

What is furniture in the metaverse for?



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Abstract

Since its beginning in the science fiction field, the Metaverse has been presented as the digital copy of the world. Neal Stephenson in *Snow Crash* (1992) imagined it as a virtual planet twice the size of the Earth, organized around the Street, an equator-like ring on which the activities align and develop on the surface of the Planet. In the novel, the Metaverse is populated by the digital alter-egos - avatars - of a small élite who find the exacerbated rituals and contradictions of a consumerist post-industrial society.

Snow Crash's Metaverse is a powerful metaphor for urban sociality, but, at the same time, it is also a dystopia. Duplicating the real world digitally, in fact, means facing and solving all its contradictions.

The literary model has inspired many social platforms that have taken the concept of doubling reality literally. In the leading platforms born as metaverses for social gatherings, such as *Second Life*, *Horizon*, *Decentraland*, *VRChat*, virtual architecture and design frequently model themselves on the real ones. Similarly, actions performed by people mirror the real world's. Given that the virtual world has neither gravity nor climate influences and the users do not have a flesh body, the needs in space are inevitably different. From the design perspective, this approach seems to waste opportunities: it roots in the usual rather than fully exploiting the potential of the new.

On the contrary, in metaverses born as videogames, architecture and design are accurately conceived to evoke a precise narrative and induce gamers to specific actions.

Some of the reasons for the normalization of metaverse spaces can be found in the ease of fruition. The users can approach a space with similar connotations and functions to the real one effortlessly. Other reasons deal with the background of people who are building the metaverses. The creation of the virtual world is open to professionals from different fields: neither design is conceived by designers nor buildings built by architects. Therefore creators often ignore the architectural and design culture and its basic methods. These untrained professionals could bring fresh air to the virtual architecture field. The mimetic model, however, seems to limit creativity so far. The essay aims to analyze from a spatial design perspective the reasons that fueled the frequent tendency of the mimesis of reality in a context entirely different in needs and potentials. Through case studies and literature, the research delves into the correlation between spaces, technologies, and actions in the metaverses born as extensions of real-life phases.

In the virtual world, actions are reshaped according to the connotations of the space and the technology involved. The more technology includes the real body in the virtual movement, the more concrete the actions become. Therefore, the crucial question is: what is the point of recreating the world in an infinite-potential platform if it is lived the same way as the real one? In a context with different potentials, actions should have different connotations to give additional value to what they have in the real world.

Keywords

Metaverse; spatial design; virtual worlds; skeuomorphism

Introduction

Since its inception in science fiction, the metaverse depicts a digital copy of the world. Neal Stephenson, the novelist who first used the word in *Snow Crash* (1992), imagined the metaverse as a virtual planet twice the of Earth's size, shaped around the Street, an equator-like ring on which activities aligned and developed. In this virtual world, the digital alter-egos - avatars - of a small élite live the exacerbated rituals and contradictions of a consumerist post-industrial society. Stephenson's metaverse is indeed a dystopia, but also a powerful metaphor for an urban lifestyle behind which it is easy to recognize Las Vegas and its Strip (Dionisio et al., 2013, p. 8).

For decades, the metaverse debate only occurred among experts, notably computer scientists, and engineers (Dionisio et al., 2013; Damar & Turkey, 2021). However, successful platforms reached a broader audience in the field of social gatherings, such as *Active World* (1995) and *Second Life* (2003), and gaming, such as *Roblox* (2006) and *Fortnite* (2011), which enlarged in number in recent years. The pandemic brought on these platforms an increasing mass of users. Finally, the decision of Mark Zuckerberg to reshape his 2 billion-user company into a metaverse in January 2021 skyrocketed the attention of the media (Narin, 2021). Metaverse websites proliferated accordingly.

We analyzed these platforms from a spatial design perspective, wondering whether the multiplicity of these metaverses may shed light on the features of spaces and places of our future virtual life. This study summarizes our findings and tries to highlight exploited and unexploited potentialities of virtual space.

