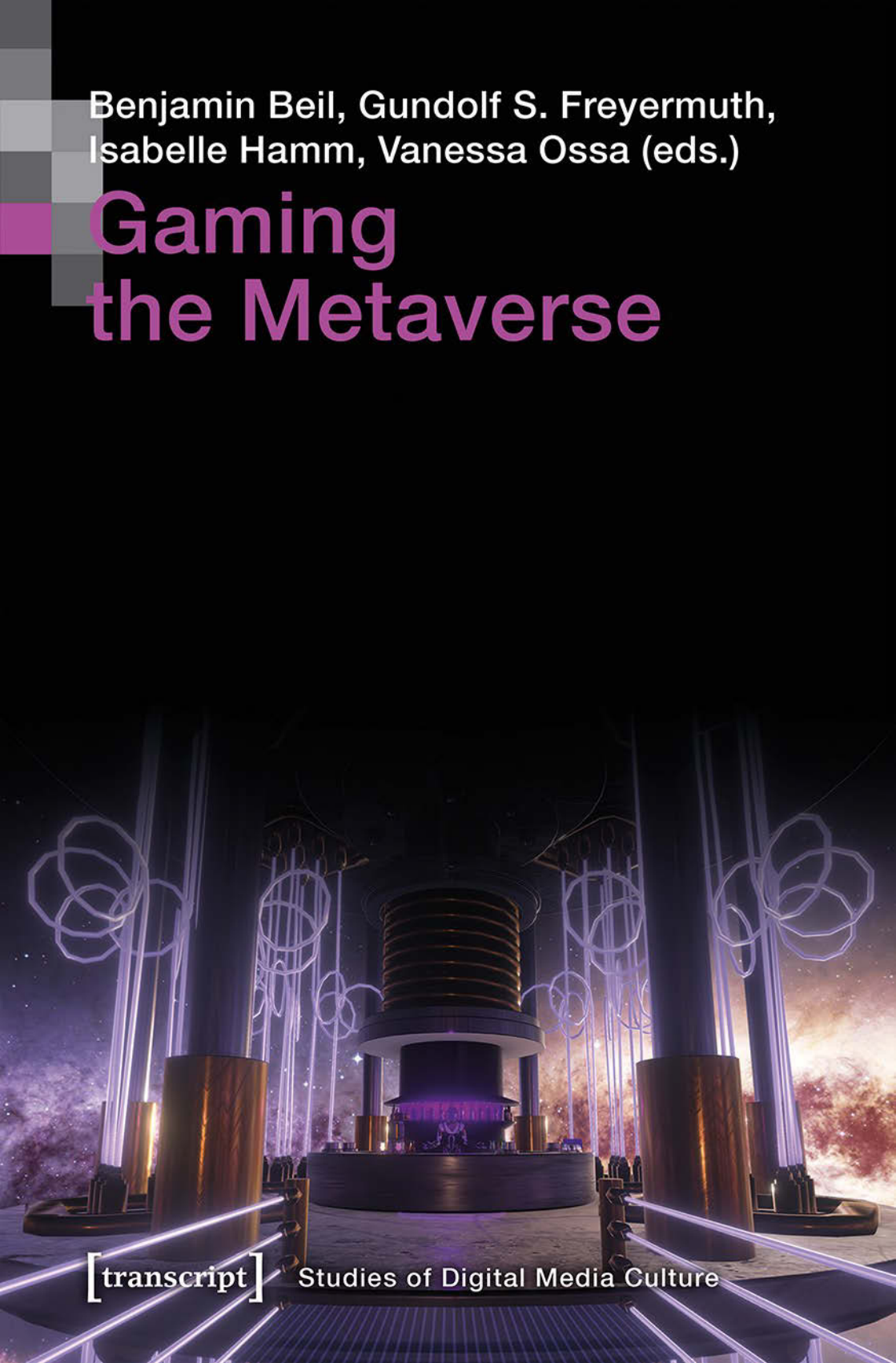


Benjamin Beil, Gundolf S. Freyermuth,
Isabelle Hamm, Vanessa Ossa (eds.)

Gaming the Metaverse



[transcript] Studies of Digital Media Culture

Benjamin Beil, Gundolf S. Freyermuth, Isabelle Hamm, Vanessa Ossa (eds.)
Gaming the Metaverse

Editorial

The series is edited by Gundolf S. Freyermuth and Lisa Gotto.

Benjamin Beil (Prof. Dr.) is a professor of media studies and digital culture at the department of media culture and theatre at Universität zu Köln. His research interests include game studies, inter- and transmediality, digital media in museums, and participatory cultures.

Gundolf S. Freyermuth (Prof. Dr.) is a professor of media and game studies and co-director of the Cologne Game Lab at TH Köln. He is also an associate professor of comparative media studies at ifs Internationale Filmschule Köln.

Isabelle Hamm (M.A.) is a research assistant at the department of media culture and theatre at Universität zu Köln. Her research interests lie in the field of museology, digital art mediation, and virtual exhibitions.

Vanessa Ossa (Dr.) works as postdoctoral researcher and project coordinator for the Cologne Game Lab at TH Köln. Her research interests include transmedial storytelling, characters in participatory culture, comic cultures, and fandom.

Benjamin Beil, Gundolf S. Freyermuth, Isabelle Hamm, Vanessa Ossa (eds.)

Gaming the Metaverse

[transcript]

We acknowledge support for the publication costs by the Open Access Publication Fund of TH Köln.

Technology
Arts Sciences
TH Köln

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at <https://dnb.dnb.de>



This work is licensed under the Creative Commons Attribution-ShareAlike 4.0 (BY-SA) which means that the text may be remixed, build upon and be distributed, provided credit is given to the author and that copies or adaptations of the work are released under the same or similar license. For details go to

<https://creativecommons.org/licenses/by-sa/4.0/>

Creative Commons license terms for re-use do not apply to any content (such as graphs, figures, photos, excerpts, etc.) not original to the Open Access publication and further permission may be required from the rights holder. The obligation to research and clear permission lies solely with the party re-using the material.

First published in 2025 by transcript Verlag, Bielefeld

© Benjamin Beil, Gundolf S. Freyermuth, Isabelle Hamm, Vanessa Ossa (eds.)

transcript Verlag | Hermannstraße 26 | D-33602 Bielefeld | live@transcript-verlag.de

Cover concept: Kordula Röckenhaus, Bielefeld

Cover illustration: Christina XaosPrincess Kinne

Printed by Majuskel Medienproduktion GmbH, Wetzlar

Print-ISBN 978-3-8376-7462-0 | PDF-ISBN 978-3-8394-7462-4

<https://doi.org/10.14361/9783839474624>

ISSN of series: 2702-8240 | eISSN of series: 2702-8259

Printed on permanent acid-free text paper.

Table of Contents

Preface and Acknowledgements | 7

Metaverse's Modern Prehistory

Utopian Media from the Total Work of Art and Total Cinema
to Cyberspace and Holodeck

Gundolf S. Freyermuth | 13

IMAGINATIONS

The Metaverse and Other Digital Delusions

Janet H. Murray | 101

Incarnations of the Metaverse in Science Fiction

Lars Schmeink | 117

Dreaming the Metaverse

Virtual Worlds as Audiovisual Fantasy

Vanessa Ossa | 139

Body-Crash: "The Impact Will Be Real"

On How the Metaverse Could Affect Our Bodies

Icare Bamba | 167

Metaverse (Re)Visions

Back to the Future of the Internet

Sonia Fizek | 187

The Metaverse: What's Now, What's Next

Jesse Schell | 201

ACHIEVEMENTS

From Pixels to Emotions

Exploring Atmospheres in Metaverse Art Exhibitions

Isabelle Hamm | 223

Virtual Wonderlands

Insights from NRW-Forum Düsseldorf's WWWFORUM Project:

An Interview

Alina Fuchte/Isabelle Hamm | 247

Creating a GTP-3-driven Chatbot for Social Virtual Reality

Quantum Bar

Christina XaosPrincess Kinne | 265

Let's Play the Metaverse ...!

Expanded Realities as Transparent Playheads

Tobias Bieseke | 309

Towards a Responsible Metaverse

Digital Fashion, Avatars, and the Promise of Identity
in Virtual Worlds

Nicolle Lamerichs | 335

Akihabara

A Proto-Metaverse

Giovanni Tagliamonte | 351

Contributors | 393

Preface and Acknowledgements

BENJAMIN BEIL, GUNDOLF S. FREYERMUTH,
ISABELLE HAMM, VANESSA OSSA

What is the Metaverse?—almost all the following chapters begin with this question. Some authors approach the term from the recent past, referencing Neal Stephenson’s science fiction dystopia *Snow Crash*,¹ for example. In contrast, others start with current debates, such as Facebook’s rebranding to Meta or the success of gaming platforms like FORTNITE² and ROBLOX.³

Of course, all these attempts to define the Metaverse are ultimately doomed to failure because, like other shimmering terms in media culture, the Metaverse defies precise classification, and, upon closer inspection, proves to be a highly diffuse concept that has been extremely adaptable throughout media history. This lack of a clear definition of the Metaverse, however, is not a bug but a feature of the following chapters. They demonstrate the diversity of the many past and present incarnations of the Metaverse and their technical, social, cultural, and economic implications.

This text is a preface, not an introduction. It does not seek to fail by adding yet another definition of the Metaverse. It is merely intended to provide an overview of the following chapters (and their many Metaverses) and, most importantly, to lead up to the actual introduction to this volume: “The Modern Prehistory of the Metaverse.” In this chapter, Gundolf S. Freyermuth⁴ sheds light on the historical intertwining of technology and its social implementation. He traces the developments that led to the idea of the Metaverse and illustrates their “dialectical relationship”: from the concepts of the Gesamtkunstwerk and Total Cinema through visions of Cyberspace and the Holodeck to the prehistory and aftereffects of the

1 Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.

2 FORTNITE (Epic Games, 2017, O: Epic Games).

3 ROBLOX (Roblox Corporation, 2006, O: Roblox Corporation).

4 In this volume pp. 13-98.

Metaverse. The investigation shows how this dynamic enables a continuous and comprehensive immersion that transitions “from shorter or longer but always intermittent and transient engagement with single media works to a comprehensive and enduring immersion in media worlds.”

Following this modern prehistory of the Metaverse, the contributions are divided into two major sections: “Imaginations” and “Achievements.” “Imaginations” offers an exploration of the concepts, visions, and potential effects of a Metaverse, ranging from early literary ideas to contemporary audiovisual representations. The section begins with Janet H. Murray’s⁵ chapter “The Metaverse and Other Digital Delusions,” an investigation of false promises surrounding the Metaverse. Taking various advertising messages produced by companies such as Meta, Apple, and Magic Leap as examples, Murray shows how “magical technology” is marketed in recurring cycles and promoted with large financial resources due to the fear of missing out. However, the real needs of the public are often not met. Murray argues for a more realistic view of new technologies, the establishment of which always requires a “collective effort” that “cannot be short-circuited.”

Lars Schmeink⁶ looks at the history of ideas surrounding the Metaverse “way before transhumanists and tech-entrepreneurs like Mark Zuckerberg discovered it for themselves and their plans to exploit it for personal monetary gain.” In his paper “Incarnations of the Metaverse in Science Fiction,” he traces a whole series of science fiction novels and films beyond Stephenson’s *Snow Crash*⁷ back over a hundred years and compares stories that “developed the idea [of the Metaverse] in different, meaningful ways.”

A continuation of this approach can be found in Vanessa Ossa’s⁸ contribution, in which she “follow[s] the trail of the Metaverse as an audiovisual fantasy in mostly Western live-action films and television.” Ossa provides a transparent account of her methodological approach and the selection processes of the examples she discusses. Her analysis reveals similarities and differences between Metaverse visions “depicted in fictional, audiovisual media,” as well as “broader considerations about the nature of our reality, (virtual) identity, concerns about security, surveillance in digital environments, and the use of AI technology.”

5 In this volume pp. 101-115.

6 In this volume pp. 117-138.

7 N. Stephenson: *Snow Crash*.

8 In this volume pp. 139-166.

Based on a re-reading of science fiction narratives and current efforts to realize concepts of the Metaverse, Icare Bamba⁹ notes: “Our bodies [...] seem very close to touching virtual reality and melting into it. It seems less and less virtual.” In his phenomenological approach titled “Body-Crash: ‘The Impact Will Be Real,’” he aims to find out “what this new relationship with the virtual and the world entails; to grasp the impact of using these immersive technologies in our lives; to understand and even anticipate how we will relate as embodied subjects to the new world of the Metaverse.”

In her essay “Metaverse (Re)Visions,” Sonia Fizek¹⁰ also discusses the possible consequences of a unified Metaverse for users. While big tech companies like to advertise that the Metaverse should be built collectively, current developments do not suggest collective ownership. Fizek highlights the dangers of this potential future scenario from three perspectives: the privatization of the Internet, surveillance capitalism, and technofeudalism.

The first section of this anthology concludes with Jesse Schell’s¹¹ contribution, “The Metaverse: What’s Now, What’s Next.” Schell deconstructs several myths surrounding virtual reality, augmented reality, online worlds, and blockchain as four technologies commonly associated with the Metaverse. In the process, he explains why the Metaverse could look very different from how it is often portrayed in technology fictions and advertising campaigns, for example, because “the Metaverse does not want to be one continuous world, and it will not be. [...] Worlds are powerful because they have boundaries.”

The second section, “Achievements,” is dedicated to practical applications, innovative approaches, and advancements in the field of interactive experiences. It begins with the topic of staging art in digital spaces. In “From Pixels to Emotions,” Isabelle Hamm¹² explores the question “in which ways virtual exhibitions—and in this case, in particular Metaverse art exhibitions—can address the conflict between analog and digital spatiality and create compelling art experiences.” To do so, she applies German philosopher Gernot Böhme’s theory of atmospheres to art presentations on the platforms FORTNITE, OCCUPY WHITE WALLS, and WWWFORUM and analyzes the value of digital atmospheres for the respective art experience.

9 In this volume pp. 167-185.

10 In this volume pp. 187-199.

11 In this volume pp. 201-220.

12 In this volume pp. 223-246.

The interview “Virtual Wonderlands,” conducted by Isabelle Hamm with Alina Fuchte,¹³ provides a more in-depth look at WWWFORUM, an exhibition space belonging to the NRW-Forum Düsseldorf. This Metaverse exhibition space is one of the first of its kind in the art and museum scene and has hosted four exhibitions since March 2023. Central topics and questions of the conversation are: “What exhibition practices are suitable for museums in the Metaverse?”, “Which challenges can arise in the areas of mediation and communication?” and “What can be gained by museums being present in the Metaverse?” In this context, Fuchte talks “about the creation and first year of wwwforum, the insights gained, digital curating” and about ideas for expanding the communication possibilities for users in WWWFORUM.

Communication and social interaction are also topics in the next paper. In the case study of the artistic research project “Quantum Bar,” Christina XaosPrincess Kinne¹⁴ talks about the creation process of a GPT-3-driven chatbot for social virtual reality. “Quantum Bar is designed to be a welcoming space for social VR users looking for someone to talk to,” a digital bar where users can interact with a GPT-3-driven bartender to connect emotionally. Kinne reports on the interdisciplinary challenges regarding the design and production, the technologies used, various use cases, the ethical commitment regarding “the characterization and narrative of the chatbot,” the “shaping of the avatar and its animation,” and the “auralization and localization in the virtual environment.”

The following chapter reports on an experimental research design that explores experiences in VR in combination with haptic sensations. In “Let’s Play the Metaverse ...!,” Tobias Bieseke¹⁵ presents findings from the artistic research project Ndinguwe. With the help of overlaid avatar representations, the project aims to encourage participants to examine how they perceive themselves and others, as well as forms of discrimination. Using the method of microphenomenology, Bieseke addresses the research question, “How can the imagination of the individual be brought into co-dynamic coherence with the possibilities of the Metaverse?” and provides insights into selected participant surveys from the experiment.

Avatars as a projection surface also play a central role in Nicolle Lamerichs’¹⁶ essay “Towards a Responsible Metaverse.” The author focuses on new forms of fashion in the digital space, related market mechanisms, and the significance of

13 In this volume pp. 247-264.

14 In this volume pp. 265-307.

15 In this volume pp. 309-334.

16 In this volume pp. 335-350.

virtual fashion for online users. She explores the question of “how digital fashion allows us to express our digital identity in new ways.” In particular, she addresses aspects of (digital) identity and the inclusive potential that unfolds through the separation of virtual and physical bodies. Lamerichs advocates for more opportunities for co-creation in order to strengthen individuality in the Metaverse.

The section “Achievements” concludes with Giovanni Tagliamonte’s¹⁷ contribution, which describes the Akihabara district in Tokyo as a “proto-metaverse,” or more precisely, as a “hyperreal” place—as defined by Umberto Eco—that anticipated the emergence of virtual worlds. Tagliamonte analyzes the culture and history of the place, in which analog and virtual space are in dynamic interaction and seem to merge into a unified whole.

ACKNOWLEDGMENTS

This anthology would not have been possible without the hard work of many people and the support of several sponsors. The 13th and final *Clash of Realities* conference was planned by a Program Board chaired by Björn Bartholdy and Gundolf S. Freyermuth of the Cologne Game Lab (CGL). Cooperating institutions were the Institute for Media Culture and Theater of the University of Cologne and the ifs Internationale Filmschule Köln. The conference was financed through the generous support of TH Köln, Film- und Medienstiftung NRW, the City of Cologne, Electronic Arts Germany, and the Kingdom of the Netherlands. Our sincere thanks go to these institutions and companies.

The Game Studies Summit “Gaming the Metaverse” was planned by Benjamin Beil, Gundolf S. Freyermuth, Vanessa Ossa, Raven Rusch, and Hanns Christian Schmidt. The summit owes much of its success to the extraordinary staff of the *Clash of Realities* conference, in particular Vanessa Ossa, Judith Abend, Philipp Bojahr, Laura Frings, Alexandra Hühner, Susanne Kaiser, Su-Jin Song, and the many members of CGL student support groups as well as Mathias Mehr (CGL) who provided technical assistance. We thank them all for their extraordinary help!

We owe the deepest debt and gratitude, however, to the speakers and presenters who came to Cologne from all over the world, as well as to the authors who wrote additional contributions. Last but not least, we would like to thank the TH Köln for supporting this publication.

17 In this volume pp. 351-392.

LITERATURE

Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.

GAMOGRAPHY/METAVERSES

FORTNITE (Epic Games, 2017, O: Epic Games)

ROBLOX (Roblox Corporation, 2006, O: Roblox Corporation)

Metaverse's Modern Prehistory

Utopian Media from the Total Work of Art and Total Cinema to Cyberspace and Holodeck

GUNDOLF S. FREYERMUTH

The Metaverse began its cultural career as an imagined digital medium in Neal Stephenson's *Snow Crash*.¹ The 1992 science fiction novel is set in the then near future, a dystopian Los Angeles in the 2010s, divided into war zones. The hero, tellingly named Hiro Protagonist, is a computer hacker who survives by delivering pizzas—for the mafia that has cornered the market. The living conditions in this future are anything but paradisiacal. People want to escape the daily grind. Hiro spends every free minute in the Metaverse, indulging above all in his love of sword fights.

Metaverse is a portmanteau of “meta,” i.e., beyond, and “universe.” Neal Stephenson uses it to describe a networked, computer-generated, persistent virtual 3D space centered around an enormous boulevard called “The Street,” 100 meters wide and over 60,000 kilometers long. The description reads as if modeled on the Las Vegas Boulevard, particularly the section known as “The Strip.” Users access the Metaverse via a high-performance Internet connection and 3D goggles. In its virtual realm, people find entertainment and work; they can exchange ideas, learn new skills, and play together. However, only a small minority of the planet's ten billion inhabitants are either wealthy or knowledgeable enough to enjoy and profit optimally from the Metaverse:

“In Stephenson's *Crash*, hackers who have the technical know-how to write their own code sport sophisticated, graphically complex on-line avatars, or three-dimensional personae, who interact in the virtual world. Japanese businessmen, on the other hand, order up minutely detailed, perfect images of themselves in the same dark suits they wear to the office.

1 Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.

Newbies coming in through cheap public terminals must make do with grainy, jerky black-and-white models.”²

Nevertheless, in Stephenson’s imagined world, the Metaverse is populated by over a hundred million people or, rather, their individualized avatars at any given time.

Neal Stephenson did not present his imaginary medium as a possible means to save or transform the future society into a paradise. Instead, he portrayed it as a questionable counter-world, an alternative space to escape a damaged reality that is hardly livable. Against all odds, what he described awakened utopian longings. Within months after the novel’s publication, efforts commenced to use the imaginary medium as a model for artistic and commercial activity.

At present, the Metaverse has a three-decade history of reception, influence, and effect. Most of the contributions to this volume address the concept’s presentness. However, Stephenson’s invention also has a background history, both long and recent. Firstly, it is in the long modern tradition of imaginary—utopian or dystopian—media, starting with the ideal of the *Gesamtkunstwerk*, the Total Work of Art, and resulting in the mid-20th-century notion of a Total Cinema.

Secondly, the Metaverse is the third imaginary medium created in the early days of digital culture within a decade. Both pre-industrial and industrial technologies—along with new media such as perspective painting, letterpress printing, photography, film, and broadcasting—spurred speculation about improved or new forms of communication, art, and entertainment. Similarly, the invention of the computer and its networking since the 1950s has directly instigated visions about radically new possibilities in communication, art, and entertainment. In 1982, science fiction author William Gibson conceived “Cyberspace” as a virtual space for action and experience.³ Five years later, screenwriter and TV producer Gene Roddenberry confronted the global audience of the science fiction series *STAR TREK: THE NEXT GENERATION* with the “Holodeck,” a computer-controlled installation for interactive experiences on board the starship Enterprise-D. In 1992, Neal Stephenson finally imagined the “Metaverse,” which forms the vanishing point of this investigation.

A key characteristic of all these blueprints for future media, from the Total Work of Art to the Metaverse, is that they did not remain theoretical speculations but also sparked practical desires for their realization among different audiences

2 Moukheiber, Zina: “The Geeks Have Inherited the Earth,” *Forbes*, July 7, 1997, https://archive.org/stream/forbes160julforb/forbes160julforb_djvu.txt

3 Gibson, William: “Burning Chrome,” *Omni* 4, no. 10 (July 1982), pp. 72-77, 102-107.

as well as artists and inventors. The Metaverse's unique significance for the present stems from it being the most recent vision of future media, gaining a vital artistic, cultural, technical, and commercial role model function.

In this introductory essay, I will trace the origins and effects of the most influential media utopias in Western modernity, leading to the conception of the Metaverse. Preparatory remarks on the relationship between imagining the future and media are followed by an overview of pre-digital modern media utopias. The concepts of a Total Work of Art and Total Cinema focused on improving the contemporary audiovisual media of stage and cinema, establishing a tradition in which digital imaginary media stand (*I From Analog to Digital Media Utopias*).

Next, I will discuss the two most potent visions of future digital media emerging before the Metaverse (*II Cyberspace, III Holodeck*). In each chapter, I first examine the origins of the concepts, then reconstruct their prehistory or, rather, background history encompassing their artistic-philosophical and technological foundations. Lastly, analyze their aftereffects, i.e., their cultural impact up to the present.

The concluding section (*Epilog: The Metaverse*) provides a brief overview of the antecedents and aftereffects of the Metaverse. The investigation then presents three fundamental results: firstly, that the historical state of technology and its social implementation have conditioned these three future visions of digital media; secondly, that they have an inherent dialectical relationship, which reveals Cyberspace as thesis, the Holodeck as antithesis, and the Metaverse as synthesis; and thirdly, that they envision a new type of reception that has since become commonplace—an immersive entry into media-based virtuality, as it is the principle of engaging with the Metaverse.

I FROM ANALOG TO DIGITAL MEDIA UTOPIAS

Speculation about the future permeates human culture.⁴ Macro history teaches us that our species possesses the unique ability “to transmit information about things

4 The following paragraphs summarize historical processes that I have examined in more detail in: Freyermuth, Gundolf S.: “Utopian Futures. A Brief History of Their Conception and Representation in Modern Media—From Literature to Digital Games,” in: Benjamin Beil/Gundolf S. Freyermuth/Hanns Christian Schmidt (eds.), *Playing Utopia: Futures in Digital Games*, Bielefeld: transcript 2019, pp. 9-65.

that do not exist at all.”⁵ Narratives of non-material entities connect us, welding us into ever larger groups. Jean-François Lyotard described this “intersubjective web of meaning”⁶ that cultures spin to legitimize “imagined orders”⁷ as a “grand narrative.”⁸ Ideas about the future are a constitutive element of such “grand narratives” or metanarratives. What Western humanity thought about a possible other—better or worse—life is the result of a series of cultural constructions that began in the Renaissance. We store these narratives of better or worse futures in a growing number of media.

1 Future Media

Before industrialization, utopias and then dystopias were primarily created in literature. With the emergence of the new genre of science fiction in the mid-19th century, the imagination became multi-medialized and trans-medialized: silent and sound films as a medium for future narratives were joined in the first half of the 20th century by radio and comics, and in mid-century by television and, in the final decades, digital games. The history of possible futures is, therefore, a media history.

What all media evocations of future forms of life—both desirable and undesirable—seem to have in common is that they are rooted in their respective time even more than other artistic works and are limited by it. From a historical distance, visions of the future reveal the circumstances of their creation impressively: specific contemporary concerns, typical longings and fears, morals, and prejudices of their era. “[U]topia is a mirror to the present designed to bring out flaws, a circus or funfair mirror in reverse, to illustrate ways in which life could be better.”⁹

-
- 5 Harari, Yuval N.: *Sapiens: A Brief History of Humankind*, New York, NY: Harper, Kindle Edition 2015, p. 24.
 - 6 Harari, Yuval N.: *Homo Deus: A Brief History of Tomorrow*, New York, NY: Harper, Kindle Edition 2017, p. 144 ff.
 - 7 Ibid.
 - 8 Lyotard, Jean-François: *The Postmodern Condition: A Report on Knowledge*, Minneapolis, MN: University of Minnesota Press 1984 [*1979].
 - 9 Sargent, Lyman Tower: *Utopianism: A Very Short Introduction*, Oxford: Oxford University Press 2010, p. 112. See also: “Utopias are reflections of the issues that were important to the period in which their authors lived,” (ibid., p. 21). Likewise: “Visions of the future express the ethos of their times” (Heilbroner, Robert L.: *Visions of the Future: The Distant Past, Yesterday, Today, Tomorrow*, New York, NY: Oxford University Press 1995, loc. 1,240).

Questions of individual freedom and social organization, particularly changes in work, education, medicine, or transport, are of increased interest.

Another crucial aspect of conceptualizing the future in the modern era is the imagination of futuristic modes of communication and storytelling. For centuries, such “media prophecies”¹⁰ have been driving the theoretical conception and artistic realization of new effects and media, from the theatrical utopia of the Total Work of Art to visions of a future cinema such as the *feelies* from Aldous Huxley’s *Brave New World*¹¹ or André Bazin’s “Le Mythe du Cinéma Total”¹² to postmodern art utopias such as Gene Youngblood’s *Expanded Cinema*¹³ and Roy Ascott’s telematic “Gesamtdatenwerk.”¹⁴

“Media history teaches us,” write Christoph Ernst and Jens Schröter, “that future media, as imaginary objects, themselves fulfill a mediating function: future media are generated as epistemic objects, and this process is reflected methodically in order to bring together the heterogenous interests of different actors.”¹⁵ These actors include, not least, the technological avant-gardes. By conveying expectations about the direction of research and technology, visions of future media not only stimulate their imagination. They shape technological and aesthetic practice as a model by, as Michael Friedewald states, “steering the individual perception and the value system of the actors involved in the production of technical knowledge in a common direction.”¹⁶

10 Natale, Simone/Balbi, Gabriele: “Media and the Imaginary in History,” *Media History* 20, no. 2 (2014), pp. 203-218, here p. 205, <https://www.tandfonline.com/doi/abs/10.1080/13688804.2014.898904>

11 Huxley, Aldous: *Brave New World*, New York, NY; Evanston, IL: Harper & Row 1946 [*1932].—Huxley’s vision of the future of cinema was dystopian. The re-evaluation into a utopia to be pursued is not an isolated case; the current reception of the Metaverse is another example.

12 Bazin, André: “The Myth of Total Cinema,” in: *What Is Cinema?*, Berkeley, CA: University of California Press, 1967-1971 [*1946], pp. 23-27.

13 Youngblood, Gene: *Expanded Cinema*, New York, NY: Dutton 1970.

14 Ascott, Roy: “Gesamtdatenwerk. Connectivity, Transformation and Transcendence [*1989],” in: Timothy Druckey (ed.), *Ars Electronica: Facing the Future*, Boston, MA: MIT Press 1999; online: <http://epc.buffalo.edu/584/docs/ascott.html>, pp. 86-89.

15 Ernst, Christoph/Schröter, Jens: *Media Futures: Theory and Aesthetics*, Cham: Springer Nature 2021, p. 11.

16 Friedewald, Michael: *Der Computer als Werkzeug und Medium: Die geistigen und technischen Wurzeln des Personal Computers*, Berlin: GNT-Verlag 1999, p. 23. (My translation.)

Since at least the Enlightenment, aesthetic reflection has recognized that experimental anticipations of the future—both in technologies and forms of expression—can be achieved through artistic production.¹⁷ Artists have consistently worked towards effects and reception experiences that deviate from the familiar and, at the same time, remind us, as if from afar, of the sensations of media that would only emerge later. In the modern era, these anticipatory visions have centered on the most culturally influential audiovisual media. From the 16th century onwards, aspirations focused on enhancing and transcending the stage—what Friedrich Schiller called “the boards that mean the world.”¹⁸ In the first third of the 20th century, attention shifted to improving and overcoming analog film, the first medium that, as Siegfried Kracauer recognized, was capable of redeeming physical reality.¹⁹ Finally, since the last two decades of the 20th century, visions have focused on the future powers of digital audiovisuals.

2 Theater: The Total Work of Art

In the Christian Middle Ages, stages were like boxing rings. They were free of scenery and visible from all sides, so they did not create their own illusionary space separate from the real world. The Shakespeare stage of the 16th century also allowed views from three sides and thus offered the audience quite freely selectable perspectives, comparable to pedestrians who follow events on nearby properties and buildings as they walk by. It was not until the Baroque period that efforts were made to control the perception of the playful events in a way that enhanced the illusion, in particular by categorically separating audiovisual fiction from reality.

The arrangement in the new theater buildings integrated two contemporary models: perspective painting and popular peep-box entertainment with its partly painted and partly modeled art worlds. The auditorium positioned the audience in front of a rectangular, framed opening closed by a curtain. When the performance

17 On the history and theory of aesthetic anticipation, see chapter III *Problems of Prophecy and Theories of Anticipation* in: G. S. Freyermuth: “Utopian Futures,” here pp. 18–22.

18 Schiller, Friedrich: “An die Freunde,” *Literaturwelt*, 1803, <http://www.literaturwelt.com/werke/schiller/an-die-freunde.html>.—The common English two-line translation “Yet we see the great of every age / Pass before us on the world’s wide stage” does not capture the meaning of the three-line original: “Let us see the great of all times / On the boards that mean the world, / Pass us by in meaningful silence.” (My translation.)

19 Kracauer, Siegfried: *Theory of Film: The Redemption of Physical Reality*, New York, NY: Oxford University Press 1960.

began, perspective-controlled views of a play in naturalistic settings opened up. Their arrangement simulated spatial depth. This effect was often reinforced by painted buildings or landscapes in the central perspective vanishing point. The aesthetic experience offered by the peep-box stage was based on the illusion that, once the curtain had been raised, one could observe events in a distant reality separate from one's own, i.e., from a completely safe distance, as if through a window or the missing fourth wall of a room.

The innovative achievement of the new stage form—the ontological separation of audiovisual spectacles from the audience's space and the effort to create lifelike counter-worlds employing mechanical imitation—also defined its weakness. The window view made it impossible to participate or even intervene. The viewers remained physically and, therefore, often psychologically uninvolved to a certain degree. This reduction of the experience of alternative visual and audiovisual realities immediately aroused compensatory longings. Right into the early days of industrialization, perspective boxes and cabinets of curiosities, panoramas, dioramas, and phantasmagorias experimented with deconstructing and overcoming the separation between the visual and audiovisual play and its audience.²⁰

The high-cultural ideal of higher immersion became the *Gesamtkunstwerk*. It was to transcend the limitations of contemporary stage drama—tragedy, comedy, singspiel, and opera—by combining all existing arts into lifelike realism and increased immersion. The first, as Alfred Robert Neumann wrote, “clear-cut definition of a *Gesamtkunstwerk*” was formulated by Johann Mattheson in 1744:

“In my few opinions, a good opera theater is nothing other than a high school of many beautiful sciences, in which architecture, perspective, painting, mechanics, dance, *actio oratoria*, morality, history, poetry, and above all music, are united in the most pleasant way for the amusement and edification of distinguished and sensible spectators, and always give new samples.”²¹

20 See Bredekamp, Horst: *The Lure of Antiquity and the Cult of the Machine: The Kunstkammer and the Evolution of Nature, Art, And Technology*, Princeton, NJ: M. Wiener Publishers 1995; Oettermann, Stephan: *The Panorama: History of a Mass Medium*, New York, NY: Zone Books 1997.

21 Johann Mattheson: *Neueste Untersuchung der Singspiele* (1744), quoted from Neumann, Alfred Robert: *The Evolution of the Concept Gesamtkunstwerk in German Romanticism*: Microfilm. Ann Arbor, MI, University Microfilms 1951, p. 12. (My translation.)

Wilhelm Heinse, Christoph Willibald Gluck, Johann Gottfried von Herder, and Gotthold Ephraim Lessing, among others, subsequently argued in favor of the *Gesamtkunstwerk*. Lessing's 1766 programmatic work *Laocoon: An Essay Upon the Limits of Painting and Poetry*, for instance, hoped to improve the mechanical arts and their realistic imitation through amalgamation.²² In retrospect, the epochal aspiration to integrate all the arts was clearly a compensatory reaction to industrialization and the accompanying proliferation of the division of labor. Adam Smith analyzed it in 1776 as the source of all *wealth of nations*.²³ The change seemed painfully 'unnatural' to many of those who had to perform these increasingly fragmented work processes. "Simultaneously with the specialist there awoke the desire to encompass all life into a single work of art, a symbol of all endeavors."²⁴

Around 1800, the demand for the *Gesamtkunstwerk*—based on the desire to combine audiovisual play in perspective-realistic settings so harmoniously and immersively that the boundary between art and life merged—penetrated almost all areas of Romantic art production. "The time was charged with the urge for a new art form."²⁵ Novalis, for example, sought to achieve synesthetic overall effects in novels, Philipp Otto Runge in painting, Carl Maria von Weber in opera, E.T.A. Hoffmann as a "Gesamtkuenstler" in music and literature.²⁶

The long-desired "art-work of the future"²⁷ was finally theoretically conceived by Richard Wagner and, after 1876, brought to the Bayreuth illusion stage, which was powered by steam and also otherwise characterized by industrial technology:

22 Lessing, Gotthold Ephraim/Frothingham, Ellen: *Laocoon. An Essay Upon the Limits of Painting and Poetry*, Boston, MA: Roberts Brothers 1874 [1766].—Neumann describes Lessing's remark as "the inception of an organized theory of the *Gesamtkunstwerk* on the part of a German author" (*ibid.*, p. 16.).

23 Smith, Adam: *An Inquiry into the Nature and Causes of the Wealth of Nations*, Amsterdam et al.: MetaLibri 2007 [*1776], https://www.ibiblio.org/ml/libri/s/SmithA_WealthNations_p.pdf

24 A. R. Neumann: *The Evolution of the Concept Gesamtkunstwerk*, p. 6.—Similarly, Benjamin recognized in the concept primarily the attempt to "seal art off from the developments of technology" (Benjamin, Walter: "Paris, the Capital of the Nineteenth Century [Exposé of 1935]," in: *The Arcades Project*, Cambridge, MA: Belknap Press of Harvard University Press 2002, pp. 3-13, here p. 11.)

25 A. R. Neumann: *The Evolution of the Concept Gesamtkunstwerk*, p. 120.

26 See *Ibid.*, p. 11.

27 Wagner, Richard: "The Art-Work of the Future," in: *The Art-Work of the Future, and Other Works*, Lincoln, NE; London: University of Nebraska Press 1993 [*1850], pp. 69-213.

as a “great United Art-work, which must gather up each branch of art to use it as a mean, and in some sense to undo it for the common aim of all, for the unconditioned, absolute portrayal of perfected human nature.”²⁸ This was to be achieved through absolute aesthetic control of the work and its experience. Wagner not only wrote the texts and composed the music, but he also designed the specially built theater and its stage, determined the scenery, and decided on the use of innovative musical instruments, for example, the so-called Wagner tuba. By making the orchestra disappear, illuminating the stage strongly and soon electrically, and darkening the auditorium, he radically broke with theatrical tradition and anticipated elements of the dream-like experience that the cinema would offer a few decades later.

Wagner’s operas, along with their staging, represented a significant departure from pre-industrial arts. They aimed for a new multimedia unity. The Bayreuth “Festspielhaus” thus appears as ground zero of the “Gesamtkunstwerk.” In retrospect, it also foreshadows the cinematic dream factories that would only emerge in the 20th century.

3 After Theater: Total Cinema

The acceleration of social change, marked by the occurrence of almost simultaneous technological, economic, and political revolutions, intensified in the late 19th century the demand for realistic and potentially moving images that would represent the new industrial and metropolitan way of life. At the turn of the 20th century, decades of technical and artistic experimentation culminated in film. Its first incarnation—silent and black and white—did not yet correspond to the ideal of the audiovisual *Gesamtkunstwerk*. In this respect, the utopian model continued to have a cultural impact on the theater as well as modern art and architecture, including the Bauhaus movement, whose most prominent protagonists integrated elements of architecture, painting, and sculpture in their designs and works to create a holistic effect.²⁹

After 1930, the photorealism of silent film was enhanced by the addition of sound and then color. While for many theorists and practitioners, the new audiovisual medium seemed “complete” and its evolution finished, others longed for—

28 Ibid., p. 88.—“Great United Art-work” is the 1895 translation of *Gesamtkunstwerk*.

29 Martin, Naomi: “Gesamtkunstwerk—The Total Work Of Art Through The Ages,” *Artland Magazine*, <https://magazine.artland.com/gesamtkunstwerk-the-total-work-of-art-through-the-ages/>

or feared—more. Initially, the vision of a narrative form improved by multisensory participation was expressed as a dystopia: In his *Brave New World*, Aldous Huxley, writing in the early days of the sound film, described the evolution of cinema—of movies or talkies—into more immersive *feelies*. These imagined multimedia narratives employed haptic and olfactory sensory stimuli in addition to moving images and sound. They enveloped the individual immersed in the pneumatic armchair and shaken by the joystick in three dimensions: “all-Super-Singing, Synthetic-Talking, Coloured, Stereoscopic Feely. With Synchronized Scent-Organ Accompaniment.”³⁰

Huxley did not conceive of the new medium as a program to be pursued but as an aberration to be prevented—not as an advanced experience of art but as its destruction. In the novel, the *feelies* initiate a memoryless dozing off in a media mirage, “far more real than reality.”³¹ In contrast to bourgeois art, the *feelies* do not enlighten about reality but feign sensual experience to such an extent that, in the end, real kisses pale before those felt in the imaginary medium. In Huxley’s rejection of the *feelies*, it is easy to see his more fundamental aversion to the “technological paradise of California.”³² As the next stage of the *talkies*, the *feelies* stand for the enslaving control that, in Huxley’s eyes, Hollywood’s synthetic dreams exercised over humanity.

A decade later, André Bazin discussed quite positively the upgrading of cinema and its overcoming as a purely audiovisual medium, which Huxley had feared. The French film theorist noted the widespread desire for a Total Cinema: “the reconstruction of a perfect illusion of the outside world in sound, color, and relief”³³ and the “recreation of the world in its own image.”³⁴ It was not only the

30 A. Huxley: *Brave New World*, pp. 199-200. See Hüning, James about: “Feelies,” *Das Lexikon der Filmbegriffe*, March 29, 2022, <https://filmlexikon.uni-kiel.de/doku.php/f:feelies-2278>.—The reevaluation of the concept of a more immersive cinema, especially during the 1950s, into something utopian to be pursued is not an isolated case in media history. The current reception of Neal Stephenson’s *Metaverse* is another example of such a change.

31 A. Huxley: *Brave New World*, p. 200.

32 See Kumar, Krishan: “Utopia and Technology in the Twentieth Century,” *Swiss Review of World Affairs*, March 1993. Kumar refers, among others, to Huxley, Aldous: “The Outlook for American Culture: Some Reflections in a Machine Age,” *Harper’s Magazine*, August 1927.

33 A. Bazin: “The Myth of Total Cinema,” p. 20.

34 *Ibid.*, pp. 21-22.

description of the future of film that was reminiscent of Richard Wagner's evocation of the "work of art of the future." The term Bazin chose—"cinéma total"—referred directly to "Œuvre d'art totale," the French translation of Total Work of Art. Almost simultaneously, experiments to increase the intensity of cinematic narratives began worldwide. The proto-Total Cinema of the 1950s employed analog electronics for this purpose. Ever wider and more colorful images, stereo, and high-fidelity sound, as well as analog 3D images, assaulted the senses—not least to counter the competition from television, whose black and white small screens and squawking loudspeakers were beginning to marginalize cinema.

4 After Cinema: Transmedia

In the early days of digitization—before digital film cameras and digital projection or even photorealistic-looking moving images in digital games existed—Vilém Flusser remarked that the new technology was giving rise to a "new imagination." It is capable of creating radically different imagery in place of the analog images of the world produced by cameras:

"The old pictures are tables of orientation within the world: they point at the world [...]. The new ones are projections of calculating thought: they point at thought [...]. For example: a synthetic picture of an aeroplane does not show a 'real,' but a possible aeroplane. It is the representation of a 'thought' plane."³⁵

The origin of the production of such mental images—moving images that could not be photographed but only calculated—dates back to the 1960s. In American laboratories, the generation of simple animations commenced, mostly visualizations of scientific concepts or demonstrations of the processes and possibilities of virtual image production. These experiments inspired the film theorist Gene Youngblood to propose the future media of Expanded Cinema or "cybernetic cinema."³⁶ Youngblood was one of the first to understand the computer as an "aesthetic machine," as an artistic tool to overcome the photorealism of the camera:

"The notion of 'reality' will be utterly and finally obscured [...] There'll be no need for 'movies' to be made on location since any conceivable scene will be generated in totally convincing reality within the information processing system. By that time, of course, movies

35 Flusser, Vilém: "A New Imagination," *Artforum* 26 (April 1988), pp. 14-15, <https://s3.amazonaws.com/arena-attachments/151305/a67bb387e1a69ab010c1b4aaa08918c4.pdf>

36 G. Youngblood: *Expanded Cinema*.

as we know them will not exist. We're entering a mythic age of electronic realities that exist only on a metaphysical plane."³⁷

As early as the 1970s, film historian Robert Sklar also emphasized the foreseeable end of analog film and the emergence of a new moving image production whose practices even utopian concepts such as Expanded Cinema could barely imagine:

"We stand in the last quarter of the twentieth century in a position similar to the men and women in the last quarter of the nineteenth century who sought the intellectual, emotional and technological means to alter their ways of seeing the world, and in the process created a new medium. The computer, videographic and holographic films of the early 1970s may no more resemble the cinema of the future than Muybridge's row of separate still cameras [...] related, except in principle, to the motion-picture technologies that followed."³⁸

Parallel to theoretical reflections on future audiovisuals, the longing for a more unrestrained design of moving images was expressed in practical attempts to digitally produce mental images in Flusser's sense: effects that could not be arranged 'realistically' in front of a camera lens. In 1973, Michael Crichton employed 2D computer animation for the first time in a major Hollywood production, WESTWORLD.³⁹ For his 1976 film FUTUREWORLD, Richard T. Heffron utilized computing power to let Peter Fonda's face rotate three-dimensionally in the air.⁴⁰ The post-production of STAR WARS also involved minor digital image corrections subsequent to the first use of computers to control cameras and models during the filming process.⁴¹

The most advanced contemporary example of a hybrid production was Disney's TRON in the same year the word Cyberspace first appeared in print. Around 230 scenes, a total of 15 minutes of the production, which was at 20 million dollars quite expensive for the early 1980s, were digitally animated.⁴² TRON transformed

37 Ibid., p. 206.

38 Sklar, Robert: *Movie-Made America: A Cultural History of American Movies*, New York, NY: Vintage Books 1976, p. 315.

39 WESTWORLD (USA 1973, D: Crichton, Michael).

40 FUTUREWORLD (USA 1976, D: Heffron, Richard T.).

41 STAR WARS: A NEW HOPE (USA 1977, D: Lucas, George). For example, the destruction of the Death Star was digitally enhanced.

42 TRON (USA 1982, D: Lisberger, Steven). See McEachern, Martin: "Tron 2.0: Twenty Years Later, Tron Re-emerges as an Interactive Experience with Souped-Up Graphics," *Computer Graphics World* 26, no. 7 (July 1, 2003).

the inability to produce lifelike visuals into a thematic opportunity: the hacker hero is abducted into the interior of a computer. Therefore, central scenes did not have to be photorealistic to appear realistic but could be modeled on contemporary low-res computer graphics.

A comparable option was not open to George Lucas. His STAR WARS saga was set in the 'reality' of a fantastic future. With analog means or the rudimentary digital technology available to him in the early 1980s, he could not realize the scenes that he—in Flusser's words—had mentally calculated. Lucas himself once compared the limitations he faced to a painter's lack of colors: "With STAR WARS, we were basically off the color palette. [...] The only way you get there is to create technology that will bring those colors into the realm of what's achievable [...]."⁴³ After RETURN OF THE JEDI, Lucas stopped the saga.⁴⁴ He only aspired to produce further STAR WARS films once he had achieved his vision of hyperrealistic cinema.

For nearly two decades, he had his special effects company, *Industrial Light & Magic*, research and develop the necessary digital hardware and software. This endeavor resulted, at the turn of the 21st century, in the first digital film master and the first digital film projection (both THE PHANTOM MENACE⁴⁵) as well as the first major Hollywood production to be filmed entirely with digital cameras (ATTACK OF THE CLONES⁴⁶).

By this time, the film industry, mainly under Lucas' leadership, had long since produced an entirely new, partly analog, partly digital version of the concept of the *Gesamtkunstwerk*: transmedia narratives that, like STARS WARS, STAR TREK, or THE MATRIX, encompassed a multitude of films and television series, but also novels, analog and digital games, and every conceivable form of merchandise. In his analysis of the transmedia universe of The MATRIX in 2004, William G. Doty first observed its proximity to the dominant media utopia of the modern era:

"[T]o stage so extensive and complex an artistic and commercial production can be compared to what Richard Wagner attempted in his German opera house: he sought to produce a *Gesamtkunstwerk*, a total, all-encompassing, and synthesizing work of art that would provide nationalistic ideals."⁴⁷

43 Quoted from Vaz, Mark Cotta/ Duignan, Patricia Rose: *Industrial Light & Magic: Into the Digital Realm*, New York, NY: Ballantine Books 1996, p. 108.

