the immersive experience. In this sense, Snap to Grid is an exploration of collective thought and sensation with the sole intention of navigating a digital space, without markers or pre-established missions, but with the idea of accompanying us while we move through speculative spaces.

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