Definitions and misunderstandings

Today, the noun “metaverse” usually refers to a freely accessible digital environment that allows social gathering, gaming, and trade. According to the Merriam-Webster dictionary, the word derives from the blend of “meta-” and “universe” (“Metaverse,” n.d.), literally “beyond the universe.”

The singular form “metaverse,” which is frequently used, expresses the idea of a single platform suitable for developing all aspects of virtual life; this form is flanked by the plural, “metaverses,” which, in fact, represents the current situation of the many existing platforms.

Today, having a single metaverse platform is a utopic vision; the potentially achievable system closest to this concept is the interconnection of the many existing platforms through a single account. Its advantage would be to access every service and web space with the same information. Consequently, all the account activities and online purchases could be accessed anywhere. The existing platforms, however, have long histories behind and consistently different purposes, which hinders the possibility of, and their interest in, interconnecting.

Since the major protagonists involved in web3 – the latest evolution of the web, based on decentralization, blockchain technologies, and token-based economy – have different ideas of how to shape the metaverse, it is a priority to provide the reader with a definition of “metaverse” adopted in this study, which is: a digital system that allows the *synchronous presence* of many users and their interactions. In other definitions, synchronous presence is frequently challenged, but the most relevant ambiguity lies in the structure of the platforms (Evans et al., 2022). In fact, in addition to the digital worlds accessible in *virtual reality*, some systems allow the synchronous co-presence of users through *mixed reality* while equally satisfying our definition.

Because of its mediatic relevance, the metaverse developed by Meta, *Horizon Worlds*, deserves to be mentioned first. Launched in December 2021, it is one of the youngest among the most famous metaverses (Rodriguez, 2021), but it is not notable for its innovativeness.

When Facebook changed its name to Meta on 28th October 2021 (Mac et al., 2022), the metaverse gained momentum, and definitively left its earlier condition of elitist web reality unknown to the general public. This massive mediatic move originated significant misunderstandings: everything dealing with the metaverse is often associated with the company, both in its functional and aesthetic setting. Instead, *Active Worlds* (1995) and *Second Life* (2003) are the first created platforms corresponding to our definition.

Second Life is the most renowned because, in its early age, it gained significant interest from visionary brands, such as Adidas (Siklos, 2006), universities, and even political entities, such as Swedish Embassy (Bengtsson, 2011), which built their headquarters there. Unlike *Active Worlds*, which in 2022 looks like a ghost town (*Active Worlds*, n.d.), *Second Life* has had a constant number of users, which has recently, even increased. In October 2022, it had about 200,000 active users daily and 500,000 active monthly (Signorelli, 2021), more than double the 200,000 monthly users of *Horizon Worlds* (Horwitz et al., 2022).

The concept of *Horizon Worlds* is very similar to *Second Life*; they both consist of a social platform focused on people

gathering and virtual purchases. They both have no ludic purpose but a video game-like aesthetic, and the access to the virtual world is through customizable anthropomorphic avatars. Therefore, compared to *Second Life*'s approach to virtual reality, *Meta*'s doesn't seem to add much.

On *Meta*'s website, *Horizon Worlds* is described as an “ever-expanding social universe” accessible using the *Meta Quest* headset – *Meta*'s hardware device for Virtual Reality (VR) – which involves customers in an engaging experience better than a two-dimensional fruition on the screen. In this respect, *Horizon Worlds* confirms the general trend of many social metaverses to enhance their attractiveness through VR technology.

Today the limited diffusion of headsets, due to their high price and the side effects caused by their prolonged use (Lawson, 2014; Kemeny et al., 2020), hinders the immersive use of platforms by many people who access the platforms mostly in 2D from computers or consoles. Indeed, according to Anand Agarawala, CEO of the metaverse *Spatial*, 80% of its customers use a computer or mobile (Levy, 2022). Also, *Meta Quest* has faced criticism, especially from its employees, who declined the CEO's invitation to hold their meetings in VR (Mac et al., 2022) because of its cumbersomeness.