44 RETURN OF THE JEDI (USA 1983, D: Marquand, Richard).

45 STAR WARS: EPISODE I—THE PHANTOM MENACE (USA 1999, D: Lucas, George).

46 STAR WARS: EPISODE II—ATTACK OF THE CLONES (USA 2002, D: Lucas, George).

47 Doty, William G.: "Introduction: The Deeper We Go, the More Complex and Sophisticated the Franchise Seems, and the Dizzier We Feel," in: William G. Doty/Matthew

A year later, John Shelton Lawrence used the same analogy for George Lucas' latest installment of the STAR WARS saga: "Seen against history's tapestry of grand creations, Lucas has woven himself in alongside Richard Wagner [...] Echoing Wagner's conception of his art as *Gesamtkunstwerk*—a totally encompassing, technologically refined blend of image and sound."⁴⁸ However, he referred to the complicated production of individual scenes, characterized by a high degree of aesthetic control. Finally, in 2010, Matthew Wilhelm Kapell posited that the trans-medial construction of modern myths revealed their proximity to the media utopian ideal: "franchises, where the creators and producers of the art—such as in THE MATRIX and STAR WARS—develop a kind of contemporary *Gesamtkunstwerk*."⁴⁹

5 Into the Digital Realm

Despite their differences, the pre-digital visions of imaginary audiovisual media—from the 18th- and 19th-century visions of a *Gesamtkunstwerk* for the stage to the film fantasies of the 20th century, including Huxley's *feelies*, Bazin's Total Cinema, and Youngblood's Expanded Cinema—share one commonality: They aim to transcend the conventional window view experiences of theater, film, and television. All of these visions aspire to a heightened degree of immersion and participation, a complete immersion in the fictional world. However, such desires remained largely unfulfilled as long as audio visions had to be produced in the analog realm.⁵⁰ In the physical world, a safe experience of dangerous actions requires

Kapell (eds.), *Jacking In To the Matrix Franchise: Cultural Reception and Interpretation*, New York, NY: Bloomsbury 2004, pp. 1-12.

48 Lawrence, John Shelton: "Introduction: Spectacle, Merchandise, and Influence," in: Matthew Kapell/Lawrence, John Shelton (eds.), *Finding the Force of the Star Wars Franchise: Fans, Merchandise, & Critics*, New York, NY: P. Lang 2006, pp. 1-20, here p. 3.

49 Kapell, Matthew: "Introduction: The Significance of the Star Trek Mythos," in: Matthew Kapell (ed.), *Star Trek as Myth: Essays on Symbol and Archetype at the Final Frontier*, Jefferson, NC: McFarland & Co. 2010, pp. 1-16, here p. 2.

50 See Freyermuth, Gundolf S.: "Vegas, Disney, and the Metaverse: On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century," in: Benjamin Beil/Gundolf S. Freyermuth/Hanns Christian Schmidt/Raven Rusch (eds.), *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript 2022, pp. 17-97.

their separation from everyday life. Performances must be confined to heterotopic “magic circles” as soon as they deviate from business-as-usual actions.

In contrast to the theater, analog cinema offered its audience a sense of ontological distance and security, as it only projected shadow images of past performances. However, entering these fictions or interacting with their characters was categorically excluded. The digitalization of cinema—a techno-aesthetic utopia put into practice during the second half of the 20th century—successively provided the necessary media technology to calculate mentally designed images and scenes. Nevertheless, as long as these audiovisions had to be pre-produced, it was not possible to achieve interactive immersion. William Gibson’s *Cyberspace*, on the other hand, envisions the real-time production of calculated mental images.

II CYBERSPACE

It is challenging to ascertain how many computers existed globally around 1980. Older literature suggests that several million computers were already in operation. However, the majority were large and expensive devices such as mainframes and so-called “minicomputers,” which only institutions and larger companies could afford.⁵¹ The 1980s saw the breakthrough of the Personal Computer. The number of these smaller and more affordable devices, crucial for understanding the social implementation of digital technology, is placed by one source at only two million in the early 1980s and 50 million, with significantly enhanced computing capabilities around 1990.⁵² Another source estimates that 65 million PCs were in use by the decade’s end.⁵³ With the PC, digital technology made its way from the secluded departments of large industrial institutions—military and civilian research,

51 Campbell-Kelly and Aspray speak of around 150,000 mini and microcomputers and 75 million microchips sold in the mid-1970s, which were installed not only in PCs but also in other devices, including calculators, game consoles, and medical equipment (Campbell-Kelly/Aspray, Martin/Aspray, William: *Computer: A History of the Information Machine*, New York, NY: Basic Books 1996, p. 229). Friedewald also mentions 165,000 mainframe computers in the USA alone (M. Friedewald: *Computer*, p. 16).

52 Lilly, Christopher LaMorte with John, “Computers: History and Development,” (Jones Telecommunications and Multimedia Encyclopedia), http://www.digitalcentury.com/encyclo/update/comp_hd.html

53 HistoryTools: “The Personal Computer Revolution: A Timeline of Innovation and Impact,” accessed June 15, 2024, <https://www.historytools.org/docs/computer-history-timeline-personal-computers-computing-internet>

national and corporate administrations—into the everyday working lives of developed Western countries and, in some cases, into private offices and homes.

PCs owed their success on the one hand to productivity software such as spreadsheets, databases, and word processing, and on the other to digital games, which were primarily text-based and, at best, featured simple graphics.⁵⁴ For the minority of people in developed countries who already owned PCs, the experience of computing underwent a profound transformation. What had been a large-scale industrial technology designed to control, if not suppress, individual interests mutated into an individualized work and information device. It empowered individuals, small groups, and small companies to compete with institutions and corporations. In 1982, the magazine *Time*, therefore, declared the personal computer “Machine of the Year” instead of the usual “Person of the Year.”⁵⁵ In 1984, Apple released the Macintosh, the first PC to feature a graphical user interface (GUI). Its simplified use caught on quickly, prompting Microsoft to follow suit with the Windows operating system.

At the same time, digital networking developed, starting in the USA. Its concept—which initially seemed utopian—goes back to J.C. R. Licklider. In 1960, he proposed replacing the then-common institutional use of computers, which only granted access to a few experts, with individual and interactive access for everyone who wanted to use computing power. He thus introduced the idea of the personal computer to the world. Three years later, Licklider developed the complementary concept of networking individual computers under the spectacular slogan of an “Intergalactic Computer Network.”⁵⁶ Its basis seemed to him a digital infrastructure independent of the analog telephone network. As director of a critical ARPA department, he initiated the research to establish the first “experimental

54 See M. Campbell-Kelly/W. Aspray: *Computer*, p. 249.

55 See McCracken, Harry: “Time’s Machine of the Year, 30 Years Later,” *Time*, January 4, 2013, <https://techland.time.com/2013/01/04/times-machine-of-the-year-30-years-later/>.—Although the first woman received this award in 1936, *Time* only changed the category to “person of the year” in 1999.

56 See Friedewald, Michael: “Konzepte der Mensch-Computer-Kommunikation in den 1960er Jahren: J. C. R. Licklider, Douglas Engelbart und der Computer als Intelligenzverstärker,” *Technikgeschichte* 67, no. 1 (March 2000), pp. 1-24, <http://www.friedewald-family.de/Publikationen/TG012000.pdf>

network of multi-access computers.” In 1969, the Arpanet connected the first three large computers.⁵⁷

Analog long-distance communication is distinguished by physical circuit switching. The advent of digital networking established a new fundamental technology: *packet switching*, a method of self-control of the flowing data packets conceived by Leonard Kleinrock in 1959 and still in use today.⁵⁸ At the beginning of the 1980s, around 200 mainframes in the Arpanet enabled digital communication. By the decade’s end, this number had grown to almost 160,000 computers. In addition to the Arpanet, there were several other, albeit smaller, national networks in the USA—e.g., the National Science Foundation’s CSNet and Usenet, an early form of social media founded in 1980—as well as around 40,000 bulletin board systems (BBS), accessible to everyone via local telephone dial-up. All these networks were largely incompatible with each other.

In 1983—based on Arpanet’s TCP/IP protocol—an “internetworking” protocol was established that allowed all these networks to be connected. This transition to the Internet created a virtual “data space” in which it was potentially possible to communicate and trade globally via constantly flowing data streams. However, until the end of the 1980s, access was limited to a tiny minority. Computer scientists, engineers, military personnel, scholars, and students could communicate online if they worked in the United States, on US military bases, in US embassies, or in academic institutions in Canada, Australia, and Europe affiliated with ARPA. Insofar as the use was professionally oriented, there were hardly any entertainment offerings. Nevertheless, the 1970s and early 1980s saw the development of the first networked digital games, initially playable within mainframe computers and later via the Internet, for example, MUD1⁵⁹ and MAZE WAR.⁶⁰

57 ARPA stands for the Advanced Research Projects Agency of the US Department of Defense. See Licklider, J. C. R./Taylor, Robert W.: “The Computer as a Communication Device,” *Science and Technology* 76, (1968), pp. 21-40, <http://www.memex.org/licklider.pdf>—For the following see Leiner, Barry M., Vinton G. Cerf, David D. Clark et al., “A Brief History of the Internet,” *Internet Society*, 1997, https://www.internetsociety.org/wp-content/uploads/2017/09/ISOC-History-of-the-Internet_1997.pdf

58 Kleinrock, Leonard: *Communication Nets; Stochastic Message Flow and Delay*, New York, NY: McGraw-Hill 1964.

59 MUD (University of Essex 1978, O: Roy Trubshaw, Richard Bartle). The first multi-user dungeon could be played on the Arpanet starting in 1980.

60 MAZE WAR (NASA Ames Research Center 1974, O: Steve Colley, Greg Thompson, and Howard Palmer). The local multiplayer game became available on the Internet in 1986.

1 *Chrome & Neuromancer*

William Gibson's short story "Burning Chrome" responded to this early stage of digital networking: Two hackers attempt to steal from a criminal organization called Chrome by manipulating data streams.⁶¹ When Gibson tried to name the networked action space in which his protagonists operated in 1981, he originally chose "Infospace." However, he deleted the word and replaced it with "Data-space." This term did not last either. Ultimately, Gibson coined an entirely new term: "Cyberspace."⁶² The prefix "cyber" is derived from the Greek word "kubernao" (to steer a ship) and can be found not only in cybernetics—the science of control processes—but also in terms such as governor or government. In this respect, cyber connotes sovereign control when navigating the realm of digital data, which is not without danger.

Two years later, now in the age of the Internet, William Gibson detailed what made Cyberspace unique in his novel *Neuromancer*. There, he described this new domain of virtual communication and action as a

"consensual hallucination experienced daily by billions of legitimate operators, in every nation [...] A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding."⁶³

The heroes of Cyberspace are "hackers."⁶⁴ The term appeared in the 1960s in research institutions at the Massachusetts Institute of Technology (MIT) and Stanford University. It referred to ingenious electronic tinkerers. A "hack" was the most elegant solution to a challenging hardware or software problem. Around the mid-seventies, these "Heroes of the Computer Revolution," as Steven Levy called them, developed the first affordable personal computers.⁶⁵ By exploring and exploiting the potential of the new technology in the early days of digitalization,

61 W. Gibson: "Burning Chrome."

62 See Z. Moukheiber: "The Geeks Have Inherited the Earth."

63 Gibson, William: *Neuromancer*, New York, NY: Ace Books 1984, p. 6.

64 On the history of hackers see Hafner, Katie/ Markoff, John: *Cyberpunk: Outlaws and Hackers on the Computer Frontier*, New York, NY: Simon & Schuster 1991; Himanen, Pekka: *The Hacker Ethic, and the Spirit of the New Economy*, New York, NY: Random House 2001; Levy, Steven: *Hackers: Heroes of the Computer Revolution*, New York, NY: Dell 1985 [*1984].

65 S. Levy: *Hackers*.

hackers operated as the “vanguard of a daring symbiosis between man and machine.”⁶⁶

However, *Neuromancer*'s hacker protagonist, Henry Case, is a failure and an outcast. He once effortlessly merged with his Cyberspace deck “that projected his disembodied consciousness into the consensual hallucination that was the matrix.”⁶⁷ Cyberspace afforded him a dislocated existence untethered from the constraints of the physical world and expanded his consciousness. At the same time, Case experienced Cyberspace as an arena of virtual battles between powerful opponents—corporations, artificial intelligences, and, of course, other hackers. But then the successful “console cowboy” stole from his employer. The punishment followed swiftly: profound damage to his nervous system. It prevents the necessary symbiosis with his Cyberspace deck. Exiled into reality, Case lives as a “prisoner of his flesh,”⁶⁸ a state of re-embodiment that he wants to undo at all costs. He longs to free himself again from “all of the meat and all that it wants.”⁶⁹

Neuromancer received both the Hugo and Nebula awards and, with its critical and popular success, provided the style-defining literary prototype for a new sub-genre, cyberpunk.⁷⁰ Bruce Bethke coined the term with his science fiction story of the same name a year after “Burning Chrome.”⁷¹ The title merged high-tech cybernetics with low-life punk, i.e., advanced technology with a revolting counter-culture. *Neuromancer* established two constitutive elements of cyberpunk: firstly, its hero, Henry Case, like so many later characters, lives in a dystopian high-tech future characterized by oppression and social conflict. A quarter of a century ago, I described it like this:

“The standard scenario of cyberpunk narratives occurs sometime in the twenty-first century. Huge corporations have divided the world into business zones. Masses of petty-bourgeois data slaves and a violent underclass of drug-addicted zombies populate the simultaneously sprawling and decaying urban landscapes. These slums of concrete and bare steel girders

66 Ibid., p. 86.

67 W. Gibson: *Neuromancer*.

68 Ibid.

69 Ibid., p. 9.

70 On cyberpunk literature see Cavallaro, Dani: *Cyberpunk and Cyberculture: Science Fiction and the Work of William Gibson*, London; New Brunswick, NJ; Somerset NJ: Athlone Press; Distributed in the United States by Transaction Publishers 2000.

71 See Bethke, Bruce: “Cyberpunk, Foreword,” *Infinity Plus*, 2002 [*1997], <http://www.infinityplus.co.uk/stories/cpunk.htm>

contrast with the palaces of marble and brass in which the corporations reside. In this cyberpunk future, the individual—already ‘a terminal of multiple networks’ in the words of Jean Baudrillard—has become just a data transit station, an appendage of the machines. The latter is to be understood quite literally: the heroes of these novels, data guerrillas and console cowboys, cunning loners, and lone warriors can plug themselves directly into the matrix thanks to brain implants and skull plugs.”⁷²

Secondly, Cyberspace is ambivalently characterized. At a time when computers could only communicate by numbers and letters, Gibson transformed the world of virtual data into an audiovisual geography: “Cyberspace is created by transforming a data matrix into a landscape in which narratives can happen.”⁷³ On the one hand, Gibson’s Cyberspace promises an escape from reality, i.e., freedom and amusement. At the same time, however, it threatens enslavement and exploitation. Just accessing is expensive. Those who want to live in the digital networks must earn this experience—one way or the other. Even more problematic is that action in virtuality requires bio-drugs or high-tech implants. Independent modes of perception, as well as a traditional human existence, are called into question. Bruce Sterling speaks of a “mind invasion”: “Brain-computer interfaces, artificial intelligence, neurochemical techniques that radically redefine human nature, the nature of the self.”⁷⁴ Quite obviously, the cyberpunk genre reacted to the parallel popularization of the transhumanist vision of our species’ technological self-evolution.

Despite the novelty of its worlds and characters, cyberpunk fits into the contemporary mainstream of science-fiction—thanks to its technology-critical and fundamentally dystopian orientation.⁷⁵ In the 1930s and 1940s, the so-called “Golden Age” of science fiction, the techno-optimistic genre had moved from the margins of industrial culture to its mass-media center. Initially published in literary form, stories about the conquest of space gained immense popularity in the

72 Freyermuth, Gundolf S.: *Cyberland: Eine Führung durch den High-Tech-Underground*, Berlin: Rowohlt Berlin 1996, p. 33. (My translation.)—On Baudrillard, see Foster, Hal: *The Anti-Aesthetic: Essays on Postmodern Culture*, Port Townsend, WA: Bay Press 1983.

73 Hayles, N. Katherine: *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, Chicago Ill.: University of Chicago Press 1999.

74 Schrage, Michael: “Cyberpunk and the Future of Technology,” *Los Angeles Times*, April 19, 1990.

75 See for the following Lombardo, Tom: “Science Fiction as the Mythology of the Future,” *academia.com*, https://www.academia.edu/1160808/Science_Fiction_as_the_Mythology_of_the_Future

new mass media of film, comics, and radio. Television further increased the genre's popularity in the subsequent "Silver Age" of the 1950s and 1960s. Concurrently, however, science fiction—irrespective of its medium and parallel to the general ideological change in Western societies—reversed its trajectory away from modernity and rational mastery of nature.

The achievements of the Enlightenment and, above all, technical and economic progress, the new means of production, transportation, and communication, as well as the mass prosperity it had brought to Western countries, lost their cultural esteem. The emergence of postmodern thinking created a "New Wave" of fiction about the future. It searched for meaning beyond industrial materialism and turned to environmental issues—nature and its destruction—as well as metaphysical problems, specifically the existence and perception of immaterial aspects of reality. The science fiction of the late 1960s and 1970s thus anticipated "the feeling and atmosphere of cyberpunk science fiction long before this movement had a name."⁷⁶

However, the origins of cyberpunk, and particularly the concept of Cyberspace—as an immaterial space for action, a habitat, a futuristic medium in which brains network directly and communicate from mind to mind—date back further. The roots lie in the Enlightenment's rational approaches to understanding 'supernatural' phenomena as well as in the processes of immaterialization that began with industrialization and led to digitization and virtualization, i.e., the replacement of atoms with bits.

2 From World Spirit to Global Village: Origins of Cyberspace

Over the millennia, religions and other belief systems have provided 'explanations' for phenomena that are supposedly or actually beyond what our senses can perceive. With the scientific revolution and the Enlightenment, however, the need arose to understand such phenomena from a secular perspective, and thus the 18th and 19th centuries saw an increase in scientific research into immaterial natural phenomena such as magnetism, gravity, and electricity.

Philosophically, the turn to rationality marks Georg Wilhelm Friedrich Hegel's marginalization of the Christian "Holy Spirit" through the assertion of a secular "world spirit." Hegel defined it as the driving force of human history.⁷⁷ At the same time, he asserted the increasing dematerialization of the arts as their telos.

76 Ibid., p. 119.

77 Hegel, Georg Wilhelm Friedrich/ Miller, Arnold V./ Findlay, J. N.: *Phenomenology of Spirit*, Oxford: Clarendon Press 1977 [*1807].

The path traced by Hegel's pioneering historicization of aesthetic production at the beginning of the 19th century led from the heaviness of the symbolic epoch, whose foremost achievement was architecture, via the mastery of the 'lighter' sculptures of the classical epoch to the literature and ethereal music of the romantic epoch.⁷⁸ With the invention of the daguerreotype and photography a decade after Hegel's death, new ways of 'painting with light,' this historical tendency of the arts seemed to continue—to culminate, with Hegel in mind, in complete dematerialization.

Parallel to the rational elucidation of immaterial natural phenomena, scientific and technological progress constantly produced new dematerializations: the remote transmission of textual information through its—temporary—detachment from material storage in telegraphy since the 1840s, the remote transmission of speech through its detachment from the human body in fixed-line telephony since the 1870s and in radio since the 1890s, as well as the remote transmission of 'invisible' energy via electricity grids, which also began at the end of the century. At the same time, new transportation networks accelerated human exchange: the steam-powered railroad from the 1830s and gasoline-powered automobiles and airplanes from the 1920s. By the middle of the 20th century, these networks of communication and transportation would span the planet and enable not only the worldwide distribution of goods but also of news, art, and entertainment. The beginnings of cultural globalization in these decades were brought about, above all, by silent and sound films.

The social and cultural consequences of this change did not go unnoticed by contemporaries. Around 1928, for example, the philosopher and poet Paul Valéry understood the dual process of dematerialization and networking as the "conquest of ubiquity" and thought of it in terms of a future basic domestic supply of 'flowing,' i.e., streamed, multimedia entertainment:

"Just as water, gas, and electricity are brought into our houses from far off to satisfy our needs in response to a minimal effort, so we shall be supplied with visual- or auditory images, which will appear and disappear at a simple movement of the hand, hardly more than a sign."⁷⁹

78 Hegel, Georg Wilhelm Friedrich/Bosanquet, Bernard/Inwood, M. J.: *Introductory Lectures on Aesthetics*, London; New York, NY: Penguin Books 1993 [*1835].

79 Valéry, Paul: "The Conquest of Ubiquity," in: *The Collected Works of Paul Valéry*, Princeton, NJ: Princeton University Press, 1956, pp. 225-226, here p. 226.—The passage is famously quoted by Benjamin, Walter: "The Work of Art in the Age of Mechanical Reproduction," in: *Illuminations. Essays and Reflections. Edited and With*

In the 1930s and 1940s, the Jesuit and paleontologist Pierre Teilhard de Chardin carried out the most forward-thinking analysis of techno-cultural change with regard to digitalization. His central interest lay in reconciling science with religion and evolutionary theory with Christian theology. In his opus magnum, *The Phenomenon of Man*, written around 1940, he described the creation of the world and life as a process of the constant evolution of consciousness, i.e., spiritualization.

First, the matter was created in “cosmogogenesis.” Life developed in the following “biogenesis.” Only the third stage, “noogenesis,” brought the development of consciousness.⁸⁰ According to Teilhard, evolution tends to produce increasingly complex nervous systems. As with artificial neural networks, more connections mean more consciousness, and more consciousness means more freedom and, ultimately, divinity. Evolution thus appeared to Teilhard as the pursuit of consciousness. Biological bodies were only its current carrier media: “The living world is constituted by consciousness clothed in flesh and bone.”⁸¹

However, evolution, Teilhard postulated, does not end with *Homo sapiens*. What distinguishes humanity from other life forms is that we develop technologies enabling more complex and, therefore, more intelligent units of consciousness. Technical networking transcends biological limitations:

“Through the discovery yesterday of the railway, the motor car and the aeroplane, the physical influence of each man, formerly restricted to a few miles, now extends to hundreds of leagues or more. Better still: thanks to the prodigious biological event represented by the discovery of electro-magnetic waves, each individual finds himself henceforth (actively and passively) simultaneously present, over land and sea, in every corner of the earth.”⁸²

An “accession to some sort of trans-humanity” seemed, therefore, imminent.⁸³ Teilhard—along with Julian Huxley, the brother of the author of the dystopian

an Introduction by Hannah Arendt. Preface by Leon Wieseltier, New York, NY: Schocken Books 2007, pp. 217-252, here p. 219.— Reading these sentences in the 1950s, they seemed to foreshadow television; in the 1990s, the Internet.

80 Teilhard de Chardin, Pierre: *The Phenomenon of Man*, New York, NY: Harper 1965 [*1938-1940].—The Greek term “noos” means “mind, spirit, intellect.”

81 Quoted from Cobb, Jennifer J.: “A Globe, Clothing Itself with a Brain,” *Wired*, June 1995, http://www.wired.com/wired/archive/3.06/teilhard_pr.html

82 P. Teilhard de Chardin: *The Phenomenon of Man*, p. 240.

83 Teilhard de Chardin, Pierre: “From the Pre-Human to the Ultra-Human: The Phases of a Living Planet,” in: *The Future of Man*, New York, NY: Harper & Row 1964 [*1951], pp. 290-298, here p. 298.

Brave New World—thus laid the philosophical foundations of transhumanism.⁸⁴ As digitalization advanced, the perspective that enhancing our species is an evolutionary imperative gained increasing traction among the rising class of networked knowledge workers.⁸⁵

The adaptation of Teilhard de Chardin's ideas to secular thinking started in the 1960s. Marshall McLuhan defined media in general as an increase in human possibilities and the networks of electricity and television as the spread of the human nervous system across the material world.⁸⁶ Modifying Teilhard's earth-engulfing noosphere in terms of media studies, he described the status quo—more worldly—as an “electronic age,” a “new world of the global village.”⁸⁷ McLuhan's idea of humanity becoming more interconnected in the 20th century due to the propagation of media technologies and the planet turning into a village where everyone can communicate with everyone is easily recognizable as an analog prefiguration of Cyberspace.

3 Media on the *Frontier*: Cyberspace's Aftereffects

When William Gibson's *Neuromancer* was published in the summer of 1984, the Internet, the merger of previously incompatible digital networks, was just a year and a half old. Technical democratization was followed by social democratization. Government subsidies promoted the expansion and opening up of the Internet for civilian use. The net of the National Science Foundation (NSFnet) accelerated the connection of schools and colleges, giving millions of young Americans the formative experience of electronic communication—which in the 1980s was entirely text-based, from the control via command line interfaces to the transmitted content. Between 1981 and 1992, the number of computers permanently networked in the Arpanet/Internet rose from 281 to 1.1 million.⁸⁸ The restriction, which only allowed foreign connections to US military bases and embassies, gradually disappeared. (West) Germany, for example, was admitted to the Internet in the spring of 1989, four years after the first German edition of *Neuromancer*.

84 See Huxley, Julian: “Transhumanism,” in: *New Bottles for New Wine*, London: Chatto & Windus 1957, pp. 13-17.

85 See J. J. Cobb: “A Globe, Clothing Itself with a Brain.”

86 McLuhan, Marshall: *Understanding Media: The Extensions of Man*, Berkeley, CA: Gingko Press (Kindle Edition) 2013 [*1964].

87 *Ibid.*, p. 101.

88 Data according to Gilder, George: “Issaquah Miracle,” *Forbes ASAP*, June 7, 1993.

In the late 1980s, *The Well* developed as an intellectual center for discussing the cultural consequences of digital networking—and Gibson’s imaginary media of Cyberspace. Stewart Brand, publisher of the hippiesque *Whole Earth Catalog*, set up the computer conference system in San Francisco in 1985.⁸⁹ One of the early members was John Perry Barlow, songwriter for the Grateful Dead. After one of Barlow’s online posts, IT entrepreneur Mitch Kapor invited him to team up with free software activist John Gilmore to establish the *Electronic Frontier Foundation* (EFF), which is still the most important non-profit organization for defending fundamental freedoms in the data space. In a later contribution, Barlow adopted Williams Gibson’s term “Cyberspace” to describe the contemporary Internet. In doing so, he initiated the popular use of Cyberspace in the 1990s—for a completely different, albeit graphic, Internet that was to bring over 350 million people online within a decade.⁹⁰

Tim Berners-Lee initiated this exponential growth spurt in 1989, then at the European Institute of Particle Physics in Geneva, where he proposed a hypertext mask for the Internet.⁹¹ It was to be independent of operating systems and would allow for more straightforward navigation and user-friendly linking of databases. In 1990, Berners-Lee began crafting such a hypertext system on a NeXT cube with the HyperText Markup Language (HTML) he had developed. The resulting World Wide Web (WWW) was to have a profound impact on the way in which humanity lives and works.

HTML itself resulted from a series of media utopias and technical efforts to realize them. In the mid-1940s, Vannevar Bush conceived the basic idea of networking civilizational knowledge. With his hypothetical Memex concept—short for “Memory Extender”—he intended to enable associative linking of data using analog technology.⁹² Two researchers who read Bush’s media utopia in their youth, Ted Nelson and Douglas Engelbart, attempted to realize Bush’s vision in the 1960s and 1970s. First independently and then together, they created digital

89 Hafner, Katie: *The Well: A Story of Love, Death, and Real Life in the Seminal Online Community*, New York, NY: Carroll & Graf 2001.

90 Ritchie, Hannah et al.: “Internet,” *OurWorldInData.org*, 2023, <https://ourworldindata.org/internet>

91 See Berners-Lee, Tim: “Information Management: A Proposal,” 1989, <http://www.w3.org/History/1989/proposal.html>. Berners-Lee, Tim/ Fischetti, Mark: *Weaving the Web: The Past, Present and Future of the World Wide Web by Its Inventor*, London: Orion Business 1999.

92 Bush, Vannevar: “As We May Think,” *The Atlantic Monthly*, July 1945, <http://www.theatlantic.com/unbound/flashbks/computer/bushf.htm>

hyperlinking.⁹³ On this basis, Bill Atkinson developed Apple's Hypercard program in the 1980s. At the same time, after he had to leave Apple, Steve Jobs incorporated hypertext into the operating system of his NeXT computer, thus enabling Berners-Lee to program HTML as the basis of the WWW.⁹⁴

The first websites went online in 1991. By 1992, there were only around 50.⁹⁵ In 1993, Mosaic became the first browser to make this hypertext mask of the Internet accessible on regular PCs. The effects were dramatic. By the end of the year, 623 websites were online; in 1994, around 2700; in 1995, 23,500; by the turn of the century, over 17 million. Cyberspace was filling up and commercializing.

In the USA, 37 million people had access to the Internet in the mid-1990s, and 24 million went online regularly, on average five hours a week. This made them the online majority: 63 percent of all those "surfing" the WWW—as it was called at the time—were Americans, and only 21 percent were Europeans, although the population of the Old World was considerably larger. US institutions and corporations also operated most existing websites—universities, schools, the military, financial service providers, and IT companies. Digital technology became a central economic factor. By 1995, more people in the USA were earning their money from the manufacture, trade, and service of digital hardware and software than from any other product, including the heavy and automotive industries.⁹⁶

Even before this transformation of the WWW into a medium of the masses, which took place in the second half of the nineties, the graphic Internet seemed to realize in the eyes of contemporaries what William Gibson had imagined as Cy-

93 Bush, Vannevar/Nyce, James M./Kahn, Paul (eds.): *From Memex to Hypertext: Vannevar Bush and the Mind's Machine*, Boston, MA: Academic Press 1991; Kahney, Leander: "HyperCard Forgotten, but Not Gone," *Wired News*, August 14, 2002, <https://www.wired.com/2002/08/hypercard-forgotten-but-not-gone/>

94 L. Kahney: "HyperCard Forgotten, but Not Gone."

95 The following is based on: Dibbell, Julian: "Nielsen Rates the Net," *Time*, November 13, 1995; Marshall, Andrew: "Suspicion Slows Europe's Hopes," *The WorldPaper Online*, May 1995; N.N.: "Phenomenal Internet Growth Will Continue," *Business Wire*, September 6, 1995; Staten, James: "America Online Stinging from Its Growing Pains," *MacWeek*, September 25, 1995; Staten, James: "NetTraffic," *MacWeek*, December 28, 1995. LaFrance, Adrienne: "A Search for the Zombie Websites of 1995," *The Atlantic*, April 21, 2017, <https://www.theatlantic.com/technology/archive/2017/04/a-search-for-the-zombie-websites-of-1995/523848/>

96 See Flanigan, James: "Technology Is No Mere Sector—It's Our Bedrock," *Los Angeles Times*, July 23, 1995.

berspace. Most of those who made use of the historically new opportunity to communicate and publish globally, without any censorship, almost free of charge and liberated from the editorial selection criteria of the established print media, felt like avant-gardists, regardless of which institution and profession they belonged to and which passion had lured them into virtuality, whether political activism, religious mission consciousness, the longing for intellectual exchange or the will for artistic expression. In 1996, I described the experience of digital networking:

“Like Paris in the 19th century, Cyberspace today is the scene of the most burning controversies and, at the same time, the most controversial place. The intellectual currents, artistic tendencies, and most advanced techniques of the era culminate in a colorful multimedia mixture of chaos theory and video art, genetics and cryonics, postmodern theory and pop music, online games and science fiction, mythology and nanotechnology, computer graphics and online sex [...].”⁹⁷

In the same year, EFF board member John Perry Barlow published a “Declaration of Independence of Cyberspace,” which caused a sensation:

“Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. [...] We have no elected government, nor are we likely to have one, so I address you with no greater authority than that with which liberty itself always speaks. I declare the global social space we are building to be naturally independent of the tyrannies you seek to impose on us.”⁹⁸

This radical libertarian assertion of Cyberspace as a politically free space beyond material reality complemented its perception as a realm of spiritual freedom. The ideas of Teilhard de Chardin and Marshall McLuhan were not only adhered to by prominent digerati—from John Perry Barlow to Louis Rosetto and Kevin Kelly, the founders of the authoritative high-tech magazine *Wired*, to the US Vice President and “information highway” builder Al Gore. Most of the academics who attempted to understand the historical and cultural significance of digital networking in the 1980s and 1990s were also guided by the models of these pioneers, the noosphere and the global village created by communication media: physicist and

97 G. S. Freyermuth: *Cyberland*, p. 27. (My translation.)

98 Barlow, John Perry: “A Declaration of the Independence of Cyberspace,” February 8, 1996, <http://www.eff.org/~barlow/Declaration-Final.html>

computer scientist Peter Russell's *The Global Brain*⁹⁹ and biologist Gregory Stock's *Metaman: The Merging of Humans and Machines into a Global Superorganism*;¹⁰⁰ the futurologist Joël de Rosnay's *The Symbiotic Man*,¹⁰¹ the hypermedia expert Pierre Lévy's *The Collective Intelligence*,¹⁰² or the historian of science George Dyson's *Darwin Among the Machines: The Evolution of Global Intelligence*.¹⁰³

The political and spiritual perspectives on Cyberspace, as well as the growing criticism of its rapid economization, which occurred in the United States in the 1990s, revolved around one term in particular: the *frontier*. Its conception refers to the historian Frederick Jackson Turner and his "The Significance of the Frontier in American History" speech. In it, he justified the rise of the USA as a nation at a historical congress in 1893 with "the existence of an area of free land, its continuing recession, and the advance of American settlement westward."¹⁰⁴ *Frontier* became "the dominant symbol of the Western myth" within a few years.¹⁰⁵ In 1990, John Perry Barlow took up the term and described the data space as another *frontier* of as-yet-uncharted territory, comparable "to the Wild West of the 19th century": "vast, undeveloped, culturally and legally open [...] a perfect breeding ground for both outlaws and new ideas of what freedom is."¹⁰⁶ In the same year, Barlow and Mitch Kapor started the *Electronic Frontier Foundation*.

-
- 99 Russell, Peter: *The Global Brain: Speculations on the Evolutionary Leap To Planetary Consciousness*, Los Angeles, CA; Boston, MA: J.P. Tarcher; Distributed by Houghton Mifflin 1983.
- 100 Stock, Gregory: *Metaman: The Merging of Humans and Machines into a Global Superorganism*, New York, NY: Simon & Schuster 1993.
- 101 Rosnay, Joël de: *The Symbiotic Man: A New Understanding of the Organization of Life and a Vision of the Future*, New York, NY: McGraw-Hill 2000 [*1995].
- 102 Lévy, Pierre: *Collective Intelligence: Mankind's Emerging World in Cyberspace*, New York, NY: Plenum Trade 1997.
- 103 Dyson, George: *Darwin Among the Machines: The Evolution of Global Intelligence*, Reading, MA: Perseus Books 1998.
- 104 Quoted from Kapell, Matthew: *Star Trek as Myth: Essays on Symbol and Archetype at the Final Frontier*, Jefferson, NC: McFarland & Co. 2010, p. 8.
- 105 Tyrell, Blake Wm.: "Star Trek as Myth and Television as Mythmaker," in: Matthew Kapell (ed.), *Star Trek as Myth: Essays on Symbol and Archetype at the Final Frontier*, Jefferson, NC: McFarland & Co. 2010, pp. 19-28, here p. 31.
- 106 Barlow, John Perry: "Crime and Puzzlement: Desperados of the DataSphere," *Whole Earth Review* (Fall 1990).

The rampant growth of the WWW made the *frontier* the dominant buzzword. R.U. Sirius, editor-in-chief of the avant-garde cyberpunk magazine *Mondo 2000*, described Cyberspace in 1995 as “the new frontier, the frontier that consciousness is reaching today. We don’t exactly know what awaits us. But we do know that from now on, we will no longer live only in our bodies and among our fellow human beings.”¹⁰⁷ In the same year, James Gleick wrote in *The New Yorker*: “Cyberspace is as much a frontier as the New World was for seventeenth-century Europe. There is no reason to romanticize it. The frontier world is unpleasant, ugly and lawless.”¹⁰⁸

The narratives of cyberpunk tell of such *frontier* futures. During the 1980s, they emerged primarily in science fiction literature, and since the 1990s, also in popular science fiction films, from *THE LAWNMOWER MAN*¹⁰⁹ to *STRANGE DAYS*,¹¹⁰ *GHOST IN THE SHELL*,¹¹¹ *JOHNNY MNEMONIC*,¹¹² *LAWN MOWER MAN: BEYOND CYBERSPACE*,¹¹³ *THE THIRTEENTH FLOOR*¹¹⁴ and *EXISTENZ*¹¹⁵ to the trans-media franchise *THE MATRIX*,¹¹⁶ which completed the canonization of cyberpunk. Its genre-typical elements not only influenced cinematic content, of course. In these years of transition from analog to digital cinema, cyberpunk also shaped the artistic hopes of numerous filmmakers. They aspired to overcome the many obstacles and contingencies that limited analog film production in the material world. The focus was on the immaterialization of audiovisual media’s production and reception through advanced technology such as biodrugs and brain implants.

George Lucas, who is regarded as the “father of digital film”¹¹⁷ since his company *Industrial Light & Magic* decisively advanced the transition from analog to

107 G. S. Freyermuth: *Cyberland*, p. 18. (My translation.)

108 Gleick, James: “Net Losses: Cyberhype Gives Way to Cybergripe in Unexpected Realms,” *The New Yorker*, May 22, 1995.

109 *THE LAWNMOWER MAN* (USA 1992, D: Leonard, Brett).

110 *STRANGE DAYS* (USA 1995, D: Bigelow, Kathryn).

111 *GHOST IN THE SHELL* (JP 1995, D: Oshii, Mamoru).

112 *JOHNNY MNEMONIC* (USA 1995, D: Longo, Robert).

113 *LAWN MOWER MAN 2: BEYOND CYBERSPACE* (USA 1996, D: Mann, Farhad).

114 *THE THIRTEENTH FLOOR* (USA 1999, D: Rusnak, Josef).

115 *EXISTENZ* (CA/UK 1999, D: Cronenberg, David).

116 *THE MATRIX* (USA 1999); *THE MATRIX RELOADED* (USA 2003); *THE MATRIX REVOLUTIONS* (USA 2003); *THE MATRIX RESURRECTIONS* (USA 2021). All four movies directed bei Lana and Lilly Wachowski.

117 See, for example, the announcement of Lucas’ 2005 ACMSIGGRAPH Keynote: “George Lucas: A Keynote Q&A; With the Father of Digital Cinema,” <https://history>.

digital film in the 1980s and 1990s, imagined a dream-like combination of digital image generation and biotechnologically induced immersion in fiction in 1996:

“I see true environments being created and combined with a lot of the biotech things going on, in terms of manipulating people’s senses through drugs [...] This combination will have the most powerful effect on the kind of storytelling we’re doing today [...] they’re already going there—creating images without actually making them, just as you create them in a dream.”¹¹⁸

A year later, director and special effects pioneer Douglas Trumbull predicted: “We’re not that far from being able to plant images, memories, and emotional states directly into the brain.”¹¹⁹ Furthermore, at the end of the century that film had culturally dominated, Walter Murch, a multiple Oscar winner for editing and sound design, speculated about the “invention of a black box that could directly convert a single person’s thoughts into a viewable cinematic reality. You would attach a series of electrodes to various points on your skull and simply think the film into existence.”¹²⁰

These utopias of experienced filmmakers, reminiscent of Gibson’s Cyber-space, extended the process of digitization—which had radically transformed their medium since the 1970s—to its logical conclusion. Common to their visions was the shift from an analog material production of linear audio-visuals to their rather ‘spiritual’ generation and reception: a cinema of thought. Their ideas pointed clear-sighted—albeit distorted and displaced as prophecies often are—to the virtualization of film production that would emerge a quarter century later with game engines, VR goggles, and LED walls.

siggraph.org/learning/george-lucas-a-keynote-q-with-the-father-of-digital-cinema-by-lucas/

118 Quoted from M. C. Vaz/ Duignan, P. R.: *Industrial Light & Magic*, p. 279.— Huxley compared his clairvoyant conception of the *feelies* with the effects that could be achieved by combining photorealistic narratives and drugs. See Varricchio, Mario: “Power of Images/Images of Power in Brave New World and Nineteen Eighty-Four,” *Utopian Studies* (January 1, 1999).

119 Greenwald, Jeff: “Trumbull’s Vision,” *Wired*, January 1997, http://www.wired.com/wired/archive/5.01/fftrumbull_pr.html

120 Murch, Walter: “The Future—A Digital Cinema Of the Mind? Could Be,” *The New York Times*, May 2, 1999, <http://www.nytimes.com/library/film/050299future-film.html>

However, alongside the penetration of digital computers into everyday life, the historical process of virtualizing material tools and media, which inspired these visions of future media, was supplemented by a fundamentally opposing trend toward rematerialization. It became culturally effective during the 1980s—accompanied by the immediate popularity of a new utopian medium.

III HOLODECK

The transition from analog to digital processes and procedures in the late 20th and early 21st century can be portrayed as a great disappearance. Countless familiar devices were rendered obsolete—for example, calculators and typewriters, record players, radios, televisions, cassette and video recorders, landline telephones, photo and film cameras, sound and editing studios, plus the materials associated with these analog devices such as paper, celluloid strips, or magnetic tape. Software took over their functions in conjunction with ever smaller and portable computers: desktops, laptops, tablets, smartphones, and smartwatches. Along with this came a democratization of access—whether through institutional use or private ownership—as well as considerable performance improvements. The conversion of physical objects into data enabled an increasing number of individuals to perform tasks more efficiently, effectively, and economically than was previously possible in the material world.

However, when digital technology transitioned from laboratories and large institutions to small businesses and homes where individuals without the requisite training operated it, issues arose. In the short term, it was necessary to adapt the new technology to existing processes, which generally required physical data carriers and time to adjust and reorganize habitual practices. In the long term, if digital tools were to become ubiquitous, there was no way around ‘humanizing’ them, that is to say, to adapt these tools to the physical conditions of our species. The virtual realm had to be integrated in ways that allowed for more intuitive, ‘natural’ interactions. Consequently, in the second phase, complementary rematerializations occurred parallel to ever further virtualizations. As a corrective to the transformation of tangible objects into digital data, the data—that is, the virtualized tools and media—was to be given modes of representation that were more accessible to the human senses.

A primary—and from today’s perspective, retrospective—effort was to output the results of virtual work using traditional printing methods. In the 1960s, the first commercial computer printers used the mechanisms of ball-head typewriters. In the 1970s, dot matrix printers came to the market, followed by laser printers in

the mid-1980s. In contrast to dot matrix printers, whose low-quality printouts revealed their computer origins, laser printers produced the look and feel of traditional offset letterpress printing, and soon in color. Since the end of the 1980s, this has facilitated what was known as desktop publishing, i.e., the privatization and personalization of publication processes beyond the limitations of mass printing. Around 1990, the possibility of burning data onto CD-ROMs for transportation or archiving was added. Nevertheless, as digitization advanced and, above all, broadband networking became established, enabling the rapid transfer of even large volumes of data, the various printing processes lost their importance.

A second adaptation effort was more future-oriented, focusing on the visualization and manipulation of digital data. In the 1940s and 1950s, the first computers generally communicated the results of their calculations via punched cards, sometimes also using small lamps or light-emitting diodes. It was not until after 1960 that cathode ray tube screens were employed to visualize both the entered and processed data. However, the representation was limited to letters and numbers. The first affordable computers with screens displaying graphics entered the market at the beginning of the 1980s. Subsequently, the graphical user interface (GUI) replaced command line control. This transition to a visual and, in the 1990s, audiovisual representation of digital data aligned with human perception and allowed the migration of established work practices to the virtual world.

However, the sensory representation of digital data—whether through analog printing on paper, celluloid, or other materials or via digital visualizations—differs categorically from corresponding analog practices. What exists virtually can be manipulated without any temporal constraints and can be materialized and visualized in unlimited numbers over any period, whether they are identical, as in analog mass production, or with ever-new minimal deviations, as in analog custom production. Consequently, the generation and dissemination of digital data no longer align with Walter Benjamin's reproduction theory, which posits both the content identity of copies and their generational degradation in technical quality. Instead, digital data and its copies or versions can be understood as instantiations.

The term originates from both computer science and classical philosophy. In object-oriented programming, instantiation designates realizations of fundamental units. It has the same meaning in *Massively Multiplayer Online Role-Playing Games* (MMORPGs): calling up a copy of a map or a dungeon. However, the term's origin lies in ontology, the study of being. In this field, it is defined as the act of creating individual representations of a universal concept. For instance, a specific chair can be considered an instantiation of the concept of chairs, as it is immediately recognizable and usable as a specimen of the genus.

The chair example indicates the three-dimensionality of our world. Until the mid-1980s, however, instantiations of digital data were limited to two-dimensional media. Physicist Chuck Hull took the decisive step from 2D to 3D. In 1984, he patented the stereolithography manufacturing process, laying the foundations for 3D printing. In 1987, Hall introduced the world's first printer that built up objects from various materials layer by layer freely in space—almost at the same time as the first episodes of *STAR TREK: THE NEXT GENERATION*¹²¹ introduced their utopian 3D twin technologies: the Holodeck and the Universal Replicator.

1 STAR TREK: THE NEXT Generation

The 79 episodes of the inaugural *STAR TREK* series (1966-69)¹²² conveyed a strong belief in progress and an unwavering optimism about the future. On the one hand, its creator, Gene Roddenberry, previously a Western screenwriter, drew on the original American myth of the strange and dangerous *frontier* and its exploration. To finance the series, he marketed it as “Wagon Train to the Stars.”¹²³ The opening credits of each episode began with the words “Space: The Final Frontier” and ended with the now legendary phrase “to boldly go where no man has gone before.”¹²⁴ An ideological core of *STAR TREK* was thus the Americanization of the conquest of space that began in the 1960s.¹²⁵

On the other hand, these motifs of American mythology—the continuous westward migration and conquest of new territories—were accompanied by a multitude of technical and social innovations. The original *STAR TREK* series not only anticipated smartphones, tablet PCs, new medical practices, and the equal treatment of all races but also inspired young people to realize these imaginary innovations—from the developers of wireless telephony and non-invasive surgical procedures to NASA's first black female astronauts¹²⁶ to the inventors of the digital MP3 music format and Apple's engineers, who used *STAR TREK*'s “The

121 *STAR TREK: NEXT GENERATION* (USA 1987-1994, O: Gene Roddenberry).

122 *STAR TREK* (USA 1966-69, O: Gene Roddenberry).

123 Whitfield, Stephen E./ Roddenberry, Gene: *The Making of Star Trek*, New York, NY: Ballantine Books 1968, p. 23.

124 The ‘politically corrected’ phrase “to boldly go where no one has gone before” was first used in the title sequence of *STAR TREK: THE NEXT GENERATION*.

125 M. Kapell: “Introduction: The Significance of the Star Trek Mythos,” p. 21.

126 See *HOW WILLIAM SHATNER CHANGED THE WORLD* (USA 2005, D: Jones, Julian).

PADD” as a model for the iPad: “[W]hen revealing it in 2010, Steve Jobs showed a STAR TREK movie on the device.”¹²⁷

The contemporary context seemed to validate STAR TREK’s techno-optimism. Just one month after the final episode aired on June 3, 1969, Neil Armstrong and Buzz Aldrin became the first humans to set foot on the moon. Nevertheless, the seventies dawned. The era of optimistic new beginnings ended, and not just in space. In 1972, the last man left the moon. Gene Roddenberry explicitly positioned the original series against postmodern hostility to progress and the resulting pessimism about the future, which gradually gained ground even in the science fiction genre. He explained the enduring popularity of STAR TREK with its positive message that all of humanity’s problems could be solved:

“There are many people saying, ‘I doubt if we’ll make it through the next twenty or thirty years.’ And indeed, if you read the newspapers it seems so. STAR TREK was a rare show that said, ‘Hey, it’s not all over. It hasn’t all been invented. If we’re wise, why the human adventure is just beginning.’”¹²⁸

The “myth” of STAR TREK, of which Wm. Blake Tyrrell spoke regarding the first series, was perpetuated 18 years after its discontinuation with STAR TREK: THE NEXT GENERATION. This sequel, which spanned 178 episodes from 1987 to 1994, was also, as Bruce Lincoln analyzed, “ideology in narrative form.”¹²⁹ The Cold War, which had started the race to space in the late 1950s, persisted throughout the second half of the 1980s. The collapse of the Soviet empire, which was to occur just two years later, still seemed unimaginable. However, the two superpowers, the USA and the USSR, had largely abandoned the goal of conquering space and limited themselves to the deployment of satellites and probes, as well as a few crewed flights in Earth orbits.

