Abstract

Immersive Space familiarizes us with an immeasurable digital presence, finds novel opportunities through the instability of the medium, and further establishes standards for what is morally acceptable in this field. To smoothly transition into a new dimension — virtual reality — this document aims to (1) provide a comfortable experience in the use of new technologies, (2) promote social interaction or social connectedness, and (3) induce positive experiences. Instead of rejecting or fearing new technology, adaptable and empathetic designers need to embrace new material so that they might predict and prevent problems before they happen.

Overview

The digital world has slowly been creeping into our physical lives for a while. Consider the impact of smartphones: we now expect a personalized, digital dimension that complements our physical day-to-day lives. On this device, we have tons of applications such as Google Maps that estimates how to get to a destination via GPS, Instagram that connects us with friends who are thousands miles away, and SSENSE that makes shopping easy with hyper-personalized recommendations. While these exemplify some of the usages out of thousands of applications that each serve unique affordances, we have been creating our own virtual space in daily uses.

Observing how technological tools in Graphic Design have been developing shows our quick adaptation to the new material. Before computers were introduced, designers used phototypesetting which involved manually cutting and pasting materials in a physical studio. After computers were invented, everything became digital on screens; being able to directly manipulate type, photography, and color, designers adapted to the new invention as it dramatically saved time and increased efficiency in production. Ultimately, the computer became the studio. After augmented reality was introduced, digital presence has adopted another dimension. Explaining what virtual reality can do may sound similar to explaining what the Internet is back when it was first introduced. We did not expect the long-term effect of the Internet and that applies similarly to augmented reality*[1] (AR) and virtual reality*[2] (VR). While we're becoming increasingly reliant on digital technology, we simultaneously crave physical experiences; bridging the virtual and analog informs the so-called "phygital" movement. One of the prominent features of virtual reality is that it connects the physical and digital space around us; imagine what this new opportunity will lead to.

The uncanny experience of virtual presence has a striking representation of the cityscapes imagined in *Hyper-Reality**[3] by Keiichi Matsuda. The animation presents a provocative and

[1] an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information
[2] a simulated experience that can be similar to or completely different from the real world
[3] Keiichi Matsuda. *Hyper-Reality.* http://hyper-reality.co/

kaleidoscopic new vision of the future, where physical and virtual realities have merged, and the city is saturated in media. This vision makes people with technophobia worrisome of how digital presence will eventually cross the boundary of the "natural" landscape. In this context, the word "natural" is not defined as apart from humankind, but as seeming normal in the modern environment that has been modified, cultivated, enhanced, and exploited through human activity. In my estimation, the extreme concentration of virtual realities will unlikely to happen in reality because regulations and rules will be established by the company and the designers.

Dynamic Material

Technological equipment and skills may be concentrated in software engineers, but in the digital age, the easy exchange of information has democratized their use. Like Pandora's box, virtual reality started as science fiction, brought to reality in the 60s*[4] through 80s, then innovations stagnated and now we see its third reincarnation as the Christmas gadgets today. In other words, sophisticated technologies are developed by the engineers to the point where the equipment is affordable and accessible to purchase in the consumer market. Such innovation enables designers to create conceptually advanced projects with new tools, which become a basis for collaboration with developers, engineers, and other specialists.

Technically speaking, in order for a virtual reality software to function, all the work would be done with lines of codes and mathematical datas by engineers. Considering the long-term effect, the usage of the application is directly under the hands of the designers who are responsible for establishing a set of regulations and standards to avoid pitfalls. Designers adopt the traditional role of critic — someone who generates variations on the central narrative about the work and what the work 'tells' the audience. *The Binding* represents this kind of responsive and iterative approach that forces front-end developers to engage with the specialized knowledge that they often relegated to the back-end. In order to create not just functional, but an effective virtual tool, a multi-disciplinary team of engineers and designers must constantly create, critique, and execute with an authority that comes from deep understanding.

How design differs from the 2D screen to unlimited field of space, and the transition from constrained dimension of the screen to modified scale in the virtual realm are some of the questions that the designer must ask in the design process. Through a virtual lens, the invisible becomes visible. For example, when we think of a gear, we imagine a rotating circular machine part having cut teeth, or in case of a cogwheel or gearwheel, inserted teeth, which mesh with another toothed part to transmit torque. The original functionality of gears is to transfer motion and torque between machine components in mechanical devices, often hidden or found inside a

[4] The first virtual reality headset was created in 1968 by American computer scientist Ivan Sutherland and his student, Bob Sproull.

product. *Intermesh*, metaphorically, represents the back-end process as the main component of the artistic form in which metals are worked into three dimensional objects. Opposed to its traditional usage, the sculptural piece works as a frame or a window of the scene in augmented scale.