Headsets are an open battlefield for the biggest technology companies. In addition to the *Meta Quest*, Apple is developing a device able to switch between VR and Augmented Reality (AR) (Charlton, 2022), Google has been working on AR viewers (Wall Street Talks, 2021), and Microsoft is developing its version too, *HoloLens*, focusing on Mixed Reality (MR) (*HoloLens 2*, n.d.). Along with the big companies, many other firms are also launching new headsets, such as HTC, PlayStation, and Valve Corporation, whose Valve Index is at the top of Tech Radar's ranking (Benetti, 2022).

The intensity of this competition is strongly connected with the development of the metaverse because the type of access profoundly influences its shape. Therefore, winning

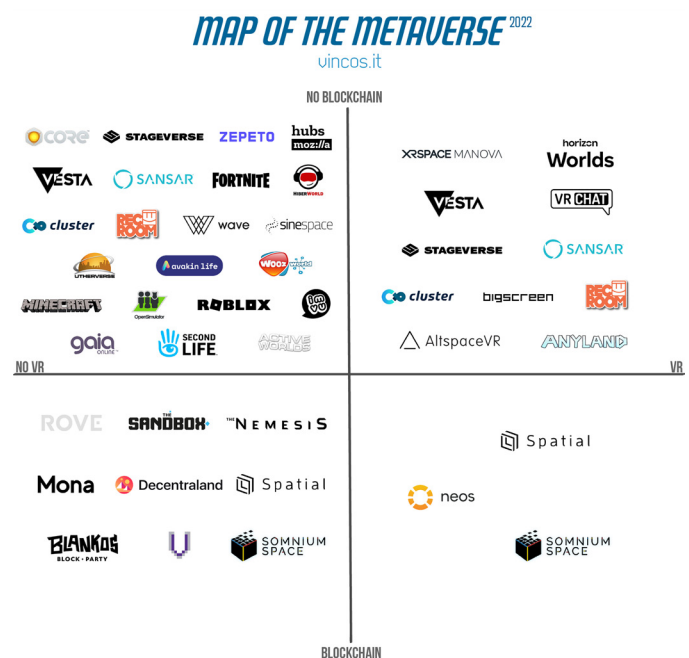


Figure 1. Map of the metaverse, Vincenzo Cosenza, 2022

the race guarantees dominance in a new market and the possibility to shape the users' experience of a new kind of web still under construction. The difference in approach between Meta and Microsoft may clarify the issues at stake: the former focused on VR devices and therefore is building a whole virtual world that allows the user to be isolated from his real surroundings and co-present with other users in the platform; the latter, which is working on MR, is designing a metaverse that preserves the direct experience of the physical environment while adding extra virtual elements in it, and developing the metaphor of teleportation technologically.

From games to social platforms

Matthew Ball, one of the greatest connoisseurs of the digital ecosystem and investor in the future of new technologies, identifies two main categories of metaverse: *game-like* and *non-game-like*. (Ball, 2022). *Game-like* metaverses are gaming platforms that developed thanks to an advantageous combination of user attendance, increased social purposes and decreased gaming reasons, and the farsighted response of the developers who intuited and accompanied the evolution.

Their primary purpose is to generate engagement through interactive narrative development; therefore, the narrative component of games lays the basis for all design choices. A notable example is *Fortnite*, which according to statistics, currently has 250.000.000 monthly active users, which makes it the most visited metaverse of all (Osservatorio Metaverso, n.d.).

Fortnite was launched in 2011 by Epic Games company, but began its exponential rise in 2017, the year in which a new game mode called *Battle Royale* was introduced; it allows the so-called Player versus Player (PvP) game instead of the traditional Player versus Environment (PvE) one (The Fortnite Team, 2017). This upgrade, brought many people to attend the platform to create communities rather than game-fighting each other. In this mode, Epic Games introduced live events, such as fight shows, movies, and concerts – emblematic cases were those of Marshmello, Travis Scott, and Ariana Grande – thus laying the foundations for an increase in engagement (Barbera, 2020).