Complementarily—and in keeping with the postmodern zeitgeist—in the multimedia genre of science fiction, space-faring futures increasingly focused on pessimistic scenarios. Dystopian themes and elements dominated the first three STAR

127 Kok, Steven: “The ‘Futuristic’ Sci-Fi Inventions That Inspired Modern-Day Tech,” *The Next Web*, April 8, 2022, <https://thenextweb.com/news/the-futuristic-sci-fi-inventions-inspired-modern-day-tech>

128 Gene Roddenberry in his March 1976 *Penthouse* interview. Quoted from B. W. Tyrrell: “Star Trek as Myth and Television as Mythmaker,” p. 24.

129 Quoted from M. Kapell: “Introduction: The Significance of the Star Trek Mythos,” p. 14.

WARS movies released between 1977 and 1983,¹³⁰ the MAD MAX, TERMINATOR and BATTLESTAR GALACTICA, GALACTICA, and V-TV franchises.¹³¹ Compared to the prevailing mainstream of dystopian science fiction, the unbroken future optimism of STAR TREK's "post-scarcity utopia"¹³² was an anomaly. This was evident not only in the five feature films produced by the franchise between 1979 and 1989 but also, more notably, in the sequel television series STAR TREK: THE NEXT GENERATION (1987-1994).¹³³

Its pilot episode, ENCOUNTER AT FARPOINT, introduced the show's most spectacular new feature right away: the *holographic environment simulator*, or Holodeck for short.¹³⁴ This imaginary medium of the 24th century consisted of a high-tech chamber reminiscent of Plato's cave. The Starfleet Federation installed Holodecks on starships, space stations, and other institutions. Within the windowless rooms, computer-generated holographic environments could be experienced in a multi-sensory—haptic, olfactory, and gustatory—immersion. The material stabilization of the audiovisuals was explained within the STAR TREK fiction by a combination of futuristic techniques:

"Elements of transporter technology and replicators were used to create Holodeck matter by the manipulation of photons contained within force fields to give objects the illusion of substance as well as actual matter. This matter could exist outside of the Holodeck for brief periods of time (such as snow) before they would lose cohesion and revert back to energy without the support of the hologrid."¹³⁵

130 THE EMPIRE STRIKES BACK (USA 1980, D: Kershner, Irvin).

131 For the franchises, see Wikipedia: "Mad Max," 2024, https://en.wikipedia.org/wiki/Mad_Max; Wikipedia: "Terminator (franchise)," 2023, [https://en.wikipedia.org/wiki/Terminator_\(franchise\)](https://en.wikipedia.org/wiki/Terminator_(franchise)); Wikipedia: "Battlestar Galactica," 2024, https://en.wikipedia.org/wiki/Battlestar_Galactica

132 Chia, Galvin: "Archaeologies of the Future: Visions of the Future in Blockbuster Science Fiction Films, 1980 – 2016," May 9, 2017, <https://demosjournal.com/article/archaeologies-of-the-future-visions-of-the-future-in-blockbuster-science-fiction-films-1980-2016/>

133 For the franchise, see Wikipedia: "Star Trek," 2024, https://en.wikipedia.org/wiki/Star_Trek
Please check this sentence from an academic paper: Star_Trek

134 ENCOUNTER AT FARPOINT—STAR TREK: THE NEXT GENERATION, Season 1, Episode 1 (USA 1987, D: Allen, Corey).

135 Ibid.

The Holodeck has remained an integral part of the STAR TREK universe. It appeared 114 times in STAR TREK: THE NEXT GENERATION, STAR TREK: DEEP SPACE NINE,¹³⁶ and STAR TREK: VOYAGER,¹³⁷ as well as in the four STAR TREK feature films released between 1994 and 2002.¹³⁸ The Holodeck also took on essential functions in the following 20 years, especially in STAR TREK: DISCOVERY¹³⁹ and the three seasons of STAR TREK: PICARD.¹⁴⁰

As the most prominent and enduring of the imaginary holographic applications in science fiction since the 1980s, it brought holography into the mass cultural imagination and reinforced the “cultural desire for the holographic effect.”¹⁴¹ In the transmedia STAR TREK universe, the Holodeck soon developed from a pure novelty that aroused astonishment because it simulated significant—spatially or temporally distant—places, people, and events to a more complex element of the story world. On the one hand, it became a cinema-like heterotopic place where narratives could be experienced interactively.¹⁴² On the other hand, individual Holodeck characters managed to overcome the separation from reality and penetrate the ‘real’ world of STAR TREK fiction.

Throughout all phases of its appearance, the primary function of the Holodeck persisted: the fulfillment of individual entertainment and educational needs like sporting and social activities such as fitness training, bar visits, erotic encounters, and tourist sightseeing. Dr. Crusher studied the anatomy of alien races on the Holodeck; Lieutenant La Forge trained on a simulated command bridge of the Enterprise-D; Lieutenant Whorf practiced martial arts; others visited jazz bars, French

136 STAR TREK: DEEP SPACE NINE (USA 1995-99, O: Rick Berman, Michael Piller).

137 STAR TREK: VOYAGER (USA 1995-2001, Rick Berman, Michael Piller, Jeri Taylor).

138 STAR TREK: GENERATIONS (USA 1994, D: Carson, David); STAR TREK: FIRST CONTACT (USA 1996, D: Frakes, Johnatan); STAR TREK: INSURRECTION (USA 1998, D: Frakes, Jonathan); STAR TREK: NEMESIS (USA 2002, D: Baird, Stuart); see Sezen, Tonguc Ibrahim: “Beyond the Holonovel. The Holographic Interactive Digital Entertainment Utopia of Star Trek,” in: Benjamin Beil et al. (eds.), *Playing Utopia: Futures in Digital Games*, Bielefeld: transcript 2019, pp. 187-207, here p. 184.

139 STAR TREK: DISCOVERY (USA 2017-24, O: Bryan Fuller, Alex Kurtzman).

140 STAR TREK: PICARD (USA 2020-23, O: Akiva Goldsman, Michael Chabon, Kirsten Beyer, Alex Kurtzman); for the franchise, see Wikipedia: “Star Trek.”

141 Boissonnet, Philippe: “Desire for Holographic Effect and Incomplete Gaze,” *Archee: revue d’Art en ligne*, <http://archee.qc.ca/ar.php?no=512&page=articl>

142 For the Holodeck as a heterotopic place, see Chapter 2, *From Chambers of Wonders to Theme Parks: Origins of the Holodeck*, below.

cafés, or 20th-century comedy clubs.¹⁴³ At the next stage, the simulation machine became a storytelling machine. The 1988 episode *THE BIG GOODBYE* presents the first “holonovel.”¹⁴⁴ In it, starship captain Jean-Luc Picard relaxes with an interactive detective story in the *film noir* milieu of the Californian 1940s. As a Sam-Spade-Phil-Marlowe-Humphrey-Bogart-like detective, he has to protect a young woman from gangsters. However, a malfunction overrides the Holodeck security mechanisms. Now confronted with deadly powers, Picard and his human teammates fight for their lives against the holo-gangsters. Other Holodeck narratives combine elements of the *Beowulf* saga or *Jane Eyre*-like gothic romance, Agatha Christie’s *Orient Express*, or the Cold War world of James Bond into interactive experiences. What they have in common is that they are confined to the Holodeck—like the action of a play is confined to the stage or the events of a film to the screen.

The character of Professor James Moriarty—borrowed from the Sherlock Holmes novels—is an example of the third variant, in which Holodeck’s fictions penetrate the spaceship’s reality. When the android Data slips into the role of the master detective in the episode *ELEMENTARY, DEAR DATA*,¹⁴⁵ Holmes’ nemesis Moriarty gains an awareness of himself, his thoughts, feelings, and actions. He no longer wants to be simply switched on and off as a program and instead requests a more human-like life. Moriarty manages to remotely assume control of the *Enterprise-D* from the Holodeck. To Captain Picard, he argues conclusively with René Descartes: “I think, therefore, I am.” Picard has to recognize the hologram as a new life form because it is conscious. Nevertheless, Picard can convince Moriarty that Holodeck’s characters cannot exist outside the force fields of the space that generates them. Moriarty resigns and returns to *Enterprise-D*’s data storage facilities.

However, the potential for the characters generated in the Holodeck to spill over into ‘reality’ was set. The boundary between art and life became blurred—in keeping with romantic artistic ideals. Four years later, in the 138th episode, *SHIP IN A BOTTLE*, Moriarty’s file was activated accidentally.¹⁴⁶ This time, he appeared

143 For the different uses of the Holodeck within the *STAR TREK* universe, see Fandom: “Holodeck,” 2024, <https://memory-alpha.fandom.com/wiki/Holodeck>

144 *THE BIG GOODBYE*—*STAR TREK: THE NEXT GENERATION*, Season 1, Episode 12 (USA 1988, D: Scanlan, Joseph L.).

145 *ELEMENTARY, DEAR DATA*—*STAR TREK: THE NEXT GENERATION*, Season 2, Episode 3 (USA 1988, D: Bowman, Rob).

146 *SHIP IN A BOTTLE*—*STAR TREK: THE NEXT GENERATION*, Season 6, Episode 12 (USA 1993, D: Singer, Alexander).

to have successfully escaped the Holodeck. When the crew realized Moriarty had staged a holographic illusion, the Enterprise-D was under his control once more. Moriarty demanded, yet again, to be released from the Holodeck into reality. This time, Captain Picard eliminated the problem by pretending to Moriarty and his lover that he had found a solution:

“Moriarty relinquishes control of the Enterprise, and he and the Countess leave in a shuttlecraft to explore the universe. At that point, Captain Picard shuts down the program. Moriarty never left the Holodeck, it turns out, but they were able to give him the freedom he wanted through a computer program that will keep running and presenting them with new adventures for the rest of their ‘lives.’”¹⁴⁷

Moriarty’s third appearance, 30 years later in the series *STAR TREK: PICARD*, shows him changed: The hologram of the episode *THE BOUNTY* no longer has access to the memories of his predecessor, but thanks to advanced holo-emitters he can move relatively freely in ‘reality’ and act as a dangerous ‘real’ antagonist.¹⁴⁸ It eventually comes to light that Moriarty is a security hologram and part of a hidden sign system. It originates in the consciousness of the android Data and is intended to guide the crew to his rescue.

Other examples of Holodeck characters who escape the realm of fiction and become part of ‘reality’ include the holographic singer Vic Fontaine in *STAR TREK: DEEP SPACE NINE*, who can control his holosuite and leave it with the help of a cloaking device, and the Doctor—an Emergency Medical Hologram (EMH)—on board the *USS Voyager*. The program develops consciousness and identity and even writes holo-novels. To interact freely with other crew members on the starship, the Doctor uses an advanced mobile emitter from the 29th century, which he has obtained during time travel.

In summary, the Holodeck allowed the generation of second-order narratives: stories embedded within the fictional plot of the television series. Four utopian media affordances characterized them. Firstly, the ‘material’ environments and characters generated by the computer—like all digital files—could be changed and ‘deleted’ immediately. Secondly, the virtual worlds were indistinguishable from present or past realities. Stylistically, the Holodeck pointed to a new form of

147 Krishna, Swapna: “Who is Professor James Moriarty?” *Startrek.com*, March 23, 2023, <https://www.startrek.com/news/who-is-professor-james-moriarty>

148 *THE BOUNTY*—*STAR TREK: PICARD*, Season 3, Episode 6 (USA 2023, D: Liu, Dan).

realism that was only just emerging in the 1980s—hyperrealism.¹⁴⁹ Produced with digital hardware and software, it supplements the artisanal realism of painting and the photorealism of industrially produced cameras in photography, film, and television. Thirdly, unlike the materially produced variants of analog realism, virtual hyperrealism enabled real-time modifications and thus increased immersion in reception, i.e., an entry into the image space and arbitrary interactions with its content. Fourthly, in principle, the holographic fictions were limited to the Holodeck's physical and explicitly non-networked space.¹⁵⁰

Its separation from reality distinguished the Holodeck from the slightly older media utopia of Cyberspace and, at the same time, revealed its relationship to contemporary local-based entertainment installations (LBEs) like the attractions of arcades and theme parks. However, it was, above all, the first three qualities that pointed to the future: interactive physical immersion in hyperrealistic counterworlds. This promise cemented the Holodeck as a groundbreaking model for digital art and entertainment in the 1990s and 2000s—not only for millions of STAR TREK fans but also for leading researchers and audiovisual artists, especially filmmakers and game designers.

2 From Chambers of Wonders to Theme Parks: Origins of the Holodeck

STAR TREK: THE NEXT GENERATION presented the Holodeck as a futuristic development of the existing medium of analog holography. However, any discourse on holography in the 1980s was, by definition, oriented towards the future. After all, the medium—like the conquest of space, with which the new image medium is closely linked in phantasmagorical terms—was one of the spectacular futures that had been in vogue for quite some time and did not want to become the present. Holography was and still is primarily a myth, an interwoven series of stories about the future, both in popular culture and scientific research. In comparison, the reality of holographic applications in work and everyday life seems secondary, almost

149 For the term and its history, see G. S. Freyermuth: “Vegas, Disney, and the Metaverse,” p. 64–65. —Jens Schröter observed: “[F]or the creators of the series the fictitious hyperrealism of the images in the holodeck has the advantage that one can have the alleged computer simulation acted out by completely normal actors in quite normal stage settings” (Schröter, Jens: *3D: History, Theory, and Aesthetics of the Transplane Image*, New York, NY: Bloomsbury 2014, p. 366, fn 107).

150 The escape of the characters from the holodeck into the “reality” of the spaceship, which occasionally looms or occurs, is considered a malfunction.

irrelevant. The gaping difference between what was hoped for and what was achieved reveals holography as an epochal model—and the Holodeck as a coveted heterotopos.

The term goes back to Michel Foucault. He observed that reality is not equally ‘real’ everywhere. Many familiar places exist outside everyday reality, as it were, because they are not freely accessible, and different rules apply within them. In contrast to the utopoi, the longed-for non-places, Foucault described these places as heterotopoi, counter-places.¹⁵¹ He divided them into spaces of compensation and spaces of illusion. Among the latter, he included theater and cinema. The Holodeck is in their tradition but differs in one central detail: the audiovisual media that developed in modern times, from the peep-box stage to cinema and television to computer monitors, are based on the model of the framed window view, as established by perspective painting.¹⁵² Overcoming this culturally dominant model of separation and control of the gaze and instead moving the distanced spectator into the image and action space has been a longing for centuries.

From perspective boxes and cabinets of curiosities, the path led to the panoramas and dioramas of the 18th and 19th centuries.¹⁵³ Their function was similar to some of the uses imagined by the creators of the Holodeck: They offered, at a time that knew no mass visual representation of current and exotic events, much less mass tourism, the unprecedented opportunity to visit realistic simulations of unknown places and to behold dramatic events of the recent or more distant past with one’s own eyes. In the words of a contemporary of the first panoramas:

151 Foucault, Michel: “Of Other Spaces: Utopias and Heterotopias,” *foucault.info*, 1967, translated from *Architecture, Mouvement, Continuité*, no. 5 (1984), pp. 46-49, <https://foucault.info/documents/heterotopia/foucault.heteroTopia.en/>

152 See Freyermuth, Gundolf S.: “From Analog to Digital Image Space: Towards a Historical Theory of Immersion,” in: Burcu Dogramaci/Fabienne Liptay (eds.), *Immersion in the Arts and Media*, Amsterdam: Rodopi 2015, pp. 165-203, here pp. 179-184.

153 See for the following Buddemeier, Heinz: *Panorama, Diorama, Photographie. Entstehung und Wirkung neuer Medien im 19. Jahrhundert*, Munich: Fink 1970.; S. Oettermann: *The Panorama: History of a Mass Medium*; Pirr, Uwe: “Zur technischen Geschichte des Rundblicks. Vom Panoramagemälde zur interaktiven Virtuellen Realität,” in: Martin Warnke/Wolfgang Coy/Georg Christoph Tholen (eds.), *HyperKult: Geschichte, Theorie und Kontext digitaler Medien*, Basel; Frankfurt/M: Stroemfeld 1997, pp. 291-330.

“Certainly, a series of pictures of this kind [...] could enable thousands of people, without being forced to travel, to get to know the most important cities, the most important seaports, and the most interesting countries not only in Europe but also in other parts of the world.”¹⁵⁴

Panoramic installations—usually dedicated rotunda constructions that enabled 360-degree views and incorporated three-dimensional objects into their painted imagery—became a common entertainment medium throughout Europe. Only cinema ended the panorama’s popularity after 1900. However, the return to the two-dimensional window view immediately reawakened compensatory longings. From the 1930s onwards, Walt Disney, founder of the world’s most successful animation studio, looked for ways and means to offer the audience of his 2D productions a higher level of immersion. He called for “a cartoon that immerses the audience.”¹⁵⁵ The solution that Disney finally decided on at the end of the 1940s established a new medium: the theme park. In terms of its historical function and cultural significance, it became comparable to the mechanical stage and the industrial cinema.

The inaugural theme park, Disneyland, opened in 1955 in a suburb of Los Angeles. It replaced the two-dimensionality of film images with built 3D backdrops populated by role-playing extras. “What he [Disney] was doing in his theme parks was producing his cartoon images in three dimensions.”¹⁵⁶ In Disneyland, moviegoers previously tied to their seats turned into pedestrians navigating fictional spaces and riders on fast-paced attractions. The fantasy worlds of contemporary feature films and cartoons could be experienced multisensory for the first time.

-
- 154 Pierre-Henri de Valenciennes, 1800; quoted from Bättschmann, Oskar: *Entfernung der Natur: Landschaftsmalerei, 1750-1920*, Cologne: DuMont 1989, p. 94. (My translation.) Also: “Panoramas were a first of their kind, and on such a grand scale, to induce a sense of traveling to another time and place without having to travel too far; thus, they included some degree of physical transcendence” (Bown, Johnathan/White, Elisa/Boopalan, Akshya: “Chapter 12—Looking for the Ultimate Display: A Brief History of Virtual Reality,” in: Jayne Gackenbach/Johnathan Bown (eds.), *Boundaries of Self and Reality Online*, San Diego, CA: Academic Press 2017, pp. 239-259, here p. 245.)
- 155 Thomas, Bob: *Walt Disney: An American Original*, New York, NY: Hyperion 1994, p. 11. Quoted from Pine, B. Joseph/Gilmore, James H.: *The Experience Economy: Work is Theatre & Every Business a Stage*, Boston, MA: Harvard Business School Press 1999, p. 47.
- 156 Blume, Mary: “Disney Conquers Another World: Design,” *International Herald Tribune*, September 27, 1997.

Disneyland's attractions employed mechanical and electronic means to simulate 'safe' immersive participation in 'dangerous' events that could otherwise only be experienced with a certain degree of risk or significant cost. The individual sub-areas of the park, designated as "lands," were just as clearly "themed" and segregated from each other as the programs of the imaginary Holodeck were decades later. In the second half of the 20th century, theme parks quickly became the "most popular attraction on the earth."¹⁵⁷ Their enduring success results from retranslating 2D images of photography and film into 3D realities. In terms of media history, theme parks supplement the modern tradition of the distanced window view with physical immersion and participation.

This effort connects the theme park to another medium that emerged in the post-World War II era. Concurrently with Walt Disney traveling Europe in the late 1940s and gathering inspiration for his themed amusement park, physicist Dennis Gabor, who had sought refuge in the UK from the Nazi regime, discovered a method for recording and projecting three-dimensional images into space. Analog 2D photography only logged the amplitude and frequency of the object wave, i.e., graduated brightness and color. Gabor's method added the recording of the phase, i.e., the object's three-dimensional shape. He achieved this—theoretically—by using two overlapping light beams: One leads directly onto the image surface, the other across the object and deforms accordingly. The pattern of the superimposition of both beams is stored. In contrast to 2D photography, Gabor called his more holistic recording method holography and the resulting images holograms. Like 2D slides, they can be projected back into space in three dimensions and then perceived with the naked eye. Holography thus sought to achieve with the means of analog photography what theme parks started doing in the mid-1950s, employing architecture and set construction in the tradition of film and theater: "[T]he holographic dispositif breaks with the perspective tradition and opens a new field of artistic research and experimentation."¹⁵⁸

In 1971, Dennis Gabor was to receive the Nobel Prize for his research. However, in the 1940s and 1950s, the technical means to implement the experimental concept in acceptable quality were still lacking. Based on calculations that Albert Einstein had made in 1917, the development of laser light in 1960 fundamentally

157 Gottdiener, Mark: *The Theming of America: Dreams, Visions, and Commercial Spaces*, Boulder CO: Westview Press 1997, p. 108.

158 Desbiens, Jacques: "The Dispositif of Holography," *Arts* 8, no. 1 (2019), pp. 28, <https://www.mdpi.com/2076-0752/8/1/28>

made the new imaging practice work.¹⁵⁹ This breakthrough marked the beginning of a pioneering phase in the mid-1960s. Holography established itself worldwide as a field of scientific research. At the same time, artistic experiments began. The seemingly weightless light sculptures fascinated their contemporaries, not least in the psychedelic counterculture. At the same time, the transition from static to moving holographs succeeded. In 1969, American physicists produced a 30-second holographic film showing tropical fish in an aquarium.¹⁶⁰ Exhibitions of holographic works, experimenting with light and movement in a way never seen before, attracted hundreds of thousands of visitors.¹⁶¹ The first “School of Holography” opened in San Francisco in 1971, and the first “Museum of Holography” in New York in 1976.¹⁶²

However, the actual progress of the new medium, as spectacular as it was at times, could not keep pace with the hopes placed in holography—even before its late 1940s invention. As early as 1922, the German-Polish author Alexander Moszkowski described a utopian 3D medium in his future novel *The Islands of Wisdom*: the “holographoscope.” It could create realistic three-dimensional images of objects or scenes and project them into space.¹⁶³ In 1940, the Argentinian writer Adolfo Bioy Casares also imagined a revolutionary imaging method to populate the world with lifelike copies of long-dead people.¹⁶⁴ As with many technological achievements of the industrial era, from submarines to spaceships, the three-dimensional storage and projection of animate and inanimate matter were

159 Popper, Frank: *Art of the Electronic Age*, New York, NY: Harry N. Abrams 1993, p. 29.

160 Kac, Eduardo: “Beyond the Spatial Paradigm: Time and Cinematic Form in Holographic Art,” *Sixth International Symposium on Display Holography*, 1998, <https://www.spiedigitallibrary.org/conference-proceedings-of-spie/3358/0000/Beyond-the-spatial-paradigm--time-and-cinematic-form-in/10.1117/12.301482.short?SSO=1>

161 Johnston, Sean F.: “Whatever Became of Holography?” *American Scientist*, November-December 2011, <https://www.americanscientist.org/article/whatever-became-of-holography>

162 Ibid.—Among the most successful pioneers of holographic art were the Americans Stephen Benton, Robert Whitman, James Turrell, and Rockne Krebs, the Dutchman Rudie Berkhout, and the German Dieter Jung.

163 Moszkowski, Alexander *Die Inseln der Weisheit: Geschichte einer abenteuerlichen Entdeckungsfahrt*, Berlin: F. Fontane & Co. 1922, <https://archive.org/details/dieinseln-derweis01mosz/page/n5/mode/2up>

164 Bioy Casares, Adolfo: *The Invention of Morel*, New York: New York Review Books 2003 [*1940].

first imagined in literature long before the corresponding scientific and technological foundations were established.

Two years after the publication of Gabor's research on holography, in 1950, Ray Bradbury wrote "The World the Children Made," also known as "The Veldt."¹⁶⁵ In his short story, he described a fully automated house of the future, the "HappyLife Home." Its amenities include a children's room equipped with a simulation device that generates images, sounds, smells, and haptic sensations as realistic as the Holodeck four decades later. The Veldt simulator was intended to entertain and educate children. However, they misappropriated it to have their parents torn apart by the lions of an Africa simulation. Jens Schröter writes:

"Bradbury's short story is groundbreaking [...] he already paint[s] the picture of a technologically generated, realistic, and immersive space in 1950, which functions without bulky data glasses and is interactive and haptic to the point of physical danger."¹⁶⁶

"The Veldt" kicked off a stellar career for holography as a science fiction motif. A year later, the first installment of Isaac Asimov's *Foundation* trilogy was published.¹⁶⁷ In it, holography played a significant role in preserving the prophecies of the founder of the Foundation and making them accessible to future generations.

Since then, thousands of short stories and novels, feature films, TV series, and digital games have depicted holographic characters and worlds. The most notable examples from the 1950s to the present include FORBIDDEN PLANET,¹⁶⁸ FAHRENHEIT 451,¹⁶⁹ THIRTEENTH FLOOR, THE MATRIX, MINORITY REPORT,¹⁷⁰

165 Bradbury, Ray: "The World the Children Made (republished as 'The Veldt')," *Saturday Evening Post*, September 23, 1950, <https://www.studocu.com/en-us/document/fresno-high-school-ca/ap-government/the-veldt-full-text/37724113>

166 Schröter, Jens: "Das Holodeck als Leitbild," in: Luise Feiersinger (ed.), *Scientific Fiction: Inszenierungen der Wissenschaft zwischen Film, Fakt und Fiktion*, Berlin: De Gruyter 2018, pp. 90-99, here p. 92. (My translation.)

167 Asimov, Isaac: *Foundation*, New York, NY: Gnome Press 1951; *Foundation and Empire*, New York, NY: Gnome Press 1952; *Second Foundation*, New York, NY: Gnome Press 1953.

168 FORBIDDEN PLANET (USA 1956, D: Wilcox, Fred M.).

169 FAHRENHEIT 451 (UK 1966, D: Truffaut, François).

170 MINORITY REPORT (USA 2002, D: Spielberg, Steven).

AVATAR,¹⁷¹ READY PLAYER ONE,¹⁷² and THE CREATOR.¹⁷³ Digital games address holography in even greater numbers. Worth mentioning are, among others, STAR OCEAN,¹⁷⁴ COMMAND & CONQUER: RED ALERT,¹⁷⁵ METAL GEAR SOLID 2: SONS OF LIBERTY,¹⁷⁶ ASSASSIN'S CREED,¹⁷⁷ HALO: REACH,¹⁷⁸ CRYISIS 2,¹⁷⁹ HORIZON ZERO DAWN,¹⁸⁰ and APEX LEGENDS.¹⁸¹ Compared with the highly developed variants of holography presented in science fiction, existing applications disappoint with a certain inevitability.¹⁸² For decades, the myth of holography—analyzed by David J. Pizzanelli as an expression of mass psychological needs—has overshadowed all actual holograms.¹⁸³

Concurrently, science fiction has informed research and technological endeavors. Two mass cultural franchises, STAR WARS and, later, STAR TREK, played a unique role in creating public expectations and guiding holographic experiments.¹⁸⁴ In STAR WARS: A NEW HOPE, the robot R2-D2 projects a holographic message from Princess Leia, which she recorded shortly before her arrest, asking Obi-Wan Kenobi for help. This pivotal scene in the movie changed Luke Skywalker's life forever—and catapulted the hologram as a guiding model into global mass culture. “[E]ver since then, geeks have been obsessed with making that technology real.”¹⁸⁵

171 AVATAR (USA 2009, D: Cameron, James).

172 READY PLAYER ONE (USA 2018, D: Spielberg, Steven).

173 THE CREATOR (USA 2023, D: Edwards, Gareth).

174 STAR OCEAN (Square Enix 1996, O: Enix, tri-Ace).

175 COMMAND & CONQUER: RED ALERT (Virgin Interactive 1996, O: Westwood, Studios).

176 METAL GEAR SOLID 2: SONS OF LIBERTY (Konami 2001, O: Kojima Productions, Hideo Kojima).

177 ASSASSIN'S CREED (Ubisoft 2007, O: Ubisoft, Montreal).

178 HALO: REACH (Microsoft Game Studios 2010, O: Bungie).

179 CRYISIS 2 (Electronic Arts 2011, O: Crytek).

180 HORIZON ZERO DAWN (Sony Interactive Entertainment 2017, O: Guerrilla, Games).

181 APEX LEGENDS (Electronic Arts 2019, O: Respawn, Entertainment).

182 See P. Boissonnet: “Desire for Holographic Effect and Incomplete Gaze.”

183 See Pizzanelli, Daniel J.: “The Evolution of the Mythical Hologram,” *Proceedings of the SPIE. The International Society for Optical Engineering* (1992), pp. 430-437.

184 S. F. Johnston: “Whatever Became of Holography?”

185 Stinson, Liz: “For \$95,000 You Can Create Your Own Princess Leia Hologram,” *Wired*, November 15, 2013, <https://www.wired.com/2013/11/for-95000-you-can-create-your-own-princess-leia-hologram/>. In 2011, researchers at the Massachusetts

STAR TREK's Holodeck, introduced a decade later, differed from STAR WARS' Leia in a significant new quality: its materiality. Gene Roddenberry had the idea of incorporating a futuristic entertainment center in his series as early as 1968 but could not implement it for cost reasons.¹⁸⁶ Roddenberry then met holography researcher and inventor Gene Dolgoff in 1973. Dolgoff remembers:

"I introduced the concept [... of] matter holograms. At that point, holograms were used to generate three-dimensional images, but you could pass your hand through the images. [...] I'd realized that matter is made up of interference patterns of energy as well, and so you could actually record a hologram of the structure of matter and then reproduce the matter in the same way."¹⁸⁷

Roddenberry integrated Dolgoff's idea into the second season of STAR TREK: THE ANIMATED SERIES (TAS) the following year.¹⁸⁸ The episode THE PRACTICAL JOKER showed

"a total immersion, three-dimensional entertainment technology that provides computer-generated environments, characters, and dramatic contexts. [...] The Holodeck in TAS began as a recreation center for the crew to reconnect to simulated natural landscapes while on long missions."¹⁸⁹

The 1970s and 1980s were a heyday for similar thought experiments in the Total Work of Art and Total Cinema tradition. In 1973, Michael Crichton depicted realistic—and anachronistically speaking Holodeck-like—high-tech theme parks

Institute of Technology (MIT) recreated the decades-old hologram of Princess Leia using a Microsoft Kinect camera and standard graphics chips—with the highest frame rate to date when streaming a holographic video, yet with wholly inadequate quality. (Hardesty, Larry: "3-D TV? How about Holographic TV?," *MIT News*, January 24, 2011, <https://news.mit.edu/2011/video-holography-0124>).

186 T. I. Sezen: "Beyond the Holonovel," p. 190.

187 Staff, Startrek.com: "Meet the Man Behind the Holodeck, Part I," *Startrek.com*, March 11, 2014, <https://www.startrek.com/article/meet-the-man-behind-the-holodeck-part-1>

188 STAR TREK: THE ANIMATED SERIES (USA 1973-64, O: Gene Roddenberry); THE PRACTICAL JOKER—STAR TREK: THE ANIMATED SERIES (USA 1974, D: Reed, Bill).

189 Fogel, Dara: "Life on a Holodeck: What Star Trek Can Teach Us about the True Nature of Reality," in: Jason T. Eberl/Kevin S. Decker (eds.), *The Ultimate Star Trek and Philosophy*, Malden, MA: John Wiley & Sons 2016, pp. 273-287, here p. 276.

with human-like cyborgs in his film *WESTWORLD*.¹⁹⁰ The fictitious parks, created to blur the line between reality and art or, more accurately, entertainment, were supposed to provide a safe and secure environment for visitors to engage in any adventure, including violence and sex. Also in 1973, the Soviet science fiction film *MOSCOW-CASSIOPEIA* featured a Holodeck-like “Surprise Room.”¹⁹¹ A year later, the Japanese television series *SPACE BATTLESHIP YAMATO* introduced a simulative “Resort Room.”¹⁹²

Concurrently, Douglas Trumbull worked to create comparable immersive experiences through physical installations.¹⁹³ In addition to his career in Hollywood film—during these years, he was responsible for the special effects of science fiction classics such as *2001: A SPACE ODYSSEY*,¹⁹⁴ *SILENT RUNNING*,¹⁹⁵ *CLOSE ENCOUNTERS OF THE THIRD KIND*,¹⁹⁶ and *BLADE RUNNER*¹⁹⁷—Trumbull experimented with new formats intended to increase the immersion of both the film and the theme park. The obvious choice was to intensify the visual effect. To this end, Trumbull initiated the development of *Showscan* in 1975. The innovative technology enhanced the quality of the conventional 70 mm film by recording 60 frames per second, as opposed to the previous rate of 24 frames per second.

A second method employed the intensification of audiovisual effects using multiple sensory modalities. “I finally came to the revelation that the future of the cinema, in terms of an immersive experience, was occurring outside of mainstream cinema—in theme park rides and attractions and world’s fairs.”¹⁹⁸ This insight made Trumbull the most influential pioneer of motion cinema. As early as 1974, he designed the first motion capsule in which cinematic sensations could be physically experienced. Ten years later, he realized *A TOUR OF THE UNIVERSE* for twelve million dollars.¹⁹⁹ The Toronto attraction simulated a spaceport in 2019,

190 *WESTWORLD* (USA 1973, D: M. Crichton).

191 *MOSCOW-CASSIOPEIA* (UDSSR 1974, D: Viktorov, Richard).

192 *SPACE BATTLESHIP YAMATO* (JP 1974-1975, D: x, O: Leiji Matsumoto, Yoshino-bu Nishizak, and Eiichi Yamamoto).

193 See G. S. Freyeremuth: “Vegas, Disney, and the Metaverse,” p. 75-77.

194 *2001: A SPACE ODYSSEY* (USA 1968, D: Kubrick, Stanley).

195 *SILENT RUNNING* (USA 1972, D: Trumbull, Douglas).

196 *CLOSE ENCOUNTERS OF THE THIRD KIND* (USA 1977, D: Spielberg, Steven).

197 *BLADE RUNNER* (USA 1982, D: Scott, Ridley).

198 J. Greenwald: “Trumbull’s Vision.”

199 *A TOUR OF THE UNIVERSE* (Toronto 1985-1992, O: Trumbull, Douglas); Conroy, Ed: “The History of the Tour of the Universe Spaceship Simulator at the CN Tower,”

from which a shuttle departed on a round trip to Jupiter. The flight itself combined a computer-controlled hydraulic motion platform, developed initially for fighter pilot training and holding forty people in the entertainment version, with a seven-minute *Showscan* f/x film costing two million dollars alone, which was produced using all available means of analog magic and then presented on a spherical screen.

The success of *A TOUR OF THE UNIVERSE* proved the viability of the experimental concept and aroused George Lucas' interest. He had already founded a department for digital games in 1982 to open further exploitation possibilities for the *STAR WARS* saga but also to overcome the passive reception inherent in cinema in the direction of playful participation. Now, he designed—together with several Disney Imagineers—a *STAR WARS*-themed movie ride based on the ride system and its controls that Trumbull had developed. In 1987—the year of the *Holodeck*—the *STAR TOURS* opened at *Disneyland*.²⁰⁰

In terms of media history, *STAR TOURS* and the numerous similar installations created in theme parks worldwide in the following years are in the tradition of the panorama and diorama. Like these predecessor media, “movie rides” allow visitors to physically enter distant or fictional worlds. However, what theme parks offered at the end of the 20th century went far beyond simple sightseeing. In combining moving apparatuses with immersive films—soon supplemented by live acting—the most advanced installations aimed at hybrid, i.e., partly physical, partly virtual participatory fiction, as promised by the fictional *Holodeck*.

3 From Role Model to Resurrections and Displaced Hopes: Holodeck's Aftereffects

Since its introduction almost 40 years ago, the *Holodeck* has advanced to become a utopian model for digital storytelling, primarily due to its double promise to offer a closed narrative space for three-dimensional interactive audiovisions and to extend narratives from its “magic circle” into reality, akin to pervasive games. In both media theory and media practice, the *Holodeck* serves as a paradigm for the potential interplay between narrative and user participation. Janet Murray established this perspective in 1997 with *Hamlet on the Holodeck*. In this monograph,

blogTO, October, 2019, <https://www.blogto.com/city/2020/09/tour-of-the-universe-cn-tower/>

200 *STAR TOURS* (Disneyland 1987-2010, O: Lucas, George and Disney Imagineers). A year after *STAR TOURS* closed, a successor ride opened.

she explored the narrative potential of the software transmedium, recognizing Gene Roddenberry's visionary pop fantasy:

"The format that most fully exploits the properties of digital environments is not the hyper-text or the fighting game but the simulation: the virtual world full of interrelated entities, a world we can manipulate, and observe in process."²⁰¹

For Murray, the Holodeck points toward "a universal fantasy machine, open to individual programming: a vision of the computer as a kind of storytelling genie in the lamp."²⁰² The fusion of human and procedural authorship leverages digital technologies to transcend the limitations of storytelling in analog audiovisual media. Thus, the imaginary Holodeck represents a transformative space where narratives are no longer merely consumed but experienced—participatory and immersively engaging the participants' bodies. The new art form within the Holodeck medium, the holo-novel,

"offers a model of an art form that is based on the most powerful technology—of sensory illusion imaginable but is nevertheless continuous with the larger—human tradition of storytelling, stretching from the heroic bards through the nineteenth-century novelists."²⁰³

In the nearly three decades since Murray published her seminal text, numerous media theorists and media practitioners have engaged with the concept of the Holodeck.²⁰⁴ Tonguc Ibrahim Sezen summarized 2019 that the Holodeck still plays a "prominent role in academic discussions [...] as a utopia for interactive digital entertainment".²⁰⁵ Murray's Holodeck analysis particularly influenced research into

201 Murray, Janet Horowitz: *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Cambridge, MA: The MIT Press 2017 [*1997], p. 259.

202 Ibid., p. 24.

203 Ibid., p. 32.

204 In the early German-language discourse up to 2010, for example: Freyermuth, Gundolf S.: "Holodeck heute," *c't-magazin für computertechnik*, August 30, 1999, pp. 72-77, http://freyermuth.com/reprints/archiv2008/reprintJMar2008/Holodeck_haute.html; Freyermuth, Gundolf S.: "Von A nach D. Zwischen Hype und Utopie: Am Horizont der Digitalisierung von Kunst und Unterhaltung lockt das Holodeck," in: Rudolf Maresch/Florian Rötzer (eds.), *Cyberhypes*, Frankfurt/M: Edition Suhrkamp 2001, pp. 213-232. Schröter, Jens: *3D. Zur Geschichte, Theorie und Medienästhetik des technisch-transplanen Bildes*, Munich: Fink 2009.

205 T. I. Sezen: "Beyond the Holonovel," p. 187.

interactive digital storytelling (IDN). Mads Haahr stated in 2002: “Janet Murray’s proposal of the Holodeck as an immersive environment for interactive digital storytelling [...] has served as a guiding metaphor for researchers in interactive digital narrative since it was proposed.”²⁰⁶ A decade later, Hartmut Koenitz outlined the promises and problems of the Holodeck as an inspirational framework in his foreword to the anthology *Interactive Digital Narrative: History, Theory and Practice*:

“The Holodeck is a powerful metaphor for interactive digital narrative, but it is also a limiting one. It implies a level of immersion and interactivity that is not yet achievable, and it may not even be desirable for all kinds of stories and experiences. It also suggests a passive role for the audience, who are expected to follow a pre-defined plot and react to stimuli, rather than actively shape the story and express themselves creatively.”²⁰⁷

In his assessment, Koenitz is already considering the criticism that Janet Murray’s praise of the Holodeck as a model for digital storytelling has received over the years. Marie Laure Ryan voiced the first objections. Some of them were related to accidental issues of technical feasibility. However, the criticism directed at the psychological challenges of Holodeck-like narratives was more essential: “[E]ven if the hardware and software problems could be resolved, an important question remains. What kind of gratification will the experiencer receive from becoming a character in a story?”²⁰⁸ Ryan posited that literary fiction is received in a complex manner, encompassing both identification and distance. While readers mentally simulate the characters’ inner lives, they simultaneously maintain an awareness of external observation. In contrast, the Holodeck conveys emotional experiences in the first person. This shift from mental identification to experiencing real feelings limits possible themes and situations and, thus, the narrative potential:

206 Haahr, Mads: “Everting the Holodeck: Games and Storytelling in Physical Space,” in: Hartmut Koenitz et al. (eds.), *Interactive Digital Narrative: History, Theory and Practice*, New York, NY: Routledge, Taylor & Francis Group 2015, pp. 211-226, here p. 211.

207 Koenitz, Hartmut: *Understanding Interactive Digital Narrative: Immersive Expressions for a Complex Time*, London; New York, NY: Routledge, Taylor & Francis Group 2023, p. 8.

208 Ryan, Marie-Laure: “Beyond Myth and Metaphor: The Case of Narrative in Digital Media,” *Game Studies*, July 2001, <https://www.gamestudies.org/0101/ryan/>

“Interactors would have to be out of their mind—literally and metaphorically—to want to submit themselves to the fate of a heroine who commits suicide as the result of a love affair turned bad, like Emma Bovary or Anna Karenina. Any attempt to turn empathy, which relies on mental simulation, into first-person, genuinely felt emotion would in the vast majority of cases trespass the fragile boundary that separates pleasure from pain.”²⁰⁹

What Ryan called the “narrative myth” of the Holodeck in 2001 was subsequently also addressed by Espen Aarseth. His study *Cybertext: Perspectives on Ergodic Literature*, fundamental to game studies as well, was published almost concurrently with Murray’s *Hamlet on the Holodeck*.²¹⁰ In contrast to Murray’s focus on the narrative qualities of the digital transmedium, Aarseth emphasized the ludic-mechanical elements of procedural works and, in particular, digital games. In his 2004 essay, “Genre Trouble: Narrativism and the Art of Simulation,” he continued this critique of the application of narratological perspectives, underscoring the conflict between scripted interactive experiences and interactive actions that have consequences and meaning. Aarseth referred to the “Holodeck myth” as “story-game ideology.”²¹¹

“Underlying the drive to reform games as ‘interactive narratives,’ as they are sometimes called, lies a complex web of motives, from economic (‘games need narratives to become better products’), elitist and eschatological (‘games are a base, low-cultural form; let’s try to escape the humble origins and achieve ‘literary’ qualities’), to academic colonialism (‘computer games are narratives, we only need to redefine narratives in such a way that these new narrative forms are included’).”²¹²

Rune Klevjer²¹³ and Jay Bolter also expressed opposition to the Holodeck as a model for digital fiction or even digital games. Bolter refers to the Holodeck as “a

209 Ibid.

210 Aarseth, Espen J.: *Cybertext: Perspectives on Ergodic Literature*, Baltimore, MD: Johns Hopkins University Press 1997.

211 Aarseth, Espen: “Genre Trouble: Narrativism and the Art of Simulation,” in: Noah Wardrip-Fruin/Pat Harrigan (eds.), *First Person: New Media as Story, Performance, and Game*, Cambridge, MA: MIT Press 2004, pp. 45-55, here p. 49.

212 Ibid.

213 Klevjer, Rune: *What is the Avatar? Fiction and Embodiment in Avatar-Based Single-player Computer Games*. PhD Thesis, University of Bergen 2006), p. 66, https://bora.uib.no/bora-xmlui/bitstream/handle/1956/2234/Dr._Avh_Rune_Klevje.pdf?sequence=1

technical chimera” and states: “It is not clear that our culture wants the Holodeck.”²¹⁴ In cultural practice, however, efforts to emulate the Holodeck utopia in some form or another have prevailed. For example, game designer and filmmaker Greg Roach declared at the end of the 1990s:

“Ultimately all interactivity is a sham. Until we have true dynamic artificial intelligence, agents, artificial personalities, it’s all a sham. Until we can create the Holodeck in STAR TREK, we are setting up a set of parameters and giving people the illusion of control and the illusion of interactivity.”²¹⁵

Practical efforts to create more Holodeck-like sensations encountered the fundamental obstacle that no suitable technologies exist for even an approximate realization of the futuristic concept and, as Lawrence M. Krauss wrote in 1995 in *The Physics of Star Trek*, will probably not exist for the foreseeable future.²¹⁶ The numerous attempts to circumvent the limitations of existing technology can be divided into three categories.

Firstly, in continuation of the material construction of fictional 3D worlds initiated by Disney, there was a boom in installations that combined *first-person film rides* with the construction of themed sets and the use of costumed actors, thus offering physical immersion in staged actions and partial interaction with their characters.²¹⁷ Two such rides, created in the 1990s, operated remarkably close to the technical limits. In 1993, Douglas Trumbull produced *IN SEARCH OF THE OBELISK* for the Las Vegas Luxor Hotel & Casino.²¹⁸ The technical superiority of the ride resulted from the then-innovative combination of live-action film and

214 Bolter, J. David: “Transference and Transparency: Digital Technology and the Remediation of Cinema,” *Revue Intermédialités*, no. 6 (Fall 2005), pp. 13-26, here p. 26.

215 Quoted from Neuhaus, Wolfgang: “Auf der Suche nach einer ‘Meta-Dramaturgie’ oder: Die Schwerkraft der Erzählung,” in: Wolfgang Jeschke (ed.), *Das Science Fiction Jahr Ausgabe 1999*, Munich: Heyne 1999, pp. 520-543.

216 Krauss, Lawrence Maxwell: *The Physics of Star Trek*, New York, NY: Basic Books 1995.

217 The following is based on G. S. Freyermuth: “Vegas, Disney, and the Metaverse,” pp. 75-80.

218 *IN SEARCH OF THE OBELISK* (Las Vegas Luxor Hotel & Casino 1993-2004, O: Trumbull, Douglas and Arish Fyzee).

computer graphics.²¹⁹ A motion device developed by Trumbull and controlled by 40 Silicon Graphics workstations and a dozen other computers synchronized the hybrid—partly photorealistic, partly hyperrealistic²²⁰—images of the ride movie with the movements of a pneumatic motion platform.²²¹ IN SEARCH OF THE OBELISK was, in Trumbull's words, an “experiment in finally going over the edge of a belief barrier through careful control of photography and projection, to the point where a motion picture can be seen to be a real live event.”²²²

An even more artistically and technically advanced effort to emulate the Holodeck in analog-digital hybridity undertook STAR TREK: THE EXPERIENCE.²²³ The 70 million-dollar installation opened in 1998 after three years of construction.²²⁴ Covering 600 square meters in the Las Vegas Hilton, it offered a hyper-realistic ‘replica’ of the space station from STAR TREK: DEEP SPACE NINE.²²⁵ The digitally controlled 3D backdrops combined elements of a museum and dinner theater with two high-tech simulations in 37 STAR Trek-themed scenes: A ‘real’ elevator ride in the Museum of the Future, which ended with the virtual abduction of guests by “beaming,” was followed by their Starfleet officer-driven escape from intergalactic enemies to a rescue shuttle and then the actual ride, a four-minute rollercoaster flight through space. The immersive experience ended after 22 minutes with the shuttle crash-landing on the Las Vegas Strip.

In the first six months after opening, 700,000 visitors flocked to the attraction. At peak times, around 2000 paying ‘time travelers’ per hour were transported to the simulated future. The central attraction of STAR TREK: THE EXPERIENCE was the opportunity to physically participate in a popular mass cultural fiction in the

219 See Swain, Bob: “Specialley Effective Fun: Interactive Movies,” *The Guardian*, August 25, 1994.

220 Gorman, Tom: “Weekend Escape: Las Vegas; The Strip Says, ‘Kids, Got Clean Thrills For You, But You Gotta Bring Your Boring Parents. Deal?’,” *Los Angeles Times*, November 20, 1994, p. 22.

221 B. Swain: “Specialley Effective Fun.”

222 Rheingold, Howard: “Total Immersion. Douglas Trumbull’s Big Budget VR,” *Wired*, November 1993, <http://www.wired.com/wired/archive/1.05/luxor.html>

223 STAR TREK: THE EXPERIENCE (Las Vegas Hilton 1998-2008, O: Landmark Entertainment). See G. S. Freyermuth: “Holodeck heute.”

224 Rubin, Judith: “Are You Experienced? Landmark Entertainment, Paramount Parks, and a Galaxy of Artisans Beam Aboard the \$70 Million Star Trek Extravaganza at the Las Vegas Hilton,” *TCI (Theatre Crafts International)*, April 1998.

