Social Networking in the Metaverse: Affordances of VR-enabled Connection

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ABSTRACT
The rebranding of Facebook to Meta and Apple's announcement of an AR/VR product in 2023 have sparked renewed interest in virtual worlds. These worlds are seen as the next phase in human interaction, extending beyond today's social media apps to offer a more immersive experience. However, questions remain about the adoption of this technology and its resonance with users accustomed to existing social media forms. This paper draws on Nagy and Neff's idea of "imagined affordances" to explore these questions, focusing on the intersection of technology and human agency. These affordances arise from the interaction between actual technological artifacts and user perceptions, attitudes, and expectations, de-emphasizing the designer's intent and allowing for the exploration of unintended uses. This approach is crucial for investigating emerging technologies like the metaverse, which are likely to yield novel and unexpected practices.

Keywords: affordances, metaverse, social networking, technology adoption, Virtual Reality (VR)

INTRODUCTION

Mark Zuckerberg's decision to rebrand Facebook to Meta reinvigorated interest in the potential of the metaverse, an interest that was accelerated even more with Apple's 2023 announcement of its own AR/VR product. While not all visions of the metaverse are based on VR, it has become one of the most prominent technologies associated with the concept and has been showcased by a number of commercial enterprises in relation to their metaverse activities. VR has already been used to play games, increase workplace efficiency, aid in training and education and, most frequently, enhance social connection through its ability to simulate presence. However, while many metaverse advocates have taken the technology's ability to enhance human connection for granted, few have sought to explain the actual mechanisms by which this might occur.

This paper seeks to address this issue by using an affordances framework to unpack how the interactions enabled by today's social networking services might evolve in the VR-enabled environment of the metaverse. Affordance has been chosen here for its ability to explore the interaction between people and technology without ascribing an overly deterministic role to either. By carefully mapping out the recognized affordances of both social media and virtual reality and then identifying the points of intersection between them, this paper aims to explore how the social and technical practices embedded in contemporary social media might evolve in the transition to the VR-enabled, 3D environment of the metaverse.

AN AFFORDANCES APPROACH

To explore how social networking might work in a VR-enabled metaverse it is important to understand the socio-technical dynamics that underpin both existing and emerging platforms, and in this respect the idea of affordances offers a useful framework. Affordance theory was first popularized by James J. Gibson in his book *The Ecological Approach to Visual Perception* in 1979. Arising from the field of cognitive psychology, the concept refers to the opportunities for action that an object or environment presents to an organism. Importantly, Gibson argued that affordances are properties of the environment that are directly perceived by the organism, rather than being inferred through the processing of sensory information. Affordances of an environment ultimately enable the behaviours of an agent operating within it: a flat surface presents the affordance of walking, while a steep slope presents the affordance of climbing. It is this relationship that explains the way in which agents and environment become inextricably enmeshed (Scarlett and Zeilinger 2019).

As Hafezieh and Eshraghian (2017) note, Gibson's formulation of affordances cuts across the subject/object dichotomy, meaning that the premise can easily be applied outside the natural environment. This prompted researchers from a wide range of fields to utilize the concept in their work, with Human-Computer Interaction (HCI) and Information Systems (IS) being perhaps the most prolific areas. This is because the concept bridges the gap between technological determinism and social constructivism (Volkoff and Strong 2017), assigning neither people nor machines a dominant role, but instead arguing that it is the interaction between the two that is the source of an affordance.

While Gibson's work is often seen as the origin of affordance theory, it is Donald Norman's conceptualization that is most commonly drawn on in practical research. Norman developed the idea of affordances further to include the role of the user's understanding and knowledge of the object. He argued that an object's affordances are not always immediately obvious, and that the user's understanding of the object's function and operation is an important factor in determining possible action. Most critically, whereas Gibson's concept of affordances emphasized the direct perception of the environment, Norman's emphasized the role of cognitive processes in interpreting the environment. This allowed Norman to distinguish between 'perceived' and 'real' affordances (Costa 2018), with the former focusing on how the physical appearance of an object provides the user with clues about its function, while the latter refers to the physical characteristics of an object that make a function possible.