Just like how designers adapted from manual to digital methods, designers must challenge themselves to step outside of their comfort zone and learn new things – whether that's trying a new app, incorporating automations into their workflow, reading up on machine learning, or even learning how to design for agentive technology. Keep looking for other skills and interests that will complement the designer's core, which we will never know where a new fascination might lead. For instance, *Machine Hallucination**[5] by Refik Anadol demonstrates the character of this collaborative mode this moment demands. Refik Anadol used artificial intelligence to turn millions of photographs of New York into the Machine Hallucination film. To create the project Anadol trained the StyleGAN algorithm — an open-source tool created by tech company NVIDIA to process photographs of New York and turn them into visuals perceptible to humans. The trick in developing an efficient skill set is not to do everything but to give ourselves a freedom to focus on more than one area, and find common ground between our interests.

Constructing New Narratives

Advanced technologies are active materials — they succeed or fail in execution. Such interactive work has experimental qualities (unpredictable behavior based mainly on each moment). Because technologies take years and years to establish their definitive shape, currently popular fields like VR must remain territories for experimentation, pushing to establish their mature forms. The general instability of these technologies can cause anxious uncertainty but it also leads to novel opportunities. The work can distribute in the ways the designer wishes and sets a system of narratives this certain way along with the ability to capture attention by developing unanticipated plot twists. Design in relation to technology can pull new technological developments into imaginary but believable everyday situations as *functional fiction* so that we can explore possible consequences before they happen.

When technology becomes accessible, and equitably distributed, and designed for and by the people who use it, we benefit from the set up of networks and demonstrations of mutual-aid, profit-sharing, and knowledge-building communities. As Tsige Tafessee mentions in the interview on *Practicing Liberation**[6],

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[5] Refik Anadol. *Machine Hallucination.* https://refikanadol.com/works/machine-hallucination/
[6] Willa Köerner. *Pioneer Works. https://pioneerworks.org/broadcast/tsige-tafesse-bufu-interview/*

> I guess overall, I'm heartened by how people are using Instagram and even TikTok and Zoom to organize. We were never meant to be in Zoom the way that we are, but given the circumstances, it's what we have.

Whatever the intention behind these prominent softwares was originally, our needs and preferences, impacted by the current physical time and situation, have shifted the focus to a new perspective. In an interview on *Creating Spaces to Imagine and Dream**[7], Salome Asega highlights the new way of helping those who are restricted from going outside,

> I'm on a Slack channel for my neighborhood in Bed-Stuy called Bed-Stuy Strong. I have a Zipcar membership, so I was helping to deliver groceries to folks who couldn't leave their house for whatever reason. And there was a sub-channel on that Slack that was a food channel. So if you wanted kombucha or sourdough starter, you could hit someone up and go to their house and get it. They'd leave it in a baggie outside their door. That is also a form of mutual aid, right? Where people are actively putting out what they need or what they have, and then people are finding each other to share. (41- 42)

The most prominent feature of the virtual realm has been establishing a new social structure of connectedness and networking. Together, AR and VR bridge the digital and physical worlds, and offer immersive mediums. As of today, most of the AR demonstrations we see are fun characters, filters, or other effects through the camera lens of our smartphones. These effects are extraordinary because they show us something impossible in real life. For example, we consider talking potatoes, or baby yoda walking down the street as virtual projections. Instead of AR just being an entertaining addition to the camera tool, it could be the most effective way to bring the practice of computation*[8] to physical objects in reality.

What happens when AR identifies an object not only as what the object is materially but also embeds networking to the object; consider everyday objects as virtual assistants. More specifically, what happens once our room gains access to a network? For example, interacting with a table may give access to all possible actions and information we would want in that situation; the table may order dinner for us, or connect with other tables in the marketplace to compare the personalized price range. Interacting with a tennis racket may give links to previous tennis matches, tutorials on how to play, and much more. Beyond implementing AR on smartphone cameras, the potential applications and usages of AR networking objects are exponential. A virtual reality with perpetual information is the next imaginable technology that

[7] *Creating Spaces to Imagine and Dream.* https://thecreativeindependent.com/people/artist-and-researcher-salome-asega-on-creating-spaces-to-imagine-and-dream/

[8] a system of data collection, execution of algorithms with the use of computer

utilizes computation to create virtual assistants in the form of everyday objects for different situations.

As immersive as the medium is, the users directly reflect their social ideologies as active participants in *spatiotemporal**[9] environment. Aware of the space and time, the participants of AR/VR create space through the patterning of everyday movements, giving it a meaning, and form. Setha Low, the author of *Spatializing Culture: An Engaged Anthropological Approach to Space and Place* (2014), analyzes how culture is reflected in, or spatialized in the space we are engaged in. In the analysis she conducted in 1996 to 2000, the *production of space* includes economic, ideological, and technological factors in the physical creation of the material setting. On the other hand, *social construction* refers to change of the space through peoples' interactions, conversations, memories, feelings, imaginings and use of places, scenes and actions that convey particular meanings. Both production of space and social construction are mediated by dialogical processes, especially that of being fought over for economic and ideological reasons. Understanding the relationship of production of space and social construction can help us see how local conflicts over space can be used to uncover and illuminate larger issues. In his studies, Low mentions that adding *embodied space**[10] to the social construction and social production of space enables the person to become a mobile spatial field—a spatiotemporal unit with feelings, thoughts, preferences, and intentions as well as out-of-awareness cultural beliefs and practices — who creates

> space as a potentiality for social relations, giving it meaning, form, and ultimately through the patterning of everyday movements, produces place and landscape*[11]

In the present days, the user of AR/VR becomes the mobile spatial field, the participant, and the gatekeeper in control of forming the space as a mental construct. The instability and the uncharted territory of the media allows happy, unprecedented accidents to occur; however, it does have a flip side.