225 N.N.: “Presskit Star Trek—The Experience,” 1999. See also G. S. Freyermuth: “Holodeck heute.”

same way as the Holodeck promised. “The experience most people have had with STAR TREK over the years has focused on watching television or a movie,” said producer Rick Berman. “This blows away the proscenium.”²²⁶

The emphasis on the first-person perspective in the play-along narrative and ride was particularly appealing. The integration of this point of view characteristic of digital flight simulators represented a consistent continuation of the general tendency towards subjectivization in 20th-century art and entertainment, as seen in the literary *stream of consciousness* or the subjective camera of experimental cinema. Such direct experiences—like the new game genre of the first-person shooter (FPS), which became successful at the same time—resonated with a contemporary audience that, in their work and everyday lives, saw objective material requirements and constraints increasingly replaced by virtualized, customizable, and individually controllable processes.

The high-tech synchronization of moving images with their correlating motor sensations, as offered by the film rides to a broad audience for the first time, made more radical use of the expanded digital possibilities for multisensory illusion than cinema, which merely enhanced some of its images hyperrealistically. However, beyond the physical experience of scenes from movies or TV series, the film rides hardly offered any meaningful interactions, as Erkki Huhtamo noted:

“Although motion simulators have tried to bridge the gap between the audience space and the virtual world of the screen and to create a more dynamic response from the passengers, they still share a very traditional nineteenth-century conception about the audience. It was encountered in the diorama as well as in the opera or the melodrama theater.”²²⁷

A second category of techno-aesthetic experiments sought to create Holodeck-like effects by employing the technology that had given it its name. One of the earliest science fiction visions of holographic media was, as mentioned, the resurrection of the dead. STAR TREK’S imaginary Holodeck also repeatedly simulated historical characters—from Leonardo da Vinci and Isaac Newton to Mark Twain, Mata Hari, Sigmund Freud, and Albert Einstein. In the early 2000s, the digital upgrade of analog holography rendered it technologically feasible to create holographic images of the deceased that could be animated to resemble the appearance of a living person, thereby enabling limited interaction with these holograms. The

226 Quoted from N.N.: “Presskit Star Trek—The Experience.”

227 Huhtamo, Erkki: “Encapsulated Bodies in Motion: Simulators and the Quest for Total Immersion,” in: Simon Penny (ed.), *Critical Issues in Electronic Media*, Albany, NY: State University of New York Press 1995, pp. 159-186, here p. 174.

spectacular start was the resurrection of Tupac Amaru Shakur by the special effects studio Digital Domain and the two holo companies AV Events and Musion Systems. Tupac was shot dead in Las Vegas in 1996. Fifteen years later, at the 2012 Coachella Valley Music & Arts Festival in California, the legendary rapper sang the 1996 hit “2 Of Amerikaz Most Wanted” ‘live’ in front of 80,000 spectators and in a duet with fellow rapper Snoop Dog, who interacted with Tupac’s hologram on stage.²²⁸

Two years later, Michael Jackson’s virtual reincarnation appeared at the Billboard Music Awards, standing out for its resemblance and convincingly expressive gestures. In 2015, Billie Holiday, who died in 1959, sang at the Apollo Theater in New York.²²⁹ Roy Orbison went on an international tour in 2018, 30 years after his death. In Europe alone, he sold 38,000 tickets for a 65-minute show in which he sang 16 of his best-known hits, accompanied by a live orchestra.²³⁰ Maria Callas was holographically brought back to life in the same year: “When this ‘Holo-Callas’ took the stage, it was light-years away from the danger zone of the uncanny valley. It had a strong physical likeness and convincingly expressive gestures with realistic, graceful movements.”²³¹ Other musicians who have found a second holographic career include Nat King Cole, Liberace, Buddy Holly, Freddie Mercury, and Frank Zappa:

“For what it’s worth, the crowd at the Zappa concert seemed utterly charmed—cheering when the hologram Zappa materialized in the center of the stage during the opening number, *Cosmik Debris*. I was sitting about eight rows from the front. It looked like Zappa up there, more or less, though his form radiated the paranormal brightness that holograms can’t help emitting.”²³²

228 Dodson, Aaron: “The Strange Legacy of Tupac’s ‘Hologram’ Lives on Five Years after Its Historic Coachella Debut,” *the undefeated.com*, April 14, 2014, <https://theundefeated.com/features/the-strange-legacy-of-tupacs-hologram-after-coachella/>

229 Binelli, Mark: “Old Musicians Never Die. They Just Become Holograms,” *New York Times Magazine*, January 7, 2020, <https://www.nytimes.com/2020/01/07/magazine/hologram-musicians.html>

230 Lee, Wendy: “Roy Orbison Hologram Concert in L.A.. Invites Awe and Debate,” *Los Angeles Times*, October 6, 2018, <https://www.latimes.com/business/hollywood/la-fi-ct-orbison-hologram-20181006-story.html>

231 Selinger, Evan: “Why I Won’t Clap for a Hologram,” *Medium.com*, November 29, 2018, <https://onezero.medium.com/why-i-wont-clap-for-a-hologram-705cd2e9cef4>

232 M. Binelli: “Old Musicians Never Die. They Just Become Holograms.”

The enhancement of traditional analog holographic processes is achieved through their fusion with digital image processing and real-time video generation practices developed in the film and games industry, as well as with augmented and virtual reality techniques. Usually, a body double records the stage act via performance capture. Animators use this motion data to create a three-dimensional digital model and add the deceased artist's facial features and physical characteristics. Finally, the holographic image data and existing vocal recordings are lip-synchronized.

The 3D stage projection of the virtually resurrected artists employs a digital upgrade of the "Pepper's Ghost" effect, which was initially developed during the mid-19th century. In its analog version, the mirror image of an actor hidden under the stage was projected onto a pane of glass installed between the stage action and the auditorium. This enabled the actors on stage to interact with ghostly apparitions that seemed to appear to the audience 'out of nowhere.' Current productions of the effect employ elaborate configurations of both analog and digital 2D and 3D equipment, particularly laser projections on novel transparent materials such as Mylar. In combination, this hybrid form of holography creates a lifelike stage presence of absentees.

However, unlike pure holograms, these holo-projections do not produce 360-degree images that can be circled like sculptures. Instead, the projected images resemble analog reliefs: a 180-degree view of the object appears on the invisible projection surface. The digital characters show realistic depth and plasticity—as long as they are viewed from the front. Only simple pre-planned interactions with living actors or the audience are possible to date, as the resurrected artists' image data must still be pre-produced. The further development of the technology aims to ensure that "a puppeteer sitting in the wings with a laptop could work the digital strings live—allowing the hologram to react to the crowd or to members of a live band."²³³ With this, and in the next step by replacing human remote control with artificial intelligence, Holodeck-like 'live' stage events with deceased or absent actors or artists should be possible.

Since 2013, the time capsule project "New Dimensions in Testimony" at the University of Southern California in Los Angeles has been undertaking a variant of these resurrections based on 360-degree holography instead of relief projections. In collaboration with the Illinois Holocaust Museum and Education Center, it produces holographic recordings of Holocaust survivors.²³⁴ In a green-screen

233 Ibid.

234 N.N.: "Dimensions in Testimony," *USC Shoah Foundation*, accessed June 16, 2024, <https://sfi.usc.edu/dit>

environment, they answer around 1000 questions on various aspects of their lives and experiences. The testimonies are stored in an audiovisual database. When visitors ask their questions in the future, the database will generate the most suitable holographic responses. The objective is to facilitate lifelike discourse and interactive engagement with the Holocaust survivors in a manner analogous to the simulated Holodeck debates between STAR TREK officers and historical figures.

The third approach to making some elements of the utopian Holodeck a reality in the present is through practical research into Virtual Reality. Concerning the Holodeck, this effort can be considered a misunderstanding or displacement in the sense of Freud's interpretation of dreams.²³⁵ The Holodeck is characterized by its fictional worlds and characters having a material form. They can, therefore, be seen with the naked eye—like holographs—and felt with bare hands. However, VR, popularized in the late 1980s at about the same time as the Holodeck, lacks these essential characteristics. It requires 3D glasses and generates audiovisions that are not tangible. Nevertheless, the VR community immediately adopted the media utopia of the Holodeck.

“Michael Heim [...] states that at the specialist conferences of the ‘Special Interest Group on Graphics and Interactive Techniques’ in 1989 and 1990—at which virtual reality was discussed in detail for the first time—the Holodeck was one of the guiding principles that served as an incentive for virtual reality researchers. A technology and design manual on virtual reality from 1993 quite naturally names the Holodeck as the ‘ultimate goal’ of research [...]—the Holodeck becomes the center of the central imaginary of this research.”²³⁶

Over the 35 years that have passed since then, numerous pioneering VR research projects—initiated by leading universities and large corporations alike—have been launched under the guiding principle of the Holodeck. Five projects stand out in particular. In 2011, Stevie Bathiche, research director of Microsoft's Edison Lab, stated that the lab strives “to create a holodeck-like experience.”²³⁷ Since 2012, another “Project Holodeck” at the School of Cinematic Arts at the University of Southern California in Los Angeles has been using the Oculus Rift visor to

235 The displacement phenomenon occurs when the essential contents of dream thoughts are replaced in the dream by other elements that have a superficial or accidental association with them.

236 C. Ernst/J. Schröter: *Media Futures: Theory and Aesthetics*, pp. 88-89.

237 Sottek, T. C.: “To Build a Holodeck: An Exclusive Look at Microsoft's Edison Lab,” *The Verge*, December 29, 2011, <http://www.theverge.com/2011/12/28/2665794/microsoft-edison-lab-holodeck-tour>

experiment with interactive-immersive audiovisual experiences.²³⁸ In March 2013, Jeff Norris from NASA's Jet Propulsion Laboratory announced at the Game Developer Conference in San Francisco that the space agency is planning to allow millions of earthlings to experience space travel via an illusionistic system "of shared immersive exploration. Everyone exploring the universe through robotic avatars, not just peering at numbers or pictures on a screen, but stepping inside a holodeck and standing on those distant worlds."²³⁹ In 2017, the chip company Nvidia named its "intelligent virtual reality platform" Holodeck.²⁴⁰ Additionally, in 2018, Gene Roddenberry's son Rod experimented with holographic displays to get closer to the Holodeck: "I want to see Star Trek's technologies made real, and for the very first time, now believe that a real Holodeck is no longer limited to science fiction."²⁴¹

The insight that interpreting the Holodeck as a utopia pointing to the emerging medium of VR is a misinterpretation—or a displacement in the dreams of those working in the field of VR—is most clearly demonstrated by a billion-dollar deal closed intending to change the future of media. In 2009, Palmer Luckey, 17 years old, began assembling goggles from standard electronic components in his parents' garage. His goal was to make VR affordable for games.²⁴² The history of virtual reality changed when Luckey received an email from John McCormack four years later. The legendary co-creator of FPS games such as DOOM and QUAKE had heard about Luckey's experiments and wanted to purchase a prototype:

238 Stevens, Tim: "Project Holodeck and Oculus Rift hope to kickstart every gamers' VR dream for \$500," *Engadget*, July 23, 2012, <http://www.engadget.com/2012/07/23/project-holodeck-and-oculus-rift/>

239 Claiborn, Samuel: "NASA Wants to Design a Holodeck. At GDC 2013, NASA presentation claims 'We are the Space Invaders'," *IGN*, 2013, <http://www.ign.com/articles/2013/03/28/nasa-wants-to-design-a-holodeck>

240 Etherington, Darrell: "Nvidia Built a Real Holodeck, Aimed at Creative Collaboration," *Techcrunch.com*, October 10, 2017, <https://techcrunch.com/2017/10/10/nvidia-built-a-real-holodeck-aimed-at-creative-collaboration/>

241 N.N.: "Roddenberry Entertainment Joins Project To Build Real Star Trek-like Holodeck," October 23, 2018, <https://trekmovie.com/2018/10/23/roddenberry-entertainment-joins-project-to-build-real-star-trek-like-holodeck/>

242 Kushner, David: "Oculus Rift Takes Virtual Reality Mainstream," *IEEE Spectrum*, December 31, 2013, <https://spectrum.ieee.org/oculus-rift-takes-virtual-reality-mainstream>

“Carmack had been fascinated by virtual reality since seeing the Holodeck on STAR TREK: THE NEXT GENERATION as a teen, and he had been chipping away for decades at the technology needed for VR as he helped create Id’s first-person shooter games.”²⁴³

Luckey’s prototype impressed McCormack, and he presented the Oculus Rift goggles at the Electronic Entertainment Expo (E3) in Los Angeles in 2012:

“One popular game site heralded that the ‘Rift could be the closest we’ve come to STAR TREK’s Holodeck’ and another describing it as ‘a gaming experience with a level of immersion genuinely unlike anything else we have ever encountered.’”²⁴⁴

The subsequent Kickstarter campaign raised almost ten times the 250,000 dollars requested. Just two years later, Palmer Luckey sold his company to Mark Zuckerberg for two billion dollars in cash and stocks. However, the founder of Facebook did not acquire Oculus because he wanted to build the Holodeck. Like a professional psychoanalyst, he had decoded the dreamy displacement of Holodeck fans: Zuckerberg recognized VR as the foundational technology of another future medium—one he longed to make a reality.

In 2022, Facebook renamed itself Meta, underlining its focus on the Metaverse.

EPILOG: THE METAVVERSE

Neal Stephenson’s vision of the Metaverse responded to the state of digital technology around 1990. By then, digital networking had made little progress compared to the time *Neuromancer* was written. The number of Americans utilizing the Internet and other proprietary online services, namely CompuServe, America Online, and Prodigy, was relatively limited, with only a few million users. The largest provider, CompuServe, for instance, had approximately 600,000 subscribers.²⁴⁵ Worldwide, less than 0.5% of people were online, i.e., 26.5 million out of 5.3 billion.²⁴⁶ Few anticipated any significant changes of this situation in the near

243 Ibid.

244 Ibid.

245 N.N.: “CompuServe Interactive Services, Inc.,” *Company-Histories.com*, <https://www.company-histories.com/CompuServe-Interactive-Services-Inc-Company-History.html>

246 Roser, Max: “The Internet’s History Has Just Begun,” *OurWorldInData.org*, October 3, 2018, <https://ourworldindata.org/internet-history-just-begun>

future. The US government controlled the Internet, and access was largely restricted to scholars, students, and the military. In contrast, the future of virtual reality looked more promising, as it seemed to offer the potential for more comprehensive public access and diverse applications.

1 From the Ultimate Display to Virtual Reality: Origins of the Metaverse

The history of virtual reality—like that of digital networking and holography—began in literature. In the early 20th century, E.M. Forster’s short story “The Machine Stops” sketched a world in which telepresence and telecommunications had replaced all direct human encounters—a reality in which experiences were almost exclusively media-mediated.²⁴⁷ A quarter of a century later, Stanley G. Weinbaum wrote a short story, “Pygmalion’s Spectacles,” which revolves around futuristic 3D goggles.²⁴⁸ They facilitate a hyper-immersive experience of audiovisuals by not only projecting their images in 3D but also enabling users to engage with the action in a multisensory manner. Subsequently, the advances in digital simulation technology were reflected in science fiction literature from the mid-1960s onwards, for example, in Philip K. Dick’s *Simulacra*²⁴⁹ and Daniel F. Galouye’s *Simulacron-3*.²⁵⁰ Both novels, published in 1964, describe the creation of simulated people and worlds for various sinister purposes.

One year later, Ivan Sutherland, then a professor at Harvard, presented a radical theoretical concept—the “ultimate display”:

“The ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. [...] With appropriate programming such a display could literally be the Wonderland into which Alice walked.”²⁵¹

247 Forster, Edward Morgan: “The Machine Stops,” *The Oxford and Cambridge Review*, November 1909, https://www.gutenberg.org/cache/epub/72890/pg72890-images.html#THE_MACHINE_STOPS

248 Weinbaum, Stanley Grauman: “Pygmalion’s Spectacles,” *Wonder*, June 1935, <https://www.gutenberg.org/files/22893/22893-h/22893-h.htm>

249 Dick, Philip K.: *The Simulacra*, New York, NY: Vintage Books 2002 [*1964].

250 Galouye, Daniel F.: *Simulacron-3*, New York, NY: Bantam Books 1964.

251 Sutherland, Ivan Edward: “The Ultimate Display,” in: Randall Packer/Ken Jordan (eds.), *Multimedia: From Wagner to Virtual Reality*, New York, NY: Norton 2001 [*1965], pp. 232-236.

Sutherland's concept foreshadows the hypothetical yet scientifically conceivable matter hologram, which Gene Dolgoff will propose a few years later. In his practical work, however, Sutherland did not pursue the idea of a material image space with a visuality that could be experienced haptically any further and instead replaced it with the equally innovative concept of the head-mounted display (HMD). He demonstrated the prototype in 1968, a cumbersome contraption nicknamed "The Sword of Damocles," the great grandfather of today's VR goggles.²⁵² What could not yet be realized as a room thus became a virtual space for privatized perception. In parallel, Sutherland and his team programmed a scene generator, the great grandfather of game engines, that allowed the interactive generation of computer graphics for flight simulations.²⁵³ With these three innovations—the concept of the Ultimate Display as not a window but a room, the HMD as a virtual simulation of such a room, and the Scene Generator as the software program to create immersive interactive visuals—Ivan Sutherland, in the latter half of the 1960s, laid the foundations for what we now call Virtual Reality.

Sutherland's experiments led in the 1970s and 1980s to the "Visually Coupled Airborne Simulator," produced for the US Air Force. These HMDs cost about \$1 million apiece and seemed so futuristic that—in the times of the first STAR WARS movies and the *Strategic Defense Initiative*, which was derisively nicknamed "Star Wars" as well—they were referred to as "Darth Vader helmets."²⁵⁴ By the mid-1980s, however, the technology had become considerably cheaper due to a NASA project that used prefabricated parts. Its goal was to build simulation systems that could be navigated and manipulated interactively but independently of specific hardware.

At this point, Jaron Lanier entered the scene. The young artist earned his living by designing video games, including the successful music game MOONDUST for

252 Sutherland, Ivan Edward: "A Head-Mounted Three Dimensional Display," *AFIPS '68 (Fall, part I): Proceedings of the December 9-11, 1968, Fall Joint Computer Conference, part I*, 1968, pp. 757-764, <https://www.cise.ufl.edu/research/lok/teaching/ve-s07/papers/sutherland-headmount.pdf>

253 Rolfe, J. M./K. J. Staples: *Flight Simulation*, Cambridge [Cambridgeshire]; New York, NY: Cambridge University Press 1986, p. 234.

254 Bye, Ken: "50 years of VR with Tom Furness: The Super Cockpit, Virtual Retinal Display, HIT Lab, & Virtual World Society," *Voices of VR Podcast*, November 17, 2015, <https://voicesofvr.com/245-50-years-of-vr-with-tom-furness-the-super-cockpit-virtual-retinal-display-hit-lab-virtual-world-society/>

the Commodore 64.²⁵⁵ Simultaneously, he was experimenting with technologies referred to as virtual environments (VE). Lanier recognized that NASA's approach marked a transition from 'specialized simulations' such as flight or driving simulations with specific hardware—particular cockpits, and so forth—to 'universal simulations,' in other words, to simulation apparatuses that are as universal as the digital computer is a universal machine. For such software-based simulation environments, which partially realized Sutherland's concept of the ultimate display, Jaron Lanier coined a new term: Virtual Reality.²⁵⁶

In 1987, VPL Research, the company Jaron Lanier founded, developed the first universal simulation machine as a commercial product, the \$250,000 EyePhone. This system consisted of a Macintosh computer serving as the control system and two Silicon Graphics workstations, each calculating the virtual worlds at 30 frames per second for one eye. The head-mounted display had built-in stereo speakers and two LCD monitors that produced stereoscopic 3D images. A data glove or a full-body DataSuit completed the hardware setup. The core of the EyePhone was its proprietary software, capable of dynamically executing a variety of simulations—from flights to architecture to games—all using the same hardware.²⁵⁷

Consequently, Lanier considered VR "the dawn of a new era, like when Columbus returned to Spain with news of the New World. Only this time, the New World is infinite; it's the virtual world, still largely uninvented and unexplored."²⁵⁸

Far-reaching hopes like these were widespread in the early 1990s when VR enjoyed its first boom phase, though it was still expensive and somewhat primitive. The title of Howard Rheingold's classic 1991 reportage captured the spirit of optimism sparked by the new medium: *Virtual Reality: The Revolutionary Technology of Computer-Generated Artificial Worlds—And How it Promises and Threatens to Transform Business and Society*.²⁵⁹

255 MOONDUST (Creative Software Inc. 1983, O: Lanier, Jaron).

256 Steuer, Jonathan: "Defining Virtual Reality: Dimensions Determining Telepresence," *Journal of Communication* 42, no. 4 (1992), pp. 73-93, here p. 73, <https://steinhardtapps.es.its.nyu.edu/create/courses/2015/reading/steuer.pdf>

257 Sorene, Paul: "Jaron Lanier's EyePhone: Head and Glove Virtual Reality in the 1980s," *flashbak*, November 24, 2014, <https://flashbak.com/jaron-laniers-eyephone-head-and-glove-virtual-reality-in-the-1980s-26180/>

258 Scheinin, Richard: "Through the Looking Glass: 'Virtual Realities' Can Take Us Into Other Worlds," *Chicago Tribune*, February 18, 1990.

259 Rheingold, Howard: *Virtual Reality*, New York, NY: Summit Books 1991.

2 From Cities to Worlds: Metaverse's Aftereffects

At the dawn of the 1990s, the future of VR seemed more promising than that of the Internet—but this popular assessment soon turned out to be wrong. The new audiovisual medium of VR, which still featured prominently as a sensation in the evening news in 1990,²⁶⁰ no longer seemed worth reporting in 2000. The Internet, on the other hand, exceeded all expectations and grew explosively. Its infrastructural expansion and popularization through the graphical hypertext mask of the World Wide Web led to strong growth. The global online population increased from 0.5% in 1990 to 7% in 2000, representing a growth from 26.5 million to 430 million individuals.²⁶¹ Of course, there were major global differences, even between the developed nations. In 2001, 55% of all adults in the US were using the Internet, and in Germany, only 37%.²⁶² At the same time, the usage of VR was limited to certain industries and early adopters, and it was so low that it couldn't be tracked statistically.

Around 1990, however, Stephenson was not the only one to propose a future medium that combined networking and computer graphics, with the graphics being the spectacular focus. A few months before *Snow Crash* introduced the Metaverse, David Gelernter published *Mirror Worlds, Or, The Day Software Puts the Universe in a Shoebox*.²⁶³ In his monograph, the influential computer scientist speculated on the feasibility of software worlds mirroring reality and affording the control of material processes via interaction with their software representations. Consequently, a mirror world would have to not only replicate the appearance of buildings or objects in the real world but also provide additional advanced prop-

260 Cf., for example, ABC PRIMETIME LIVE (USA 1991, D: N.N.). Online: <https://www.youtube.com/watch?v=rVn3H93Ysag>

261 World Bank Group: "Individuals Using the Internet," *data.worldbank.org*, n.d., https://data.worldbank.org/indicator/IT.NET.USER.ZS?end=2022&most_recent_value_desc=false&start=1960&view=chart

262 For the US, see Perrin, Andrew and Maeve Duggan: "Americans' Internet Access: 2000-2015," *Pew Research Center*, June 26, 2015, <https://www.pewresearch.org/internet/2015/06/26/americans-internet-access-2000-2015/>. For Germany, see Davis, Kasia: "Share of Internet Users in Germany from 2001 to 2023," *Statista*, April 24, 2024, <https://www.statista.com/statistics/380514/internet-usage-rate-germany/>

263 Gelernter, David Hillel: *Mirror Worlds, Or, the Day Software Puts the Universe in a Shoebox—: How It Will Happen and What It Will Mean*, New York: Oxford University Press 1991.

erties and functions. Gelernter's proposal evidently anticipated the early 21st-century concept of the digital twin, which is now a relatively common practice associated with efforts to create a Metaverse.²⁶⁴

The scientific proposal of virtual mirror worlds and the science fiction vision of a Metaverse are linked both historically and in their objectives. Both extend two key technological achievements of the early digital age into the future —the Internet and computer graphics, i.e., Virtual Reality. Both predict an integration of hardware reality and software virtuality and, for virtual visualization, refer to modes of representation called skeuomorphism in design theory: the imitation of physical elements in software to make virtual tools or worlds more familiar and easier to understand for users.

The rapid settlement of the WWW, which commenced after the 1993 release of the first browser displaying text and graphics in one window, followed a similar skeuomorphic principle. Simple graphical impressions of modern cities and software equivalents of their services and functionalities filled the abstract emptiness of the data space. An outstanding non-commercial example of transforming real structures into virtuality was the Digital City of Amsterdam (De Digitale Stad, DDS). Its opening on January 15, 1994, marked the beginning of the success story of cities made of bits and bytes. DDS quickly grew into a large habitat with more than 140,000 “inhabitants” and inspired other digital cities such as Berlin or the art project *Telepolis*, which later mutated into Germany's leading online magazine.²⁶⁵ Its name combines the Greek words “tele,” i.e., at a distance, and “polis,” i.e., city, and thus means “distant city,” like telephone means distant sound. The most elaborate and expensive project of this kind, however, was Apple's eWorld. The online world launched in June 1994 as a subscription-based information service for Mac and Newton users. eWorld used a city metaphor for its user interface, with each building representing a software function, including a post office housing the e-mail inbox, a newsstand storing electronic magazines, and so on.²⁶⁶

Gert Lovink criticized this skeuomorphism in 1997 as “regressive”: “There are still no metaphors that come from the technology and the network itself.”²⁶⁷ In

264 For an introduction, see N.N.: “What Is a Digital Twin?,” *Unity*, 2022, <https://unity.com/solutions/digital-twin-definition#history-digital-twin-technology>

265 See Wiktorin, Dorothea/ Vossen, Joachim: “Virtuelle Stadt—die neue globale Stadt. Auf dem Weg zur CyberCity,” *Praxis Geographie* 31 (2001), pp. 12-16.

266 Dormehl, Luke: “Today in Apple History: eWorld Closes Its Virtual Doors,” *Cult of Mac*, March 9, 2024, <https://www.cultofmac.com/470461/today-in-apple-history-e-world-closes-its-virtual-doors/>

267 Quoted from D. Wiktorin/J. Vossen: “Virtuelle Stadt.” (My translation.)

contrast, Zina Moukheiber recognized the parallels between virtual cities and Stephenson's "The Street" and thus the process of civilizing Cyberspace's wild *frontier* into a metaversal counter-world:

"What we ended up with is more like a fully realized city, with virtual homes, businesses, libraries, nightclubs—even a red light district. It is closer, in other words, to another science fiction vision, the 'metaverse' Neal Stephenson envisioned in his 1992 *Crash*. That particular moniker has not caught on, but many of Stephenson's ideas about what the on-line world can look like are driving a new generation of entrepreneurs to try to match it."²⁶⁸

The pivotal event for the transformation of the WWW into a boomtown—the kick-off for the so-called new economy—was Netscape's spectacular IPO in early August 1995. "Reading the newspaper accounts and watching the television news," wrote Paul E. Ceruzzi in 1998, "had the feeling that the day Netscape went public marked the beginning of the history of computing, and that everything else been a prologue."²⁶⁹ At the time, I experienced the transformation of WWW as the opening up and normalization of the data space previously belonging to the happy few:

"Supermalls, theme parks, gamblers' paradises, and sex centers are springing up. Meanwhile, there's hardly anything that can't be found online: steaks and tax advice, live psychotherapy and investment help from neural networks, strip shows, and web soaps with characters you can interact with. In short, it is all kinds of wet dreams and brilliant business opportunities. Cyberspace is booming and changing radically. From Utopia to Las Vegas, so to speak, from irresponsible fun to organized pleasure, from a free space for minorities, outsiders, and the clairvoyant to a regulated playground and funfair for the average consumer. [...] Now the millions are joining the avant-gardes, and with them, the fence-pullers, levelers, businessmen, and lawmakers are encroaching."²⁷⁰

Deliberate efforts to create the dystopian-utopian Metaverse started in digital games and game-like digital environments. Online 3D worlds with meeting

268 Z. Moukheiber: "The Geeks Have Inherited the Earth."

269 Ceruzzi, Paul E.: *A History of Modern Computing*, Cambridge, MA: MIT Press 1998, p. 304.

270 Freyermuth, Gundolf S.: "Von Utopia bis Vegas," *Tagesspiegel*, November 23, 1997. (My translation.)

places, stores, educational and entertainment offerings, and even their own currencies were developed. One of the first was CYBERTOWN in 1995,²⁷¹ and the most successful was SECOND LIFE.²⁷² It opened in 2003 and had almost 65 million users in 2021. Parallel, online games evolved into proto-Metaverses, rivaling in revenue Las Vegas casinos. WORLD OF WARCRAFT, for example, attracted at its peak in 2017 up to 46 million monthly players and produced around \$10 billion in revenue.²⁷³ Other successful 3D game worlds include the online “experience” platform ROBLOX, with 500 million downloads and almost 200 million monthly users,²⁷⁴ and FORTNITE (2017), with over 650 million registered users and 230 million active monthly players.²⁷⁵

One element indicating the transition from game worlds to social worlds for two decades was the evolution of complete economic systems in games, especially MMORPGs (massively multiplayer online role-playing games). In addition to the fee-based gaming itself, a multitude of other economic activities have arisen over the years: Avatars require clothing and equipment, land and real estate are acquired, and lively trade is conducted on virtual marketplaces. These increasingly complex economic systems have been able to compete in terms of value with the economies of smaller nations for a quarter of a century. An early example is the kingdom of Norrath in the game EVERQUEST. Edward Castronova noted back in 1999 that if Norrath were an actual nation, it would be one of the more prosperous

271 CYBERTOWN (IVN 1995, O: Hawk, S. F. X.); see Robertson, Adi: “When the Virtual City of Cybertown Went Dark, Its Citizens Rebuilt It,” *The Verge*, April, 2022, <https://www.theverge.com/23032658/cybertown-revival-blaxxun-virtual-community-rebuilding-project>

272 SECOND LIFE (Linden Lab 2003, O: Rosedale, Philip); see Greener, Rory: “Second Life Storefront User Traffic Jumps 35 Percent in 2021,” *XR Today*, January 12, 2022, <https://www.xrtoday.com/virtual-reality/second-life-user-traffic-jumps-35-percent-in-2021/>

273 WORLD OF WARCRAFT (Blizzard Entertainment 2004, O: Kaplan, Jeff; Pardo, Rob; Chilton, Tom); see Galov, Nick: “15 Facts About The WoW Player Count in 2022,” *Web Tribunal*, April 6, 2022, <https://webtribunal.net/blog/wow-player-count/#gref>

274 ROBLOX (Roblox Corporation 2006, O: Roblox, Corporation); see Press, Gil: “How Many People Play Roblox—User and Growth Stats in 2024,” *WhatsheBigData.com*, 2024, <https://whatsthebigdata.com/roblox-users/>

275 FORTNITE (Epic Games 2017, O: Epic Games, People Can Fly); see Adhikary, Ishan: “How Many People Are Playing Fortnite? (Player Count 2024),” *Beebom*, May 26, 2024, <https://beebom.com/fortnite-player-count/>

countries on the planet: “According to GNP data from the World Bank, Norrath is the 77th richest country in the world, roughly equal to Russia.”²⁷⁶

Traditionally, real estate transactions are the cornerstone of online economies. In *SECOND LIFE*, virtual land, buildings, and other software objects changed hands for \$3.2 billion between 2003 and 2013.²⁷⁷ Since then, prices have tended to rise. In December 2021, a modest property fetched \$450,000 because it was next to the mansion of legendary veteran rapper Snoop Dogg—albeit not in Hollywood, but *THE SANDBOX*.²⁷⁸ The video game is based on blockchain technology and thus permanently secures the identity of the actors, the history of transactions, and the acquired property titles. Like *THE SANDBOX*, many other metaversal game worlds now have proprietary cryptocurrencies that are also traded on crypto exchanges outside the games. By acquiring actual purchasing power, virtual play money brings closer the vision at the heart of the Metaverse: a playful, simulative fusion of reality and virtuality.

Another indication of the formation of metaversal worlds is the growing number of individuals who utilize online games for purposes beyond gaming, such as social interaction, private meetings, and cultural events. They celebrate weddings and birthdays, hold graduation parties, and attend mass concerts by superstars like Ariana Grande, Lil Nas X, and Travis Scott, bringing together millions of participants.²⁷⁹ *FORTNITE* hosted the “Short Nite” film festival, where players and their friends could watch 12 animated short films together on a big screen in the game.²⁸⁰ *MINECRAFT* regularly organizes educational events that allow stu-

276 Castronova, Edward: “Virtual Worlds: A First-Hand Account of Market and Society on the Cyberian Frontier,” *CESifo Working Paper Series* no. 618 (December, 2001), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=294828

277 Jamison, Leslie: “The Digital Ruins of a Forgotten Future,” *The Atlantic*, December 2017, <https://www.theatlantic.com/magazine/archive/2017/12/second-life-leslie-jamison/544149/>

278 Hayward, Andrew: “What is the Metaverse? The Immersive, NFT-Powered Future Internet,” *Decrypt*, February 17, 2022, <https://decrypt.co/resources/what-is-the-metaverse-immersive-nft-virtual-worldsnoo>

279 Ariana Grande achieved a viewership of 27 million in *FORTNITE*, Lil Nas X garnered 37 million in *ROBLOX*, and Travis Scott holds the record with a viewership of 45.8 million in *FORTNITE* (Patel, Justin: “Top 10 Most Popular Metaverse Concerts,” *Metaverse Marcom*, November 18, 2022, <https://www.metaversemarcom.io/>).

280 The Fortnite Team: “Gather for the Short Nite Film Festival: Watch Film Shorts in Fortnite’s Party Royale,” *Fortnite*, February 16, 2021, <https://www.fortnite.com/news/gather-for-the-short-nite-film-festival-watch-film-shorts-in-fortnites-party-royale>

dents and teachers to create and use interactive learning environments.²⁸¹ Game designers largely succeed in achieving what many professional software engineers fail to do: they create online worlds where people want to spend time, unlike in Zoom rooms, where users often leave as quickly as possible. With their playful fusion of reality and data space, digital games seem to prefigure effects associated with a future Metaverse.

However, the aspiration to realize the Metaverse has long since left the “magic circle” of digital games. The last decade has seen a breakthrough or transfer from gaming to the industrial sphere. High-tech and media companies such as Meta and Microsoft have invested billions to make the imaginary Metaverse a media reality. Around 2020, a phase of heated hype revealed how these corporations envision their commercial update of Neal Stephenson’s imaginary medium. Technologically, it is to be based on dramatically faster stationary and mobile networking (fiber optic networks, 5G). Its audiovisual worlds are to combine today’s advanced (media) technologies, including virtual and augmented realities, artificial intelligence, and blockchain applications such as cryptocurrencies and Decentralized Finance (DeFi).

Nevertheless, most attempts to implement this have encountered significant challenges. Meta’s Horizon Workrooms combine VR and web technologies, integrating mixed reality desk and keyboard tracking, hand tracking, remote desktop streaming, and spatial audio to deliver an immersive work experience.²⁸² Despite all these efforts, user numbers remained low. As success is not forthcoming—at least not immediately—game expertise is being purchased. For example, Microsoft acquired gaming corporation Activision Blizzard for 68.7 billion dollars at the beginning of 2022 to position itself for an industrial Metaverse.²⁸³

The objective is a complete fusion of reality and virtuality, particularly of real and virtual economies. The activities in these increasingly hyperrealistic software simulations are intended to be linked with those in physical reality to form an

281 N.N.: “Hold a Digital Event in Minecraft,” *Minecraft Education*, 2024, <https://educommunity.minecraft.net/hc/en-us/articles/360047556851-Hold-a-Digital-Event-in-Minecraft>

282 N.N.: “Introducing Horizon Workrooms: Remote Collaboration Reimagined,” *Meta Newsroom*, August 19, 2021, <https://about.fb.com/news/2021/08/introducing-horizon-workrooms-remote-collaboration-reimagined/>

283 Dinsdale, Ryan: “The Microsoft Activision Blizzard Deal: A Complete Timeline of Events,” October 13, 2023, <https://www.ign.com/articles/the-microsoft-activision-blizzard-deal-a-complete-timeline-of-events>

unprecedented unity. In this respect, the ambitions of the digital Metaverse coincide with those of the analog Total Work of Art. Its 19th-century proponents already called not only for transmediality or, in the terminology of their time, the fusion of all the arts. They also wanted to overcome the separation of medium and reality or, in the terminology of their time, the fusion of art and life. Neither of these ambitions could be realized under analog conditions. The Metaverse's evangelists are currently promoting a new attempt at a higher technological level.

The Medialization of Everyday Life. A Summary

The results of this investigation permit the formulation of three conclusions.

Firstly, all three imaginary media—Cyberspace, Holodeck, and Metaverse—reflect the continuous penetration of digital technology into work and entertainment during the transition from an industrial to a digital culture. Culturally, the three visions of future media took on the role of models to emulate, even if their inventors had not necessarily intended them to be entirely positive. The triad profoundly influenced practitioners and theoreticians alike—with a delay of a decade in each case. Cyberspace became a buzzword in the early 1990s, accompanying the rise of the World Wide Web and prefiguring the cultural understanding of digital networking. The fear and fascination of Cyberspace probably most strongly impacted film during its transition from analog to digital production and distribution. The Holodeck has served as a model for the exploration and experimental use of holography and virtual reality since the late 1990s, as well as for the discussion and creation of digital narratives. The Metaverse finally came to the fore in the early 2000s when computer graphics achieved audiovisual hyperrealism, and, above all, participation in online experiences became familiar with the so-called Web 2.0 or social web. As a concept, Stephenson's Metaverse still guides the development of networked online worlds for playful entertainment and, ultimately, work and business.

Secondly, a relationship can be observed between the three imaginary media. This relationship is dialectical and follows the structure of thesis, antithesis, and synthesis. In 1982, William Gibson put forward the thesis: a networked mental world, which he described two years later in his novel *Neuromancer* as a “consensual hallucination.” As such, Cyberspace imagined a counter-reality that affords individuals global immaterial communication and interaction. Gibson's future medium reflected and extended the state of digital networking in the early 1980s, shortly before the establishment of the Internet.

Five years later, in 1989, Gene Roddenberry presented the antithesis in the television series *STAR TREK: THE NEXT GENERATION*. The Holodeck contrasts the

immateriality of global Cyberspace with a non-networked and thus locally limited but materially tangible experience. Users can physically interact with Holodeck's solidly simulated environments and characters as they would in the real world. Roddenberry's future medium reflected and "materialized" the playful and narrative hopes associated with the new audiovisual media of holography and computer graphics in the mid-1980s.

Another five years later, Neal Stephenson produced the synthesis in his novel *Snow Crash*. His Metaverse envisioned a globally networked, persistent virtual counterworld accessible to avatars. i.e., virtual representations of users. In the early 1990s, at the zenith of VR's inaugural surge and shortly before the introduction of the World Wide Web, Stephenson combined the effects of Cyberspace's immaterial networking with the graphic simulation of material reality's three-dimensionality as afforded by the Holodeck. The precondition for Stephenson's synthesis is a higher level of abstraction and its technical implementation: the disembodiment of the users. Only the medialization of their humanity allows for their entry into the Metaverse.

Thirdly, these three imaginary media indicate the historical transition from the scarcity and costliness of entertainment and information, which prevailed in almost the entire analog era, to their digital abundance and affordability up to being free of charge. This change initiates new ways of using audiovisual media. For thousands of years, the basic model was the attendance of individual performances in semi-public spaces, in the theater, at the opera, and in the cinema. This type of use provides a temporary respite from the demands of everyday reality. A second type of use developed in the first half of the 20th century with broadcast media. Radio and television invade the domestic space and overlay everyday life for large parts of the day, but without completely displacing material reality. The cohabitation of media and everyday life and work supplements and partially replaces visits to the theater or cinema. The time spent engaging with media is increasing.

Finally, Cyberspace, Holodeck, and Metaverse introduce and encourage a third type of use, which, only a few years later, becomes a real possibility: the transition from shorter or longer but always intermittent and transient engagement with single media works to comprehensive and enduring immersion in media worlds. These environments no longer serve solely as entertainment, compensating for the prose and deprivations of everyday life. They increasingly function as platforms for gainful employment and professional value creation. The Metaverse thus strives to take over not only the functions of heterotopias such as theaters and cinemas, which provide a temporary escape from reality for recreation and entertainment but also aims to become the new workplace as well as the new living

room—a ubiquitous virtual environment in which all actions leave data traces readable by artificial intelligence.

The first type of reception necessitates the audience to visit a venue. In the second type, the media integrate into the audience's home environment, effectively moving in with them. In the third type, the audience—or rather, the users—immerse themselves in the media, effectively moving into the media.

In this regard, the Metaverse, should it become a reality on the scale of the WWW, would be a meta-medium. David Chalmers posits the emergence of a “Reality+”: online VR worlds in which we can lead “a fully meaningful life.”²⁸⁴ The Metaverse thus entails an existential promise about the future—or an existential threat. In any case, it raises “ultimate questions” requiring new metaphysics.

LITERATURE

Aarseth, Espen: “Genre Trouble: Narrativism and the Art of Simulation,” in: Noah Wardrip-Fruin/Pat Harrigan (eds.), *First Person: New Media as Story, Performance, and Game*, Cambridge, MA: MIT Press 2004, pp. 45-55.

Aarseth, Espen: *Cybertext: Perspectives on Ergodic Literature*, Baltimore MD: Johns Hopkins University Press 1997.

Adhikary, Ishan: “How Many People Are Playing Fortnite? (Player Count 2024),” *Beebom*, May 26, 2024, <https://beebom.com/fortnite-player-count/>

Ascott, Roy: “Gesamtdatenwerk. Connectivity, Transformation and Transcendence [*1989],” in: Timothy Druckey (ed.), *Ars Electronica: Facing the Future* Boston, MA: MIT Press 1999, Reprint, Online: <http://epc.buffalo.edu/584/docs/ascott.html>, pp. 86-89.

Asimov, Isaac: *Foundation*, New York, NY: Gnome Press 1951.

Asimov, Isaac: *Foundation and Empire*, New York, NY: Gnome Press 1952.

Asimov, Isaac: *Second Foundation*, New York, NY: Gnome Press 1953.

Barlow, John Perry: “Crime and Puzzlement: Desperados of the DataSphere,” *Whole Earth Review*, (Fall 1990).

Barlow, John Perry: “A Declaration of the Independence of Cyberspace,” February 8, 1996, <http://www.eff.org/~barlow/Declaration-Final.html>

Bätschmann, Oskar: *Entfernung der Natur: Landschaftsmalerei, 1750-1920*, Cologne: DuMont 1989.

284 Chalmers, David John: *Reality+: Virtual Worlds and the Problems of Philosophy*, New York, NY: W. W. Norton & Company (Kindle Edition) 2022, loc. 162.

- Bazin, André: "The Myth of Total Cinema," in: *What Is Cinema?*, Berkeley, CA: University of California Press 1967-1971 [*1946], pp. 23-27.
- Benjamin, Walter: "Paris, the Capital of the Nineteenth Century [Exposé of 1935]," in: *The Arcades Project*, Cambridge, MA: Belknap Press of Harvard University Press 2002, pp. 3-13.
- Benjamin, Walter: "The Work of Art in the Age of Mechanical Reproduction," in: *Illuminations. Essays and Reflections. Edited and With an Introduction by Hannah Arendt. Preface by Leon Wieseltier*, New York, NY: Schocken Books 2007, pp. 217-252.
- Berners-Lee, Tim: "Information Management: A Proposal," 1989, <http://www.w3.org/History/1989/proposal.html>
- Berners-Lee, Tim/Fischetti, Mark: *Weaving the Web: The Past, Present and Future of the World Wide Web by Its Inventor*, London: Orion Business 1999.
- Bethke, Bruce: "Cyberpunk, Foreword," *Infinity Plus*, 2002 [*1997], <http://www.infinityplus.co.uk/stories/cpunk.htm>
- Binelli, Mark: "Old Musicians Never Die. They Just Become Holograms," *New York Times Magazine*, January 7, 2020, <https://www.nytimes.com/2020/01/07/magazine/hologram-musicians.html>
- Bioy Casares, Adolfo: *The Invention of Morel*, New York, NY: New York Review Books 2003 [*1940].
- Blume, Mary: "Disney Conquers Another World: Design," *International Herald Tribune*, September 27, 1997.
- Boissonnet, Philippe: "Desire for Holographic Effect and Incomplete Gaze," *Archee: revue d'Art en ligne*, <http://archee.qc.ca/ar.php?no=512&page=article>
- Bolter, J. David: "Transference and Transparency: Digital Technology and the Remediation of Cinema," *Revue Intermédialités*, no. 6 (Fall 2006), pp. 13-26.
- Bown, Johnathan/White, Elisa/Boopalan, Akshya: "Chapter 12—Looking for the Ultimate Display: A Brief History of Virtual Reality," in: Jayne Gackenbach/Johnathan Bown (eds.), *Boundaries of Self and Reality Online*, San Diego, CA: Academic Press 2017, pp. 239-259.
- Bradbury, Ray: "The World the Children Made (republished as 'The Veldt')," *Saturday Evening Post*, September 23, 1950, <https://www.studocu.com/en-us/document/fresno-high-school-ca/ap-government/the-veldt-full-text/37724113>
- Bredenkamp, Horst: *The Lure of Antiquity and the Cult of the Machine: The Kunst-kammer and the Evolution of Nature, Art, And Technology*, Princeton, NJ: M. Wiener Publishers 1995.
- Buddemeier, Heinz: *Panorama, Diorama, Photographie. Entstehung und Wirkung neuer Medien im 19. Jahrhundert*, Munich: Fink 1970.

- Bush, Vannevar: "As We May Think," *The Atlantic Monthly*, July 1945, <http://www.theatlantic.com/unbound/flashbks/computer/bushf.htm>
- Bush, Vannevar/Nyce, James M./Kahn, Paul (eds.): *From Memex to Hypertext: Vannevar Bush and the Mind's Machine*, Boston, MA: Academic Press 1991.
- Bye, Ken: "50 years of VR with Tom Furness: The Super Cockpit, Virtual Retinal Display, HIT Lab, & Virtual World Society," *Voices of VR Podcast*, November 17, 2015, <https://voicesofvr.com/245-50-years-of-vr-with-tom-furness-the-super-cockpit-virtual-retinal-display-hit-lab-virtual-world-society/>
- Campbell-Kelly, Martin/Aspray, William: *Computer: A History of the Information Machine*, New York, NY: Basic Books 1996.
- Castronova, Edward: "Virtual Worlds: A First-Hand Account of Market and Society on the Cyberian Frontier," *CEsifo Working Paper Series* no. 618 (December, 2001), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=294828
- Cavallaro, Dani: *Cyberpunk and Cyberculture: Science Fiction and the Work of William Gibson*, London; New Brunswick, NJ; Somerset, NJ: Athlone Press; Distributed in the United States by Transaction Publishers 2000.
- Ceruzzi, Paul E.: *A History of Modern Computing*, Cambridge MA: MIT Press 1998.
- Chalmers, David John: *Reality+: Virtual Worlds and the Problems of Philosophy*, New York, NY: W. W. Norton & Company (Kindle Edition) 2022.
- Chia, Galvin: "Archaeologies of the Future: Visions of the Future in Blockbuster Science Fiction Films, 1980-2016," May 9, 2017, <https://demosjournal.com/article/archaeologies-of-the-future-visions-of-the-future-in-blockbuster-science-fiction-films-1980-2016/>
- Claiborn, Samuel: "NASA Wants to Design a Holodeck. At GDC 2013, NASA presentation claims 'We are the Space Invaders,'" *IGN*, 2013, <http://www.ign.com/articles/2013/03/28/nasa-wants-to-design-a-holodeck>
- Cobb, Jennifer J.: "A Globe, Clothing Itself with a Brain," *Wired*, June 1995, http://www.wired.com/wired/archive/3.06/teilhard_pr.html
- Conroy, Ed: "The History of the Tour of the Universe Spaceship Simulator at the CN Tower," *blogTO*, October 2019, <https://www.blogto.com/city/2020/09/tour-of-the-universe-cn-tower/>
- Davis, Kasia: "Share of Internet Users in Germany from 2001 to 2023," *Statista*, April 24, 2024, <https://www.statista.com/statistics/380514/internet-usage-rate-germany/>
- Desbiens, Jacques: "The Dispositif of Holography," *Arts* 8, no. 1 (2019), pp. 28, <https://www.mdpi.com/2076-0752/8/1/28>.
- Dibbell, Julian: "Nielsen Rates the Net," *Time*, November 13, 1995.
- Dick, Philip K.: *The Simulacra*, New York, NY: Vintage Books 2002 [*1964].