Non-game-like metaverses are fundamentally social platforms, virtual spaces that allow people to meet and talk. They are frequently business-based and adopt both decentralized and centralized systems. This means that some are controlled by several figures, and some are owned and directed by a single company. Some relevant decentralized examples are *Second Life* (2003), *Spatial.io* (2016), *Decentraland* (2017); centralized ones are *VRChat* (2017) and *Horizon Worlds* (2021).

Gaming platforms and social platforms fundamentally differ in their aim. In the former platforms, architecture and design are accurately conceived to evoke a precise narrative and induce gamers to specific actions. In the latter ones, people can gather freely as if these virtual environments were a new contemporary cities. Therefore, the design of spaces focuses on the best conditions to induce social interaction. The challenge is shaping these new virtual meeting places effectively.

To study the spatial connotations of the platforms, we analyzed 55 popular metaverses, divided according to their immersiveness (VR or desktop view), belonging to a blockchain system, and primary purpose (gaming or sociality). Our survey focused on the spatial features of the sites, on their degree of adherence



Figure 2. Hoppin' World, <https://hoppin.world>

to the spatiality of the physical world (three-dimensionality, gravity, climate), with interest in understanding the reasons and purposes for their design choices and the exploited or non-exploited potential of virtual spaces. We identified three main sub-groups: *copy-worlds*, generally called *mirror worlds* (Gelernter, 1991), *semi-copy worlds*, and *experimental worlds*.

Mirror worlds are virtual copies of Earth that could be envisioned as the immersive evolution of satellite mapping websites, but with the intent of a metaverse. Their structure and aesthetics is similar to *Google Earth* and its twin *Bing Maps*, but their primary aim is to be meeting places instead of documentarist 3D maps. Even if the photorealistic effect unites them all in a specific category, these metaverses have consistently different structures.

The most direct approach to mirror worlds is that of the blockchain-based *Earth2* (2020). This metaverse comprises a perfectly rendered terrestrial landscape where users can browse through different transportation. The platform replicates a land market. Users can buy a plot corresponding to a specific place on the Earth and build on it. Due to the absence of avatars, which will be introduced shortly following an agreement with Ready Player Me (A2Analyst, 2022), the aesthetic coherence is not compromised by any unrealistic element.

On the contrary, *Hoppin' World* (2020) is distinguishable for its cartoon-like avatars, similar to *Horizon World's*, contrasting with the realistic video environment in which they move. This platform allows users to explore places on earth through 360° videos uploaded by other users. Therefore, the landscape looks alive and populated by real people recorded on the clips. Unlike other metaverses, it is *not designed* from a technical point of view, as it does not stand on a geometric mesh.



Figure 3. Decentraland, <https://decentraland.org/>

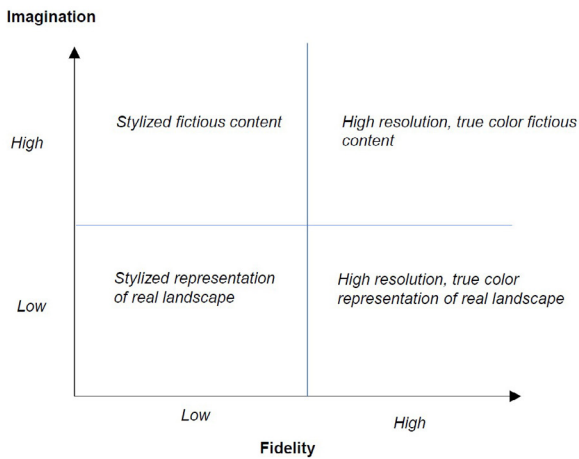


Figure 4. Designing Metaverse artifacts - Designing the Metaverse, Seidel et Al., 2022