Nagy and Neff (2015) expanded on this idea and also redefined the concept of affordances by returning to its origins in environmental psychology. They argued that the way that affordances had come to be used in fields like design has actually limited its usefulness for areas like communications studies by "failing to capture the complexity of the interactive production of the stuff of communication" (1). In response, the authors proposed what they term "imagined affordances," which they describe as emerging "between users' perceptions, attitudes, and expectations; between the materiality and functionality of technologies; and between the intentions and perceptions of designers" (5). Key here is the idea that affordances do not have to be tied to intention on the part of the designer or the user, and that uses and actions can arise from misunderstandings and/or misinterpretations of an object's affordances. For these authors, the concept of imagined affordances allows for an examination of key attributes of modern communication technologies, including mediation, interactivity, and affect.

For the purposes of this paper, I will be focusing primarily on Nagy and Neff's idea of imagined affordances, because, as the authors state, "the technological affordances of new versions of communication technologies, then, may become constituted partly by the perceptual and affective states of previous versions' users" (7). While the metaverse has been positioned as a new development, it is also the result of the integration of a number of existing technologies and attendant social practices. This is especially true of VR, which while still in its infancy has already become an established part of media practice in activities such as computer gaming. By exploring the imagined affordances of both social networking and VR, it is possible to identify points of intersection between them, thereby revealing some of the new affordances offered by the emerging metaverse. Firstly, however, it is necessary to briefly explore the origins of the metaverse concept and clarify what is meant by the term in contemporary usage.

METAVERSE EVOLUTION

Although the recent surge of interest in the metaverse was prompted by Facebook's transformation, the term itself can be traced back to Neal Stephenson's 1992 novel *Snow Crash* (Dwivedi et al. 2022). In the novel, the central protagonist switches between a dystopian vision of future Los Angeles and a virtual world called the Metaverse, with each location depicted as being as real as the other from the characters' perspective. The novel has since become one of the key

influences on the cyberpunk movement and has been directly referenced or alluded to in countless books, comics, films, television series, and video games.

The popularity of Stephenson's work can be at least partially attributed to the resonance of the idea of a virtual world that reflects and refracts lived reality. Parallel worlds—either virtual or extra-terrestrial—have long been a staple of science fiction storytelling, and thus it is no surprise that people have been trying to create working versions of a metaverse for as long as the technology was capable of doing so. Some of the earliest versions of this were Multi-User Dungeons (MUDs) of the late 1980s—text-based imaginative universes that were often based on pen-and-paper role-playing games. These subsequently transformed into MUD, Object-Oriented (MOOs), which increased the versatility of the platforms while still remaining largely text-based.

As technology progressed, increasingly sophisticated virtual worlds have been produced, some directly seeking to imitate the environment described in *Snow Crash.* Early examples included *Habbo Hotel*, *Second Life* and *PlayStation Home*, all of which encouraged users to engage in a range of activities including shopping, entertainment, education, and socializing through the use of virtual avatars. More recent attempts have tended to come from the games industry, often focusing more on younger users. Of these *Roblox* represents the most notable example, having accumulated 47 million daily active users by 2022 (Hollensen, Kotler, and Opresnik 2022). In many ways *Roblox* is a simplified version of Sony's PlayStation *Home* platform, with less realistic avatars and environments and a more cartoonish graphics style in keeping with the younger audience it targets. As with *Second Life* before it, one of the main attractions of *Roblox* is the ability for users to create their own content. With more than two million developers creating content for the platform, they earn a 50% cut of the revenue for their efforts (Khahif 2020). Like *Second Life*, brands have begun to explore the platform, drawn by its large and predominantly young user base. By 2022, several major companies had experimented with the *Roblox* space, with clothing brands such as American Eagle and PacSun among the first to establish a presence in the virtual world (Wheless 2022).

All these virtual environments represent attempts at creating a metaverse like that imagined by Stephenson in his 1992 novel, albeit with their own distinct characteristics based on their social or commercial objectives and the technology available at the time of their creation. This is reflected in the academic literature on the subject, with a significant amount of work devoted to defining the concept. Park and Kim (2022), for example, identified 54 distinct variants of the metaverse from a survey of more than 260 published papers on the topic. While there are a variety of perspectives embodied by these definitions, there is also a significant overlap, suggesting that there are several key elements thought to comprise the metaverse idea.