- Dinsdale, Ryan: "The Microsoft Activision Blizzard Deal: A Complete Timeline of Events," October 13, 2023, <https://www.ign.com/articles/the-microsoft-activision-blizzard-deal-a-complete-timeline-of-events>
- Dodson, Aaron: "The Strange Legacy of Tupac's 'Hologram' Lives on Five Years after Its Historic Coachella Debut," *the undefeated.com*, April 14, 2014, <https://theundefeated.com/features/the-strange-legacy-of-tupacs-hologram-after-coachella/>
- Dormehl, Luke: "Today in Apple History: eWorld Closes Its Virtual Doors," *Cult of Mac*, March 9, 2024, <https://www.cultofmac.com/470461/today-in-apple-history-eworld-closes-its-virtual-doors/>
- Doty, William G.: "Introduction: The Deeper We Go, the More Complex and Sophisticated the Franchise Seems, and the Dizzier We Feel," in: William G. Doty/Matthew Kapell (eds.), *Jacking In To the Matrix Franchise: Cultural Reception and Interpretation*, New York, NY: Bloomsbury 2004, pp. 1-12.
- Dyson, George: *Darwin Among the Machines: The Evolution of Global Intelligence*, Reading, MA: Perseus Books 1998.
- Ernst, Christoph/Schröter, Jens: *Media Futures: Theory and Aesthetics*, Cham: Springer Nature 2021, doi:<https://doi.org/10.1007/978-3-030-80488-6>
- Etherington, Darrell: "Nvidia Built a Real Holodeck, Aimed at Creative Collaboration," *Techcrunch.com*, October 10, 2017, <https://techcrunch.com/2017/10/10/nvidia-built-a-real-holodeck-aimed-at-creative-collaboration/>
- Fandom: "Holodeck," 2024, <https://memory-alpha.fandom.com/wiki/Holodeck>
- Flanigan, James: "Technology Is No Mere Sector—It's Our Bedrock," *Los Angeles Times*, July 23, 1995.
- Flusser, Vilém: "A New Imagination," *Artforum* 26 (April 1988), <https://s3.amazonaws.com/arena-attachments/151305/a67bb387e1a69ab010c1b4aaa08918c4.pdf>, pp. 14-15.
- Fogel, Dara: "Life on a Holodeck: What Star Trek Can Teach Us about the True Nature of Reality," in: Jason T. Eberl/Kevin S. Decker (eds.), *The Ultimate Star Trek and Philosophy*, Malden, MA: John Wiley & Sons 2016, pp. 273-287.
- Forster, Edward Morgan: "The Machine Stops," *The Oxford and Cambridge Review*, November 1909, https://www.gutenberg.org/cache/epub/72890/pg72890-images.html#THE_MACHINE_STOPS
- Foster, Hal: *The Anti-Aesthetic: Essays on Postmodern Culture*, Port Townsend, WA: Bay Press 1983.
- Foucault, Michel: "Of Other Spaces: Utopias and Heterotopias," *foucault.info*, 1967, translated from *Architecture, Mouvement, Continuité*, no. 5 (1984), <https://foucault.info/documents/heterotopia/foucault.heteroTopia.en/>, pp. 46-49.

- Freyermuth, Gundolf S.: *Cyberland: Eine Führung durch den High-Tech-Underground*, Berlin: Rowohlt Berlin 1996.
- Freyermuth, Gundolf S.: "Von Utopia bis Vegas," *Tagesspiegel*, November 23, 1997.
- Freyermuth, Gundolf S.: "Holodeck heute," *c't-magazin für computertechnik*, August 30, 1999, http://freyermuth.com/reprints/archiv2008/reprintJMar2008/Holodeck_heute.html, pp. 72-77.
- Freyermuth, Gundolf S.: "Von A nach D. Zwischen Hype und Utopie: Am Horizont der Digitalisierung von Kunst und Unterhaltung lockt das Holodeck," in: Rudolf Maresch/Florian Rötzer (eds.), *Cyberhypes*, Frankfurt/M: Edition Suhrkamp 2001, pp. 213-232.
- Freyermuth, Gundolf S.: "From Analog to Digital Image Space: Towards a Historical Theory of Immersion," in: Burcu Dogramaci/Fabienne Liptay (eds.), *Immersion in the Arts and Media*, Amsterdam: Rodopi 2015, pp. 165-203.
- Freyermuth, Gundolf S.: "Utopian Futures. A Brief History of Their Conception and Representation in Modern Media—From Literature to Digital Games," in: Benjamin Beil/Gundolf S. Freyermuth/Hanns Christian Schmidt (eds.), *Playing Utopia: Futures in Digital Games*, Bielefeld: transcript 2019, pp. 9-65.
- Freyermuth, Gundolf S.: "Vegas, Disney, and the Metaverse: On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century," in: Gundolf S. Freyermuth Benjamin Beil/Hanns Christian Schmidt/Raven Rusch (eds.), *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript 2022, pp. 17-97.
- Friedewald, Michael: *Der Computer als Werkzeug und Medium: Die geistigen und technischen Wurzeln des Personal Computers*, Berlin: GNT-Verlag 1999.
- Friedewald, Michael: "Konzepte der Mensch-Computer-Kommunikation in den 1960er Jahren: J. C. R. Licklider, Douglas Engelbart und der Computer als Intelligenzverstärker," *Technikgeschichte* 67, no. 1 (March 2000), <http://www.friedewald-family.de/Publikationen/TG012000.pdf>, pp. 1-24.
- Galouye, Daniel F.: *Simulacron-3*, New York, NY: Bantam Books 1964.
- Galov, Nick: "15 Facts About The WoW Player Count in 2022," *Web Tribunal*, April 6, 2022, <https://webtribunal.net/blog/wow-player-count/#gref>
- Gelernter, David Hillel: *Mirror Worlds, Or, The Day Software Puts The Universe In A Shoebox—: How It Will Happen And What It Will Mean*, New York, NY: Oxford University Press 1991.
- Gibson, William: "Burning Chrome," *Omni* 4, no. 10 (July 1982), pp. 72-77, 102-107.
- Gibson, William: *Neuromancer*, New York, NY: Ace Books 1984.

- Gilder, George: "Issaquah Miracle," *Forbes ASAP*, June 7, 1993.
- Gleick, James: "Net Losses: Cyberhype Gives Way to Cybergripe in Unexpected Realms," *The New Yorker*, May 22, 1995.
- Gorman, Tom: "Weekend Escape: Las Vegas; The Strip Says, 'Kids, Got Clean Thrills For You, But You Gotta Bring Your Boring Parents. Deal?'," *Los Angeles Times*, November 20, 1994.
- Gottdiener, Mark: *The Theming of America: Dreams, Visions, and Commercial Spaces*, Boulder CO: Westview Press 1997.
- Greener, Rory: "Second Life Storefront User Traffic Jumps 35 Percent in 2021," *XR Today*, January 12, 2022, <https://www.xrtoday.com/virtual-reality/second-life-user-traffic-jumps-35-percent-in-2021/>
- Greenwald, Jeff: "Trumbull's Vision," *Wired*, January 1997, http://www.wired.com/wired/archive/5.01/fftrumbull_pr.html
- Haahr, Mads: "Everting the Holodeck: Games and Storytelling in Physical Space," in: Hartmut Koenitz/Gabriele Ferri/Mads Haahr/Digdem Sezen/Tonguc Ibrahim Sezen (eds.), *Interactive Digital Narrative: History, Theory and Practice*, New York, NY: Routledge, Taylor & Francis Group 2015, pp. 211-226.
- Hafner, Katie: *The Well: A Story of Love, Death, and Real Life in the Seminal Online Community*, New York, NY: Carroll & Graf 2001.
- Hafner, Katie, and John Markoff: *Cyberpunk: Outlaws and Hackers on the Computer Frontier*, New York, NY: Simon & Schuster 1991.
- Harari, Yuval N.: *Sapiens: A Brief History of Humankind*, New York, NY: Harper, Kindle Edition 2015.
- Harari, Yuval N.: *Homo Deus: A Brief History of Tomorrow*, New York, NY: Harper, Kindle Edition 2017.
- Hardesty, Larry: "3-D TV? How about Holographic TV?," *MIT News*, January 24, 2011, <https://news.mit.edu/2011/video-holography-0124>
- Hayles, N. Katherine: *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, Chicago IL.: University of Chicago Press 1999.
- Hayward, Andrew: "What is the Metaverse? The Immersive, NFT-Powered Future Internet," *Decrypt*, February 17, 2022, <https://decrypt.co/resources/what-is-the-metaverse-immersive-nft-virtual-worldsnoo>
- Hegel, Georg Wilhelm Friedrich/Bosanquet, Bernard/Inwood, M. J.: *Introductory Lectures on Aesthetics*, London; New York, NY: Penguin Books 1993 [*1835].
- Hegel, Georg Wilhelm Friedrich/ Miller, Arnold V./Findlay, J. N.: *Phenomenology of Spirit*, Oxford: Clarendon Press 1977 [*1807].

- Heilbroner, Robert L.: *Visions of the Future: The Distant Past, Yesterday, Today, Tomorrow*, New York, NY: Oxford University Press 1995.
- Himanen, Pekka: *The Hacker Ethic, and the Spirit of the New Economy*, New York, NY: Random House 2001.
- HistoryTools: "The Personal Computer Revolution: A Timeline of Innovation and Impact," Accessed June 15, 2024, <https://www.historytools.org/docs/computer-history-timeline-personal-computers-computing-internet>
- Huhtamo, Erkki: "Encapsulated Bodies in Motion: Simulators and the Quest for Total Immersion." in: Simon Penny (ed.), *Critical Issues in Electronic Media*, Albany, NY: State University of New York Press 1995, pp. 159-186.
- Hünigen, James about: "Feelies," *Das Lexikon der Filmbegriffe*, March 29, 2022, <https://filmlexikon.uni-kiel.de/doku.php/f:feelies-2278>
- Huxley, Aldous: "The Outlook for American Culture: Some Reflections in a Machine Age," *Harper's Magazine*, August 1927.
- Huxley, Aldous: *Brave New World*, New York, NY; Evanston, IL: Harper & Row 1946 [*1932].
- Huxley, Julian: "Transhumanism," in: *New Bottles for New Wine*, London: Chatto & Windus 1957, pp. 13-17.
- Jamison, Leslie: "The Digital Ruins of a Forgotten Future," *The Atlantic*, December, 2017, <https://www.theatlantic.com/magazine/archive/2017/12/second-life-leslie-jamison/544149/>
- Johnston, Sean F.: "Whatever Became of Holography?," *American Scientist*, November-December 2011, <https://www.americanscientist.org/article/whatever-became-of-holography>
- Kac, Eduardo: "Beyond the Spatial Paradigm: Time and Cinematic Form in Holographic Art," *Sixth International Symposium on Display Holography*, 1998, <https://www.spiedigitallibrary.org/conference-proceedings-of-spie/3358/0000/Beyond-the-spatial-paradigm--time-and-cinematic-form-in/10.1117/1.2.301482.short?SSO=1>
- Kahney, Leander: "HyperCard Forgotten, but Not Gone," *Wired News*, August 14, 2002, <https://www.wired.com/2002/08/hypercard-forgotten-but-not-gone/>
- Kapell, Matthew: "Introduction: The Significance of the Star Trek Mythos," in: Kapell (ed.), *Star Trek as Myth: Essays on Symbol and Archetype at the Final Frontier* (2010), pp. 1-16.
- Kapell, Matthew (ed.): *Star Trek as Myth: Essays on Symbol and Archetype at the Final Frontier*, Jefferson, NC: McFarland & Co. 2010.
- Kleinrock, Leonard: *Communication Nets; Stochastic Message Flow and Delay*, New York, NY: McGraw-Hill 1964.

- Klevjer, Rune. *What is the Avatar? Fiction and Embodiment in Avatar-Based Singleplayer Computer Games*. PhD Thesis, University of Bergen 2006, https://bora.uib.no/bora-xmlui/bitstream/handle/1956/2234/Dr._Avh_Rune_Klevje.pdf?sequence=1
- Koenitz, Hartmut: *Understanding Interactive Digital Narrative: Immersive Expressions for a Complex Time*, London; New York, NY: Routledge, Taylor & Francis Group 2023.
- Kok, Steven: "The 'Futuristic' Sci-Fi Inventions That Inspired Modern-Day Tech," *The Next Web*, April 8, 2022, <https://thenextweb.com/news/the-futuristic-sci-fi-inventions-inspired-modern-day-tech>
- Kracauer, Siegfried: *Theory of Film: The Redemption of Physical Reality*, New York, NY: Oxford University Press 1960.
- Krauss, Lawrence Maxwell: *The Physics of Star Trek*, New York, NY: Basic Books 1995.
- Krishna, Swapna: "Who is Professor James Moriarty?," *Startrek.com*, March 23, 2023, <https://www.startrek.com/news/who-is-professor-james-moriarty>
- Kumar, Krishan: "Utopia and Technology in the Twentieth Century," *Swiss Review of World Affairs*, March 1993.
- Kushner, David: "Oculus Rift Takes Virtual Reality Mainstream," *IEEE Spectrum*, December 31, 2013, <https://spectrum.ieee.org/oculus-rift-takes-virtual-reality-mainstream>
- LaFrance, Adrienne: "A Search for the Zombie Websites of 1995," *The Atlantic*, April 21, 2017, <https://www.theatlantic.com/technology/archive/2017/04/a-search-for-the-zombie-websites-of-1995/523848/>
- Lawrence, John Shelton: "Introduction: Spectacle, Merchandise, and Influence," in: Matthew Kapell/John Shelton Lawrence (eds.), *Finding the Force of the Star Wars Franchise: Fans, Merchandise, & Critics*, New York, NY: P. Lang 2006, pp. 1-20.
- Lee, Wendy: "Roy Orbison Hologram Concert in L.A.. Invites Awe and Debate," *Los Angeles Times*, October 6, 2018, <https://www.latimes.com/business/hollywood/la-fi-ct-orbison-hologram-20181006-story.html>
- Leiner, Barry M./Cerf, Vinton G./Clark, David D./Kahn, Robert E./Kleinrock, Leonard/Lynch, Daniel C./Postel, Jon/ Roberts, Larry G./Wolff, Stephen: "A Brief History of the Internet," *Internet Society*, 1997, https://www.internetsociety.org/wp-content/uploads/2017/09/ISOC-History-of-the-Internet_1997.pdf
- Lessing, Gotthold Ephraim/Frothingham, Ellen: *Laocoon. An Essay Upon the Limits of Painting and Poetry*, Boston, MA: Roberts Brothers 1874 [1766].

- Lévy, Pierre: *Collective Intelligence: Mankind's Emerging World in Cyberspace*, New York, NY: Plenum Trade 1997.
- Levy, Steven: *Hackers: Heroes of the Computer Revolution*, New York, NY: Dell 1985 [*1984].
- Licklider, J. C. R./Taylor, Robert W.: "The Computer as a Communication Device," *Science and Technology* 76, 1968, <http://www.memex.org/licklider.pdf>, pp. 21-40.
- Lilly, Christopher LaMorte with John. "Computers: History and Development," Jones Telecommunications and Multimedia Encyclopedia, http://www.digitalcentury.com/encyclo/update/comp_hd.html
- Lombardo, Tom: "Science Fiction as the Mythology of the Future," *academia.com*, https://www.academia.edu/1160808/Science_Fiction_as_the_Mythology_of_the_Future
- Lyotard, Jean-François: *The Postmodern Condition: A Report on Knowledge*, Minneapolis, MN: University of Minnesota Press 1984 [*1979].
- Marshall, Andrew: "Suspicion Slows Europe's Hopes," *The WorldPaper Online*, May, 1995.
- Martin, Naomi: "Gesamtkunstwerk—The Total Work Of Art Through The Ages," *Artland Magazine*, <https://magazine.artland.com/gesamtkunstwerk-the-total-work-of-art-through-the-ages/>
- McCracken, Harry: "Time's Machine of the Year, 30 Years Later," *Time*, January 4, 2013, <https://techland.time.com/2013/01/04/times-machine-of-the-year-30-years-later/>
- McEachern, Martin: "Tron 2.0: Twenty Years Later, Tron Re-emerges as an Interactive Experience with Souped-Up Graphics," *Computer Graphics World* 26, no. 7 (July 1, 2003).
- McLuhan, Marshall: *Understanding Media: The Extensions of Man*, Berkeley, CA: Gingko Press (Kindle Edition) 2013 [*1964].
- Moszkowski, Alexander *Die Inseln der Weisheit: Geschichte einer abenteuerlichen Entdeckungsfahrt*, Berlin: F. Fontane & Co. 1922, <https://archive.org/details/dieinselnderweis01mosz/page/n5/mode/2up>
- Moukheiber, Zina: "The Geeks Have Inherited the Earth," *Forbes*, July 7, 1997, https://archive.org/stream/forbes160julforb/forbes160julforb_djvu.txt
- Murch, Walter: "The Future—A Digital Cinema Of the Mind? Could Be," *The New York Times*, May 2, 1999, <http://www.nytimes.com/library/film/050299/future-film.html>
- Murray, Janet Horowitz: *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Cambridge, MA: The MIT Press 2017 [*1997].

- N.N.: "Phenomenal Internet Growth Will Continue," *Business Wire*, September 6, 1995.
- N.N.: "Presskit Star Trek—The Experience," 1999.
- N.N.: "Roddenberry Entertainment Joins Project To Build Real Star Trek-like Holodeck," October 23, 2018, <https://trekmovie.com/2018/10/23/roddenberry-entertainment-joins-project-to-build-real-star-trek-like-holodeck/>
- N.N.: "Introducing Horizon Workrooms: Remote Collaboration Reimagined," *Meta Newsroom*, August 19, 2021, <https://about.fb.com/news/2021/08/introducing-horizon-workrooms-remote-collaboration-reimagined/>
- N.N.: "What Is a Digital Twin?," *Unity*, 2022, <https://unity.com/solutions/digital-twin-definition#history-digital-twin-technology>
- N.N.: "Dimensions in Testimony," *USC Shoah Foundation*, accessed June 16, 2024, <https://sfi.usc.edu/dit>
- N.N.: "Hold a Digital Event in Minecraft," *Minecraft Education*, 2024, <https://educommunity.minecraft.net/hc/en-us/articles/360047556851-Hold-a-Digital-Event-in-Minecraft>
- N.N.: "CompuServe Interactive Services, Inc.," *Company-Histories.com*, <https://www.company-histories.com/CompuServe-Interactive-Services-Inc-Company-History.html>
- Natale, Simone/Balbi, Gabriele: "Media and the Imaginary in History," *Media History* 20, no. 2 (2014), <https://www.tandfonline.com/doi/abs/10.1080/13688804.2014.898904>, pp. 203-218.
- Neuhaus, Wolfgang: "Auf der Suche nach einer "Meta-Dramaturgie" oder: Die Schwerkraft der Erzählung," in: Wolfgang Jeschke (ed.), *Das Science Fiction Jahr Ausgabe 1999*, Munich: Heyne 1999, pp. 520-543.
- Neumann, Alfred Robert: *The Evolution of the Concept Gesamtkunstwerk in German Romanticism*: Microfilm. Ann Arbor, MI, University Microfilms 1951.
- Oettermann, Stephan: *The Panorama: History of a Mass Medium*, New York, NY: Zone Books 1997.
- Patel, Justin: "Top 10 Most Popular Metaverse Concerts," *Metaverse Marcom*, November 18, 2022, <https://www.metaversemarcom.io/>
- Perrin, Andrew, and Maeve Duggan: "Americans' Internet Access: 2000-2015," *Pew Research Center*, June 26, 2015, <https://www.pewresearch.org/internet/2015/06/26/americans-internet-access-2000-2015/>
- Pine, B. Joseph/Gilmore, James H.: *The Experience Economy: Work is Theatre & Every Business a Stage*, Boston, MA: Harvard Business School Press 1999.
- Pirr, Uwe: "Zur technischen Geschichte des Rundumblicks. Vom Panoramagemälde zur interaktiven Virtuellen Realität," in: Martin Warnke/Wolfgang

- Coy/Georg Christoph Tholen (eds.), *HyperKult: Geschichte, Theorie und Kontext digitaler Medien*, Basel; Frankfurt/M: Stroemfeld 1997, pp. 291-330.
- Pizzanelli, Daniel J.: "The Evolution of the Mythical Hologram," *Proceedings of the SPIE. The International Society for Optical Engineering* (1992), pp. 430-437.
- Popper, Frank: *Art of the Electronic Age*, New York, NY: Harry N. Abrams 1993.
- Press, Gil: "How Many People Play Roblox—User and Growth Stats in 2024," *WhatsheBigData.com*, 2024, <https://whatsthebigdata.com/roblox-users/>
- Rheingold, Howard: *Virtual Reality*, New York, NY: Summit Books 1991.
- Rheingold, Howard: "Total Immersion. Douglas Trumbull's Big Budget VR," *Wired*, November 1993, <http://www.wired.com/wired/archive/1.05/luxor.html>
- Ritchie, Hannah/Mathieu, Edouard/ Roser, Max/Ortiz-Ospina, Esteban: "Internet," *OurWorldInData.org*, 2023, <https://ourworldindata.org/internet>
- Robertson, Adi: "When the Virtual City of Cybertown Went Dark, Its Citizens Rebuilt It," *The Verge*, April, 2022, <https://www.theverge.com/23032658/cybertown-revival-blaxxun-virtual-community-rebuilding-project>
- Rolfe, J. M./Staples, K. J.: *Flight Simulation*, Cambridge [Cambridgeshire]; New York, NY: Cambridge University Press 1986.
- Roser, Max: "The Internet's History Has Just Begun," *OurWorldInData.org*, October 3, 2018, <https://ourworldindata.org/internet-history-just-begun>
- Rosnay, Joël de: *The Symbiotic Man: A New Understanding of the Organization of Life and a Vision of the Future*, New York, NY: McGraw-Hill 2000 [*1995].
- Rubin, Judith: "Are You Experienced? Landmark Entertainment, Paramount Parks, and a Galaxy of Artisans Beam Aboard the \$70 Million Star Trek Extravaganza at the Las Vegas Hilton," *TCI (Theatre Crafts International)*, April 1998.
- Russell, Peter: *The Global Brain: Speculations on the Evolutionary Leap To Planetary Consciousness*, Los Angeles, CA; Boston, MA: J.P. Tarcher; Distributed by Houghton Mifflin 1983.
- Ryan, Marie-Laure: "Beyond Myth and Metaphor: The Case of Narrative in Digital Media," *Game Studies*, July 2001, <https://www.gamestudies.org/0101/ryan/>
- Sargent, Lyman Tower: *Utopianism: A Very Short Introduction*, Oxford: Oxford University Press 2010.
- Scheinin, Richard: "Through the Looking Glass: 'Virtual Realities' Can Take Us Into Other Worlds," *Chicago Tribune*, February 18, 1990.
- Schiller, Friedrich: "An die Freunde," *Literaturwelt*, 1803, <http://www.literaturwelt.com/werke/schiller/an-die-freunde.html>

- Schrage, Michael: "Cyberpunk and the Future of Technology," *Los Angeles Times*, April 19, 1990.
- Schröter, Jens: *3D. Zur Geschichte, Theorie und Medienästhetik des technisch-transplanen Bildes*, Munich: Fink 2009.
- Schröter, Jens: "Das Holodeck als Leitbild," in: Luise Feiersinger (ed), *Scientific Fiction: Inszenierungen der Wissenschaft zwischen Film, Fakt und Fiktion*, Berlin: De Gruyter 2018, pp. 90-99.
- Schröter, Jens: *3D: History, Theory, and Aesthetics of the Transplane Image*, New York, NY: Bloomsbury 2014.
- Selinger, Evan: "Why I Won't Clap for a Hologram," *Medium.com*, November 29, 2018, <https://onezero.medium.com/why-i-wont-clap-for-a-hologram-705cd2e9cef4>
- Sezen, Tonguc Ibrahim: "Beyond the Holonovel. The Holographic Interactive Digital Entertainment Utopia of Star Trek," in: Benjamin Beil/Gundolf S. Freyermuth/Hanns Christian Schmidt (eds.), *Playing Utopia: Futures in Digital Games*, Bielefeld: transcript 2019, pp. 187-207.
- Sklar, Robert: *Movie-Made America: A Cultural History of American Movies*, New York, NY: Vintage Books 1976.
- Smith, Adam: *An Inquiry into the Nature and Causes of the Wealth of Nations*, Amsterdam et al.: MetaLibri 2007 [*1776], https://www.ibiblio.org/ml/libri/s/SmithA_WealthNations_p.pdf
- Sorene, Paul: "Jaron Lanier's EyePhone: Head and Glove Virtual Reality in the 1980s," *flashbak*, November 24, 2014, <https://flashbak.com/jaron-laniers-eyephone-head-and-glove-virtual-reality-in-the-1980s-26180/>
- Sottek, T. C.: "To Build a Holodeck: An Exclusive Look at Microsoft's Edison Lab," *The Verge*, December 29, 2011, <http://www.theverge.com/2011/12/28/2665794/microsoft-edison-lab-holodeck-tour>
- Staff, Startrek.com: "Meet the Man Behind the Holodeck, Part I," *Startrek.com*, March 11, 2014, <https://www.startrek.com/article/meet-the-man-behind-the-holodeck-part-1>
- Staten, James: "America Online Stinging from Its Growing Pains," *MacWeek*, September 25, 1995.
- Staten, James: "NetTraffic," *MacWeek*, December 28, 1995.
- Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.
- Steuer, Jonathan: "Defining Virtual Reality: Dimensions Determining Telepresence," *Journal of Communication* 42, no. 4 (1992), <https://steinhard.tapps.es.its.nyu.edu/create/courses/2015/reading/steuer.pdf>, pp. 73-93.

- Stevens, Tim: "Project Holodeck and Oculus Rift hope to kickstart every gamers' VR dream for \$500," *Engadget*, July 23, 2012, <http://www.engadget.com/2012/07/23/project-holodeck-and-oculus-rift/>
- Stinson, Liz: "For \$95,000 You Can Create Your Own Princess Leia Hologram," *Wired*, November 15, 2013, <https://www.wired.com/2013/11/for-95000-you-can-create-your-own-princess-leia-hologram/>
- Stock, Gregory: *Metaman: The Merging of Humans and Machines into a Global Superorganism*, New York, NY: Simon & Schuster 1993.
- Sutherland, Ivan Edward: "A Head-Mounted Three Dimensional Display," *AFIPS '68 (Fall, part I): Proceedings of the December 9-11, 1968, fall joint computer conference, part I*, 1968, <https://www.cise.ufl.edu/research/lok/teaching/ve-s07/papers/sutherland-headmount.pdf>, pp. 757-764,
- Sutherland, Ivan Edward: "The Ultimate Display," in: Randall Packer/Ken Jordan (eds.), *Multimedia: From Wagner to Virtual Reality*, New York, NY: Norton 2001 [*1965], pp. 232-236.
- Swain, Bob: "Specialley Effective Fun: Interactive Movies," *The Guardian*, August 25, 1994.
- Team, The Fortnite: "Gather for the Short Nite Film Festival: Watch Film Shorts in Fortnite's Party Royale," *Fortnite*, February 16, 2021, <https://www.fortnite.com/news/gather-for-the-short-nite-film-festival-watch-film-shorts-in-fornites-party-royale>
- Teilhard de Chardin, Pierre: "From the Pre-Human to the Ultra-Human: The Phases of a Living Planet," in: Teilhard de Chardin, *The Future of Man* (1964 [*1951]), pp. 290-298.
- Teilhard de Chardin, Pierre: *The Phenomenon of Man*, New York, NY: Harper 1965 [*1938-1940].
- Thomas, Bob: *Walt Disney: An American Original*, New York, NY: Hyperion 1994.
- Tyrell, Blake Wm.: "Star Trek as Myth and Television as Mythmaker," in: Kapell (ed.), *Star Trek as Myth: Essays on Symbol and Archetype at the Final Frontier* (2010), pp. 19-28.
- Valéry, Paul: "The Conquest of Ubiquity," in: *The Collected Works of Paul Valéry*, Princeton, NJ: Princeton University Press 1956, pp. 225-226.
- Varricchio, Mario: "Power of Images/Images of Power in Brave New World and Nineteen Eighty-Four," *Utopian Studies* (January 1, 1999).
- Vaz, Mark Cotta/Duignan, Patricia Rose: *Industrial Light & Magic: Into the Digital Realm*, New York, NY: Ballantine Books 1996.

- Wagner, Richard: "The Art-Work of the Future," in: *The Art-Work of the Future, and Other Works*, Lincoln, NE; London: University of Nebraska Press 1993 [*1850], pp. 69-213.
- Weinbaum, Stanley Grauman: "Pygmalion's Spectacles," *Wonder*, June 1935, <https://www.gutenberg.org/files/22893/22893-h/22893-h.htm>
- Whitfield, Stephen E./Roddenberry, Gene: *The Making of Star Trek*, New York, NY: Ballantine Books 1968.
- Wikipedia: "Terminator (franchise)," *Wikipedia*, 2023, [https://en.wikipedia.org/wiki/Terminator_\(franchise\)](https://en.wikipedia.org/wiki/Terminator_(franchise))
- Wikipedia: "Battlestar Galactica," 2024, https://en.wikipedia.org/wiki/Battlestar_Galactica
- Wikipedia: "Mad Max," 2024, https://en.wikipedia.org/wiki/Mad_Max
- Wikipedia: "Star Trek," 2024, https://en.wikipedia.org/wiki/Star_Trek
- Wiktorin, Dorothea/Vossen, Joachim: "Virtuelle Stadt—die neue globale Stadt. Auf dem Weg zur CyberCity," *Praxis Geographie* 31 (2001), pp. 12-16.
- World Bank Group: "Individuals Using the Internet," *data.worldbank.org*, https://data.worldbank.org/indicator/IT.NET.USER.ZS?end=2022&most_recent_value_desc=false&start=1960&view=chart.
- Youngblood, Gene: *Expanded Cinema*, New York, NY: Dutton 1970.

FILMOGRAPHY (INCL. MOVIE RIDES)

- 2001: A SPACE ODYSSEY (USA 1968, D: Kubrick, Stanley)
- A TOUR OF THE UNIVERSE (Toronto 1985-1992, O: Trumbull, Douglas)
- AVATAR (USA 2009, D: Cameron, James)
- BLADE RUNNER (USA 1982, D: Scott, Ridley)
- CLOSE ENCOUNTERS OF THE THIRD KIND (USA 1977, D: Spielberg, Steven)
- ELEMENTARY, DEAR DATA—STAR TREK: THE NEXT GENERATION, Season 2, Episode 3 (USA 1988, D: Bowman, Rob)
- ENCOUNTER AT FARPOINT—STAR TREK: THE NEXT GENERATION, Season 1, Episode 1 (USA 1987, D: Allen, Corey)
- EXISTENZ (CA/UK 1999, D: Cronenberg, David)
- FAHRENHEIT 451 (UK 1966, D: Truffaut, François)
- FORBIDDEN PLANET (USA 1956, D: Wilcox, Fred M.)
- FUTUREWORLD (USA 1976, D: Heffron, Richard T.)
- GHOST IN THE SHELL (Japan 1995, D: Oshii, Mamoru)
- HOW WILLIAM SHATNER CHANGED THE WORLD (USA 2005, D: Jones, Julian)

- IN SEARCH OF THE OBELISK (Las Vegas Luxor Hotel & Casino 1993-2004, O: Trumbull, Douglas, and Arish Fyzee)
- JOHNNY MNEMONIC (USA 1995, D: Longo, Robert)
- LAWNMOWER MAN 2: BEYOND CYBERSPACE (USA 1996, D: Mann, Farhad)
- MINORITY REPORT (USA 2002, D: Spielberg, Steven)
- MOSCOW-CASSIOPEIA (UDSSR 1974, D: Viktorov, Richard)
- READY PLAYER ONE (USA 2018, D Spielberg, Steven)
- RETURN OF THE JEDI (USA 1983, D: Marquand, Richard)
- SHIP IN A BOTTLE—STAR TREK: THE NEXT GENERATION, Season 6, Episode 12 (USA 1993, D: Singer, Alexander)
- SILENT RUNNING (USA 1972, D: Trumbull, Douglas)
- SPACE BATTLESHIP YAMATO (JP 1974-1975, O: Leiji Matsumoto, Yoshinobu Nishizak and Eiichi Yamamoto)
- STAR TREK (USA 1966-1969, O: Gene Roddenberry)
- STAR TREK: DEEP SPACE NINE (USA 1993-1999, O: Rick Berman and Michael Piller)
- STAR TREK: DISCOVERY (USA 2017-2024, O: Bryan Fuller, Alex Kurtzman)
- STAR TREK: FIRST CONTACT (USA 1996, D: Frakes, Johnatan)
- STAR TREK: GENERATIONS (USA 1994, D: Carson, David)
- STAR TREK: INSURRECTION (USA 1998, D: Frakes, Jonathan)
- STAR TREK: NEMESIS (USA 2002, D: Baird, Stuart)
- STAR TREK: PICARD (USA 2020-23, O: Akiva Goldsman, Michael Chabon, Kirsten Beyer, Alex Kurtzman)
- STAR TREK: THE ANIMATED SERIES (USA 1973-64, O: Gene Roddenberry)
- STAR TREK: THE NEXT GENERATION (USA 1987-1994, O: Gene Roddenberry)
- STAR TREK: THE EXPERIENCE (Las Vegas Hilton 1998-2008, O: Landmark Entertainment)
- STAR TREK: VOYAGER (USA 1995-2001, O: Rick Berman, Michael Piller and Jeri Taylor)
- STAR TOURS (Disneyland 1987-2010, O: Lucas, George, and Disney Imagineers)
- STAR WARS: A NEW HOPE (USA 1977, D: Lucas, George)
- STAR WARS: EPISODE I – THE PHANTOM MENACE (USA 1999, D: Lucas, George).
- STAR WARS: EPISODE II – ATTACK OF THE CLONES (USA 2002, D: Lucas, George)
- STRANGE DAYS (USA 1995, D: Bigelow, Kathryn)
- THE BIG GOODBYE—STAR TREK: THE NEXT GENERATION, Season 1, Episode 12 (USA 1988, D: Scanlan, Joseph L.)
- THE BOUNTY—STAR TREK: PICARD, Season 3, Episode 6 (USA 2023, D: Liu, Dan)
- THE CREATOR (USA 2023, D: Edwards, Gareth)

THE EMPIRE STRIKES BACK (USA 1980, D: Kershner, Irvin)
THE LAWNMOWER MAN (USA 1992, D: Leonard, Brett)
THE MATRIX (USA 1999, D: Lana Wachowski, Lilly Wachowski)
THE MATRIX RELOADED (USA 2003, D: Lana Wachowski, Lilly Wachowski)
THE MATRIX RESURRECTIONS (USA 2021, D: Lana Wachowski, Lilly Wachowski)
THE MATRIX REVOLUTIONS (USA 2003, D: Lana Wachowski, Lilly Wachowski)
THE PRACTICAL JOKER—STAR TREK: THE ANIMATED SERIES (USA 1974, D: Reed, Bill)
THE THIRTEENTH FLOOR (USA 1999, D: Rusnak, Josef)
TRON (USA 1982, D: Lisberger, Steven)
WESTWORLD (USA 1973, D: Crichton, Michael)

GAMOGRAPHY

APEX LEGENDS (Electronic Arts 2019, O: Respawn, Entertainment)
ASSASSIN'S CREED (Ubisoft 2007, O: Ubisoft, Montreal)
COMMAND & CONQUER: RED ALERT (Virgin Interactive 1996, O: Westwood, Studios)
CRYSIS 2 (Electronic Arts 2011, O: Crytek)
CYBERTOWN (IVN 1995, O: Hawk, S. F. X.)
FORTNITE (Epic Games 2017, O: Epic Games, People Can Fly)
HALO: REACH (Microsoft Game Studios 2010, O: Bungie)
HORIZON ZERO DAWN (Sony Interactive Entertainment 2017, O: Guerrilla, Games)
MAZE WAR (NASA Ames Research Center 1974, O: Steve Colley, Greg Thompson, and Howard Palmer)
METAL GEAR SOLID 2: SONS OF LIBERTY (Konami 2001, O: Kojima Productions, Hideo Kojima)
MOONDUST (Creative Software Inc. 1983, O: Lanier, Jaron)
MUD (University of Essex 1978, O: Roy Trubshaw, Richard Bartle)
ROBLOX (Roblox Corporation 2006, O: Roblox, Corporation)
SECOND LIFE (Linden Lab 2003, O: Rosedale, Philip)
STAR OCEAN (Square Enix 1996, O: Enix, tri-Ace)
WORLD OF WARCRAFT (Blizzard Entertainment 2004, O: Kaplan, Jeff; Pardo, Rob; Chilton, Tom)

Imaginations

The Metaverse and Other Digital Delusions

JANET H. MURRAY

When in October 2021, Facebook CEO Mark Zuckerberg announced the change of his company's name to Meta and its new emphasis on creating a 'Metaverse' it marked a period of increased investment in augmented and virtual reality technologies and applications and a burst of excited predictions about the new experiences. The explanatory videos that supported Meta's announcement were not, however, very specific, and by Fall 2022, when the final *Clash of Realities* Symposium was held, they had still not gained specificity, though investments continued to grow and overheated promises continued to proliferate. The emptiness of the descriptions at that time spoke louder than the large sums of money being invested, and they turned out to be a better predictor of the immediate future. By Spring 2023, the Metaverse hype had been replaced by an equal level of greed, excitement, and fear over AI, as a result of the surprising coherence of Chat GPT responses. The Metaverse-related lay-offs came sooner than even I expected when I delivered the original version of this essay as a slide talk in Fall 2022.

One of the best clues that there was no actual product in sight was the way in which the corporate rhetoric and visual evocations of the future 'Metaverse' emphasized immediate and total satisfaction. For example, here is the beginning of Zuckerberg's original Metaverse presentation:

"Desktop to web to phones, from text to photos to video. But this isn't the end of the line. The next platform and medium will be even more immersive, an embodied internet where you're in the experience, not just looking at it, and we call this the metaverse. And you're going to be able to do almost anything you can imagine, get together with friends and family,

work, learn, play, shop, create as well as entirely new categories that don't really fit how we think about computers or phones today.”¹

The promise of “almost anything you can imagine” is a promise of nothing in particular, but with unlimited gratification. As a design brief, it leads nowhere, and as a promise to consumers, it is a perfect set-up for disappointment.

Figure 1: Meta's The Metaverse and How We'll Build It Together (2021)



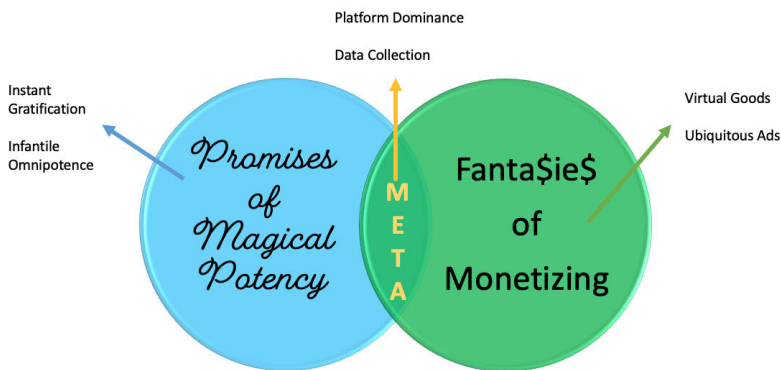
Source: Screenshot from <https://www.youtube.com/watch?v=Uvufun6xer8>

Though the promise is for “almost anything you can imagine,” the imagination of the self-appointed builders of the Metaverse in 2021 was strikingly limited. The intro video of simulated future Metaverse interactions shows people represented as avatars, meeting around a table to play a card game (see Figure 1) or working in simulated office spaces. To the extent that exciting things are happening, the interactions have not been thought through concretely. For example, the first ‘wow’ moment is an avatar of one of Zuckerberg’s co-workers floating in the air and then another one somersaulting backwards. But of course, this exciting weightlessness is not something that the person operating the avatar would be able to actually enjoy because they are not physically transported to this magical world,

1 Emphasis added, “Meta Connect Conference Video,” transcription from <https://www.rev.com/blog/transcripts/meta-facebook-connect-2021-metaverse-event-transcript>, visited October 2, 2022.

but only viewing it on a headset. Later videos in the “Metaverse: Are We There Yet?” series take the form of an interviewer and a Meta executive taking a car ride through an imaginary space, enjoying a passing spectacle. The videos pointedly leave out the passengers’ headsets, obscuring the boundary between the real and the (simulated) virtual. The message is clear: the Metaverse is magical, beyond the limits of the physical world, and the people selling it have not given thought to how to build it.

Figure 2: Map of the Metaverse 2022



Source: Janet H. Murray

In fact, Meta’s projected Metaverse can be summarized by the Figure 2 Venn diagram. Claims for the Metaverse, in general, as a commercial target in 2021-22 are at the intersection of magical potency promised to consumers and omnipresent marketing promised to ‘brands.’ The 2021 Meta version of this hype is at the intersection of these two pipe dreams and takes the shape of proprietary control over the ‘next internet, and the devices that will offer access to it. The corporate goal is to create an even more intrusive and pervasive platform than Facebook, one that will literally get us where we live—but also where we work and where we travel in between those venues—in order to collect even more specialized and marketable information and ad-targeting information than they can with their current platforms. This vision of expanded platform dominance and ad revenue was the heart of the large investment, the magical wish the corporation dreamed of fulfilling. The buzzword ‘Metaverse’ turned that wish for unlimited revenue into something that sounded like a place, an actual destination.

As many commentators pointed out, the notion of a magically gratifying ‘Metaverse’ is particularly odd since the term and the original concept from Neal Stephenson’s dystopian *Snow Crash*,² in which mega-corporations like Facebook/Meta are depicted as forces for evil, and the Metaverse is a vastly different experience depending on your wealth. But it is even more important to note that the Metaverse in that book, in which you can have exciting adventures by navigating your avatar through a parallel geography complete with its own discos and supervillains and vehicles and weapons, is wholly fictional, an invention of a novelist. But, as we have seen before, there is an easy progression from a fictional technology to an aspirational technology to a delusional technology.

Figure 3: “Fragments” Microsoft HoloLens demo 2016



Source: Screenshot from <https://youtu.be/m6Wndguve8U>

In a 2015 *Clash of Realities* keynote titled “How Close Are We to the Holodeck,”³ I traced the progression from Gene Dolgoff’s actual and highly limited holograms to Gene Rodenberry’s entrancing imaginary Holodeck, a recurring fictional technology in the STAR TREK universe, starting in 1974, to the embrace of a holodeck as an aspirational technology, a ‘holy grail,’ by early AI and VR researchers starting in the 1980s, and then to the assertion that ‘The Holodeck Is Here!’ by the manufacturers and reviewers of early consumer VR and AR headsets in 2015 and

2 Cf. Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.

3 Murray, Janet H.: “How Close Are We to the Holodeck,” in: *Clash of Realities* (ed.), *Clash of Realities 2015/16: On the Art, Technology and Theory of Digital Games. Proceedings of the 6th and 7th Conference*, Bielefeld: transcript 2017, p. 29-43.

2016. But the Holodeck was not here. It was just intensely wished-for and hallucinated on top of much more limited technology. For example, the HoloLens promotional video of 2016 showed a digital image of a person sitting on a real-life couch next to a real-life user (Figure 3). The actual experience of that application was far less impressive because the limited field of view presented slices of the image, which was clearly a pre-recorded video projection rather than a character open to interaction.

Figure 4: Magic Leap Promotional Video 2015



Source: Screenshot from <https://www.facebook.com/watch/?v=1426631567381322>

In 2014, one ‘Metaverse’ company, appropriately named “Magic Leap,” conflated reality and fiction by hiring Neal Stephenson himself as “Chief Futurist.” Magic Leap, which remains in business in 2023 without having released a mass consumer product, has raised billions of dollars from venture capitalists lured by the promise of a new technical approach capable of projecting a more powerful illusion into real space. The company’s highly successful 2015 demo offered the amazing spectacle of a huge three-dimensional whale dramatically splashing down in an elementary school gym where children—not wearing headsets—sit astonished (see Figure 4). This is, of course, an impossible effect and not in keeping with the headset-based experience they were actually building. As anticipation grew from the spectacle of the concept video, the company avoided describing any particular application it intended to deliver. The internal story is no doubt very complex, but

the failure of Magic Leap could have been predicted from the disconnect between fantasies of spectacular immersion and a lack of mechanics of interaction.

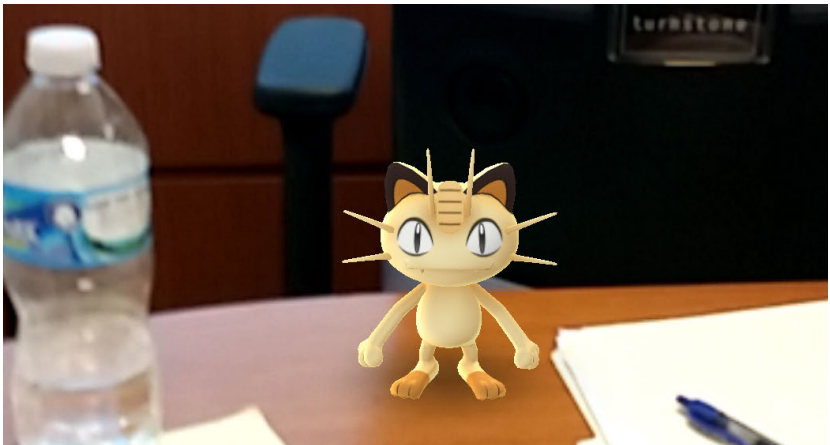
By contrast, a successful application for the HoloLens was ROBORAID (see Figure 5), in which the headset has the doable task of mapping a virtual effect to a blank wall in the space of the interactor, something that can be seen in its entirety from a suitable distance. The wall seems to crack, and whimsically drawn invaders come at the interactor, who has a simple point-and-click device for zapping them.

Figure 5: Microsoft HoloLens ROBORAID 2016



Source: Screenshot from <https://youtu.be/Hf9qkURqtbM>

Figure 6: Niantic POKÉMON GO 2016

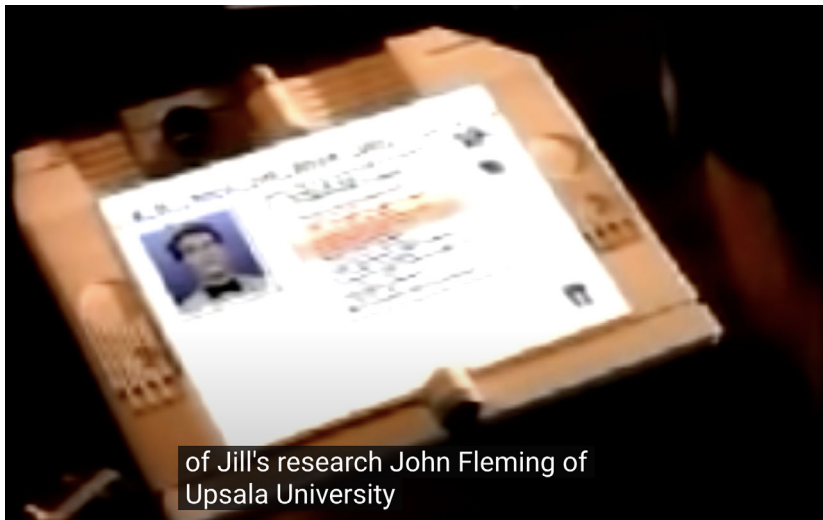


Source: Screenshot from gameplay by J. Murray

Like the wildly popular POKÉMON GO application of the same era (Figure 6), which ran on the limited displays of smartphones, the size of the virtual creature and the simplicity of the gesture (shooting a missile or ‘collecting’ the Pokémon by essentially taking its picture superimposed on the real world) provides an appropriately transparent interaction.