Semi-copy worlds, instead, hold an intermediate position on design choices between mirror worlds and gaming metaverses. They are social platforms designed to recall some literal features of the real world but with a cartoon-like or video-game-like aesthetic. We can distinguish three main aesthetic threads: pixel art, Disney-like, and cyber-punk. The *pixel art* aesthetics derives from the first videogames design and has many examples in the gaming field; the most emblematic are *Minecraft* (2011) and *Sandbox* (2012). The *Disney-like* thread, instead, is based on a modification of archetypes typical of cartoons with very different levels of abstraction. *Decentraland* (2017), *Spatial.io* (2016), *Cryptovoxels* (2018), and *ChatVR* (2017) appertain to this aesthetic. *Cyberpunk* metaverses are instead hyper-realistic scenarios massively inspired by science-fiction literature and movies. Many platforms in this category make use of the powerful computer graphics engine Unreal Engine 5, such as *Netvrk* (2016), *Bloktopia* (2021), and *Wilder World* (2021).

Regardless of their aesthetics, semi-copy worlds host buildings with doors and windows, furnished with chairs, tables, and beds, as in real-life houses. In April 2022, even the first bathroom line for the metaverse was launched, "Meta-Loo," inevitably causing hilarity (Rowland-Dixon, 2022).

Each metaverse is clearly distinguishable aesthetic-wise. The following diagram illustrates the type of appearance through the parameters of *Imagination* and *Fidelity* (Seidel et al., 2022). Mirror worlds would be located in the lower right quadrant – low imagination, high fidelity – whereas semi-copy worlds would be located in the three other quadrants.

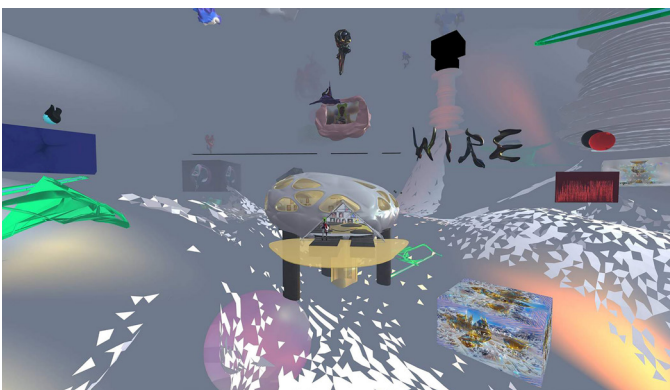


Figure 5. WIRE, Portrait XO, 2022, <https://newart.city/>

The third category of virtual environments we identified is *experimental worlds*. They constitute a small minority of non-game-like virtual worlds, designed without reality-mimicking, and experiencing virtual spatiality more radically. Unsurprisingly, these proposals challenging the physical world's limits deal with contemporary art and target people inclined to the unknown. For example, Bika Rebek from Some Place Studio, whose spaces look like extraterrestrial universes made of extra-large human-world elements and foams, put a different perspective on the design of virtual spaces (Rebek, 2022).

Similarly, Markéta Gebrian presents on NEOS VR platform the experimental project *Bodily Metaverse of Lisbon*, an artistic interpretation of Lisbon city center reshaped as an immersive virtual world. The VR environment enables "non-constructible and non-gravitational elements of architecture to be designed as floating floors, transposable elements, and teleportation features" and tests "the new opportunities that social VR brings to architecture design" (Gebrian, Florián, & Eloy, 2021, p. 133).

Frequently, virtual spaces corresponding to this category are not metaverses per se. Instead, they are worlds inside larger systems or independent platforms, such as *New Art City*, a brilliant example of a virtual space that doesn't mimic reality. It is a curated virtual gallery, whose exhibitions show free-floating elements in the space, with no perceivable limitation of distance nor connotations recalling the familiar human environment (*New Art City*, n.d.).

Skeuomorphism and comfortable habits

For decades, computer scientists and engineers have been working to produce a metaverse that could constitute "a compelling alternative realm for human sociocultural interaction." In a list of "four features that are considered central components of a viable metaverse," Dionisio and his colleagues put realism in the first place. The primary design effort – they state – should focus on shaping a "virtual space sufficiently realistic to enable users to feel psychologically and emotionally immersed" (Dionisio et al., 2013, p. 2). Therefore, from their perspective, there is no alternative to realism, as it provides effective foundations for the whole program.