Firstly, many definitions of the metaverse focus on the potential it has to replicate or extend common activities. For example, Connolly, Stansfield, and Hainey (2011) use the example of *Second Life* and other Augmented Reality Games (ARGs) to explore how virtual worlds can be used in education, suggesting that this form of technology will become increasingly important when dealing with what are often termed "digital natives" (1389). Grings, Trein, and Oliveira (2009) also discuss the metaverse in terms of its capacity to enhance education, noting that the defining feature of this technology is its ability to create telepresence. Whereas other forms of media position the user as an observer, virtual worlds explicitly position them as a participant: "Being

present is no longer limited to physical presence as determined by the limits of the physical body, since our new technologized, digital-virtual bodies can be here and there at the same time, permit us to construct and explore fresh realities, experiences and feelings" (28). This idea is operationalized by Papagiannidis and Bourlakis (2010), who see the metaverse as the obvious next step for retailing. According to the authors, traditional retailing has been product orientated, while electronic retailing shifted the emphasis to customer service. Metaverse retailing, they argue, shifts the focus to the experience itself, noting that the use of avatars in virtual worlds can lead to a unique "retail theatre experience" (425).

Many of the recent corporate attempts at defining the metaverse also focus on this capacity to extend real-world activities into the virtual realm with Mark Zuckerberg, for example, focusing his definition on the idea that the metaverse is connected to the real world but could extend our capabilities beyond it. In his announcement at the Connect 2021 event, Zuckerberg described the metaverse as "a set of interconnected digital spaces that lets you do things you can't do in the physical world. Importantly, it'll be characterized by social presence, the feeling that you're right there with another person, no matter where in the world you happen to be" (Meta 2021). The announcement went on to describe the various activities that would be impacted by the metaverse, focusing on entertainment, work, fitness and social interaction, and highlighting the technologies that would be at the center of the metaverse's evolution. Unsurprisingly, virtual reality was given the most prominent position through the company's existing and planned head-mounted displays (HMDs), but the announcement also focused heavily on Augmented Reality and the partnerships it was developing to explore this technology.

A second common element across most definitions of the metaverse is the potential for enhancing human interaction. Dionisio, Burns, and Gilbert (2013), for example, suggest that it might be defined as "a fully immersive three-dimensional digital environment in contrast to the more inclusive concept of cyberspace that reflects the totality of shared online space across all dimensions of representation" (7). The potential to build community is also the focus of Forte et al. (2010), who define a metaverse as "a virtual place where a cyber community of individuals can share social interactions without the restrictions of the physical world" (80). Community is also at the central focus for Kim, Lee, and Kang (2012), who argue that the key to understanding virtual communities is the interaction between the real user and their online avatar representation. This point is reiterated by Schroeder, Huxor, and Smith (2001), whose study of the *Activeworlds* virtual environment highlights the way different avatars are used to define social roles.

Human interaction is also the focus of Microsoft's position on the metaverse, with CEO Satya Nadella outlining his vision for his company's involvement in the metaverse at the Microsoft Ignite 2021 event: "As the digital and physical worlds come together, we are creating an entirely new platform layer, which is the metaverse. We're bringing people, places and things together with the digital world in both the consumer space as well as in the enterprise" (Takle 2021). Finally, the vast majority of metaverse definitions suggest that the environment must be three-dimensional, with Wright et al. (2008), for example, defining the metaverse as "an extensive 3D networked virtual world capable of supporting a large number of people simultaneously for social interaction" (263). Similarly, Messinger et al. (2009) define the concept as "Virtual worlds, where thousands of people

can interact simultaneously within the same simulated three-dimensional space" (204), going on to identify a number of virtual environments that were already in operation at the time of writing.

Commercial visions of the metaverse also focus on the three-dimensional nature of the environment, with graphics giant Nvidia describing it as the next generation of connectivity experienced in 3D, though they take exception with the way the metaverse is often described. According to the head of Nividia Omniverse research team, Richard Kerris:

> People are misinterpreting metaverse as a destination, a virtual world, a this or that. The metaverse is not a place, it's the network for the next version of the Web… In much the same way the Web unified so many things, the next generation of that Web, the core underlying principles of that will be 3D, and with that comes the challenge of making that ubiquitous between virtual worlds. (Ray 2022).