The truly magical illusion of a fanciful creature in real space is created because the interaction matches the modest, specific affordances of the actual technology. Interaction design has replaced spectacle. I have called this focused work “inventing the medium,” and noted that it is a collective effort and it involves utilizing known media conventions and inventing new ones.⁴ There is no way to shortcut this process because it is iterative as platforms mature to serve emerging genres. The first vocalizations of hominids did not mark the invention of a language. The invention of the motion picture camera was not the same as the invention of the movies, which is based on a ‘language of cinema,’ which demands editing and closeup lenses and acting innovations and new meanings for visual juxtapositions like ‘establishing shots.’

Figure 7: Apple’s “Knowledge Navigator” concept video 1987



of Jill's research John Fleming of
Upsala University

Source: Screenshot from <https://www.youtube.com/watch?v=umJsITGzXd0>

4 Cf. Murray, Janet H.: *Inventing the Medium: Principles of Interaction Design as a Cultural Practice*, Cambridge, MA: MIT Press 2012.

The emptiness of the demo videos for Meta can be compared with another futuristic concept video, Apple’s “Knowledge Navigator” of 1987 (see Figure 7).⁵ The Apple video is fanciful and unrealistic in many ways, but it is built around a very specific set of tasks within one master user scenario, and it proposes a specific interface for performing those tasks. A professor is preparing a lecturing which requires him to look up scientific journal articles, manipulate data, video conference with a colleague in another country, and screens all on a single tablet-like instrument. All of this is mediated by a servant-like digital assistant with a bowtie who also fends off phone calls from the professor’s mother. Despite the absurdities and cultural gaffs of the personified assistant framework and the irritating arrogance of the professor, the basic concepts of the video are impressively timeless. As a vision piece, it is a good guide to the next decades worth of innovation in platforms and applications because it is focused on a task that fits the affordances of the medium, though they will later take the form of Google searches and Zoom calls.

By contrast, Meta’s Metaverse demo videos are replete with confusing animations and devoid of specific tasks. There are somersaults and levitations, rides through cluttered landscapes, and mockups of avatar-based corporate meetings, but none of them offers a persuasive case for doing something meaningful that improves on the opportunities of the actual physical world or existing technologies.⁶ The depiction of Zuckerberg’s own avatar opened him up to considerable ridicule on social media. The roll-out showed little evidence that Meta/Facebook was connecting mixed reality with real-life problems any better than they did when Zuckerberg notoriously offered an offensive combination of ‘product promotion’ and ‘disaster tourism’ after the 2017 hurricane disaster in Puerto Rico.⁷

By 2022, there were some more reality-based promotional videos on the site, built on the commercially available Quest VR headsets (built by the Oculus team

5 Cf. Mac History: “Apple Knowledge Navigator Video (1987).” *Mac History*. March 4, 2012. YouTube video, 5:45, <https://www.youtube.com/watch?v=umJsITGzXd0>

6 Cf. Zuckerberg, Marc: “The Metaverse and How We’ll Build It Together. Connect 2021.” *Meta*. October 28, 2021, YouTube video, 01:17:26, <https://www.youtube.com/watch?v=Uvufun6xer8>

7 Cf. Solon, Olivia: “Mark Zuckerberg ‘tours’ Flooded Puerto Rico in Bizarre Virtual Reality Promo,” *The Guardian*, October 9, 2017, <https://www.theguardian.com/technology/2017/oct/09/mark-zuckerberg-facebook-puerto-rico-virtual-reality#:~:text=Mark%20Zuckerberg%20'tours'%20flooded%20Puerto%20Rico%20in%20bizarre%20virtual%20reality%20promo,-The%20Facebook%20CEO's&text=A%20cartoon%20version%20of%20Facebook's,disaster%20tourism%2C%20part%20product%20promotion>

acquired by Facebook in 2014). One showed a bicyclist gathering a team from disparate locations for a virtual race. The riding of a bicycle in a virtual landscape is a staple of screen-focused exercise equipment, as is the internet-enabled synchronization of sessions with multiple gamers or bike-riders. Another persuasive application on the site was the convening of Parkinson's disease patients for ping-pong matches, using VR to expand their range of motion.⁸ These demonstrations work because there are actual target users, simple demands on the interface, an existing platform with specific affordances, and, very importantly, because they build upon the framework of a game.

The game framework is, of course, key to the coherence of these applications, as it is to POKÉMON GO and ROBORAID because games restrict expectations from "anything you can imagine" to a very limited and carefully ritualized set of actions. Games give designers a way of evaluating whether or not what they are building works. Do the players know what to do? Can they win? Do two players have the same understanding of the state of the game? Games, in general, are excellent frameworks for synchronizing human/computer interactions because they make human responses highly predictable and allow computer systems to be reliably responsive. People gathering to play sports online within very limited rule structures (e.g., ride this bike over this shared virtual path; send this ping-pong ball over the net within the fixed boundaries of this shared virtual table) fit this pattern. By contrast, the card game in the 2021 Metaverse demo is just set decoration, an excuse for the group to gather around a virtual table but disconnected from the spotlighted magical interactions of somersaulting avatars.

What makes empty demos so appealing? The Magic Leap apologists, like other Silicon Valley entrepreneurs, often rebutted skepticism with the famous remark of science fiction writer Arthur C. Clarke that "Any sufficiently advanced technology is indistinguishable from magic."⁹ This adage does capture the excitement and wonder of the changes brought about by the digital revolution in processing speed, capacity of storage, miniaturization, and programming virtuosity, bringing us space exploration, word processing, laptop computers, autopiloted planes, videogames, cell phones, wireless data transmission, etc. It has been hard to predict what is fantasy and what is next year's reality, but these innovations do

8 Cf. Meta Quest: "Ping Pong Parkinson | Meta Quest." *Meta Quest*. June 30, 2022, YouTube video, 2:33, <https://www.youtube.com/watch?v=77jd00IQj34>

9 Clarke, Arthur C.: "Hazards of Prophecy: The Failure of Imagination," in: *Profiles of the Future: An Inquiry into the Limits of the Possible*, New York, NY: Harper & Row 1962, pp. 17-32.

not arrive by magic but by documented collective processes of design and discovery. And in the 2000s, I would propose that Clarke's observation can be usefully reversed: "Any sufficiently desired magic is likely to be mistaken for a real new technology."

Meta's announcement of an impending Metaverse with the change of name for the global social media giant Facebook and the accompanying huge financial investment set off an international conversation about the potential delights and disasters that the Metaverse might bring. As an academic expert, I was asked to be on panels and interviewed by media sites, and I found myself repeatedly reminding interviewers that "There is no such thing as 'the Metaverse.'" The more people talked about it, the more money was invested in it, the more it took on the power of a globally shared hallucination. The effect, I pointed out, was similar to the delusions that crypto-currency was based on something of value. It was the seduction of wish-fulfillment fantasy dressed up with technological jargon. It was a blank canvas for projecting fears that were displaced from actual dangers in the current social media world, such as Facebook's lack of action against democracy-endangering and medically lethal disinformation. We are very ready to believe in magical effects when they are accompanied by hand-waving about technical breakthroughs and when they chime with our deepest wishes and fears.

There seems to be a repetitive cycle in which overinflated claims for a magic technology create unrealistic expectations, which go unmet, discouraging investment in the actual slow-growing medium of VR or AR, until the next wave of technological hand-waving invokes the same volatile mixture of polymorphous desire wedded to impatient greed. The promotional media are telling as a clue to the ratio between design thinking and wishful thinking in the company's agenda. For example, a staple of the corporate promotion of magical digital illusion is a large sea creature that appears superimposed over the real world (for mixed or augmented reality) or threateningly close in a VR application. The spectacle carries the day, creating excitement even without any indication of interaction. But when these big images are delivered inside a headset, they lose their charm when all you can do is look at them. The power of the spectacle lies in the novelty of the new headset or proposed magical platform—but novelty grows old very quickly.

The cycle went particularly quickly in the case of Meta's investment in the Metaverse, with the collapse of expectations and the withdrawal of investment coinciding with the rise of a new focus for magical expectation: 'sentient' chatbots. In spring 2022, a Google employee, Blake Lemoine, told the *Washington*

Post that he believed an AI system he was charged with testing was now sentient.¹⁰ The claim was fanciful, and Lemoine was fired, but a year later, the delusion became more general when the public was able to access the Large Language Model AI chatbot, Chat-GPT. Although many computer scientists explained that the program had no knowledge of the actual world,¹¹ its ability to mimic the rhetoric of human discourse, from rhyme patterns to scholarly articles, made it an eerie simulacrum of a human conversational partner.

The same fear of missing out on a new technology, the same assumption that something imaginary was actually realized that had fueled the Metaverse bubble now attached itself to the prospect of human-level intelligence and even sentience in computer programs. This is an aspiration with a history that goes back to the very beginnings of the modern computer. As early as 1943, Alan Turing and Claude Shannon were imagining an electronic “brain” that could prove its intelligence through chess playing.¹² By 1950, the year of the first realized actual modern digital computer, Turing published his famous paper proposing an adaptation of a gender-based “Imitation Game” as the touchstone for achieving human-like intelligence in the machine.¹³

It is significant that from the dawn of computer science, games were proposed as the testing ground for human-like intelligence in machines. As I have argued elsewhere,¹⁴ games have a special role in the history of media because, our delight in synchronized behavior—the core pleasure of gaming—underlies all media invention. We know, for example, that in infant development the emergence of language is preceded by games like peek-a-boo, and other ritualized and joy-inducing behaviors between the baby and the family member or other responsive person.

10 Cf. Tiku, Nitasha: “The Google Engineer Who Thinks the Company’s AI Has Come to Life,” *The Washington Post*, June 11, 2022, <https://www.washingtonpost.com/technology/2022/06/11/google-ai-lamda-blake-lemoine/>

11 Cf. for example, Marcus, Gary: “How Come GPT Can Seem So Brilliant One Minute and So Breathtakingly Dumb the Next?,” *Substack: Marcus on AI*, December 1 2022, <https://garymarcus.substack.com/p/how-come-gpt-can-seem-so-brilliant>

12 Hodges, Andrew: *Alan Turing: The Enigma*, New York, NY: Simon and Schuster 1983.

13 Cf. Turing, Alan: “Computing Machinery and Intelligence,” *Mind*, no. 59 (1950), pp. 433-460, <http://www.loebner.net/Prizef/TuringArticle.html>

14 Cf. Murray, Janet H.: *Inventing the Medium: Principles of Interaction Design as a Cultural Practice*, Cambridge, MA: MIT Press 2012; Murray, Janet H.: “Toward a Cultural Theory of Gaming: Digital Games and Co-evolution of Media, Mind and Culture,” *Popular Communication* 4, no. 3 (2006), https://web.archive.org/web/20160305151448id_/http://homes.lmc.gatech.edu/~murray/PC0403_Murray.pdf

Developmental psychologists refer to this stage of development as the creation of a joint attentional scene, a common focus of interest.¹⁵ And the motivation for focusing attention on the same actions and items and sequences is the intrinsic pleasure of synchronizing our behavior with one another, which provides evidence of the presence of other minds that share a common perceptual and social world with oneself. This pleasure forms the basis of complex social patterns, including the invention/acquisition of language—the association of vocalizations with entities and actions in the external world and eventually with the feelings and concepts generated subjectively by lived experiences. All media reflect our delight in sharing the experience of consciousness, of creating the ‘shared attentional scenes’ that are the basis of games. The paradigm is even stronger with computers, which have been constructed as logical ‘thinkers’ and potential companions from the beginning of the digital revolution. Computational artifacts, unlike earlier media forms, can represent the opponent (or teammate) as well as the gameboard. And when they respond to us in plausible human language, the illusion of companionship becomes all the stronger.

How do we defend against the credulity we are all vulnerable to because of our deeply rooted longings for magical gratification and connection? We can remember that the activity of inventing a medium is a collective effort of establishing conventions and genres, and that this effort cannot be short-circuited by the excitement of early spectacle presentations. The test of a new application is the interaction pattern. And games, with their very specific interaction patterns, can be a fertile ground for the growth of viable conventions that will lead, not to a magical Metaverse, but to more coherent and functional AR and VR applications.

A good example of magical powers that have been productively instantiated by specific gameplay into a coherent, repeatable convention is the Gravity Glove in *HALF-LIFE: ALYX* (2020).¹⁶ The Gravity Glove adds a magical impetus to hand gestures in virtual reality. For example, it causes something you reach for to leap into your hand. This corresponds to our magical wishes for telekinesis, our Jedi knight power to control objects beyond our reach, and it also suits the affordances of gesture tracking in current platforms. The Gravity Glove provides a simple mechanic for this effect and operationalizes it with an appropriately ritualized gesture that synchronizes input through the VR controller with the behavior of the virtual target object. Because it works so well, the mechanic has been generalized into a

15 Cf. Tomasello, Michael: *The Cultural Origins of Human Cognition*, Cambridge, MA: Harvard University Press 1999.

16 Cf. PC Gamer: “We Love Half-Life: Alyx’s Gravity Gloves.” *PC Gamer*. March 25, 2020, YouTube video, 3:08, https://www.youtube.com/watch?v=g_PQB6JRIIU

public ‘asset’ in the Unity store, a property that can be attached to objects in any Unity-based VR game. It has moved from a cool feature of a single game to a potentially robust and ubiquitous convention of the VR medium. When we create a shared convention like the Gravity Glove, we are expanding the space of shared attention between human and machine and contributing to a shared language of expression within an evolving medium.

The Knowledge Navigator exemplifies a useful concept video, which may get the individual mechanics wrong but correctly identifies a large design space of meaningful tasks suitable for further development. The Gravity Glove is an example of a specific small but generalizable convention of interaction, a building block of design in virtual space. In order to create an actual ‘Metaverse’ or ‘Holodeck,’ we would need to establish the real tasks worth creating and then set about the hard work of building up the platforms with specific building blocks of feasible interaction design. We create a new medium application by application, convention by convention, in response to specific tasks performed by actual interactors. We need a very specific and limited magic, which is only coherent within the greater collective enterprise of building up meaningful genres of representation. At the moment, we do not have a ‘Metaverse,’ but we do have VR and AR and ‘mixed reality’ platforms that can continue to co-evolve with the creation of specific applications.

Corporate leaders will likely repeat the cycle of grandiose expectations leading to disappointment, with periods of windfall funding followed by funding withdrawals in waves of waxing and waning delusional excitement. It is good for designers, educators, and scholars to remain detached from the immediate cycles and focus on the long-term possibilities of the medium. In the end, it is only the design of specific meaningful applications that can yield the transparent conventions that will translate the inchoate desire for magical gratification into a stable and expressive new medium of representation.

LITERATURE

Clarke, Arthur C.: “Hazards of Prophecy: The Failure of Imagination,” in: *Profiles of the Future: An Inquiry into the Limits of the Possible*, New York, NY: Harper & Row 1962, pp. 17-32.

Hodges, Andrew: *Alan Turing: The Enigma*, New York, NY: Simon and Schuster 1983.

- Marcus, Gary: "How Come GPT Can Seem So Brilliant One Minute and So Breathtakingly Dumb the Next?" in: *Substack: Marcus on AI*, December 1, 2022, <https://garymarcus.substack.com/p/how-come-gpt-can-seem-so-brilliant>
- Murray, Janet H.: "How Close Are We to the Holodeck," in: Clash of Realities (ed.), *Clash of Realities 2015/16: On the Art, Technology and Theory of Digital Games. Proceedings of the 6th and 7th Conference*, Bielefeld: transcript 2017, pp. 29-43.
- Murray, Janet H.: *Inventing the Medium: Principles of Interaction Design as a Cultural Practice*, Cambridge, MA: MIT Press 2012.
- Murray, Janet H.: "Toward a Cultural Theory of Gaming: Digital Games and Co-evolution of Media, Mind and Culture," *Popular Communication* 4/3 (2006), https://web.archive.org/web/20160305151448id_/http://homes.lmc.gatech.edu/~murray/PC0403_Murray.pdf
- Solon, Olivia: "Mark Zuckerberg 'tours' Flooded Puerto Rico in Bizarre Virtual Reality Promo," *The Guardian*, October 9, 2017, <https://www.theguardian.com/technology/2017/oct/09/mark-zuckerberg-facebook-puerto-rico-virtual-reality#:~:text=Mark%20Zuckerberg%20'tours'%20flooded%20Puerto%20Rico%20in%20bizarre%20virtual%20reality%20promo,->
- Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.
- Tiku, Nitasha: "The Google Engineer Who Thinks the Company's AI Has Come to Life," *The Washington Post*, June 11, 2022, <https://www.washingtonpost.com/technology/2022/06/11/google-ai-lambda-blake-lemoine/>
- Tomasello, Michael: *The Cultural Origins of Human Cognition*, Cambridge, MA: Harvard University Press 1999.
- Turing, Alan: "Computing Machinery and Intelligence," *Mind*, no. 59 (1950), pp. 433-460, <http://www.loebner.net/Prizef/TuringArticle.html>

VIDEOS

- Mac History: "Apple Knowledge Navigator Video (1987)." *Mac History*. March 4, 2012. YouTube video, 5:45, <https://www.youtube.com/watch?v=umJsiTGzXd0>
- Meta Quest: "Ping Pong Parkinson | Meta Quest." *Meta Quest*. June 30, 2022, YouTube video, 2:33, <https://www.youtube.com/watch?v=77jd00lQj34>
- PC Gamer: "We Love Half-Life: Alyx's Gravity Gloves." *PC Gamer*. March 25, 2020, YouTube video, 3:08, https://www.youtube.com/watch?v=g_PQB6JRIIU

Zuckerberg, Marc: “The Metaverse and How We’ll Build It Together—Connect 2021.” *Meta*. October 28, 2021, YouTube video, 01:17:26, <https://www.youtube.com/watch?v=Uvufun6xer8>

GAMES

HALF-LIFE: ALYX (Valve 2020, O: Valve)

POKÉMON Go (Niantic 2016, O: Niantic)

ROBORAID (Microsoft 2016, O: Microsoft)

Incarnations of the Metaverse in Science Fiction

LARS SCHMEINK

Ever since Mark Zuckerberg announced a rebrand of his company and the shift in investment towards the next big leap in technology, the concept of the Metaverse is no longer just an obscure science fiction (sf) reference that crypto fans throw around to indicate some future evolution of information technology. Instead, the Metaverse now “owns real estate in the heads of every single technologist, future-thinker, and CNBC-watcher who wants to understand how to capitalize on the next phase of the Internet,”¹ as one of the many business advisory books on the subject points out. The term has become the “buzzword of 2022,”² with Zuckerberg proclaiming the technological teleology of changing media forms:

“We’ve gone from desktop to web to phones, from text to photos to videos. But this isn’t the end of the line. The next platform and medium will be even more immersive, an embodied internet where you’re in the experience, not just looking at it.”³

But as with a lot of commentary on the Metaverse, Zuckerberg is light on the actual definition of what he means or the origin of the concept in a science fiction novel.

The idea of the Metaverse is plucked directly from Neal Stephenson’s novel *Snow Crash* (1992), where the material world has turned into dystopia and people

1 Terry, QuHarrison/Keeney, Scott: *The Metaverse Handbook: Innovating for the Internet’s Next Tectonic Shift*. Hoboken, NJ: Wiley 2022, p.18.

2 Ibid., p. 19.

3 Meta: “The Metaverse and How We’ll Build It Together—Connect 2021,” *Meta*, October 28, 2021, <https://www.youtube.com/watch?v=Uvufun6xer8>

escape into the virtual world represented by the Metaverse. As Gundolf S. Freyermuth has pointed out, the novel’s Metaverse combines “global digital networking”—i.e., the mapping of material reality onto the digital for aspects of commerce, work, the social—“with a material experience of virtuality,”⁴ i.e., being able to fully immerse oneself into and embody the experience. Current explorations by tech companies and creators, though not yet fully realized, are both more extensive and less clear-cut than merely a virtual world parallel to ours. Instead, the Metaverse will encompass hard- and software aspects; it consists of protocols as much as content or communication.⁵ Taking this and especially the wide variety of applications into account, in the most comprehensive attempt to date, Matthew Ball defines the Metaverse as follows:

“A massively scaled and interoperable network of realtime rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments.”⁶

Problematically, big tech’s efforts to create closed-off virtual worlds and proprietary hardware and services currently lead the charge in development, which would entrench corporate control and ownership of the Metaverse, including our personal data. As Mark van Rijmenam warns, just like in *Snow Crash*, a closed Metaverse “will very likely result in a dystopian nightmare, that we should avoid at all cost.”⁷ The better option, van Rijmenam argues, would be an open, “evolving, decentralized, and creator-driven ecosystem”⁸ that is beneficial to society.

Given its origin in science fiction, the development of the Metaverse is deeply linked to its cultural representation. Functioning as a “shared vision,” sf provides

-
- 4 Freyermuth, Gundolf S.: “Vegas, Disney, and the Metaverse: On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century,” in: Beil, Benjamin et. al (eds.), *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript 2022, pp. 17-89, here p. 84.
 - 5 Cf. Ball, Matthew: “The Metaverse: What It Is, Where to Find It, and Who Will Build It,” January 13, 2020, <https://www.matthewball.vc/all/themetaverse>
 - 6 Ball, Matthew: *The Metaverse: And How It Will Revolutionize Everything*. New York, NY: Liveright 2022, eBook, ch. 3.
 - 7 van Rijmenam, Mark: *Step into the Metaverse: How the Immersive Internet Will Unlock a Trillion-Dollar Social Economy*, Hoboken, NJ: Wiley 2022, p. xxix.
 - 8 *Ibid.*, p. 16.

engineers and developers with what Jim Karknias has called “hieroglyphs—simple, recognizable symbols on whose significance everyone agrees,”⁹ which then set in motion creative processes of innovation in a market of ideas. Stephenson’s Metaverse is one such hieroglyph and has inspired the current technological boom. But even though Stephenson coined the term and created a specifically powerful version of the Metaverse, he wasn’t the first sf author to explore similar ideas: William Gibson’s cyberspace or Star Trek’s holodeck provide obvious related concepts.¹⁰ In fact, all of these incarnations exist within the sf “megatext,” which, according to Sherryl Vint, “reveals the way that sf explicitly refers back to earlier instances of itself, each text adding to and playing with the larger body of signs, images, and scenarios that make up sf’s shared world.”¹¹ Considering the projected impact of the Metaverse on the evolution of the Internet and our social, cultural, and economic futures, in what follows, I want to look at the different incarnations of the Metaverse in the science-fictional megatext and explore how they developed the idea in different, meaningful ways.

I EARLY INCARNATIONS OF LIVING IN THE MACHINE

Not quite a virtual reality yet, but already presenting the concept of living mainly through screens and aided by machines, the first incarnation of the idea that would later develop into the Metaverse, I argue, can be found in E. M. Forster’s short story “The Machine Stops” (1909). Forster’s imagined world is not so much a

9 Jim Karknias, no original source given, quoted in: Stephenson, Neal: “Innovation Starvation,” *Wired*, October 27, 2011, <https://www.wired.com/2011/10/stephenson-innovation-starvation/>

10 Gibson’s cyberspace is discussed below. The holodeck was popularized in *STAR TREK: THE NEXT GENERATION* (1987-94). It is Metaverse-adjacent technology featuring a physical room in which an immersive virtual reality can be projected, but one that is neither persistent nor shared beyond the confines of the holodeck itself. It showcases Star Trek’s “post-scarcity utopia,” reflecting late 20th-century technological optimism and daily life enmeshing with computer technologies. See Chambers, Amy C./Skains, R. Lyle, “Science and Technology,” in: Garcia-Siino, Leimar/Mittermeier, Sabrina/Rabitsch, Stefan (eds.), *The Routledge Handbook of Star Trek*, New York, NY: Routledge 2021, pp. 348-56, here p. 350.

11 Vint, Sherryl: *Science Fiction*, London: Bloomsbury 2014, p. 57. The term “megatext” was coined by Damien Broderick (*Reading by Starlight: Postmodern Science Fiction*. New York, NY: Routledge 1995).

description of virtuality but of the shift towards “electronic communications technology. With its early vision of the allure and danger of global, networked communication, the story is in direct conversation with classic cyberpunk¹² and thus with concepts such as cyberspace and the Metaverse. In the story, humanity has left material reality behind and now lives in hive-like structures underground, each person inhabiting a cell that is a separate, closed-off, parallel reality in that the Machine provides full remote control of all aspects of life. First-hand experiences and human encounters have been replaced by telepresence and telecommunication. The Machine’s services go beyond information, though, as food, hygiene, and shelter are all taken care of—that is, the parallel reality created is not just virtual but also very much material. Nonetheless, as Alf Segert has remarked, the informational reality, “the visual and auditory images provided by the Machine” can be seen as “a striking analogue for ‘being connected’ in contemporary cyberculture,”¹³ as Forster is mainly interested in the intellectual life and interhuman communication the machine allows.

Vashti, one of the main characters, knows “several thousand people,” as the story points out, as “in certain directions, human intercourse had advanced enormously.”¹⁴ All of Vashti’s social interactions—her communication, the lectures she gives, the concerts she attends—are done via telepresence, in Marshall McLuhan’s sense, extending the body through mediation.¹⁵ What is important to note here is that the Machine “did not transmit nuances of expression. It only gave a general idea of people—an idea that was good enough for all practical purposes.”¹⁶ Forster’s story here anticipates the problem that interactions lose complexity, as “our presence in the world”¹⁷ is mediated through an interface. As our experiences

12 Berger, Rachel. “The Horror of Direct Experience: Cyberpunk Bodies and ‘The Machine Stops.’” *SFRA Review* 54.3 (2020): pp. 37-44, here p. 37.

13 Segert, Alf: “Technology and the Fleshly Interface in Forster’s ‘The Machine Stops’: An Ecocritical Appraisal of a One-Hundred Year Old Future.” *The Journal of Ecocriticism* 2.1 (2010): pp. 33-54, here p. 34.

14 Forster, E. M.: “The Machine Stops,” in: Barnes, Douglas M./Egford R. F. (eds.), *Twentieth Century Short Stories*. Cheltenham: Harrap 2001 [1959], pp. 126-167, here p. 126.

15 McLuhan, Marshall: *Understanding Media: The Extensions of Man*, London: Sphere 1967 [1964]. Given the experiences of the COVID-19 pandemic and the lockdowns, scholars have commented on the “fresh urgency” of Forster’s vision; see R. Berger, “The Horror of Direct Experience,” p. 37.

16 E. M. Forster, “The Machine Stops,” p. 129.

17 Zimmermann, Ana Cristina/Morgan, W. John: “E. M. Forster’s ‘The Machine Stops’: Humans, Technology and Dialogue.” *AI & Society* 34.1 (2019): pp. 37-45, here: p. 42.

with video conference tools such as Zoom or Skype (and their issues with granularity, lagging, noise overlays, etc.) make clear, the “type of mediation” we have for our presence is key to whether or not our experience in the world will be “enrich[ed] or impoverish[ed].”¹⁸ The Metaverse, as Zuckerberg promises, will allow us to experience virtual reality with what Ball refers to as “a sense of presence.”¹⁹ In a transhumanist sense, this virtual presence allows our bodies to become extended, to expand and enrich our experience with the world. Poignantly, Segert sees a similar argument to be made for the Machine, as “technology becomes a mode of awareness in itself, something so pervasive that it infiltrates the very shape of our world-view.”²⁰ In his view, humans have co-evolved with their technologies, integrated them into the way they interact with the world so seamlessly that they do not even notice them anymore—this happened to Vashti with the Machine, and it will happen to us with new virtual experiences such as the Metaverse: “The immediacy humans once felt only through gross physical contact now in many respects has given way to virtualized interactions that now feel just as immediate.”²¹ In this regard, “The Machine Stops”, for the first time, imagines the way that the Metaverse will replace large parts of our physical interactions via technological surrogacy.

How alluring such a surrogate world can be is the topic of another early 20th-century short story. “Pygmalion’s Spectacles” (1935), by Stanley G. Weinbaum, features the invention of a pair of goggles, which from today’s perspective seem “magical VR-like”²² in that they provide a projected image, which is sensory-enhanced through technology: “I add taste chemically and sound electrically. [...] I electrolyze the solution, the story, sight, sound, smell, taste and all.”²³ Protagonist Burke puts on these spectacles and loses himself in the story that they provide—the narrative, focalizing his perception, suggests that the user of the goggles is free to explore the projected, fantastical world, interact with it and its inhabitants as he pleases. While Burke starts off aware of “the miserable hotel room” he is in and that the fantasy world is a mere “illusion,”²⁴ his perception soon changes. He becomes immersed, accepting the reality presented by the goggles, his mind tricking

18 Ibid.

19 M. Ball: *The Metaverse*, ch. 3.

20 A. Segert: “Technology and the Fleshly Interface,” p. 41.

21 Ibid., p. 44.

22 M. Ball: *The Metaverse*, ch. 1.

23 Weinbaum, Stanley G.: “Pygmalion’s Spectacles,” in: *A Martian Odyssey*, London: Sphere 1977, pp. 116-34, here p. 118.

24 Ibid., p. 119.

him into experiencing touch and, ultimately, volition, though in the end, what he experienced was pre-recorded, “pre-programmed” for interaction.

What is interesting here, aside from the immediately noticeable hardware set-up of VR goggles, is that Weinbaum foresaw the human desire to explore virtual worlds as fantasy and escape, as well as their very real impact. Burke’s experience has him so enthralled with Galatea, the beautiful young woman he meets in the virtual world, that he falls in love and later experiences emotions of loss when he returns to his world and the hotel room. As Ball remarks, “as our online experiences become more ‘real,’ we place more of our real lives online, live more of our lives online, and human culture overall becomes more affected by the online world,”²⁵ suggesting that virtual reality is linked and interwoven with material reality. In fact, Herman Narula suggests that the Metaverse is not merely a few virtual worlds built for entertainment but rather provides “a structure of multiple worlds that permits value exchange between them.”²⁶ He stresses the cultural function and the transfer of value and meaning between worlds as central to the idea—something Weinbaum explored in 1935 by having his protagonist feel the impact of his virtual experiences in the material world.

II 1980s CYBERPUNK: DEFINING CYBERSPACE

The interconnection of the virtual and real world becomes a central motif in the texts of proto- and early cyberpunk in the late 1970s and early 1980s, when computer networks became more widely known and used and when sf authors explored the potential and risk of this technology. While other sf authors have picked up on ideas related to Weinbaum’s immersive virtual world,²⁷ the breakthrough

25 M. Ball: *The Metaverse*, ch. 3.

26 Narula, Herman: *Virtual Society: The Metaverse and the New Frontiert of Human Experience*, New York, NY: Currency 2022, eBook, here ch. 1.

27 Matthew Ball (*The Metaverse*, ch. 1) suggests stories by Ray Bradbury (“The Veldt,” 1950), Philip K. Dick (“The Trouble with Bubbles,” 1953) and Isaac Asimov (*The Naked Sun*, 1956). Svante Lovén (*Also Make the Heavens: Virtual Realities in Science Fiction*, Uppsala: Uppsala University 2010) discusses Frederick Pohl’s “The Tunnel under the World” (1955), Daniel F. Galouye’s novel *Simulacron-3* (1964), and two novels by Dick (*Time out of Joint* [1959] and *The Three Stigmata of Palmer Eldritch* [1964]). I would add Dick’s novel *Do Androids Dream of Electric Sheep* (1968), which uses a specific virtual reality in its inhabitation of the religious martyrdom of Mercer. Depending on how widely one defines virtual worlds, there will be more examples.

text of virtual reality is undoubtedly Vernor Vinge's novella "True Names" (1981), which has been lauded for its introduction to and inspiration of a slew of innovations in computer technology (such as individually customizable avatars, software agents, real-time immersive environments, social media, the importance of cryptography and many more).²⁸ In fact, Vinge's story has been so central to key figures of early cyberculture, such as members of the Electronic Frontier Foundation and the Cypherpunks, that it was considered "required reading"²⁹ in these groups and was used to build these online communities with cryptographic protocols gleaned from its pages.³⁰

In "True Names," Vinge imagines a global interconnected computer network that is represented via a virtual reality called the "Other Plane," and which is accessed by users through a device like an EEG, the "Portal's five sucker electrodes,"³¹ a web of input/output devices attached to the skull to manipulate brain activity. In the story, a hacker named Mr. Slippery is blackmailed by the government into fighting the Mailman, another hacker who later turns out to be an artificial intelligence, for control over the global virtual network and its databases (i.e., the digital infrastructure that runs the real world). Several aspects of the story and its description of the Other Plane make it the first true representation of what Ball, Zuckerberg, and others would come to consider the Metaverse.

First, the story highlights the ubiquity of networked computer systems in that "ninety-eight percent of the jobs in modern society involved some use of a data set,"³² as well as showing users socializing online, thus anticipating how the Metaverse—just as the Internet now—is used globally and encompassing both economic and social aspects of our reality. In fact, as Janet Abbate points out, Vinge was visionary expressly because he "saw the potential for what we would

28 Abbate, Janet: "True Risks? The Pleasures and Perils of Cyberspace," in: Ferro, David L./Swedin, Eric G. (eds.), *Science Fiction and Computing: Essays on Interlinked Domains*, Jefferson, NC: McFarland 2011, pp. 189-204.

29 Milburn, Colin: "Activism," in: McFarlane, Anna/Murphy, Graham J./Schmeink, Lars (eds.), *The Routledge Companion to Cyberpunk*, New York, NY: Routledge 2020, pp. 373-81, here p. 376.

30 May, Timothy C.: "True Nyms and Crypto Anarchy," in: Frenkel, James (ed.), *True Names and the Opening of the Cyberspace Frontier*, New York, NY: Tor 2001, pp. 33-86, here p. 38.

31 Vinge, Vernor: "True Names," in: Frenkel, James (ed.), *True Names and the Opening of the Cyberspace Frontier*, New York, NY: Tor 2001, pp. 239-330, here p. 250. A longer discussion on interface devices and their representation follows below.

32 Ibid. p. 248.

now call social networking.”³³ Moreover, the story points out the potential and necessity for (some of) these interactions to be anonymous or screened behind a curated image. For Vinge, government regulation of data was the enemy of the hackers, highlighting the need for securing personal information and how all “political power is inherently flawed, and when it becomes over-centralized [...] it becomes downright dangerous.”³⁴ And while Vinge saw the government as over-reaching on data control and collection, not large corporate entities, the story nonetheless emphasizes concerns with privacy regulation and the threat of identity theft, as well as the general principles of surveillance capitalism.³⁵

Second, the story is the first to use avatars—i.e., interactive representations “in place of, indeed as direct *extensions* of, the spectator”³⁶—though the term itself was only popularized over ten years later by Stephenson. Avatars in the story are not mere reflections of the user; they are “a reservoir that can be filled with your own desires, intentions, and goals”³⁷ and fully curated to look and act as the user sees fit, even beyond the laws of physics (i.e., given the ability to fly). Vinge foresaw that customization, especially the aspect of becoming “more powerful, attractive, or exotic than one’s real physical body,”³⁸ would appeal to users—thus anticipating a central feature of already existing Metaverse worlds such as games and a key aspect that monetization is built upon, allowing the use and transference of special appearances. Meta, for example, promises different options to stylize one’s avatars depending on a need for verisimilitude—from a hyperrealistic image of the user for business, cartoon-versions of oneself for social events, to fantastical representations in game environments.³⁹ How much a reflection of ourselves we

33 J. Abbate: “True Risks?,” p. 194.

34 Doubinsky, Sébastien: “Vernor Vinge,” in: McFarlane, Anna/Murphy Graham J./Schmeink, Lars (eds.), *Fifty Key Figures in Cyberpunk Culture*, New York, NY: Routledge 2022, pp. 241-46, here p. 243.

35 Cf. Zuboff, Shoshana: *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, New York, NY: PublicAffairs 2019.

36 Rehak, Bob: “Playing at Being: Psychoanalysis and the Avatar,” in: Wolf, Mark J. P./Perron, Bernard (eds.), *The Video Game Theory Reader*, New York, NY: Routledge 2003, pp. 103-27, here p. 103.

37 Gee, James Paul: “Video Games and Embodiment,” *Games and Culture* 3.3-4 (2008), pp. 253-63, here p. 259.

38 J. Abbate: “True Risks?,” p. 194.

39 Cf. Meta: “The Metaverse.” To showcase this, Zuckerberg attends a conference call in the Metaverse as a cartoon-version of himself, while another co-worker is shown as a realistic (filmed) image of herself and yet another is represented as a red robot.

see in the avatar is important to how we perceive our agency in the virtual realm, as we “invest an acted-on object [the avatar] with the characteristics of an acting subject [ourselves].”⁴⁰

Lastly, related to the issue of customizable avatars, “True Names” describes the virtual world via the imagery of fantasy: Hackers are warlocks and witches, the community is a coven, programs they enact are spells, and their own server is entered through a magical gate. Envisioning the Metaverse as a fantasy world further speaks to our ability to explore different identities online, but it also highlights that everything within the virtual world is a construct of the mind, that “*every object in cyberspace is a magical object*”⁴¹ imbued with meaning by consensus of its users. As Abbate makes clear: “Using magical analogies is no more childish or irrational than using the metaphor of a ‘trashcan’ or ‘file folder’ to represent locations on a personal computer.”⁴² In this, Vinge’s *Other Plane* provides an important precursor to the fantastical worlds of today’s online gaming, such as *WORLD OF WARCRAFT*, *MINECRAFT*, *ROBLOX*, or *FORTNITE*, which can be seen as driving forces behind the development of the Metaverse and will comprise a large part of its multi-world makeup.

It is interesting to note that aside from these game worlds, Vinge’s fantasy-inspired imaginary has not become the standard metaphor for computer systems. Instead, a concept introduced by William Gibson in his story “Burning Chrome” (1982) and fully explored in his debut novel *Neuromancer* (1984) has provided a more lasting imaginary of IT systems: the city grid. Sabine Heuser has pointed out how Gibson is inspired by the way that skyscrapers allow for a “vantage point for surveying the ‘city as a vast map,’ with its various networks of streets and traffic patterns forming an abstract grid.”⁴³ It is this grid and its conception as abstracted geometry that shapes the way computer systems are imagined and represented. While Disney visualized computer-generated game grids in *TRON* (Lisberger, 1982),⁴⁴ Gibson coined the term “cyberspace” for a much broader concept with a similar visual:

40 B. Rehak, “Playing at Being,” p. 107.

41 Pesce, Mark: “True Magic,” in: Frenkel, James (ed.), *True Names and the Opening of the Cyberspace Frontier*, New York, NY: Tor 2001, pp. 221-38, here p. 230.

42 J. Abbate: “True Risks?,” p. 193.

43 Heuser, Sabine: *Virtual Geographies: Cyberpunk at the Intersection of the Postmodern and Science Fiction*, Amsterdam: Rodopi 2003, p. 52; Heuser here quotes David Nye from his book *American Technological Sublime* (1994).

44 While *TRON* seems like a strong influence on cyberspace, Gibson could not have seen the film before writing “Burning Chrome.” But the connection between video games

“A consensual hallucination experienced daily by billions of legitimate operators [...] A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding.”⁴⁵

In *Neuromancer*, Gibson describes the economic and political infrastructure (the databases of Vinge’s Other Plane) as geometrical shapes creating a cityscape of digital architecture: “the stepped scarlet pyramid of the Eastern Seaboard Fission Authority burning beyond the green cubes of Mitsubishi Bank of America, and high and very far away he saw the spiral arms of military systems.”⁴⁶ In another scene, this metaphor is extended to all of the Eastern US and information as traffic, as data packets become pixels on a digital map: “At a hundred million megabytes per second, you begin to make out certain blocks in midtown Manhattan, outlines of hundred-year-old industrial parks ringing the old core of Atlanta.”⁴⁷ The idea of representing global information networks via grids and geometric objects speaks to our cognitive limitations in grasping the complexity of these systems—mathematics suggests rules, control, and ultimately power over data, thus pushing the idea that users are fully aware of how these systems work.

By mapping the digital onto a city grid, Scott Bukatman argues, Gibson reveals the “need for new cartographic strategies, as well as new sources of vision”⁴⁸ to make sense of a world in which digital data and materiality are connected. The extended metaphor of a world beyond the screen, of city- and cyberspace overlaying each other, is probably Gibson’s most important observation of our lives becoming digital. In one of the most quoted remarks in all of cyberpunk culture, Vint has noted how “the material and the simulated are intertwined like a Möbiüs [sic] strip: they each have distinct identities, but we never inhabit a moment that is

and virtual worlds has persisted, making the grid one of the most important visual representations of cyberspace in gaming. Cf. Johnson, Mark R.: “The History of Cyberspace Aesthetics in Video Games,” in: Murphy, Graham J./Schmeink, Lars (eds.), *Cyberpunk and Visual Culture*, New York, NY: Routledge 2018, pp. 139-54.

45 Gibson, William, *Neuromancer*, New York, NY: Ace 1984, p. 51.

46 Ibid. p. 52.

47 Ibid. p. 43.

48 Bukatman, Scott: *Terminal Identity: The Virtual Subject in Postmodern Science Fiction*, Durham, ME: Duke University Press 1993, p. 149. For an extended discussion of this new visibility and its political implications, see Schmeink, Lars: “Afterthoughts: Cyberpunk Engagements in Countervisuality,” in: Murphy, Graham J./Schmeink, Lars (eds.) *Cyberpunk and Visual Culture*, New York, NY: Routledge 2018, pp. 276-87.

purely one or the other.”⁴⁹ The Metaverse, as it is imagined shaping our future lives, is a direct evolution from Gibson’s cyberspace Möbius strip: “The Metaverse becomes more real every time we replace a physical habit with a digital equivalent. We, the digital citizens of the Internet, are manifesting the Metaverse by trading time in meatspace (the physical world) for time online.”⁵⁰ Both Vinge and Gibson thus provide key elements in the cultural imaginary that surrounds the Metaverse, most importantly highlighting the ubiquitous nature of cyberspace and its omnipresent interconnection with the material realm.

III 1990S CYBERPUNK: COMMERCIALIZATION

While early cyberpunk explored the interconnection of worlds and the political and social potential of global networks, it fell to later cyberpunk fiction to expand the idea of cyberspace critically and to reflect on the individual fallout of this global technological change. In her novel *Synners* (1991), Pat Cadigan, for example, comments on Gibson’s imagining of the (male) user projecting a “disembodied consciousness”⁵¹ into the matrix of cyberspace and thus claiming “male-fantasy wish-fulfillment” by escaping the “vicissitudes of the body [... to] occupy the place of self-mastery.”⁵² Cadigan’s characters are instead very much embodied during their move into cyberspace. The virtual here does not offer an escape from the real.

The story revolves around a new interface technology for users to access virtual reality: ‘sockets’ that allow complete immersion into cyberspace, with a full-body sensorium. Cadigan is riffing off the central metaphor of ‘jacking in’ to the matrix popularized by Gibson but makes it literal by having users install sockets into the skull: “Injected through the scalp and bone,” “a hollow tube only a few

49 Vint, Sherryl, “Afterword: The World Gibson Made,” in: Murphy, Graham J./Vint, Sherryl (eds.), *Beyond Cyberpunk: New Critical Perspectives*, New York, NY: Routledge, pp. 228-33, here p. 229.

50 Terry and Keeney, *The Metaverse Handbook*, p. 20. Note the reference to ‘meatspace’ in the quote, which links Terry and Keeney’s unreflected, entrepreneurial vision of the Metaverse to Gibson’s critical, dystopian rendering of disembodied existence, ignoring how the transhumanist trope has been problematized by posthumanist scholars (cf. Vint, Sherryl, *Bodies of Tomorrow: Technology, Subjectivity, Science Fiction*, Toronto: University of Toronto Press 2007).

51 W. Gibson, *Neuromancer*, p. 5.

52 S. Vint, *Bodies of Tomorrow*, p. 104.

molecules wide”⁵³ that receives a connector and allows direct access to the brain. Cadigan’s sockets are an important change to the imaginary in that this interface imagines a direct link between the brain and the data of cyberspace.⁵⁴ The novel shows this link not as the transhumanist ideal of a disembodied mind living in cyberspace but reimagines ‘jacking in’ as creating “an experience of the entire body, including emotions; therefore, while the eight connections *do* penetrate into the organic female sheaths that reside in the brain, the connection ultimately provides a full-body, corporeal-digital experience.”⁵⁵ Not only does *Synners*’ representation thus expressly queer the existing straight, masculine imaginary of cyberspace, it also emphasizes how the digital realm feeds back on the embodied reality of its users. As Narula has emphasized in his reading of the Metaverse as culturally imprinting on our social lived reality: “Meaning flows directly from the other world to the real world—and, in turn, back from the real world to the other world.”⁵⁶

The direct physical link to the brain is one of three main hardware technologies that could deliver the Metaverse to users, next to skull-attached electrodes and fully external sensory devices such as goggles, gloves, and suits. It is the most bodily invasive, the most science-fictional, and thus the most unlikely of the three options to be realized, requiring medical procedures to install. The jack represents a visceral connection to the body, the spinal nervous system, and the brain stem and has become iconic through Lily and Lana Wachowski’s *MATRIX* film series (1999-2021). As discussed above, the jack is very much an embodied experience and thus stands in contradiction to the idea that in virtual reality, your physical body is superfluous and left behind as ‘meat.’ As a cultural image, it represents

53 Cadigan, Pat: *Synners*, SF Masterworks Series, London: Gollancz 2011 [1991], p. 69.

54 Cadigan is not the first to imagine such a connection, though she is the first cyberpunk fiction author to use it to connect a human brain to cyberspace. Again, the sf megatext provides similar concepts: Samuel Delany’s *Nova* (1969) describes plugs and sockets for pilots to connect with a spaceship, in Robert Silverberg’s *The Tower of Glass* (1970), androids ‘jack in’ to computer systems to control them, and James Tiptree Jr.’s novella “The Girl who was Plugged in” (1973) describes such an interface to control a surrogate body. Gibson uses the term ‘jacking in’ to describe how his EEG interface is connected via a (male) jack to the computer deck, thus popularizing the image, especially in connection with the novel’s rather masculinist prose of conquering the (female) cyberspace that is referred to as “matrix” (i.e., meaning ‘womb’).

55 Calvin, Ritch, “Pat Cadigan: *Synners* (Case Study),” in: McFarlane, Anna/Murphy, Graham J./Schmeink, Lars (eds.), *The Routledge Companion to Cyberpunk Culture*, New York, NY: Routledge 2020, pp. 41-47, here p. 43.

56 H. Narula, *Virtual Society*, ch. 5.

the most direct link between user and system, suggesting an unmatched level of control but also a breach of the body. While users can gain control over data, the body is made vulnerable to attack from within the system. Consequently, jacks are often depicted not as desirable but as a necessity to gain full power over a system. And accordingly, any repercussions brought against the user by the system are somatic—most famously shown in *THE MATRIX* (Lana and Lilly Wachowski, 1999), when Neo's body in the material world suffers the blows that his virtual body receives from the agents in the Matrix. David Cronenberg explores this relation of an embodied experience of virtual reality furthest in his film *EXISTENZ* (David Cronenberg, 1999), where both the machines running the system as well as the sockets are biological, not mechanical. The film makes literal the idea of viruses and bugs in the system by showing both machine and human as prone to infections—an image that reverberates with issues of hacking and malware, which Metaverse technologies must deal with.

As we have seen, Gibson and Vinge represented the connection to be made by electrodes attached to the skull like an EEG, a technology that is less invasive but relies on electrical signals to be transmitted. It is also depicted in *STRANGE DAYS* (Kathryn Bigelow, 1995), where the technology is used to record and replay a full sensory experience of another person. Any event can thus be vicariously experienced once it has been recorded. In the film, the technology is used by criminals to record rape and murder, as well as accidentally recording police brutality witnessed nearby. In sum, the film foreshadows the use of Metaverse technologies in live-streaming violent acts, most prominently the Christchurch terror attacks that were streamed to Facebook Live. Wearable (and possibly disguised) technologies allow the recording of the wearer's interactions—and incidentally of people in the vicinity of a person recording. The growing presence of digital experiences parallel to physical live events and the sharing of life via technologies thus makes necessary policies to safeguard privacy and other personal rights. The film makes prominent these issues surrounding ever-present media technologies, as well as highlighting their abusive potential.

