

What can the metaverse bring to architecture?

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Abstract: There are currently over 30 publicly accessible metaverse projects whose main goal is to bring a three-dimensional immersive version of the Internet. Architects should participate in such a challenge because they are educated in 3D modeling and organizing objects and events in space. Which of these projects has the greatest potential for use in architectural creation? What criteria and characteristics of these open metaverse projects are key for architects? The main goal of the work is the use of the metaverse in participatory projects and co-design.

1. What is (will be) the Metaverse

There are currently over 54 different definitions of what the Metaverse is or will be (Park and Kim, 2022). Some are descriptive, some already even normative, yet a common tendency already crystalized towards an extension of what we understand as internet today to the third dimension with focus on users owning their platform data. Park and Kim extend this effort by gathering and comparing many different angles of a possible general Metaverse definition (Park and Kim, 2022). For the scope of this paper, let's consider the definition to be a 3D virtual space with many qualities of the current internet enhanced by the immutability and transparency of blockchain data with decentralized distributed governance.

2. Using the Metaverse to enable architectural work

Ching states that Architecture is defined as the making of a place by the ordering and definition of meaningful space, as developed in response to a need or program (Ching, 2015). It is also described as the expression of society or culture in spatial, experiential form (Campbell, 1996). Both of these definitions describe architecture as a concept or idea which has both physical and virtual expressions (Campbell, 1996). Meaning that the virtual spaces of the Metaverse are not such a new phenomenon since virtual architecture has been around for already a couple of decades. The novelty which metaverse brings stems from its blockchain infrastructure. Contrary to M. Gebrian who supports the idea that the Metaverse should offer abstract spaces to be explored (Gebrian, 2022), the Metaverse can also become a

digital twin of a place in the physical world. Then the transparency and immutability of blockchain data can be useful to the real-world use-cases.

2.1. Transparency and Incentivization using blockchain

The difference between a virtual world and the Metaverse lies in the fact that in the Metaverse the user has ownership of the platform data describing his or her status, her or his possessions etc. using blockchain. This contrasts with current situation where almost any platform data is owned and maintained by the platform itself for example like on Facebook, World of Warcraft, Fortnite, Roblox and many other web2 platforms. A new institution named OPEN METAVERSE ALLIANCE FOR WEB3 was formed to enforce the idea that ownership of data should belong to the user (*OMA3*, 2022, p. 3).

All transactions of any crypto-identity are publicly visible and verifiable using blockchain explorers. This leads to unprecedented level of transparency. Which by itself doesn't mean much however coupled with democratic processes might usher a new era of public discussion and search for consensus. This is already reflected in the work of T. Asikis regarding Value-Sensitive Design Approach (Asikis *et al.*, 2020).

Another aspect of the Metaverse being built on a blockchain is monetization (or tokenization) of almost every aspect of it. All the assets (interactive objects) in the Metaverse are going to be some kind of a token – a unique non-fungible one or an interchangeable fungible, currency-like one. This means that tracking of contributions, work, time, and achievements can be directly linked to real economic transactions. Those who contribute to a public discussion in a positively perceived way can benefit from it based on a new economic business model dubbed Play-to-Earn (P2E). This model is currently being tested and developed in blockchain gaming, but has far bigger consequences for the whole Creator Economy (Zhan, Xiong and Xing, 2022).

An open metaverse can then host a variety of events which can be relevant to real physical places. In the scope of this paper, let's explore one of them – a participatory co-design workshop with aim to extract citizens' needs and demands for a new design of a public space.

2.2. Co-design workshop enhanced by the Metaverse

One of the important tasks in this context is to gather a meaningful number of motivated participants for the workshop. In numerous countries and cities this even involves a financial reward for the citizens. The Metaverse can serve as another motivating factor by providing immutable and publicly verifiable data about who participated. This can be then extended to a more granular level giving rewards for successful ideas and proposals which end up being used in the design brief for professional urban designers. Such a concept is a part of an economical paradigm shift commonly referred to as the Creator Economy. In general, most of the current metaverse projects with ambition of contributing to the (one, interconnected, interoperable) Metaverse plan to incorporate the approach of the Creator Economy to generating vast amounts of interactive objects in huge open-world spaces. Such collective effort is still more promising than other approaches to generate worlds in such detail on such a large scale. The use of generative design in case of a video game named No Man's Sky brought unexpected challenges (Tach, 2015).

Since the participant can publicly verify that he or she has done substantial work for the betterment of a public space at hand, this can turn into a directed financial rewards and also reputation building scenario. Meaning the Metaverse could serve as a public display of community engagement and as a new platform for public discussion about our shared urban spaces. The idea of using blockchain to augment democratic processes is being investigated by E. Pournaras and he has already proven there is a lot of potential in this research

(Pournaras, 2020). Once there is a truly open Metaverse, his findings can be applied in there as well.

2.3. Current development

Currently many metaverse projects use a voxelated 3D representations which brings them close to successful multiplatform game Minecraft which popularized it. Even co-design workshops already experiment with Minecraft game as a medium to express design ideas in 3D by users unskilled in 3D modelling (Delaney, 2022) (Westerberg and von Heland, 2015).

However, is Minecraft ideal modelling environment for unexperienced 3D modelers to express their ideas? (Andersen and Rustad, 2022), (Soffar, 2016) Is there a better modelling approach or 3D model representation for such context and users? (Carbonell-Carrera *et al.*, 2021) Is there a combination of current 3D modelling approaches which would be more efficient?

List of 3D modelling approaches

Constraint modelling
Dense Depth Maps Modelling
Discrete Elements Modelling
Dynamic Spine Volume
Modelling
Editable Poly Modelling
Extrusion Modelling
Kit bashing
Mesh Modelling
Non-manifold modelling
NURBS Modelling
Photogrammetry
Point Cloud Modelling
Primitive Modelling
Sculpting
Simulation
Subdivision Surface Modelling
T-Splines
Voxel Modelling
Wave Function Collapse

*Table 1: 3D modelling approaches***References**

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