Since the interaction in the metaverse will occur in 3D, many visions of the metaverse suggest that virtual reality hardware will be a key facilitator. Both Microsoft and Meta have their own VR hardware that they promote in discussions of the metaverse, with Meta in particular being aggressive in selling its Quest 2 and 3 VR headsets. VR fundamentally changes the way people engage with a platform, and research suggests that it will play a key in many metaverse activities such as shopping (Han, Bergs, and Moorhouse 2022), education (Hedrick et al. 2022), sports (Demir, Argan, and Halime 2023), health care (Bhugaonkar, Bhugaonkar, and Masne 2022) and especially social interaction (Rospigliosi 2022; Jiaxin and Gongjing 2022; Liang et al. 2023). From this brief review we can see that many of the most prominent visions of the metaverse portray it as an immersive, three-dimensional virtual environment which large numbers of individuals can simultaneously inhabit.

In the following section I will focus on the social interaction element in particular, exploring how the transition into a three-dimensional space accessed via VR might affect the practice of social networking as we know it today. To do this, I will outline some of the key affordances of both social networking and virtual reality, and then explore the potential intersections between them.

AFFORDANCES OF SOCIAL NETWORKING AND VIRTUAL REALITY

Social media, and social networking more broadly, has been extensively discussed from an affordance perspective. As Fox and McEwan (2017) note, this approach allows researchers to identify similarities and differences across platforms and time periods. Over the past decade a significant body of research has emerged which attempts to identify the key affordances of social networking and map their existence across different platforms. Across this body of literature there is considerable variance in both the number of affordances identified and their descriptions, but it is possible to identify three major themes that tend to be consistent across most studies.

The first of these is what could be termed "profile building" and refers to the ability of users to construct online identities to use on specific platforms. Profile building is identified by O'Riordan, Feller, and Nagle (2016) as one of the key affordances of social networking, with different platforms offering slightly different tools for creating one's online persona. As the authors note, the amount

of detail a user can add to their profile on Facebook is considerably more than is possible with Twitter or YouTube (251), pointing to the idea that promoting the user's online identity is one of the key objectives of that platform. A similar idea is expressed by Chen and Peng (2022), who draw on the work of O'Riordan et al. but combine some of their affordances, arguing that the self-profile also encompasses affordances such as privacy and anonymity. A version of profile building also features prominently in the work of Treem and Leonardi (2013) under the banner of "visibility," with the authors noting that one of the key features of present social networking platforms is their ability to make the behaviors, preferences, and activities of individuals visible to others with in their network (150), thereby allowing for the creation of a very nuanced self-profile.

Related to profile-building, the second affordance commonly associated with social networking is social presence, which Fox and McEwan (2017) define as "the feeling that interactants are near and sharing the same experience together" (302). This idea is also discussed by Rice et al. (2017) as "visibility" and Lüders, Dinkelberg, and Quayle (2022) as "encapsulating shared emotions." This affordance is also related to social connectivity, which O'Riordan, Feller, and Nagle (2016) describe as the "linking of individuals in a system, through both commonly held information (resource connectivity) and social contacts" (347). Social presence also features in the work Chen and Peng (2022) where it is discussed as "communicating with others" and Treem and Leonardi (2013) where it is referred to as "association." Leidner, Gonzalez, and Koch (2020) also identify similar concepts in their study of the use of social media in an organization context, though in their study they label them as "networking" and "organizational visibility" which work to collapse profile building and social presence to some extent.

The third common social networking affordance in the literature is "persistence," which Treem and Leonardi (2013) describe as content that retains its form on the communication platform over time. Fox and McEwan (2017) offer a slightly different perspective, suggesting that persistence is a function of the ability to easily capture, save, and replicate digital information. Boyd (2010) extends this point by arguing that persistence in social networking refers to "online expressions [being] automatically recorded and archived" (46). For Rice et al. (2017) persistence has two connected but distinct dimensions: the ability to maintain relations with others regardless of activity or location and the continued availability of information or messages after they have been posted. This description of persistence is also offered by Manata and Spottswood (2022) whose work represents an updating of, and extension to, Rice et al.'s earlier work.