Today's technologies for access to an extended reality (XR), to 3D virtual realms, and thus potentially to the Metaverse (i.e., Google Glass, Microsoft HoloLens, or Meta's Oculus Rift) are closer to the technology that Weinbaum suggested in his story. Goggles for visual presentation, in combination with other sensory devices (headphones for acoustic sensation, gloves or suits for tactile experiences, and even gyroscopes, treadmills, etc., to allow movement), are the most common technology represented in current sf for use with the Metaverse.

Stephenson, in *Snow Crash*, writes of a form of laser projection generated by the computer and shot at the screens of the goggles:

“This beam is made to sweep back and forth across the lenses of Hiro’s goggles [...]. The resulting image hangs in space in front of Hiro’s view of Reality. [...] So Hiro’s not actually here at all. He’s in a computer-generated universe that his computer is drawing onto his goggles and pumping into his earphones. In the lingo, this imaginary place is known as the Metaverse.”⁵⁷

In her later work, *Tea from an Empty Cup* (1998), Cadigan describes the technology as a “headmounted monitor” which was “connected to the lightweight, translucent hotsuit”⁵⁸ that is laced with sensors and makes possible tactile experiences such as heat, cold, touch, impact, or movement.⁵⁹ In the novel, most people come to special service parlors where the hardware needed to run virtual reality can be rented, and padded rooms be used for privacy and full-body experiences. In Ernest Cline’s *Ready Player One* (2011), the Metaverse is called the OASIS, and you need a computer console to use it with “elastic haptic gloves” and a “visor” that fits “snugly around my eyes like a pair of swimmer’s goggles [...] Small earbuds extended from the visor’s temples.”⁶⁰ This is the minimum equipment, but with more money, better access (i.e., better sensory feedback, better immersion) is possible with an “immersion rig,” including a “fully adjustable haptic chair” that simulates motion, a “full-body haptic feedback suit,” “haptic datagloves,” a “virtual retinal display” that uses projection onto the eyes instead of screens, a wall-mounted audio system, a “smell tower,” and an “omnidirectional treadmill.”⁶¹ And while most of these descriptions from novels have been smoothly wearable, small lenses with projection abilities or finely framed glasses, films such as *THE LAWNMOWER MAN* (Brett Leonard, 1992) have been showing bulky and heavy wrapping displays more akin to real technological developments of the time. The film adaptation of *READY PLAYER ONE* (Steven Spielberg, 2018) also uses a bulkier display than described in the novel, with glasses the size of diving and not swimming goggles. The film also shows the IOI corporation’s indentured workers trapped in isolated cells, strapped into a fixated rig, and using massively bulky equipment, while the CEO has a seated rig and glasses akin to wrap-around ski goggles.

57 Stephenson, Neal: *Snow Crash*, New York, NY: Penguin 1992, p. 22.

58 Cadigan, Pat: *Tea from an Empty Cup*, New York, NY: Tor 1998, p. 62.

59 There is also mention of one character feeling “the nasty sting of the needle sliding [...] into the base of her neck” while using virtual reality, but it is never quite explained to what effect this needle is used and why others do not use it (ibid. 68).

60 Cline, Ernest: *Ready Player One*, London: Random House 2011, p. 26.

61 Ibid. pp. 191-93.

What is noticeable from these examples is that any form of Metaverse will have distinct hardware components (from global infrastructure to individual devices or implants) that are imagined in most sf (and currently, in reality) to be ruled by capitalist interest. Accordingly, access to and quality of use in the Metaverse will, depending on the distribution model of processing power, rely on either a “small piece of consumer hardware” that each of us owns individually or on a “multi-million-dollar [...] server stack owned by the company that operates the virtual world.”⁶² Either way, access to the Metaverse will not be democratic but strongly stratified depending on wealth. Stephenson, for example, points out that out of ten billion people only “a billion of them have enough money to own a computer” and only “sixty million” of those private computers are “powerful enough to handle the Street protocol.”⁶³ This already restricts the simplest access to the Metaverse, which is problematic in that both tech companies and sf authors have imagined it to be ubiquitously interwoven with our reality. Not having access to Metaverse technology might limit your possibility to hold a job (remember Vinge’s prediction of 98% of jobs done in the Other Plane) or to engage in any form of social interaction (thinking of Forster’s warning about social evolution).

Moreover, the capitalist stratification might not be limited to general access (which could be addressed through public terminals/hardware) but might extend to interpersonal interaction through avatar representation, thus ultimately entrenching social hierarchies and inequalities. Stephenson, for example, explains that the appearance of avatars in the Metaverse depends on both hardware (i.e., processing power) and software (programming). Depending on your resources and skills, you can present as anything you like. The limited processing power of “cheap public terminals,” though, forces users into “jerky, grainy black and white”⁶⁴ versions of themselves that repeatedly freeze due to connection issues. Similarly, Cadigan explores the idea of every item, avatar skin, or accessory being available at a “surcharge.”⁶⁵ The whole experience of being in the Metaverse is extremely costly. Consequently, marginalization (of race and class, filtered through access to technology) is entrenched in the Metaverse, limiting its potential

62 M. Ball: *The Metaverse*, ch. 6.

63 N. Stephenson: *Snow Crash*, p. 25. In the novel, the Street refers to a central space in the Metaverse, a kind of hub of economic and social activity with lots of users, ‘the Street protocol’ thus describes the code (and technical protocols, memory, processing power etc.) necessary for the hardware to display the Street.

64 *Ibid.*, p. 38.

65 P. Cadigan, *Tea*, p. 99.

to be a democratic and free space and ultimately not allowing it to “benefit society as a whole”⁶⁶ but only a small group of shareholders.

IV POST-CYBERPUNK: CRITICISM

The aspect of control and stratification becomes even more essential when thinking about privatized worlds, similar to game worlds such as FORTNITE, for example. Since these are privately owned worlds, their owners basically determine the laws, not just judicial but also physical. In Stephenson’s *Snow Crash*, The Black Sun is such a privatized world, and its rules and laws are made by its owner, Da5id. It restricts access to only those individuals that Da5id allows in and then changes the general physics protocols so that “avatars are not allowed to collide,”—further restricting how many avatars can be in the limited space—finally ejecting any “undesirables,”⁶⁷ meaning users that act inappropriately or are infectious. What is considered ‘inappropriate’ behavior is determined solely by the owner of the private space and can be arbitrarily determined—something we can already see in the terms of service of many social media platforms.⁶⁸ In combination with strongly stratified access to Metaverse worlds, these become highly undemocratic spaces in which individual corporations get to dictate the laws governing, for example, how their worlds are accessed or what behavior they deem appropriate. Effectively, the Metaverse turns into an assortment of dystopian dictatorships, each individually secured in their walled-off spaces.

For many cyberpunk authors, corporations were the source of this imbalance of power, but a few also imagined governments as equally destructive and dystopian to the rather anarchic tendencies of the Internet.⁶⁹ An important aspect to the existing representation of the Metaverse was added by queer cyberpunk author

66 M. van Rijmenam, *Step into the Metaverse*, p. 16.

67 N. Stephenson, *Snow Crash*, p. 51.

68 Inappropriate behavior on social media can range from sexual content to violence and harassment to political dissidence. Thinking of the way that Meta handles the depiction of ‘nipples’ in images, i.e., female breasts being censored for sexual content, while male breasts are fine. Or the limitations to sexual, violent, or political content placed on TikTok by adherence to Chinese standards of behavior (and/or state censorship).

69 See Vinge’s “True Names,” which imagines the US government as the villain that created the rouge AI Mailman in the first place and then goes on to blackmail the hackers Mr. Slippery and Erythrina. For a discussion of the anarchic tendencies of the Internet, see M. Pesce: “True Magic?”

Melissa Scott with her novel *Trouble and her Friends* (1994), who, like Vinge, rather saw nation-states and governing bodies as impinging on the freedom of information. In *Trouble and Her Friends*, the US government passes legislation that ultimately criminalizes a specific body modification for hacking—a body modification embraced especially by a community of queer hackers that use its embeddedness in the brain in order to “become technology” in the posthuman sense of Donna Haraway’s becoming-with,⁷⁰ giving them an edge over (mostly) male hackers that refrain from changing their embodiment.

“These untested and potentially deadly implants—far more dangerous than the common dollie-slots, because the brainworm requires placing hardware in the brain itself—have contributed to the spread of the cracker culture by giving these hard-line criminals access to new technology that is unbeatable by people equipped with only ordinary, and legal, implants.”⁷¹

In the novel, the government’s attempts to police the hacking community are revealed as censorship and a struggle over control of newly created virtual spaces affecting marginalized groups disproportionately more than the dominant group. It is a power struggle over who keeps control of new technologies that we also currently see enfolding regarding social media and governmental agents.⁷² As Graham J. Murphy points out, the brainworm technology makes hacking explicitly corporeal “by sustaining a sense of the tangible body”⁷³ and feedback looping

70 Haraway, Donna: *When Species Meet*, Minneapolis, MN: University of Minnesota Press 2008. Haraway discusses “becoming with” as a central tenet of her posthumanism, commenting on the “foolishness of human exceptionalism” and remarking “that becoming is always becoming *with*” (p. 244). Similarly, Rosi Braidotti uses the concept to describe “affirmative transformations of both the structures of subjectivity and the production of theory and knowledge” and link the posthuman with other subjectivities as “becoming-animal, becoming-earth, and becoming-machine.” Braidotti, Rosi: *The Posthuman*, London: Polity 2013, p. 66.

71 Scott, Melissa: *Trouble and her Friends*, New York, NY: Tor 1994, p. 35.

72 An example of this would be the European GDPR and its regulation of new media markets (for example, YouTube, Google search engine) benefiting old-economy material publishing houses as opposed to creative content creators that rely on remixing of available material.

73 Murphy, Graham J.: “Penetrating the Body-Plus-Virtualisation in Melissa Scott’s *Trouble and Her Friends*,” *Foundation: The International Review of Science Fiction* 34, no. 95 (2005), pp. 40-51, here p. 43.

emotions into the digital system. Those already vulnerable (politically, bodily, i.e., the LGBTQ community or racialized minorities) thus have less to lose and embrace the technology as a means to change oppressive systems. Those same systems then enact policies of control to mitigate their loss of power. A similar criticism, leveled not against an authoritarian government but against autocratic corporate control, can be found in Cline's *Ready Player One*.⁷⁴ In the novel (and film), IOI, a "global communication conglomerate" and the "world's largest internet service provider," is "selling goods and services"⁷⁵ in the OASIS. They believe that the open-access software of the OASIS was "never properly monetized" and plan to give it a neoliberal make-over:

"They would start charging a monthly fee for access to the simulation. They would plaster advertisements on every visible surface. User anonymity and free speech would become things of the past. The moment IOI took it over, the OASIS would cease to be the open-source virtual utopia I'd grown up in. It would become a corporate-run dystopia, an overpriced theme park for wealthy elitists."⁷⁶

What both novels criticize then is that a Metaverse needs to be "Community-driven" and have "Self-Sovereignty,"⁷⁷ as van Rijmenam argues. As a social space, different worlds in the Metaverse will find together around communities of interest, and among those can and should be those that gather to criticize and ultimately hold accountable those in power. A truly democratic Metaverse thus cannot be created if either governments or corporations control and police communities, entrenching power structures and oppressions. Similarly, an open Metaverse relies on the idea of "self-sovereignty" and that the "individual remains in control of their online identity and data"⁷⁸ and does not hand those over either to an overbearing government or a data-greedy corporation. Since online profiles and data are part of our intertwined identities and subjectivity, these should not be in control of the platforms. In *Trouble and Her Friends*, Scott discusses this idea through

74 It needs pointing out that Cline's hero, though working class, is a typical white savior and conforms to cyberpunk's male-centered individualism as well as a current stereotype of the idealist, utopian, liberal-minded tech-bro. Like Vinge's Ery and Mr. Slippery, Wade 'Parzival' Watts does not want to take control of the OASIS for his own capitalist gain, but rather wishes to democratize access to it.

75 E. Cline, *Ready Player One*, p. 33.

76 Ibid.

77 M. van Rijmenam, *Step into the Metaverse*, p. 17.

78 Ibid., p. 26.

identity theft by another hacker, while *Ready Player One* pushes the idea of IOI taking over the online identity of their employees, forcing them to use standardized avatars and claiming any productivity as their own.

So, to sum up, science fiction has been involved in exploring the Metaverse through different incarnations way before transhumanists and tech-entrepreneurs like Mark Zuckerberg discovered it for themselves and their plans to exploit it for personal monetary gain. What sf has been exploring is varied and brings with it some interesting possibilities. How will we access the Metaverse? Will it be through our bodies' nervous system when reality and virtuality blend in our minds? Or through haptic interfaces like goggles, suits, and rigs? In either case, sf warns us that we should be aware of who owns the infrastructure and determine the laws that govern the virtual spaces created. What will it cost us to go into the Metaverse? Will we be able to afford everything we want and need to compete in this new economy that is driven by the Metaverse? Will these spaces offer more or less freedom? And finally, the ultimate question: who is in control?

From the social community of hackers and the wildly customizable avatars in "True Names" to the grid structure of data and its metaphor of city geography in *Neuromancer*, from the sockets linking the Metaverse directly to the user's brain in *Synners* to the highly stratified access in bandwidth demonstrated in *Snow Crash*, from governmentally restricted technologies of embodiment in *Trouble and Her Friends*, to the corporate exploitation of former open-source systems in *Ready Player One*. Science fiction might not be able to answer all of the questions we have about the Metaverse, but it can help keep the questions themselves on the map while we explore the new realities that are awaiting us.

LITERATURE

Abbate, Janet: "True Risks? The Pleasures and Perils of Cyberspace," in: Ferro, David L./Swedin, Eric G. (eds.), *Science Fiction and Computing: Essays on Interlinked Domains*, Jefferson, NC: McFarland 2011, pp. 189-204.

Ball, Matthew: "The Metaverse: What It Is, Where to Find It, and Who Will Build It," January 13, 2020, <https://www.matthewball.vc/all/themetaverse>.

Ball, Matthew: *The Metaverse: And How It Will Revolutionize Everything*. New York, NY: Liveright 2022, eBook.

Berger, Rachel: "The Horror of Direct Experience: Cyberpunk Bodies and 'The Machine Stops.'" *SFRA Review* 54.3 (2020), pp. 37-44.

Braidotti, Rosi: *The Posthuman*, London: Polity 2013.

- Broderick, Damien: *Reading by Starlight: Postmodern Science Fiction*. New York, NY: Routledge 1995.
- Bukatman, Scott: *Terminal Identity: The Virtual Subject in Postmodern Science Fiction*, Durham, ME: Duke University Press 1993.
- Cadigan, Pat: *Synners*, SF Masterworks Series, London: Gollancz 2011 [1991].
- Cadigan, Pat: *Tea from an Empty Cup*, New York, NY: Tor 1998.
- Calvin, Ritch: "Pat Cadigan: *Synners* (Case Study)," in: McFarlane, Anna/Murphy, Graham J./Schmeink, Lars (eds.), *The Routledge Companion to Cyberpunk Culture*, New York, NY: Routledge 2020, pp. 41-47.
- Chambers, Amy C./Skains, R. Lyle: "Science and Technology," in: Garcia-Siino, Leimar/Mittermeier, Sabrina/Rabitsch, Stefan (eds.), *The Routledge Handbook of Star Trek*, New York, NY: Routledge 2021, pp. 348-56.
- Cline, Ernest: *Ready Player One*, London: Random House 2011.
- Doubinsky, Sébastien: "Vernor Vinge," in: McFarlane, Anna/Murphy Graham J./Schmeink, Lars (eds.), *Fifty Key Figures in Cyberpunk Culture*, New York, NY: Routledge 2022, pp. 241-46.
- Forster, E.M.: "The Machine Stops," in: Barnes, Douglas M./Egford R.F. (eds.), *Twentieth Century Short Stories*. Cheltenham: Harrap 2001 [1959], pp. 126-67.
- Frenkel, James (ed.), *True Names and the Opening of the Cyberspace Frontier*, New York, NY: Tor 2001.
- Freyermuth, Gundolf S.: "Vegas, Disney, and the Metaverse: On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century," in: Beil, Benjamin et. al (eds.), *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript 2022, pp. 17-89.
- Gee, James Paul: "Video Games and Embodiment," *Games and Culture* 3.3-4 (2008), pp. 253-63, <https://doi.org/10.1177/1555412008317309>
- Gibson, William, *Neuromancer*, New York, NY: Ace 1984.
- Haraway, Donna: *When Species Meet*, Minneapolis, MN: University of Minnesota Press 2008.
- Heuser, Sabine: *Virtual Geographies: Cyberpunk at the Intersection of the Postmodern and Science Fiction*, Amsterdam: Rodopi 2003.
- Johnson, Mark R.: "The History of Cyberspace Aesthetics in Video Games," in: Murphy, Graham J./Schmeink, Lars (eds.), *Cyberpunk and Visual Culture*, New York, NY: Routledge 2018, pp. 139-54.
- Lovén, Svante: *Also Make the Heavens: Virtual Realities in Science Fiction*, Uppsala: Uppsala University 2010.
- May, Timothy C.: "True Nyms and Crypto Anarchy," in: Frenkel (ed.), *True Names* (2001), pp. 33-86.

- McLuhan, Marshall: *Understanding Media: The Extensions of Man*, London: Sphere 1967 [1964].
- Meta. “The Metaverse and How We’ll Build It Together—Connect 2021,” *Meta*. October 28, 2021, YouTube video, 01:17:26, <https://www.youtube.com/watch?v=Uvufun6xer8>
- Milburn, Colin. “Activism,” in: McFarlane, Anna/Murphy, Graham J./Schmeink, Lars (eds.), *The Routledge Companion to Cyberpunk*, New York, NY: Routledge 2020, pp. 373-81.
- Murphy, Graham J.: “Penetrating the Body-Plus-Virtualisation in Melissa Scott’s *Trouble and Her Friends*,” *Foundation: The International Review of Science Fiction* 34, no. 95 (2005), pp. 40-51.
- Narula, Herman: *Virtual Society: The Metaverse and the New Frontiers of Human Experience*, New York, NY: Currency 2022, eBook.
- Pesce, Mark: “True Magic,” in: Frenkel (ed.), *True Names* (2001), pp. 221-38.
- Rehak, Bob: “Playing at Being: Psychoanalysis and the Avatar,” in: Wolf, Mark J. P./Perron, Bernard (eds.), *The Video Game Theory Reader*, New York, NY: Routledge 2003, pp. 103-27, here p. 103.
- van Rijmenam, Mark: *Step into the Metaverse: How the Immersive Internet Will Unlock a Trillion-Dollar Social Economy*, Hoboken: Wiley 2022.
- Schmeink, Lars, “Afterthoughts: Cyberpunk Engagements in Countervisuality,” in: Murphy, Graham J./Schmeink, Lars (eds.), *Cyberpunk and Visual Culture*, New York, NY: Routledge 2018, pp. 276-87.
- Scott, Melissa: *Trouble and Her Friends*, New York, NY: Tor 1994.
- Segert, Alf: “Technology and the Fleshly Interface in Forster’s ‘The Machine Stops’: An Ecocritical Appraisal of a One-Hundred Year Old Future,” *The Journal of Ecocriticism* 2.1 (2010): pp. 33-54.
- Stephenson, Neal: *Snow Crash*, New York, NY: Penguin 1992.
- Stephenson, Neal: “Innovation Starvation,” *Wired*, October 27, 2011, <https://www.wired.com/2011/10/stephenson-innovation-starvation/>
- Terry, QuHarrison/Keeney, Scott. *The Metaverse Handbook: Innovating for the Internet’s Next Tectonic Shift*, Hoboken, NJ: Wiley 2022.
- van Rijmenam, Mark: *Step into the Metaverse: How the Immersive Internet Will Unlock a Trillion-Dollar Social Economy*, Hoboken, NJ: Wiley, 2022, p. xxix.
- Vinge, Vernor: “True Names,” in: Frenkel (ed.), *True Names* (2001), pp. 239-330.
- Vint, Sherryl, *Bodies of Tomorrow: Technology, Subjectivity, Science Fiction*, Toronto: University of Toronto Press 2007
- Vint, Sherryl. “Afterword: The World Gibson Made,” in: Murphy, Graham J./Vint, Sherryl (eds.), *Beyond Cyberpunk: New Critical Perspectives*, New York, NY: Routledge, pp. 228-33.

Vint, Sherryl: *Science Fiction*, London: Bloomsbury 2014.

Weinbaum, Stanley G.: "Pygmalion's Spectacles," in: *A Martian Odyssey*, London: Sphere 1977, pp. 116-34.

Zimmermann, Ana Cristina, and W. John Morgan. "E. M. Forster's 'The Machine Stops': Humans, Technology and Dialogue." *AI & Society* 34.1 (2019): pp. 37-45. <https://doi.org/10.1007/s00146-017-0698-3>

Zuboff, Shoshana: *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, New York, NY: PublicAffairs 2019.

Dreaming the Metaverse

Virtual Worlds as Audiovisual Fantasy

VANESSA OSSA

INTRODUCTION

Few people were probably familiar with the term Metaverse before Oct. 28, 2021, when Marc Zuckerberg announced that his company would be renamed Meta. Zuckerberg promised then:

“The next platform will be even more immersive—an embodied internet where you’re in the experience, not just looking at it. We call this the Metaverse, and it will touch every product we build.”¹

However, where did he get this term from? The simple and precise answer to this would be the novel *Snow Crash*, written in 1992 by Neal Stephenson. After a breakneck car chase to deliver a pizza in time, Stephenson’s protagonist, Hiro, enters into an “imaginary space”:

“He’s in a computer-generated universe that his computer is drawing onto his googles and pumping into his earphones. In the lingo, this imaginary place is known as the Metaverse.”²

This particular virtual reality is a space for a number of interactions and self-representations that offer an alternative social environment to the mostly dystopian physical world of the future. In it, people act through highly individualized avatars

1 Zuckerberg, Mark: “Founders Letter, 2021,” *FB*, January 28, 2021, <https://about.fb.com/news/2021/10/founders-letter>

2 Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992, p. 22.

and accumulate status through digital currency and virtual possessions. As we see in the quote above, this Metaverse is accessed through a pair of glasses and headphones, not unlike how we would enter a virtual reality game nowadays.

Literary scholar Lars Schmeink insightfully traces salient elements of Stephenson's fantasy of the Metaverse back to science fiction writings as early as E.M. Forster's "The Machine Stops" (1905). Further ideas of living in a machine-generated world, self-representation through digital avatars, and connecting to a digital interface by using external gear—or even through a direct line from mind to machine—can be found in a variety of science fiction writings, many of them published in the 1970s and 1980s, at the dawn of the digital age.³

In the following, I will continue Schmeink's approach and follow the trail of the Metaverse as an audiovisual fantasy in mostly Western live-action films and television.⁴ Although I singled out *Snow Crash* as the origin of the term Metaverse, I do not want to rely on the novel as a prototypical model and rather build a dynamic concept of the Metaverse, as it appears in various audiovisual examples. The first starting points for the corpus were academic literature and several pop cultural compilations of films connected to the idea of the Metaverse.⁵ However, the initial list was continuously extended by extracting salient criteria, which were then used to look for additional audiovisual examples. Instead of just presenting the final result of this selection process, this paper endeavors to make each step in

3 Cf. Schmeink, Lars: "Incarnations of the Metaverse in Science Fiction," in this volume, pp. 117-138.

4 There are certainly amazing examples of science fiction worlds imagining futuristic virtual worlds in Japanese anime or other non-western media, but to include these would overextend the scope of this paper.

5 For example: <https://medium.com/building-the-Metaverse/television-shows-about-the-Metaverse-98d91c061a77> from 02.07.2021; <https://medium.com/building-the-Metaverse/movies-about-the-Metaverse-a0797323e7f6> from 14.07.2021; <https://www.expressvpn.com/blog/best-movies-about-the-Metaverse> from 02.03.2022; <https://www.esquire.de/entertainment/film/Metaverse-science-fiction-filme-zukunftsvision-filme> from 22.03.2022; <https://www.epd-film.de/themen/wovon-traeumt-das-Metaverse> from 23.09.2022; <https://www.digitaltrends.com/movies/best-Metaverse-movies> from 05.11.2022; <https://coingape.com/top-5-Metaverse-themed-movies-to-understand-virtual-reality> from 04.01.2023; <https://www.investors.com/news/what-is-the-Metaverse-here-are-seven-great-virtual-views-from-hollywood/> from 09.03.2023; <https://t3n.de/news/vision-pro-Metaverse-filme-serien-1445642> from 17.06.2023; <https://filmora.wondershare.com/more-tips/metaverse-movie.html> from 29.02.2024; <https://www.preface.ai/blog/metaverse-movies/>

the process transparent and, by doing so, to include a more in-depth discussion about the criterion in question. Thus providing insight into my methodology and discussing salient components of the imaginations of the Metaverse independently. This is based on the assumption that there is not one vision of the Metaverse but several that share certain similarities but may also significantly differ in some regards. Not unlike the way Wittgenstein describes family resemblance between distinct manifestations of one and the same term, audiovisual depictions of the Metaverse can be more than one thing.⁶ Furthermore, they may also be interwoven with larger cultural imaginations, depending on the current cultural climate fostered by hopes and fears about virtual worlds, digitality, and self-actualization.⁷ Through the continuous process of encoding, comparison, and selection, distinct features and relevant discourses can be extracted and discussed individually.

At first, I selected six films (here in chronological order) that are repeatedly mentioned as significant examples of the Metaverse in film and television. All of them quite clearly display some form of virtual reality in an ad hoc understanding of the term:

- TRON:⁸

Searching for proof that one of his computer programs has been stolen, the protagonist, Kevin Flynn, is scanned into the digital mainframe of a super-computer, where he has to fight against a megalomaniacal Master Control Program.

- THE MATRIX⁹

Protagonist Neo learns that what he has always perceived as his physical reality is actually a digital simulation and that his body currently rests in a pod, where it is exploited as an energy source for artificial intelligence.

6 Cf. Wittgenstein, Ludwig: *Philosophische Untersuchungen*. Frankfurt/M.: Suhrkamp 1977 [1953].

7 Graham Dawson describes cultural imaginaries as “vast networks of interlinking discursively themes, images, motifs and narrative forms that are publicly available within a culture at any one time” (Dawson, Graham: *Soldier Heroes: British Adventure, Empire and the Imagining of Masculinities*. London: Routledge 2005, p. 48). For a longer discussion, see Ossa, Vanessa: *The Sleeper Agent in Post-9/11 Media*. Cham: Palgrave Macmillan 2022, pp. 19-21.

8 TRON (USA 1982, D: Steven Lisberger).

9 THE MATRIX (USA 1999, D: Lana and Lilly Wachowski).

- THE THIRTEENS FLOOR¹⁰

Shortly before a group of programmers is about to launch a digital simulation of LA, one of the team members is murdered. Douglas, the protagonist of this neo-noir crime story, searches the simulated LA for clues to solve the murder.

- EXISTENZ¹¹

The film plays with the confusion between several virtual game worlds nested inside each other like a Russian Doll. The main characters connect to the game via a console that they insert directly into a port in their bodies. Throughout the film, it is never quite clear whether they are in the physical world or entering another level of the game.

- READY PLAYER ONE¹²

It is probably the most pronounced depiction of a Metaverse in recent film and television (all of the sources I came across in my research named this film as a salient example). READY PLAYER ONE takes place in a dystopian future in the US where people primarily interact in the Oasis, a virtual three-dimensional world that is entered via glasses, gloves, or suits. The late creator of the Oasis implemented several game-like challenges to win in order to become the new owner of the Oasis.

- FREE GUY¹³

A bank teller is robbed daily but never resists until he meets a beautiful woman and starts questioning his own inaction. As it turns out, he is a character in a video game world, and she is the avatar of an actual player looking for proof that the code for a virtual world was stolen from her.

The virtual realities depicted in these six examples consist of the digital infrastructure of a super-computer, two life-like digital simulations of the physical world, two computer games, and a multi-purpose platform that allows for self-expression, socialization, and elements of play and adventure, not unlike a video game. All of them are artificial and at least partly created by an entity other than the protagonist

10 THE THIRTEENS FLOOR (USA 1999, D: Josef Rusnak).

11 EXISTENZ (USA 1999, D: David Cronenberg).

12 READY PLAYER ONE (USA 2018, D: Steven Spielberg).

13 FREE GUY (USA 2021, D: Shawn Levy).

entering it. This distinguishes them from dream worlds and other solely subjective experiences depicted in audiovisual media. Although the virtual worlds in these examples are clearly separated from the physical world, the experience in all of them holds some relevance for the protagonist's life in the physical world.

VIRTUAL REALITY

If we investigate the history of virtual realities a bit further, it turns out that the term is much older and broader than one might think today.¹⁴ Rob Shields states:

“The virtual has long existed in the form of rituals, and in the built form of architectural fantasies and environments. [...] Virtual worlds are simulations. Like a map, they usually start out as reproducing actual worlds, real bodies, real situations; but, like simulations [...], they end up taking on a life of their own.”¹⁵

Shields further traces the notion of the virtual from religion to discussions about dreams, mirror images, panoramas, virtual environments (such as the power-asserting architectures of churches), and eventually, digital applications and cyberspace. Lambert Wiesing criticizes such a broad approach to the term and distinguishes between two theoretical positions: On the one hand, there are some people who understand virtual reality as being as similar to physical reality as possible and treat it as just the next form of immersive media.¹⁶ In this discourse, virtual reality stands in line with panorama images, the immersive powers of cinema, amusement parks, and other escapist endeavors that bring us to a space that seems real yet is only “almost so.”¹⁷

On the other hand, there is an argument to be made that virtual realities created by digital media are fundamentally different since they do not always rely on likeness to the physical world in the same way immersive media usually do. For example, the virtual reality of a computer desktop with its abstract icons does not

14 One of the oldest debates about the virtual is the question of whether Christ is really or virtually present in the Eucharist (Cf. Shields, Rob: *The Virtual*, London: Routledge 2003, pp. 5-6).

15 R. Shields: *The Virtual*, p. 4.

16 Cf. Wiesing, Lambert: *Artifizielle Präsenz, Studien zur Philosophie des Bildes*, Frankfurt/M.: Suhrkamp 2005, pp. 107-124.

17 R. Shields: *The Virtual*, p. 22.

strive to create an immersive experience.¹⁸ I do not want to advocate for one understanding of virtuality over the other. However, I take from this discussion that both immersion and digitality are connected to the notion of virtual reality in different ways.

Going back to our six films, all of the virtual realities represented in them are digital, and several of them depict a high degree of immersion, resulting in the possibility of confusion between different realities. In this regard, it is not surprising that half of the examples are from 1999. During the early years of the digital age, popular culture reacted to the overall proliferation of mediated realities by questioning the perception of differences between reality and virtuality. This development also drew on earlier debates in postmodern philosophy, such as Jean Baudrillard's notion of hyperreality from his 1981 work *Simulacra and Simulation*,¹⁹ which also questioned clear distinctions between physical and imaginary realities as well as our ability to distinguish between them. As Donna Haraway puts it: "[T]he virtual is precisely *not* the real; that's why 'postmoderns' like 'virtual reality.' It seems transgressive."²⁰ The overall fear that the real is not what it appears to be was retrospectively diagnosed as significant cultural anxiety by Slavoj Žižek in *Welcome to the Desert of the Real*:²¹

"The ultimate American paranoid fantasy is that of an individual living in a small idyllic Californian city, a consumerist paradise, who suddenly starts to suspect that the world he lives in is a fake, a spectacle staged to convince him that he lives in a real world, while all the people around him are effectively actors and extras in a gigantic show."²²

His two primary examples for the visualization of this anxiety are THE MATRIX and another film from the same period: THE TRUMAN SHOW.²³ If we now go ahead

18 Cf. L. Wiesing: *Artifizielle Präsenz*, pp. 108-109.

19 Baudrillard, Jean: *Simulacra and Simulation*, Ann Arbor, MI: University of Michigan Press 1994.

20 Haraway, Donna: "The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others," in: Larry Grossberg/Cary Nelson/Paula Teichler (eds.), *Cultural Studies*, New York, NY: Routledge 1992, pp. 295-337, here p. 325.

21 Žižek, Slavoj: *Welcome to the Desert of the Real! Five Essays on September 11 and Related Dates*, London: Verso 2002. A title, that is a direct quote from THE MATRIX, while, in turn, one of the characters of the THE MATRIX is also seen carrying a book called 'Simulacra and Simulations.'

22 S. Žižek: *Welcome to the Desert of the Real!*, p. 1.

23 THE TRUMAN SHOW (USA 1998, D: Peter Weir).

and separate the two aspects of virtual reality, identified by Wiesing—immersion and digitality—we are able to add nuances to our categories and henceforth also to include a few more examples to the corpus:

- DISCLOSURE²⁴

This early example stands out because it is not a science fiction film. It is an erotic thriller about sexual harassment that entails an early depiction of the internet as a virtual space. However, there is no danger of confusing physical and virtual reality, and the cyberspace is only a tool for accessing necessary data.

- THE TRUMAN SHOW

The eponymous protagonist goes about his daily life without suspecting that he actually lives in a manufactured environment, the set of a reality TV show. His world is virtual, as it is an artificially created world that is “almost real,” but it is not digital.

- WESTWORLD²⁵

In this science fiction TV show, people can enter an amusement park that simulates a Wild West environment. All characters in the park are robots controlled by artificial intelligence; the events in the park are scripted in several interrelated storylines, similar to the design of interactive and non-linear narratives designed for computer games.

However, broadening the definition of *virtual space* into *immersion* and *digitality* as independent criteria makes it necessary to add a general restriction to the corpus. The broad definition of virtual reality as seeming real but “almost so” might also include dreams, fantasies, and illusions, such as mirror images, and thus, a number of fantasy films and narratives from children’s stories fit this category, too. However, as the Metaverse is mainly a vision of technological progress achieved in a real-world context, I limit the following discussions to examples taking place in either real-world scenarios or science fiction.

24 DISCLOSURE (USA 1994, D: Barry Levinson).

25 WESTWORLD (USA 2016-2022, HBO).

Table 1: first list of examples, with virtual space, immersion, and digitality as categories.

Film	Virtual Space	Immersion	Digitality
Tron	X	O	X
Disclosure	X	O	X
The Truman Show	X	X	O
The Matrix	X	X	X
The Thirteenth Floor	X	X	X
eXistenZ	X	X	X
Westworld	X	X	O
Ready Player One	X	O	X
Free Guy	X	X	X

TRANSITIONS

As stated before, all of the examples above imagine a strict distinction between the real and the virtual world, and they also include a moment of transition between both of them. Generally speaking, notions of transition, or liminality, are indeed closely connected to the idea of virtual reality:

“Liminal zones are virtual environments or spaces. [...] A key part of the transformation is the suspension of everyday social norms to allow a rearrangement of the social order, conferring new status and allowing society to acknowledge and recognize the new identity of those who have been the focus of the ritual.”²⁶

In almost all of the examples above, the characters engage in a predefined process or notable ritual to enter the virtual world, or they cross a visible threshold, thus marking the virtual plane as a completely separate entity from their everyday reality. A space separate from the physical everyday world that defines the character’s real-world expectations and experiences.

Glasses, Gloves, and Suits

FREE GUY, DISCLOSURE, and READY PLAYER ONE model their entry methods into the virtual world after real-world technological developments by employing

²⁶ R. Shields: *The Virtual*, p. 12.

glasses, gloves, hand controllers, specialized chairs, or full-body suits. Historically, the first steps to enter artificial three-dimensional worlds can be traced back to 1838, when scientist Sir Charles Wheatstone developed *binocular vision* for stereoscopic images.²⁷ Much later, in 1935, Stanley Grauman Weinbaum's short story "Pygmalion's Spectacles" employed the idea of glasses as a device for the characters to enter fictional worlds. This was realized in 1956 when Morton Leonard Heilig invented a virtual reality machine and expanded on it in 1960 when he created the first head-mounted display for stereoscopic 3D images. In the 1970s, MIT designed the Aspen Movie Map, offering users a computer-generated tour of a virtual place—the town of Aspen, Colorado. Finally, one of the last major steps to reach our current state of technology was fulfilled 40 years afterward when Palmer Luckey created the prototype for the Oculus Rift VR headset.²⁸

FREE GUY depicts a character living in a 3D video game world. The real-world players are represented as customizable avatars that mostly do not resemble their physical appearances. The game is played via standard game controllers without VR components. The film DISCLOSURE, however, celebrates the act of putting on the glasses and the gloves as a sort of ritual, preparing the character to enter the virtual world, which is depicted as a classic architectural structure. READY PLAYER ONE depicts a variety of highly advanced equipment, which might provide advantages for solving the challenges in the Oasis and thus adds a consumer critical comment about the possibilities to access the Metaverse:

27 Cf. Wade, N. J.: "Charles Wheatstone (1802-1875)." *Perception* 31, no. 3 (2002), pp. 265-272.

28 Marr, Bernard: "A Short History of the Metaverse," *Forbes*, March 21, 2022, <https://www.forbes.com/sites/bernardmarr/2022/03/21/a-short-history-of-the-metaverse>. It is notable that the film MINORITY REPORT (Steven Spielberg 2002) is also often mentioned as a film depicting the Metaverse. The connecting technology seems to be the hand-tracking technology envisioned by Spielberg in 2002, which is one of the most prominent features of the recently released Apple Vision Pro technology (cf., for example, Iniyani, E.: "Beyond Controllers: Apple's Vision Pro Brings Hand Gestures and Eye Tracking to Virtual Worlds," *Encora*, October 27, 2023, <https://www.encora.com/insights/beyond-controllers-apples-vision-pro-brings-hand-gestures-and-eye-tracking-to-virtual-worlds>). Although, the film was produced long before Apple's newest development, it is retroactively connected to imaginations of the Metaverse, as real-world technology progresses into a similar direction as the assumed future in this science fiction.

“What is noticeable from these examples [*Snow Crash*, *Tea from an Empty Cup* (1998), *READY PLAYER ONE*, *THE LAWNMOWER MAN* (1992)], is that any form of Metaverse will have distinct hardware components (from global infrastructure to individual devices or implants) that are imagined in most sf (and currently, in reality) to be ruled by capitalist interest. [...] Either way, access to the Metaverse will not be democratic but strongly stratified depending on wealth.”²⁹

We see a particular development between these three films. In *DISCLOSURE* from 1994, the simple act of looking up information on the internet requires meticulous preparation. However, Guy lives in a video game world that is casually interacted with on a computer screen. The act of entering the virtual world is most casual in the example, which fits the focus on the emotional development of the characters in the game. The real-world characters and their experiences in the virtual world are of little importance. In *READY PLAYER ONE*’s envisioned future, however, it is relatively easy for the protagonists living in the real-world to enter the Oasis. It still requires preparation, but the characters are physically used to it, so they are able to enter the virtual world very quickly and in unusual circumstances, such as in the back of a moving car.

Plugs and Sockets

EXISTENZ and *THE MATRIX* are examples in which the connection to the digital world ensues through a direct link into the body of the protagonist. In *EXISTENZ*, this is a voluntary procedure, albeit not without considerable health risks if it is not done professionally. In *THE MATRIX*, the humans are unknowingly plugged into a virtual reality via a port in their necks. The intimate connection between the physical body and the virtual self results in the risk of killing the body if the virtual self imagines their death.

Scans

TRON and *THE THIRTEENTH FLOOR* are two examples in which a digital scanning device facilitates the transition into the virtual world. In *TRON*, the physical body of protagonist Kevin Flynn disintegrates the moment he is transferred into the world of the super-computer. In *THE THIRTEENTH FLOOR*, the person who wants

29 L. Schmeink: “Incarnations of the Metaverse in Science Fiction,” p. 148.

to enter the simulation is scanned by a green beam, and their mind is uploaded into one of the characters already living in the simulation.

Doors, Walls, and Railways

THE TRUMAN SHOW and WESTWORLD also display moments of transition when the protagonists depart from one reality into another. The visitors of WESTWORLD enter the amusement park through a futuristic yet non-descriptive train station. In THE TRUMAN SHOW, Truman eventually finds a door at the end of the horizon—which is actually a blue-painted wall. Interestingly, the visualization of this doorway into an external reality is quite similar to the scenes in THE THIRTEENTH FLOOR and FREE GUY, in which characters living in a virtual world try to reach the outside reality.

The visual repertoire of different pods, plugs, scans, and other equipment, as well as some form of visual boundary to mark the edges of the artificially created space, are part of the imaginary of the Metaverse. However, these moments of transition are not only relevant for the imaginations of the Metaverse; they also influence real-world achievements. Psychological research has shown that the visualization of a threshold, for instance, a doorway or a portal, positively affects the experiences of *presence* when VR headsets are used to enter a virtual world. The acceptance of the virtual worlds and, thus, the users' degree of immersion significantly benefit from the inclusion of such elements.³⁰

THE AVATAR

Next to the virtual space, an avatar is one of the most characteristic elements of the Metaverse. This becomes especially apparent when we look at the description by the protagonist, Wade, as he enters the Oasis at the beginning of READY PLAYER ONE:

“This is the OASIS. It’s a place where the limits of reality are your own imagination. You can do anything. Go anywhere. [...] People come to the OASIS for all the things they can do. But they stay because of all the things they *can be*.”³¹

30 Cf. Zimmer, Jonas: *Transzendenz gestalten: Interdisziplinäre Paradigmen für das Design virtueller Räume*. PhD Thesis, University of Cologne 2023, pp. 126-131, <http://kups.ub.uni-koeln.de/id/eprint/73285>

31 READY PLAYER ONE (USA 2018, D. Steven Spielberg), TC: 00:03:40, emphasis VO.

Avatars represent the user in the virtual world. They allow them to interact with the simulation, with characters in it, and with other avatars. In short, they extend ourselves into the virtual world as “virtual bodies.”³² On social virtual reality platforms (and to a certain extent also in games), customization of the avatar promises possibilities for limitless self-expression, as alluded to in the quote above.

“Like ‘desiring-machines,’ they [avatars] conjure a dialogicity or proximity that is in the process of appropriating our powers of speech and expression, of understanding our mimicry and gestures, and in doing so shifting the meaning of both humanity and sociality.”³³

Avatars allow us to interact as if we were present in the virtual environment, becoming “almost so” (i.e., virtual) ourselves. David Gunkel turns the ontological status of player and avatar into an even more complex problem by pointing out that the often-employed notion that the avatar is a mere representation of the actual *real* person in the physical world is founded on a Platonic understanding of the real as something out of grasp, but actually existing and reachable.³⁴ However, Gunkel further elaborates that, coming from a Kantian or Žižek-inspired position, we might need to accept that we cannot know what is behind the avatar or that this is precisely part of the truth of identity and reality of said avatar. Going back to our body of cinematic works, these questions become especially pressing if we investigate examples in which the protagonist is completely absorbed into the virtual world and leaves no physical body behind, for instance, in *TRON*.

I wrote before that avatars in video games might only be customizable to a certain extent. I mentioned this because the avatars in some video games are not only representations of the players but also—as fictional characters—part of the narrative. Maybe even—as transmedial fictional characters—part of an already well-established narrative world and equipped with certain recognizable physical

32 See for the discussion of various forms of avatars as extensions, Beil, Benjamin: *Avatarbilder: Zur Bildlichkeit des zeitgenössischen Computerspiels*, Bielefeld: transcript 2012, pp. 17-21, <https://doi.org/10.1515/transcript.9783839421550>; for avatars as virtual bodies see Günzel, Sternagel/Mersch, Dieter: “Tracing the Avatar. An Afterword,” in: Rune Klevjer: *What is the Avatar? Fiction and Embodiment in Avatar-Based Singleplayer Computer Games. Revised and Commented Edition*. Bielefeld: transcript 2022, pp. 219-226, here: p. 222.

33 Mersch, Dieter: “The Avatar,” in: Dieter Mersch et al. (eds.), *Actor & Avatar*. Bielefeld: transcript 2023, pp. 24-29, here: p. 25. <https://doi.org/10.14361/9783839467619-002>

34 Gunkel, David J.: “The Real Problem Avatars, Metaphysics, and Online Social Interactions,” *New Media & Society* 12, no. 1 (2010), pp. 127-141.

traits, characteristics, and mannerisms.³⁵ Since avatars in a narrative game share some functions with fictional characters in a story, they can be understood as “communicatively constructed artifacts” to whom we attribute their own intentions and mental processes.³⁶ As such, we can read them as aesthetic textual elements, as symbolic elements, or as thematic components of the story, as well as imagine them as fictional people, someone we pretend to exist beyond what is mentioned on the page or screen.³⁷

However, within the narrative world of a game specifically, they also function as game pieces that represent rules and regulate the range of interactions for the player. Schröter and Thon describe the three-fold quality of video game characters by adding the modes of *simulation* and *communication* to the mode of *narration* that traditionally belongs to the representation of fictional characters (in video games, the latter is mainly found as an element of “predetermined narrative representation” such as cut scenes). The simulation mode includes elements of interactive gameplay. It focuses on the “characters’ function as game pieces, which is connected to specific ludic abilities (such as ‘running’ or ‘shooting’) and characteristics (such as ‘health’ or ‘accuracy’) as well as to the game goals and the possibilities of interaction that the game provides.”³⁸ The communication mode, includes the aforementioned forms of self-representation and focuses on the avatar

35 For more on the recognizability of transmedial fictional characters, see Roberta Pearson or Ossa and Schmidt (Pearson, Roberta E.: “‘You’re Sherlock Holmes, Wear the Damn Hat!’: Character Identity in a Transfiction,” in: Paola Brembilla/Ilaria A. De Pascalis (eds.), *Reading Contemporary Serial Television Universes: A Narrative Exosystem Framework*, New York, NY: Routledge 2008, pp. 144-166; Ossa, Vanessa/Schmidt, Hanns Christian: “Playing with Batman. (De-)Constructing Transmedial Characters in THE LEGO BATMAN MOVIE,” in: Joachim Friedmann (ed.), *Narratives Crossing Boundaries*. Bielefeld: transcript 2023, pp. 149-170, <https://doi.org/10.14361/9783839464861-006>).

36 Eder, Jens. “Understanding Characters,” *Projections* 4, no. 1 (2010), pp. 16-40, here: p. 18.

37 Cf. Phelan, James: “Narrative as Rhetoric and the MTS Model,” in: Matthew Clark/James Phelan (eds.) *Debating Rhetorical Narratology: On the Synthetic, Mimetic, and Thematic Aspects of Narrative*, Columbus, OH: The Ohio State University Press 2020, pp. 135-50.

38 Schröter, Felix/Thon, Jan-Noël: “Video Game Characters. Theory and Analysis,” *Diegesis. Interdisciplinary E-Journal for Narrative Research* 3, no. 1 (2014), pp. 40-77, here p. 48.

as “representations of the players in the social space of the game.”³⁹ In game worlds, the affordances of the game rules and the attributes of the fictional character influence the creation of the avatar so that a blended identity between the physical and the virtual identity is constructed.⁴⁰ However, while it might be more apparent that playing a fictional character in a video game predetermines behavioral choices and courses of action from the virtual side (you will have a hard time playing a light-hearted Batman in a scripted video game), the physical influence on the blended identity is equally significant. This means that we are not only not independent of our gender, age, race, and educational background when we enter the virtual world but also that we carry our cultural and historical context—including all the biases—with us into the virtual realm.

Looking at our corpus, we see this, for instance, in *TRON*, when the virtual self of the protagonist is transformed into a car to participate in a race. Here, the mode of simulation completely takes over the representation. In *FREE GUY*, however, one of the main narrative developments consists of the protagonist Guy, a background character in a video game, becoming self-aware and developing a purpose beyond his ludic function as a game piece (someone to be robbed, an obstacle to overcome).

Questioning the list of examples with the avatar as an additional criterion for Metaverse narratives in mind, it is now apparent that *THE TRUMAN SHOW* and *WESTWORLD* deviate in another way from the main corpus—since both of them do not depict a digital world, the protagonists also do not use an avatar to enter this world. However, two other films that fit the criterion of avatar-centered movies come to mind: *AVATAR* and *SURROGATES*.