The phenomenon of reality-mimicking is called skeuomorphism. The Oxford Dictionary defines it as "the use of symbols or other objects on a computer screen that look or sound like a physical object in order to suggest their purpose" ("Skeuomorphism," n.d.). While skeuomorphism is justified in video games by the presence of a narrative and gaming purpose, it becomes questionable in other metaverses as it shrinks the imaginative potential offered by technology.

Limitations that exist in the physical world do not exist in the digital one (Seidel et al., 2022). The metaverse is not subject to the rules of physics, therefore, devoid of gravity and climate problems. Natural phenomena do not obstacle construction, and there is no need to protect from rain: roofs are not needed, neither sheltering from cold or heat nor walls, if not as a visual limit. There is no need for furniture or urban and architectural elements to "live" in the metaverse.

In a world where the body does not feel fatigued, there is no need to sit or lay down to rest; food has no meaning, and no action is physically dangerous. From this point of view, the metaverse looks like the new paradise for advertising and sales: it is an audiovisual world in which the possibilities for action fall fundamentally on what you see, hear and possess; the only physical action allowed is moving in a certain direction, walking

or flying, and at most, in some metaverses, winking. In many platforms, much of the world can be reached by teleportation, a connotation that efficiently exploits the fluidity of the virtual, making the road connections ephemeral.

As much as one may use the metaphor of "living in the metaverse," it is hard to perceive its spaces as lively ones. As discussed in the book *Lost Zone. Hiking the dawn of the Metaverse*, some virtual worlds are likely to look – and be – abandoned since they don't respond to real needs (Belosi & Rafael, 2022). Exploring Active Worlds (AW), these authors moved across an abandoned land with all the connotations of a post-apocalyptic scenario, even with intact buildings. AW is the oldest metaverse, but the spaces that are currently visible, built in the last twenty-eight years, do not differ from the skeuomorphic design approaches of contemporary worlds. General users have built the urban structures; therefore, the scenario represents a non-curated accumulation of undefined and undefinable cultures. The authors encountered streets, cities, private and public constructions, cult buildings, and natural landscapes, an entire world that looks like a memorial of a lost society.

The continuous accumulation of these buildings recalls the *Junkspace* theorized by Rem Koolhaas (2006): a space resulting from careless planning that is transformed with the expansion of urban areas and characterizes contemporary cities. According to Koolhaas, Junkspace creates apparent unity but is actually a dividing space as it defines collectivity through the lack of well-defined shared rules; it is detached from the individual, an absent space which people can only perceive as an autonomous evolution: Man is only a witness, a "reluctant participant" (Koolhaas, 2006). In Koolhaas' opinion, Junkspace may transform the world into an immense public place without limits, language, and form. So it seems to have happened in the ruins of Active Worlds, and may happen to other metaverses built on the same approach.

Belosi & Rafael (2022) also raise the problem of the inconsistency of the metaverse, which looks, in their opinion, like a "literal simulacra of the real world." Although many professionals share this point of view, there is a general difficulty in implementing a more visionary approach. Bjarke Ingels, the founder of BIG Architects, showed an experimental method of conceiving architecture in the metaverse. He was the first to design a virtual building: Viceverse, the headquarter of the digital agency Vice Media in Decentraland. Ingels described as an "architect's dream" the absence of physical constraints, budget, and law regulations, which is verifiable in his virtual work that stretches the construction in an otherwise physically impossible way (Brandoli, 2022).

Virtual architecture is the ideal dimension also for Zaha Hadid Architects (ZHA) studio, which designed the general layout and all the buildings of the state of *Liberland* on Mytaverse as a meeting point for crypto companies and events. (Massoni, 2022) Both *Viceverse* and *Liberland* are architecture projects that look like IRL buildings in their concept phase, so before static and budget calculations, but they are still human-based buildings. Architects must still carry out a commission; consequently, experimentalism is limited by the client's vision. Moreover, even visionary studios like these seem resistant to abandoning the canons of architecture in favor of creating completely innovative experiences worthy of the possibilities of contemporary virtual technology.