Turning to virtual reality, the literature pertaining to the affordances of VR is also quite diverse, but again it is possible to identify a number of affordances that feature across multiple studies. The most prominent by far is the affordance of "embodiment," which Dincelli and Yayla (2022) define as users perceiving "the virtual body they control as their own biological body and its social and physical actions in the virtual environment as their own actions in real-life" (3). Embodiment also features heavily in the work of Shin (2017, 2022), Zheng, Xie, and Liu (2018), and Raz (2019), who argue that this affordance in particular moves the user's experience beyond other forms of mediation such as cinema or gaming.

Another affordance of VR that features prominently in the literature is "presence," which Shin (2017) describes as "the extent to which two people interacting via VR feel as if they are together

(1830). In some ways presence is an extension of embodiment in that the feeling that one is inhabiting their avatar (as opposed to merely controlling it) increases the sense of connection the user has to the virtual world and those they interact with inside it. As Coelho et al. (2006) note, presence in virtual reality is often connected to the sophistication of the simulation, with higher fidelity in the environment making the user feel that the experience is less mediated. This leads Raz (2019) to suggest that the affordance of presence in VR can greatly enhance the emotional response users have to an experience, far greater than is the case with traditional media like cinema. This was also noted by Shin (2022) in their experimental research, which found that the greater the visual fidelity of a virtual space, the greater the feeling of presence experienced by the user.

Finally, "immersion" is identified as a key affordance across several studies, often in combination with embodiment and presence. Shin (2017) suggests that users of VR systems frequently use terms such as "absorption" and "engrossment" to describe their experiences, but these are really proxies for immersion, which the author defines as "deep engagement with the medium." Steffen et al. (2019) expand on this, suggesting that one of the key features of virtual reality is its ability to immerse users in a simulation to such a degree that they forget that they are engaged in a mediated experience, mentally removing themselves from their physical environment. Lee et al. (2018) argue that, similar to presence, the visual fidelity of the virtual world plays a key role in enabling the affordance of immersion, with accurate representations of events, people, and places being more likely to lead to an immersive experience. For Zheng et al. (2018), the affordance of immersion is what makes virtuality reality a great tool for education, as the ability to deeply engage users with an experience works to remove distractions and maintain focus on the prescribed task.

SOCIAL NETWORKING IN THE VR METAVERSE: AFFORDANCES AS MODIFIERS

In the preceding section I outlined a number of commonly identified affordances in the literature pertaining to social networking, as well as some of the most common affordances associated with virtual reality. In this section I will look at the potential interaction between these affordances, as this will help illuminate some of the issues we might encounter as social networking transitions to the VR metaverse. In this respect, Nagy and Neff's (2015) notion of imagined affordances is especially useful, as it recognizes that affordances "can include the expectations and beliefs of users, whether or not they are "true" or "right" (4). Users will approach social networking in the metaverse with the imagined affordances of social networking from their experience of current platforms, combined with imagined affordances of what the new platforms might enable. The actual experience of users will likely be a combination of both, with the affordances of social networking being modified by the affordances of VR.

The affordance of profile building represents one of the clearest examples of this, as all current visions of the metaverse have the creation of personal profiles as the first step to engaging in the virtual world. However, unlike traditional social platforms, profile building in the metaverse is likely to be focused around creating persistent 3D avatars as the affordance intersects with the VR affordance of embodiment. With some rare exceptions, a user's social identity is not transferable between social networking platforms; one's identity on Instagram is usually different from one's

identity on TikTok, which is again different from one's identity on Snapchat. In the VR metaverse, avatars will likely persist across different worlds and platforms, enabling users to project a unified identity wherever they go online.