A Manual of Virtual Realm

In the wake of society's exposure to virtual reality (VR), and due to today's powerful computer systems, designers are able to develop complex interactive virtual worlds; the original functionality of digital platforms can further be enhanced through VR with the deliverance and proximity of the physical and digital. These immersive environments offer numerous

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[9] belonging to both space and time or to space-time
[10] where human experience and consciousness takes on material and spatial form
[11] Low 2009; Munn 1996; Rockerfeller 2010

opportunities — both good and bad. Much debate has arisen over its ethical complexities such as virtual crimes, travel, and addiction. These questions arise because VR technologies are pervasive to classify, and because it is difficult to predict their short and long-term impacts. Decision making and ethics should go hand in hand throughout the development process.

How the system of regulations we follow in the physical world should be applied, and to what extent it should be considered in the virtual space needs to be justified in the development of the VR technologies. In the interview on *On Navigating the Tension Between Physical and Digital Realms**[12], Rindon Johnson mentions that

> [...] there's this thing that I think we're going to start to run into, which is if I say I thought about robbing a liquor store, nobody can prosecute me because I didn't rob the liquor store. It was a passing thought. But if I physically rob a liquor store, you can prosecute me. In VR, it's much muddier, because it's like, if someone reaches out their virtual hand and touches someone's avatar body in a way that's inappropriate, they've done something to that person that feels physical. A passing thought has become a physical movement in virtual space, and has perhaps been enacted on someone in a way that makes them feel physically violated. How do we deal with that? (31)

Because artificial reality blurs the line between physical and virtual, it is necessary to rewrite how we deal with one another. For example, if the person is stabbed in the virtual space, how should that violation be prosecuted? Should the punishment be made in the virtual or in physical space? The victim does not physically feel the pain but mentally undergoes the experience of getting stabbed. On a simpler note, more shared intentions must be promised just as we agreed to mute ourselves when we are Zooming with multiple people.

Recently, I watched a documentary by MBC called *I Met You* about a mother reuniting with her young deceased daughter in virtual reality. The project handles a controversial issue of using VR that strongly impacts one's personal life. Some people believe that the concept is wrong, as if the mother wanted to trick herself into simulation and live in a perpetual state of denial of her daughter's death. Opposed to the critics, the producers of the documentary assert that it was intended to help the mother who wanted closure. The mother lost her child so suddenly and felt she hadn't had a chance to say a proper goodbye. While some people think it is cruel to show a grieving mother an artificial representation of her daughter, or will cause people like her to get addicted to virtual reality in a failure to confront the present, the producers say it can be helpful in allowing grieving people to move on, accept the passing of a loved one and

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[12] Rindon Johnson. *On Navigating the Tension Between Physical and Digital Realms.* https://pioneerworks.org/wp-content/uploads/S4AB001_Building_Better_Realities.pdf.pdf

spend more time with the rest of the family. It is difficult to say what may work as a proper interaction of VR in regards to ethical issues — I believe we have a lot of discussions and questions to go through.

As Ben Kenwright asserts in *Virtual Reality: Ethical Challenges and Dangers*, "traditional moral responsibilities do not always translate to the digital world*[13]" — it is necessary to consider new regulations and standards for VR. Currently, there is a lack of information on the short and long-term psychological impacts of VR. Not enough studies about who and what types of individuals are using VR (age, types of experience, attitudes, and levels of digital sophistication) aggravates the problem. We need to look at VR as part of a system, and not just as an isolated, individual interaction. As VR combines multiple senses each of which influences the immersive experience, the synergistic operation of the system can, in turn, have a broader impact on the user. In developing virtual technologies, designers should consider addressing the implications of the embodied space, and demonstrate reasonable caution through monitored testing. Further examination needs to include predictions, forecasting impact, evaluating with openness, and identifying any issues with transparency.

The growth of VR technologies has led to an increase in accelerated development of the VR industry, and huge opportunities for new and innovative VR applications, beyond entertainment uses. On the other hand, there are numerous challenges and ethical issues that need to be addressed. If the VR economy is to continue to grow while maintaining sustainable healthy new developments, it must be supported by extensive research to investigate the ethical issues around these technologies.

— Lastly (some side thoughts),
How can we visualize digital presence in a more familiar context?
What should be prioritized in executing the design with the new medium?
How can advanced technologies be executed and moved forward, other than being an aloof concept?
What strategies designers can adopt based on the changing needs

[13] Ben Kenwright. *Virtual Reality: Ethical Challenges and Dangers.*
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