Unlike BIG and ZHA, George Bileca, CEO of Voxelarchitects, a metaverse architecture studio, stated in *Domus* magazine that mimicking the real world gives newcomers "a chance to adapt to this space by offering them a reassuring environment" (Signorelli, 2022). In supporting the skeuomorphic trend in the metaverse, Bileca sounds more pragmatic and determined to favor a perspective of comfort for the users. But is comfort in the metaverse really given by chairs and bathrooms? And also, is comfort the best concept to pursue in designing it?

One main reason for the skeuomorphic approach is the ease of welcoming virtual people in an environment with known functions. Still, other factors could have influenced this process. The search for ease may come from the designers themselves, who are not trained to imagine non-human spaces and may find the mimic approach a more straightforward design method. Indeed, in web3, professionals from different fields approach art and design without appropriate education. The creative economy in the metaverse can provide equal opportunities for professional and emerging architects and people with entirely different backgrounds (Matoso, 2022). Therefore, coders or computer engineers can fill the role of urban planners and architects of the metaverse. Moreover, in many virtual platforms, such as Minecraft (a game-like metaverse), and Active Worlds (a non-game-like metaverse), the users are allowed to build structures on their own, which adds variety and stylistic indefiniteness (Matoso, 2022).

Lights in the cloud of troubles

The analysis conducted on the spatial features of the most popular active metaverses led us to understand that they depend on three main factors: the development of the technology adopted, the aim pursued, and the design culture of creators.

As far as technology is concerned, in addition to the constant development of computer graphics and programs, the choice of the technology of use is predominant for constructing these worlds. VR technology is one of the possible directions. For now, however, VR devices, as well as being prohibitive from an economic perspective, cause motion sickness (Lawson, 2012), so many users of the metaverse choose to enter screen mode. In our survey, 31 metaverses out of 55, more than half, are accessible only through the screen, which leads us to think that these platforms do not estimate VR as essential for development. The elitism and cumbersomeness of current headsets hinder projects based on immersive use, which can only grow by introducing lighter and more easy-to-use devices.

From a spatial point of view, the common thread of most of the investigated metaverses is the inclination to simulate the real world. Although the levels of interpretation and the aesthetics adopted vary substantially, the tendency toward realism is dominant. Not only have architecture and cityscape been replicated, but also the real estate market, which frequently leads the aim of many metaverses to speculation on lands and propriety prices (Schreier, 2011).

The aim of the single metaverses inevitably leads their design approach and justifies spatial choices. In game-like metaverses, whose purpose is creating involvement in the game, the design follows a specific narrative and fosters identification. Instead, in non-game-like worlds, which do not respond to any declared need, except social encounters and trade, the design of spaces becomes a unique tool to create value.



Figure 6. Miami, Wilder World, <https://www.wilderworld.com>

Still, in many cases, spatial research is limited to trivializing archetypes and a set of clichés. In contrast, mimesis could be an inspiring approach to conjure up scenarios that lead to reflection as an exercise to visualize the future, for example, in the Solarpunk direction (Pintarelli, 2020). The metaverses we defined as cyberpunk have great potential to evoke sci-

ence-fiction scenarios and make cinematographic environments experienceable.

Aside from experimental metaverses, whose approach exploits the absence of physical limits to create a spatiality detached from the real one and leads users to new cognitive experiences based on art and space research, the lack found in the most significant number of cases is that of references to visual culture. The opportunity of the variety of visual and design cultures, an enormous wealth of metaverses globality, often seems neglected.

Being the virtual worlds created by professionals from fields that often have nothing to do with the design culture, and given that architects and designers entered the sector after the creation of platforms, the methodologies and references typical of spatial design research still need to be integrated. Therefore, the creative potential that the virtual world allows, both for the absence of gravity and physical phenomena and its narrative and interpretative possibilities, could be exploited much more to add value to users' experience.

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