This is due to the fact that VR experiences encourage users to embody their avatars to a level that exceeds traditional platforms. Character creation in video games has already demonstrated that players will often spend many hours crafting their in-game personas, requiring far more time and effort than the simple 2D pictures that represent users in current social networks. This alone suggests that users will be less likely to have multiple avatars representing them in metaverse spaces, especially given that the interoperable nature of the platform means that avatars can move between virtual spaces. This practical consideration is reinforced by how users psychologically engage with their avatars in VR, for as Raz (2019) suggests, in VR the user and avatar can be brought into "an unprecedented perceptual proximity" (1005). There is already an extensive body of video game research that demonstrates the powerful connection players form with their in-game characters (Ferchaud et al. 2020; Li, Liau, and Khoo 2013; Banks and Bowman 2021; Fraser, Slattery, and Yakovenko 2023), and it is reasonable to assume that similar attachments will form between users and their metaverse avatars.

The practical and psychological incentives to limit the number of virtual identities one has in the metaverse is likely to be compounded by economic factors. Just like video game characters, metaverse avatars will be highly customizable. However, as Joy et al. (2022) explain, this customization is likely to come at a cost as brands seek to expand their presence into virtual spaces—a practice that, as noted earlier, was already established in virtual worlds like *Habbo Hotel* and *Second Life*. Brands such as McDonalds, Ray Ban, Nike, Adidas, and Vans have already established metaverse strategies and have begun their first tentative forays into the space through experiments on platforms like Roblox (Spajić et al. 2022). One of the more interesting examples of this is the fashion retailer Zara, whose Lime Glam line of digital apparel provides a clear illustration of how the commercialization of profile building might work (Fakhry and Nasr 2023). While users may be able to share branded items between a number of avatars, the effort required to customize and re-customize their online persona for each virtual space they enter might work to discourage frequent changes.

A similar interaction between affordances is likely to occur with social presence, which unsurprisingly intersects with the VR affordances of presence and immersion. Whereas much of the interaction on contemporary social networking sites tends to occur in an asynchronous manner, many visions of the metaverse leverage the affordance of presence and emphasize the synchronous nature of interactions in VR spaces. Such interactions are already available in experiences like *Horizon Worlds* and *VRChat* and are actually implicit in the way interaction is described: a user interacts with their network 'on' Facebook while they interact with their network 'in' *Horizon Worlds*.

The shift in terminology also demonstrates how the move to VR collapses the affordances of social presence and immersion. As noted earlier, immersion involves engaging with a medium to such an extent that the outside world fades away, and it is likely that the immersive qualities of VR will enhance feelings of social presence among users. Indeed, the creation of virtual spaces such as

those available in *VRChat* allows for specific types of social connection based on the space itself. For example, users of VRChat can already visit spaces where they can engage in virtual cooking classes (*Kitchen Cooks!*), play mini golf (*Putt Put Quest*), or interact with virtual puppies (*Happy Hill Dog Park*), with each of these experiences incorporating and extending the affordances offered by existing social media platforms.

Research across multiple fields suggests that virtual reality can greatly enhance social connection. A study by Freeman and Acena (2021), for example, found that engaging in activities such as those described above proved to be an excellent way of fostering strong interpersonal relationships. This finding was also shared by Deighan et al. (2023) who found that *VRChat* could be used as a tool to alleviate loneliness and promote better mental health, to such an extent that some study participants wished they could carry over features from the platform to their offline lives. Similarly, Maloney et al. (2020) found that participants in their study actually felt greater social connection than in many offline encounters, with physical gestures seeming to feel more intimate in the virtual environment, despite the lack of haptic feedback.

VRChat actually offers a fine example of Nagy and Neff's assertion that imagined affordances opens up a space for novel and often unexpected applications of technology. *VRChat* was designed as a way of enhancing traditional text-based chat services by having users interact through three-dimensional avatars. While many users engaged with the platform in the way designers intended, others quickly discovered that the avatars could be used to simulate sexual activity and other adult-orientated actions. This has raised many concerns over the safety of *VRChat* for minors and the need to create regulation appropriate for this emerging platform for social interaction (Trauthig and Woolley 2023). In this instance we are seeing users taking the imagined affordances offered by VR and using them to create new forms of social interaction. The fact that participants were inclined to engage in sexual activity using their VR avatars also points to the extent to which they felt they were embodying their online personas.

Finally, the social networking affordance of persistence is also likely to be modified by VR, but in more complex ways than was the case with profile building or social presence. In traditional social networks, persistence facilitates greater connection between users because content that is posted online tends to stay online, thereby creating a continuity of engagement. This is especially true of platforms like Facebook and Instagram, where posted content can be engaged with by other users almost indefinitely. Every interaction leaves a trace: a comment is replied to and the reply itself elicits a response, or a meme is re-edited and reposted While most platforms offer options for synchronous interaction, their default modality is asynchronous. In this respect, social interaction in the metaverse is likely to be both more persistent and more ephemeral than what we see with contemporary social media platforms.

Persistence is also a feature of VR environments, with rooms and other virtual spaces persisting from one instance to the next. A virtual object might occasionally be moved, but a user leaving and returning to a virtual space will find it almost exactly as they left it. While the accidental or deliberate deletion of content might inconvenience users of current platforms, the removal of elements of a virtual environment that users inhabit potentially destabilizes the environment itself and destroys the VR affordance of immersion; a user will expect the environment they inhabit to persist from

one visit to the next, and for other users in the same virtual space to experience it in much the same way they do. Thus, a chair placed in a virtual room must be rendered the to the same dimensions and in the same location for all users simultaneously inhabiting that space, and many core elements such as the location of different areas should also be persistent from visit to visit. We can already see this in operation in early metaverse test environments like *Horizon Worlds* and in earlier non-3D worlds such as *Second Life.*

As noted above, the affordance of embodiment means that the avatars will also be persistent, with the open and interoperable nature of the metaverse allowing the same avatar to be used across a range of different platforms and spaces. However, the experience of any one virtual space will be a constant stream of avatars appearing and disappearing as users connect and disconnect. Most importantly these users will often leave no trace of their existence: in contrast to current social networking platforms, the synchronous VR environment will wipe evidence of their engagement once they disconnect. In the metaverse users will persist across spaces, and the spaces themselves will persist from visit to visit, but interaction between users will be fleeting. It would be like a Facebook page that records no posts, or a Linkedin profile that deletes all messages once a user logs off.

CONCLUSION

Compared to its period of peak-hype in the years 2021 and 2022, the term "metaverse" has almost disappeared into irrelevance; Google trend data shows that searches for the term reached their peak in January 2022 before slowly declining over the following two years. However, while the term has faded from prominence, the idea that the future of social interaction will involve three-dimensional worlds has not and is being shaped by as much by corporate posturing as by technological advancement. A plethora of companies such as Meta, Microsoft, Nvidia, Epic, Unity and Roblox are continuing to work on developing the platforms that enable the creation of increasingly sophisticated digital worlds, though most today are reluctant to associate them with the metaverse.

At this point in time it is impossible to say exactly what the shape of this new virtual world will be. However, the way we engage with any technology is shaped by its affordances, which encompass both the uses developers imagined and the experiences users have had with analogous technologies. This allows us to use the affordances of existing technologies to predict, to some extent, how we might engage with emerging platforms.

This paper has discussed how the affordances of social networking platforms might intersect with the affordances of virtual reality in the VR-enabled 3D environment of the metaverse. In doing so it has shown that social networking in the metaverse is likely to be a very different experience to what we are currently familiar with; it will be more embodied and more immersive than our current platforms, but at the same time more ephemeral. Our avatars will be able traverse the digital landscape in ways that are not possible in our current environment of siloed platforms, but at the same time will flicker in and out of existence leaving little or no trace behind.

There is still much work to be done in this area. This paper only explored a limited number of affordances of social networking and VR technologies, and even then only touched upon some of

the complex interactions between them. Future work will need to investigate the affordances of both entities more fully, and also incorporate other aspects of the metaverse that have not been discussed here. While virtual reality is currently positioned as a prominent feature of the future metaverse, it is yet to be seen how mainstream this technology will become. The emergent metaverse may be focused on other technologies which will have their own affordances that will also need to be explored.

It is also important to note that the very nature of affordances means that it is impossible to accurately predict how a technology might evolve due to the sheer number of factors involved in its evolution. As Nagy and Neff (2015) explain, the idea of imagined affordance "helps to identify the space between users' perception and the reception of technologies" (7), but this is a space that is constantly in flux. At best, this paper has provided a framework for exploring how the current affordances of social networking and virtual reality might interact, but it is and must always be seen as a work-in-progress.

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