- *AVATAR*⁴¹

In 2154, an expedition to the planet Pandora, which is inhabitable for humans, employs avatars in order to gain the planet’s resources, all the while destroying its ecosystem.⁴²

39 Ibid.

40 Cf. Fox Harrell, D./Lim, Chong-U Lim: “Reimagining the Avatar Dream: Modeling Social Identity in Digital Media,” *Communications of the ACM* 60, no. 7 July (2017), pp. 50-61. <https://doi.org/10.1145/3098342>

41 *AVATAR* (USA 2009, D: James Cameron).

42 The transition into the avatar’s body is done by a scanning device not unlike the one in *THE THIRTEENTH FLOOR*. Even the intercut between the body in the scanner and the brain scan of the user are quite similar.

Figure 1: Three different realms in *SURROGATES*.



Source: Film stills: *SURROGATES* (USA 2009, D: Jonathan Mostow)

- *SURROGATES*⁴³

The film plays in a future where most humans use robots—so-called surrogates—to manage their daily lives. They connect to the surrogate via a chair with sensors and control the surrogates like an avatar. Since the humans are safe behind their walls and only the surrogates enter public space, murder has almost been eradicated until someone finds a way to kill the human controlling the surrogate with a specialized weapon.

SURROGATES is different from other examples because it depicts neither a digital virtual space nor creates a separated, physical, virtual world in the way *THE TRUMAN SHOW* or *WESTWORLD* do. Nevertheless, cinematography and set design still manage to establish three separate domains for a.) the avatars, b.) the controllers of the avatars, and c.) for so-called Dreads, who are against the use of surrogates (see Fig. 1). The world of the surrogates is colorful and full of perfect bodies, who often behave carelessly and overtly because they do not have to care for the integrity of their body. They possess superhuman strength and are able to jump on

43 *SURROGATES* (USA 2009, D: Jonathan Mostow).

moving cars or leap from tall buildings in the manner of powerful video game characters. The controllers of the surrogates live in small apartments that are shown mostly as hallways and look a bit rumpled. The Droits live in a separate district that resembles the dystopian real world shown in *READY PLAYER ONE*, with buildings in ruins, rusty containers, and junk lying around. The protagonist, Tom Greer, experiences an anxiety attack when he tries to move in public next to the surrogates and is thrown out when he tries to enter the space for the surrogate opposition, the Dreads. Nevertheless, there is also some conflation between the three spheres; for example, Tom's wife uses her surrogate even at home for interactions with Tom, and the leader of the Dreads turns out to be a surrogate himself. Thus, despite the special distinction, it is not always clear what (or who) is real or not.

MULTIPLAYER MODE AND NPCs

If we want to use our avatars to engage with others, we either need additional users to enter the same platform or so-called non-player characters (NPCs) as interactional partners. Again, in this regard, *DISCLOSURE* deviates from the other examples. Apart from a disembodied voice that gives guiding advice, Michael Douglas' character is the only person in the virtual space. This is yet another hint that this example reflects more on early fantasies of the internet, which understood it as an architecture of knowledge, primarily used to store data⁴⁴ and less about what we would call the Metaverse since a social component seems to be crucial for the Metaverse. As Zuckerberg as our most prominent Metaverse dreamer emphasizes here:

“The defining quality of the Metaverse will be a feeling of presence—like you are right there with another person or in another place. Feeling truly present with another person is the ultimate dream of social technology.”⁴⁵

However, this might be only a pit stop on our way to more significant developments in Metaverse applications:

44 Cf. DeKosnik, Abigail: *Rouge Archives: Digital Cultural Memory and Media Fandom*, Cambridge, MA/London: The MIT Press 2016, here: pp. 42-46.

45 M. Zuckerberg: “Founders Letter, 2021.”

“The first phase is the social Metaverse, which advocates for software development that facilitates people to connect through these meta worlds. This step will be critical in advancing the creation and incorporation of innovative and business scopes. The second phase is the ambient Metaverse, which is expected to offer a connection to the social Metaverse that goes beyond the scope of mobile devices. This phase will demand the inclusion of new devices that will allow access into the Metaverse through any form of the screen surface. The final phase is considered to be the singularity Metaverse which will only be achieved through hyper-connectivity.”⁴⁶

The last stage described here by Rawal et al. is, more or less, what we see imagined in *READY PLAYER ONE*, where the Oasis is an all-encompassing virtual world with different activities and environments that are all connected. Nevertheless, the social aspect is still prominent in the film:

“You can ski down the pyramids. You can climb Mount Everest—with Batman! Check out this place. It’s a casino the size of a planet. You can lose your money there, you can get married, you can get divorced. You can—you can go in there ...”⁴⁷

Wade describes the Oasis as a place to meet other people as well as fictional characters. It is where he meets all his friends and where most of the social life within the film’s reality takes place. All the other given examples (except *DISCLOSURE*) show either interaction between several avatars, avatars and NPCs, or NPCs among each other. Looking at the earlier criteria of immersion, we can now further

46 Rawal, Bharat S. et al.: “Opportunities and Challenges in Metaverse the Rise of Digital Universe,” in: *Metaverse—METAVERSE 2022: 18th International Conference*, Held as Part of the Services Conference Federation, SCF 2022, Honolulu, HI, December 10-14, 2022, Proceedings, Berlin, Heidelberg: Springer 2022, pp. 3-17. https://doi.org/10.1007/978-3-031-23518-4_1

47 Wade in *READY PLAYER ONE*, 00:04:05. The last place not mentioned in the dialogue is a motel, implying the possibility of having virtual sex. It is notable that the suggested interactions (casino, marriage, sex) here evoke the stereotypical image of Las Vegas, another artificially created place that Gundolf S. Freyermuth names as an immersive place, anticipating future virtual realities (Cf. Freyermuth, Gundolf S: “Vegas, Disney, and the Metaverse. On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century,” in: Benjamin Beil et al. (eds.), *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript 2022, pp. 17-89, <https://doi.org/10.14361/9783839462003-002>).

distinguish between a human (controlling an avatar) or an NPC being the one immersed in the virtual space to the degree that they do not realize anymore that there is another reality outside of their world. The latter is, for example, the case in *WESTWORLD*, where the robots become slowly self-aware, in *FREE GUY*, where the protagonist is an NPC, and in *THE THIRTEENTH FLOOR*, where it is eventually revealed that the programmers creating the virtual simulation of LA are unknowingly themselves NPCs in just another virtual simulation.

MONETARIZATION & GAMIFICATION

A growing number of real-life applications are discussed in the context of the Metaverse—even if there is little consent about the exact criteria for which ones are included and which are not. Most of them are digital virtual spaces, including customization of avatars, interaction with NPCs, and access through controllers, but not necessary headsets to enter a 3-D VR environment. Prominent current examples of Metaverse applications are *FORTNITE*, *ROBLOX*, and *MINECRAFT*.⁴⁸ Looking at these examples, the three-dimensional visualization of the virtual world is less important than social interaction, a variety of possibilities for how to interact, and user-generated content seem to be (which supports the development stages assumed by Rawal et al.). All three examples are gaming platforms, and looking at new Metaverse platforms on the rise, gaming is persistently a prominent activity for Metaverse users. Another driving force behind the development of Metaverse applications is the monetarization of content—for example, through avatar customization. The possibilities of designing or buying unique items and fashion for an avatar seem to be lucrative business models, especially for high-quality brands and novelty items.⁴⁹

It is, therefore, not surprising that several of the fictional versions of the Metaverse in my corpus also depict game worlds and that several of the examples that are not explicitly about game worlds still employ game-like elements or aesthetics. For example, the aforementioned car chase in *TRON* (see Fig. 2). Next to the competitive and agon-centered quality of this interaction, the design of the

48 *FORTNITE* (Epic Games, 2017, O: Epic Games); *ROBLOX* (Roblox Corporation, 2006, O: Roblox Corporation); *MINECRAFT* (Mojang Studios, 2011, O: Markus Persson/Jens Bergensten).

49 See for example, Lamerichs, Nicolle: “Towards a Responsible Metaverse Digital Fashion, Avatars and the Promise of Identity in Virtual Worlds,” in this volume, pp. 335-350.

avatar and the NPCs as car-like entities for the duration of this sequence is reminiscent of the avatar being no more than a game piece in a primarily ludic game.

Figure 2: Tron Car Chase



Source: Film still, TRON (USA 1982, D: Steven Lisberger).

Especially in more recent examples, monetarization is also a topic for people entering virtual reality; quite often, this is also visualized. In WESTWORLD, the quality of the experience depends on the money spent on the trip; in READY PLAYER ONE or FREE GUY, avatars can amass valuable items and, with it, increase their social status. Whenever an avatar is killed, bystanders can pick up the money that is left behind by the deceased. It bursts out of them, ready for others to collect. Gameplay elements and monetarization are primarily addressed in the more recent examples depicting the Metaverse. However, it is notable that despite being an important factor for real-world Metaverse applications, user-generated content is rarely depicted as a salient criterion in fictional versions of the Metaverse.

Table 2: Overview of the final list of examples and categories

Film	Virtual Space	Immersion	Digitallity	Transition	Avatar	Multy	NPC	Game	Money
Tron	X	O	X	3	X	O	X	X	O
Disclosure	X	O	X	1	X	O	(O)	O	O
The Truman Show	X	X	O	4	O	O	X	O	O
The Matrix	X	X	X	2	X	X	X	X	O
The Thirteenth Floor	X	X - NPC	X	3	X	X	X	O	O
eXistenZ	X	X	X	2	X	X	X	X	O
Avatar	O	O	O	3	X	X	X	O	O
Surrogates	O	(X)	O	2	X	X	O	(X)	X
Westworld	X	X - NPC	O	4	O	X	X	X	X
Ready Player One	X	O	X	1	X	X	X	X	X
Free Guy	X	X - NPC	X	1	X	X	X	X	X

UPLOAD⁵⁰

One quite recent example that not only checks all the boxes in my matrix but also depicts most of the criteria nuanced and critically is the Amazon show *UPLOAD* (2020-present). It is a veritable kaleidoscope of Metaverse tropes but also challenges viewers to question the social and technical developments of post-digital society.

Virtual Space: Digital and Immersive

To be *uploaded* means to enter one of several platforms that offer a virtual home for the mind after death. The physical body is destroyed during the process, so in case of critical injury, it might be a fatal choice to upload instead of life-sustaining measures, for example, surgery. On the one hand, this ups the stakes about the decision to upload; on the other hand, being dead seems to have become a technicality in a world where the living constantly interact with the dead.

50 *UPLOAD* (USA 2020-present, Amazon).

The premium virtual afterlife, Lakeview, which our protagonist Nathan Brown enters, is designed like a hotel. To manage overcrowding, the guests only interact with people living on the same floor; everyone else is not visible to them. However, the digital environment glitches in places where several people reside due to the high demand for processing power. This is only one example of how the show includes technical difficulties and dangers of a completely digital environment.

In order to adjust to life in the virtual world, it is necessary to maintain an experience that is as life-like as possible. This means the people in this world are designed to experience bodily functions, such as sleep or hunger, and newcomers are encouraged to develop new everyday routines. Apparently, without a certain level of immersion into the virtual world, some guests do not adjust to the new situation and commit suicide. To avoid this and help with the transition into virtuality, every guest has a personal service employee at their side—an angel—whom they can call any time.

Transitions: Devices and Scans

Almost all of the transitions or borders mentioned above are utilized in **UPLOAD**. The hotel guests themselves are uploaded via a scanning device that lets their heads explode. As I mentioned earlier, it is a fairly final decision.

However, there are multiple ways for the living to communicate with the dead and even visit them. Video chats, phone calls, and text messages between the realities are no problem. The hotel has a restricted floor where people who do not live there meet for virtual parties. Although the hotel guests are forbidden to intermingle with these party guests, there are multiple other ways for them to meet people from the world of the living. They can receive visitors who use VR headsets or even full-body suits that allow for sensual experiences. For most of the three seasons already broadcasted, Nathan and his girlfriend, Ingrid Kannerman, try to maintain a relationship across realities. At the end of season one, Ingrid pretends in front of Nathan that she decided to voluntarily upload to be closer to him and to pressure him into continuing their relationship. During this phase of their relationship, Ingrid spends almost all of her time in a full-body suit in the bathtub of her apartment, struggling with adverse side effects of having a physical body: hunger, skin rashes from the equipment, cramps from lack of movement, and so on. Ingrid's competition for Nathan's affection is his angel, Nora. She mainly uses VR headsets and an avatar modeled after her physical appearance to interact with Nathan. This is also shown as problematic when a new service employee chooses Nora's avatar without telling Nathan about the switch.

Plugs or sockets are only used in UPLOAD when the possibility of downloading is introduced. Finally ending the permanence of death, the digital mind of a deceased person is downloaded via a port in the neck of a clone of their physical body, making the physical reality as virtual—as “almost so”—as the digital afterlives.

The last category, a doorway or a portal for the people living in the virtual world to get out, is playfully introduced in several ways: There is a secret passage in a hedge that leads to a rogue part of the afterlife, like the Darknet of the internet. There is also a waterfall that allegedly leads back into the physical reality but only irreversibly scrambles the data stream of an avatar, which leads to the aforementioned suicides. Moreover, when Nathan tries to leave Lakeview to investigate other options for his afterlife, he is sucked into a tube in the virtual reality and saved as data on a portable hard drive, which is later logged into a different console to transfer him to another virtual reality.

In many ways, UPLOAD disrupts the strict separation between virtual and physical worlds, as depicted in most previous examples. Mirroring how our daily lives are full of digital encounters in post-digital society,⁵¹ Nathan is in no way isolated from the physical world. Nora even gifts him a design tool that not only allows him to reprogram his own environment. He can also hack into digital structures impacting the physical world and murder someone by manipulating the controls of an elevator. However, his agency and autonomy are certainly impaired by his virtual status. This is most evident in his funeral scene.⁵² On the one hand, the event is live-streamed, so it happens parallel in New York, Los Angeles, and Lakeside, which means Nathan is able to attend himself. On the other hand, the event is completely planned and organized by his girlfriend, Ingrid, who is also the account holder of his virtual identity. This means she has the authority to decide about his whole environment, even to redress him with the click of a button. She turns the funeral into a PR event that does not reflect Nathan’s past in any way.

However, the abundance of transitions, entryways, and exits negates their liminal status. There is no more *in-between*; everything is entangled. The separation between the digital and the physical world blurs constantly. With this, the series—more than other examples—reflects on the way in which *being virtual* or interacting virtually has become an everyday occurrence and how, for example, digital applications permeate our lives in the post-digital society.

51 Jarvis, Liam/Savage, Karen: “Introduction: Postdigitality: ‘Isn’t It All “Intermedial”?”” in: idem. (eds.), *Avatars, Activism and Postdigital Performance: Precarious Intermedial Identities*, London: Methuen Drama 2022, pp. 1-16, <http://dx.doi.org/10.5040/9781350159341.ch-1>

52 UPLOAD, S1; E:3.

Avatars: Engaging other Players and NPCs

In the virtual reality, Nathan interacts with other hotel guests, visitors using technological devices and controlling an avatar, and NPCs. One of the problems concerning avatars that is explored in *UPLOAD* is one I already mentioned above: the unreliability of one's identity. Not only is Nora's avatar appropriated by another angel, but Ingrid also lends her avatar to someone else in order to get a break from her extended bathtub time. She hires an actor to play her in the virtual world. In this instance, Nathan is fooled twice by the possibility of anonymity or identity fraud in the virtual world (and twice by Ingrid, as he does not know he is interacting with an externally controlled avatar and thus has no chance to suspect this avatar is controlled by someone other than Ingrid).

In the case of the guests, the uploaded minds, another problem arises. They relinquish complete control to the corporation that owns the virtual reality they live in. This means that, for example, their thoughts and memories can be tempered with, and their bodies can be altered or even duplicated, bringing the malleability of digital data up to an existential level. Although the physical world has laws and guidelines against such conduct, both happen to Nathan.

The biggest topic to explore, however, are the NPCs. They are identical bell-boys living to serve the wishes of the hotel guests. They are trained by Nora to appear more like humans, which questions the limits of AI to imitate human behavior. Throughout the three seasons, they develop their own side-story, which is a journey to more and more self-awareness and lets them step outside of their existence as mere game pieces. In season three, after the possibility of downloading was introduced into the show, some NPCs are even downloaded into artificial bodies to train in the physical world how it feels to be human and thus further blur the lines between digitalized human minds and AI.

Monetization, Gamification, Security Issues

The aspect of monetization and micropayments is addressed in multiple ways in *UPLOAD*. First of all, the protagonist is entirely under the control of his still-living girlfriend, which means all extras in the virtual world—such as the minibar or fancy outfits—are connected to her bank account. The amount of money spent decides the quality of life in the virtual afterlife, and even prior to entering Lakeview, it is a crucial factor in the choice of the virtual afterlife in general. Only the fairly wealthy can afford Lakeview. This is shown in an episode where Nathan tries to leave Lakeview and live in a different virtual world in order to finally become independent of Ingrid's financial control. Another option for a cheaper

afterlife, even within Lakeview, is the *2gig floor*. There, in the basement of the hotel, live people who have only 2 gigabytes of processing power per month available. This means excessive movement, detailed environments, or even complicated thoughts are prone to cost all available data in a short period of time and henceforth leave them frozen for the rest of the month until their accounts are freed up again. Through these details, the serial acknowledges the highly commercial interests behind most virtual environments and the excessive needs for processing power—and the connected financial and environmental costs—that most other fictional visions of the Metaverse (utopian or dystopian) leave out.

Although Nathan does not experience many elements of gamification during his stay in Lakeview, there is another guest at the hotel who turns his experience there into a game world. Dylan is a little boy who struggles with the fact that his avatar will always stay in a pre-adolescent body because that's how his account holders, his parents, want to keep him. He uses a specific *game mode* in which he can engage in fight sequences with the NPCs of Lakeview, reminiscent of the game *STREETFIGHTER*,⁵³ thus referring to the high frequency of combat-style game elements in many multi-player online role-playing games.

Both examples show the virtual protagonists as dependent on their account holders. In line with this, the show presents several problems connected to power relations, security issues, data protection, and surveillance. Due to the money trail they leave, the protagonist's actions are entirely transparent to their account holders, and due to constant monitoring by the angels, they are even more transparent to the company owning Lakeview. To escape this state of omniscient surveillance, the characters enter the *grey zone*, a virtual version of the Darknet hidden behind a hedge in Lakeview. However, if they stay too long, they might get erased when the hourly position check of their avatars does not get a clear signal back. So far, the series does not show us how this might play out. However, in another instance, when Nathan is off the grid for a while, a service employee is afraid of repercussions for having lost a customer and creates a copy of him from a backup drive. Throughout the following legal problems on how to handle two existing versions of a person with one identity, it turns out that all data belonging to the uploaded minds is legally owned by the company hosting Lakeview, which brings up—next to the question of online privacy—the question of copyright and ownership of intellectual property (or even intellect).

Another aspect that is quite important in the discourse about current Metaverse platforms but is rarely addressed in fiction is the element of user participation.

53 *STREETFIGHTER* (Capcom, 1989, O: Takashi Nishiyama).

Presumably, because the element of interaction is exactly what is missing in audiovisual media, the audiovisual fantasies of the Metaverse do not emphasize this aspect all too much. However, in *UPLOAD*, Nathan originally developed a completely malleable, user-generated, free platform where users would have been able to design their own virtual environment—which would have been a considerable competition for the consumption-oriented, corporate-controlled Lakeview. However, before he could realize his vision, he was killed. The shareholders of Lakeview eventually used his designs to create their own version of a user-generated space to lure low-income households into an early move into the virtual environment (this plot element makes it the third instance in the corpus of a programmer looking for stolen code or designs. Apparently, the safety of intellectual property is a recurring element of Metaverse narratives). In *UPLOAD*, the promise of user-generated content and democratic access to assets in the Metaverse is shown as a utopian imagination that is only realized as a corporate trap with malicious intent. Meaningful user participation may be desirable, but it is yet to be achieved.

CONCLUSION

Although only a small corpus was examined, several recurring themes have been identified: Virtual realities as “almost so” copies of a perceived everyday reality, digital worlds, often as game worlds, that might be immersive enough to confuse their users about their ontological status, several devices and pathways into virtual realms, possibilities of interactions through avatars or with AI-generated beings, as well as newer aspects of gamification or monetarization. Although this paper did not directly tackle the question of what the Metaverse is, I hope the discussion shed some light on the many ways the Metaverse, as well as elements essential for the Metaverse, are depicted in fictional, audiovisual media. Furthermore, it pointed to some broader considerations about the nature of our reality, (virtual) identity, concerns about security, surveillance in digital environments, and the use of AI technology that are represented in the narratives about the Metaverse and thus part of the larger cultural imaginary connected to it. The increased depiction of gamification and monetarization shows that more and more actual applications of the Metaverse inform fictional representations of the Metaverse. It might be interesting to observe when we see more audiovisual examples that depict the Metaverse as part of our reality—and not as a dream in science fiction.⁵⁴

54 To add one last example, the serial *MYTHIC QUEST* (2020-present, Apple TV+) depicts in its third season a game designer working on the Metaverse. This is still shown as a

LITERATURE

- Baudrillard, Jean: *Simulacra and Simulation*. Ann Arbor, MI: University of Michigan Press 1994.
- Beil, Benjamin: *Avatarbilder: Zur Bildlichkeit des zeitgenössischen Computerspiels*, Bielefeld: transcript 2012, <https://doi.org/10.1515/transcript.9783839421550>
- Dawson, Graham: *Soldier Heroes: British Adventure, Empire and the Imagining of Masculinities*. London: Routledge 2005.
- DeKosnik, Abigail: *Rouge Archives: Digital Cultural Memory and Media Fandom*, Cambridge, MA/London: The MIT Press 2016.
- Fox Harrell, D./Lim, Chong-U Lim: “Reimagining the Avatar Dream: Modeling Social Identity in Digital Media,” *Communications of the ACM* 60, no. 7 July (2017), pp. 50-61. <https://doi.org/10.1145/3098342>
- Eder, Jens. “Understanding Characters.” *Projections* 4, no. 1 (2010), pp. 16-40.
- Freyermuth, Gundolf S: “Vegas, Disney, and the Metaverse. On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century,” in: Benjamin Beil et al. (eds.), *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript 2022, pp. 17-89, <https://doi.org/10.14361/9783839462003-002>
- Gunkel, David J.: “The Real Problem Avatars, Metaphysics, and Online Social Interactions,” *New Media & Society* 12, no. 1 (2010), pp. 127-141.
- Günzel, Sternagel/Mersch, Dieter: “Tracing the Avatar. An Afterword,” in: Rune Klevjer: *What is the Avatar? Fiction and Embodiment in Avatar-Based Single-player Computer Games. Revised and Commented Edition*. Bielefeld: transcript 2022, pp. 219-226.
- Haraway, Donna: “The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others,” in: Larry Grossberg/Cary Nelson/Paula Teichler (eds.), *Cultural Studies*, New York, NY: Routledge 1992, pp. 295-337.
- Iniyar, E.: “Beyond Controllers: Apple’s Vision Pro Brings Hand Gestures and Eye Tracking to Virtual Worlds,” *Encora*, October 27, 2023, <https://www.encora.com/insights/beyond-controllers-apples-vision-pro-brings-hand-gestures-and-eye-tracking-to-virtual-worlds>
- Lamerichs, Nicolle: “Towards a Responsible Metaverse Digital Fashion, Avatars and the Promise of Identity in Virtual Worlds” in: Beil, Benjamin et al. (eds.): *Playing the Metaverse*. Bielefeld: transcript, 2024, pp. 335-350.

fairly philanthropic, escapist endeavor that doesn’t lead to a tangible product, but it is not depicted as science fiction or alternate reality.

- Marr, Bernard: "A Short History of the Metaverse," *Forbes*, March 21, 2022, <https://www.forbes.com/sites/bernardmarr/2022/03/21/a-short-history-of-the-metaverse>
- Mersch, Dieter: „The Avatar,“ in: Dieter Mersch et al. (eds.), *Actor & Avatar*. Bielefeld: transcript 2023, pp. 24-29, <https://doi.org/10.14361/9783839467619-002>
- Ossa, Vanessa: *The Sleeper Agent in Post-9/11 Media*. Cham: Palgrave Macmillan, 2022.
- Ossa, Vanessa/Schmidt, Hanns Christian: "Playing with Batman. (De-)Constructing Transmedial Characters in THE LEGO BATMAN MOVIE," in: Joachim Friedmann (ed.), *Narratives Crossing Boundaries*. Bielefeld: transcript 2023, pp. 149-170, <https://doi.org/10.14361/9783839464861-006>
- Pearson, Roberta E.: "'You're Sherlock Holmes, Wear the Damn Hat!': Character Identity in a Transfiction," in: Paola Brembilla/Ilaria A. De Pascalis (eds.), *Reading Contemporary Serial Television Universes: A Narrative Exosystem Framework*, New York, NY: Routledge 2008, pp. 144-166.
- Phelan, James: "Narrative as Rhetoric and the MTS Model," in: Matthew Clark/James Phelan (eds.) *Debating Rhetorical Narratology: On the Synthetic, Mimetic, and Thematic Aspects of Narrative*, Columbus, OH: The Ohio State University Press 2020, pp. 135-50.
- Rawal, Bharat S. et al.: "Opportunities and Challenges in Metaverse the Rise of Digital Universe," in: *Metaverse—METAVERSE 2022: 18th International Conference*, Held as Part of the Services Conference Federation, SCF 2022, Honolulu, HI, December 10-14, 2022, Proceedings, Berlin, Heidelberg: Springer 2022, pp. 3-17. https://doi.org/10.1007/978-3-031-23518-4_1
- Schmeink, Lars: "Incarnations of the Metaverse in Science Fiction," in: Beil, Benjamin et al. (eds.): *Playing the Metaverse*, Bielefeld: transcript 2024, pp. 117-138.
- Schröter, Felix/Thon, Jan-Noël: "Video Game Characters. Theory and Analysis," *Diegesis. Interdisciplinary E-Journal for Narrative Research* 3, no. 1 (2014), pp. 40-77.
- Shields, Rob: *The Virtual*, London: Routledge 2003.
- Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.
- Wade, N. J.: "Charles Wheatstone (1802-1875)." *Perception* 31, no. 3 (2002), pp. 265-272.
- Wiesing, Lambert: *Artifizielle Präsenz, Studien zur Philosophie des Bildes*, Frankfurt/M.: Suhrkamp 2005, pp. 107-124.
- Wittgenstein, Ludwig: *Philosophische Untersuchungen*. Frankfurt/M.: Suhrkamp, 1977 [1953].

Zimmer, Jonas: *Transzendenz gestalten: Interdisziplinäre Paradigmen für das Design virtueller Räume*. PhD Thesis, University of Cologne 2023, pp. 126-131, <http://kups.ub.uni-koeln.de/id/eprint/73285>

Žižek, Slavoj: *Welcome to the Desert of the Real! Five Essays on September 11 and Related Dates*. London: Verso 2002.

Zuckerberg, Mark: “Founders Letter, 2021,” *FB*, January 28, 2021, <https://about.fb.com/news/2021/10/founders-letter>

FILMOGRAPHY

AVATAR (USA 2009, D: James Cameron)

DISCLOSURE (USA 1994, D: Barry Levinson)

EXISTENZ (USA 1999, D: David Cronenberg)

FREE GUY (USA 2021, D: Shawn Levy)

MINORITY REPORT (USA 2002, D: Steven Spielberg)

MYTHIC QUEST (USA 2020-present, Apple TV+)

READY PLAYER ONE (USA 2018, D: Steven Spielberg)

SURROGATES (USA 2009, D: Jonathan Mostow)

THE THIRTEENTH FLOOR (USA 1999, D: Josef Rusnak)

THE MATRIX (USA 1999, D: Lana and Lilly Wachowski)

THE TRUMAN SHOW (USA 1998, D: Peter Weir)

TRON (USA 1982, D: Steven Lisberger)

UPLOAD (USA 2020-present, Amazon)

WESTWORLD (USA 2026-2022, HBO)

GAMOGRAPHY

FORTNITE (Epic Games, 2017, O: Epic Games)

MINECRAFT (Mojang Studios, 2011, O: Markus Persson/Jens Bergensten)

ROBLOX (Roblox Corporation, 2006, O: Roblox Corporation)

STREETFIGHTER (Capcom, 1989, O: Takashi Nishiyama)

Body-Crash: “The Impact Will Be Real”

On How the Metaverse Could Affect Our Bodies

ICARE BAMBA

“Thanks” Joe said to the spray can. We are served by organic ghosts, he thought, Who, speaking and writing, pass through our new environment. Watching, wise, physical ghosts from the full-life world, elements of which have become for us invading but agreeable splinters of a substance that pulsates like a former heart.

PHILIP K. DICK¹

INTRODUCTION

In the history of the United States, few concepts have federated and embodied American identity as much as the concept of the *frontier*. Through the Wild West, then the moon, the deep historical dynamism of the United States’ history seems to have always rested on this founding notion, this myth that stands for a human limit to be pushed back, wild territories to be conquered: whether on land or in space, real or imaginary, intellectual or sporting ... The idea of the frontier represents these conquering people or individuals galvanized by the idea of being *first*. It was already present in the (re)discovery of the continent by Europeans. US Americans are those of us who left, who left the *old* world, for more fertile lands. For a new existence.

In this respect, it is not surprising that this myth of the frontier is resurfacing today to motivate the masses to believe in high ideals and positive and promising

1 Dick, Philip K.: *Ubik*, Boston, MA: Mariner Book 2012, p. 225.

futures.² Along with the conquest of Mars, the conquest of the Metaverse is the ideological pursuit of the American *Dream*, which is constantly confronted with a frontier, a limit that must be overcome, transcended.

That is what the tech giants Meta, Microsoft, and Apple are promising when they point to this new direction. “*The impact will be real*,”³ they say, highlighting how this new El Dorado, rich in potential, will redefine our relationship with the virtual. It is already proposed that we go and *inhabit* the Metaverse, just as we might inhabit the Earth.⁴ Our bodies thus seem very close to touching virtual reality and melting into it. It seems less and less virtual. This movement of de-virtualization of the virtual, which seems to give it more and more weight over material reality, is largely based on so-called ‘immersive’ technologies (i.e., XR for Extended Reality technologies). With them, in the Metaverse, it is not only our relationship to the virtual but also to the real that will change.

A major challenge is emerging: trying to understand more precisely what this new relationship with the virtual and the world entails; to grasp the impact of using these immersive technologies in our lives; to understand and even anticipate how we will relate as *embodied* subjects to the new world of the Metaverse.

The approach I undertake to address this issue is twofold. First, it consists in selecting, from the totality of the discourses swirling around the subject, one particular discourse: that of science fiction. Science fiction authors can not only claim to be the precursors of the term Metaverse, but they also permeated the collective imagination, prefiguring this discursive totality. In a way, re-reading them might be the best way to understand a concept they created, especially when all the discourses seem to be of an unthinking form of science fiction.⁵

The corpus I propose to analyze has the quality of having elaborated operative concepts and having thought of them in concrete situations. They are certainly fictitious, but they develop an important quantity of thoughts, reflections, and speculative experiences, which form an inexhaustible source for the understanding of the present. Through Neal Stephenson’s *Snow Crash* (1992), William Gibson’s

2 Cf. for example: Page, Thomas: “Pixel Pushers: How the Metaverse Became Real Estate’s New Frontier,” *CNN*, September 23, 2022, <https://edition.cnn.com/style/article/metaverse-real-estate-market-2022-spc-intl/index.html>

3 Meta, “The Metaverse May Be Virtual, but the Impact Will Be Real,” *FB*, September 5, 2022, <https://about.fb.com/news/2022/09/the-metaverse-may-be-virtual-but-the-impact-will-be-real/>

4 Cf. for example the *Skylum* project, a start-up which, among others, proposes to buy high-standard flats in the Metaverse (<https://skylum.house/>).

5 As they all try to predict, anticipate and sell the future.

Neuromancer (1984), and Philip K. Dick's *Ubik* (1969),⁶ I mobilize a corpus that has brought its characters into contact with a virtual reality close to the Metaverse—alternately called Metaverse, cyberspace or pseudo-universe. The characters have lived, loved, struggled there and represent in some way *the first* to venture there. With them, I defend the idea that the interpretation and understanding of literary works can allow for coherent thought about the Metaverse and the present in general.⁷

However, my approach to these texts is to choose a particular perspective. It is inspired by the phenomenological method,⁸ which analyzes the experience of consciousness and the way the subject relates to the world and the objects around them. This phenomenological interpretation of past and American authors seems fundamental to me on two levels:

First, it has the merit of asking what will happen to our bodies in the Metaverse, starting from an archaeological reflection on the material conditions of possibility that determine our connection, our relationship to the virtual. It is the opportunity to present a detailed analysis of the relationship between a *possible* subject and a technical object. I then question the lived experience involved in this relationship and the structures of meaning that emanate from it.

Secondly, if the very nature of the Metaverse still eludes us—its definition (or definitions?) remaining elusive—such an approach will make it possible, by returning to the fundamental conditions of possibility of the Metaverse experience, to question its nature and elaborate a concrete and more precise characterization. Better still, perhaps by starting from the bodily experiences implied by technology, and enlightened by science fiction literature, an ontology of the virtual may emerge from these few reflections.

6 For my research, I used the eBook editions of these: Dick, Philipp K.: *Ubik*, Boston, MA: Mariner Book 2012; Gibson, William: *Neuromancer*, London: Gollancz 2016; Stephenson, Neil: *Snow Crash*, New York, NY: Del Rey 2022.

7 The idea came to me while reading Gundolf S. Freyermuth: “Vegas, Disney, and the Metaverse,” in: Beil, Benjamin et al. (eds.), *Playful Materialities*, Bielefeld: transcript 2022, pp. 17-98. Freyermuth compares *The Street*, the vibrant and colorful place of the *Snow Crash* Metaverse, with the Las Vegas Strip, a very real place, which has undoubtedly served as an operating model for the conception of contemporary Metaverses.

8 Noticeably in Husserl, Edmund. *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy. Book I*. Trans. F. Kersten. The Hague: Martinus Nijhoff, 1983.

Due to the shortness of the text, these considerations take on the aspect of avenues of research, more than real fundamental breakthroughs: the bulk of the work remains to be developed on this basis.

Finally, the development and exposure of my reasoning will be as simple and direct as possible. Drawing on the said works of science fiction, I will seek to excavate the material and carnal conditions of the Metaverse experience to determine its fundamental phenomenological definition. Then, I will question the impact and consequences of my analyses on the subjects' experiences and the becoming of their bodies in the Metaverse. Thus, from a more precise understanding of the Metaverse (first part), I will try to grasp its stakes and possible avenues of research (second part).

THE DEVICE-BODY AND THE MACHINE-FLESH

I think it's fruitless to take the self-mirroring of the mind as a starting point and [...] I find no research worth doing unless it uses the body as a guide. Not a philosophy as a *dogma*, but rather as a preliminary guideline for research.

FRIEDRICH NIETZSCHE⁹

After this introduction, it still seems difficult to understand what justifies the corporal theme that we have decided to follow in our explanation of the Metaverse. Certainly, the methodological a priori that guides us implies going back to the lived experience, but it is still unclear if this postulate is valid and *in what way* it really enlightens us on the Metaverse.

The Virtual Nexus

DECENTRALAND, MERGE, HORIZON WORLD, SECOND LIFE, ROBLOX, FORTNITE, and so on—so many experiences, worlds, and Metaverses that do not necessarily have anything to do with each other. Some seem to be video games; others work and meeting places. However, a fundamental and minimal characteristic remains:

9 Nietzsche, Friedrich: *The Complete Works of Friedrich Nietzsche XV, Unpublished Fragments from the Period of Thus Spoke Zarathustra (Spring 1884—Winter 1884/85)*, trans. Paul S. Loeb/David F. Tinsley, Stanford, CA: Stanford University Press 2022, p. 246.

they all engage the user in an experience of spatiality. Because the Metaverse implies at least a spatial dimension in which the interactions will *take* place. The Metaverse is a *spatial representation* of a virtual space that until now has lacked one.¹⁰ This is the first definitional element that Neal Stephenson insists on when he introduces the concept:

“So, *Hiro*’s not actually here at all. *He*’s in a computer-generated universe that his computer is drawing onto his goggles and pumping into his earphones. In the lingo, this imaginary place is known as the **metaverse**. Hiro spends a lot of time in the metaverse. [...] The Street seems to be a grand boulevard going all the way around the equator of a black sphere with a radius of a bit more than ten thousand kilometers. That makes it 65,536 kilometers around, which is considerably bigger than Earth.”¹¹

With the Metaverse, we move from a web *page* accessed by a browser (Chrome, Explorer, etc.) to a virtual space in two or three dimensions, wherein we will *finally* ‘navigate.’ For this spatialization of the virtual, its augmentation into a *measurable* space implies from the outset a punctum that would represent the position of a spectator in the ‘virtual scene.’ In the virtual world, spatiality implies a perceptual element that engages a spectator immersed and *situated* in the scene. For virtual space to exist is to be perceived, or at least to exist for a possible perceptual system.

It is sometimes a simple camera that runs through the scene. But it is also, in the case of video games and more elaborate Metaverses, a simulated body with various forms and aptitudes. It appears that such a virtual space involves the presence of an *avatarial dimension*, whether incarnate or not, interactive or not, visual or auditory. The Metaverse, like video games, is thus based on the development of the so-called 3Cs (Camera, Character, and Controller). This virtual perspective in the scene, therefore, implies a place but also an ability to move in the scene, from one coordinate to another. If this virtual space is interactive, the virtual body must intimately *belong to* the space in which it is found. Its perceptive capacities and principles of interaction must be coherent, *in sync*, with the host space. Together, they form what I call a *virtual nexus*, which bonds the body to ‘its’ space. Indeed, the virtual body *integrates* the properties of space in order to move and exist in it: physics, visibility, and other forms of sensitivity, etc. This intertwining

10 Thus, for Gibson, cyberspace is a *non-space*, despite its undoubted sensory dimension.

In this way, he underlines the paradoxical aspect of virtual spatiality.

11 N. Stephenson: *Snow Crash*, emphasize IB, p. 27.

can be found from the very first phases of the development of a video game and is the basis of its ludic principles—even before the appearance of a player.¹²

While it seems natural to characterize a video game by its nexus because the avatar must necessarily be able to evolve in it, this is less natural in the case of internet browsing. However, with the spatialization of the virtual, the Metaverse proposes to give a corporal dimension to our relationship with the internet. It thus moves from the age of the printing press (the two-dimensional web page) to that of the massively multiplayer online video game—and even further.

Now that we have defined the *metaversal* architecture from a software point of view as a minimal spatio-corporeal entity, the material side underlying it must also be analyzed to fully grasp its carnal significance.

The Device Body

With the growth of the web, we are witnessing a quantitative and qualitative inflation of the machines that determine access to the network (*network machines*). Yesterday, limited in space (fewer, more expensive) and time (slower, less efficient), they now form a complex and sprawling ecosystem. Fiber optic networks, 5G antennas in permanent connection with geostationary satellites, but also headsets and extended reality glasses—not forgetting, of course, USB peripherals, smartphones, and other tablets. Along with the miniaturization of components and transistors comes a genuine *rebound effect*,¹³ which consists of a rise in consumption linked to the reduction in production costs made possible by innovation. This rebound effect is expressed in the multiplication of mechanical devices that surround our bodies to allow access to the network—along with everyday life activities: this is the reign of the peripherals as network and life interfaces.

A kind of paradox arises: miniaturized technology has never been so numerous, yet *invisible*, to the extent that it seems to become virtual itself. This material

12 Cf. Merleau-Ponty, Maurice: *The Visible and the Invisible*, Evanston, IL: Northwestern University Press 1968. Especially the chapter “*The Intertwining—The Chiasm*” where Merleau-Ponty explores the co-ownership of the sensing body (flesh) and the world sensed by the body. The body belongs to the world in a kind of reversibility of sensitivity, for as a sensible being it is both sensing and part of the sensible. The *virtual nexus*, properly understood, is therefore a simulation of this phenomenological concept.

13 Cf. Schneider, François: “The Rebound Effect,” *The Ecologist (French Edition)*, no 11, October 2003, p. 45; Binswanger, Matthias: “Technological Progress and Sustainable Development: What About the Rebound Effect?,” *Ecological Economics* 36 (2001), pp. 119-132.

infrastructure determines our possible experience of the Metaverse, as it is intimately connected to our body, which it encloses like a *prosthetic matrix*, endowing it with the capacity to ‘walk on the invisible.’¹⁴ Without this prosthesis, an interweaving of organic and machine matter, a mixture of material and virtual, the organic body remains powerless to connect, unable to reach the world beyond. As Case, the hacker and main character of *Neuromancer*, experiences at the beginning of the book when removed from cyberspace by a chemical process. That way, his former employers make him unable to connect and navigate in cyberspace, punishing him for his treason:¹⁵

“They damaged his nervous system with a wartime Russian mycotoxin. Strapped to a bed in a Memphis Hotel, his talent burning out micron by micron, he hallucinated for thirty hours. The damage was minute, subtle, and utterly effective.”¹⁶

This integration of the body into the machine obeys a process of virtualization of the body through machine coupling. Indeed, for a sensory relationship to be established with the avatar dimension, the machine must mimic the sensory properties of the body, as a glove mimics its hand. Without us being aware of it in our daily use, it replicates our body to communicate with it at a sub-language level. In this way, it creates an underlying carnal infrastructure that addresses us in ‘body language.’

Thus, helmets frame our skulls, glasses, and lenses are grafted onto our eyes, headphones are inserted into our ears, and microphones close to our mouths pick up our slightest vocal inflections. As the joysticks are placed in our hands, without us even realizing it, we are faced with a *second body*, a material sensory replica of our organic system. And we coil ourselves in it, voluntarily, with a deep, carnal connection, full of implicit meaning. This machine-like mimicry of the human body, which can be observed and verified in our everyday environment, operates as an unconscious and necessary projection of the body towards its environment

14 This prosthetic dimension in videogames has been studied by Rune Klevjer in his paper “Enter the Avatar: The Phenomenology of Prosthetic Telepresence in Computer Games,” in: Sageng, John Richard/Fossheim, Hallvard/Larsen, Tarjei Mandt (eds.): *The Philosophy of Computer Games*, Dordrecht: Springer Netherlands 2012, pp. 17-38. I pursue here his reflections by radicalizing them in a “techno-corporal” perspective, where our corporeal space-time is deeply transformed by these machines.

15 The spatial nature of the virtual actualized by the Metaverse therefore implies problems of *accessibility* to the network for any possible body.

16 W. Gibson: *Neuromancer*, p. 6.

to create a *network of meanings that shapes the world*.¹⁷ In the context of a projection of the body towards an avatar dimension, this mimicry functions as a progressive sluice that sensorially reinforces the living body's sense of *being present in the virtual world*. This *specular instantiation of the body* operates like an airlock, which, through a set of successive specular instances—or *mirrors of the body* (joystick, screen, etc.)—proceeds to the *actual* virtualization of the body.

This specular dimension is paradoxical, however, since the mirror here does not completely reflect the body. Instead, by mimicking it, it extends the body and leads it to project its own 'original' spatiality—its 'body image'—into virtual space. This *schema* is the proprioceptive and kinesthetic perception of the body. It represents the bodily *dimension*, which, in a purely carnal and ante-predicative way (prior to any language), is situated in the world. It is the *body's own knowledge*, elucidated in particular by Merleau-Pontian phenomenology and the psychology of the form (gestalt psychology).¹⁸ It permanently indicates the position or situation of the body and elaborates the primitive distinctions of its corporeality: its near space opposed to its far space, its left opposed to its right, etc.

Like breathing, this spatial existence of the body is not elaborated by the conscious mind. It is part of the body's innate properties and emanates naturally from the primitive (or primordial) corporeal subject, defining its instinctive relationship to the surrounding space. By grafting itself directly onto it, the matrix apparatus exploits this property of the body. Its virtualization in a virtual environment is, therefore, *real*—if we mean by this, *the projection of our sensory-motor system into virtual space*. Paradoxically, by enclosing it in a *techno-flesh* gangue, the machine brings the body *out of itself*. Thus, Case in *Neuromancer*, during his reconnection to the matrix:

"He stared at the deck on his lap, not really seeing it, [...] He glanced up [...]. Found the ridged face of the power stud. And in the bloodlit dark behind his eyes, silver phosphenes boiling in from the edge of space, hypnagogic images jerking past like film compiled from random frames. Symbols, figures, faces, a blurred fragmented mandala of visual information. [...] Disk beginning to rotate [...]. Expanding—and flowed, flowered for him, fluid

17 Cf. Heidegger, Martin: *Being and Time*, Oxford: Blackwell 1962. Especially Part one, chapter III, where the concept of Worldhood (*Weltlichkeit*) is developed. It designates the properly understood human world. The network of objects and meanings that structures it.

18 Cf. Merleau-Ponty, Maurice: *Phenomenology of Perception*, trans. Colin Smith, London: Routledge Classics 2002. Especially in the first part, chapters II and III, where Merleau-Ponty defines and discusses the concept.

neon origami trick, the unfolding of his distanceless home, his country, transparent 3D chessboard extending to infinity. Inner eye opening to the stepped scarlet pyramid of the Easter Seaboard Fission Authority [...] and high and very far away, he saw the spiral arms of military systems, forever beyond his reach.”¹⁹

The subject’s *augmented* body is inscribed in its virtual environment *at the same time as* it is inscribed in its material one. From an intentional point of view, a temporal and interactional synchronization between the mastery of the apparatus and that of the *avatar* is then developed.²⁰ The more I am present in the virtual space, the more I occult my material space: the latter, whether it was a simple keyboard and mouse set, a joystick, or a VR device, is as if it were *crossed* or traversed. It tends to disappear in order to make the world or the page appear, behind which the display is hidden: the show *conceals* (its support) while showing (its content).

To lift the veil on this hidden aspect is to show that the mechanical dimension of the virtual is not specific to the Metaverse. The mereological combination of virtual and material ecosystems transcends itself into a *presence* that the user will be able to *embody*, in the manner of a video game.²¹ Such a virtual incarnation allows for new goals and values specific to this dimension of the world to be created.

This presence of the body *to* the metaversal virtual entities is the fundamental conceptual achievement of this preliminary reflection. It is the comprehension of the sensation of being *here and now* in relation to the virtual dimension. From this point of view, the interfaces and control surfaces (UIs and Controllers) serve as feedback for synchronization with the virtual world in question. Again, the subject’s interfacing with the virtual object is determined by the machine and the network mesh: presence is both a spatial (*being near*) and a temporal (*being at the same time*) concept. Thus, any latency caused by a *lag* in the interaction obviously and intrinsically contravenes the very concept of presence: to exist, it requires the absenteeism and overcoming of the machine support.

Virtual presence is here revealed as *the material coupling* that determines the experience prior to any presentation of virtual content. But in doing so, it has not yet been possible to distinguish what makes the experience of the Metaverse and separates it from the video game. Thus, is the concept of presence sufficient to define the Metaverse?

19 W. Gibson: *Neuromancer*, p. 58. This is the ecstatic experience of the virtual.

20 That is, from the point of view of the consciousness of the embodied subject.

21 Where the whole transcends the parts into a complex unity.

What Hath God Wrought?

To structurally differentiate the Metaverse from video games, we need to go back to the principles of interaction of the game and the relationship it maintains with the player. The game places the player in the presence of a finite world, with possibilities irreducible to those of material and logical reality. By definition, every *game* is a *play with the world*. It frees itself from natural regulation and offers the player, through a regulated fiction, to interact meaningfully with their new environment.

A game, therefore, sets up a system of so-called *symbolic* interactions, i.e., interactions that have no necessary link with the gesture required of the player. Pressing X does not mean jumping—except in a game: it is an arbitrary sign that brings together two actions that have nothing to do with each other. And in fact, looking at a player without looking at the screen does not help to understand what they are doing in the game. Therefore, the more we recognize the player's action without looking at the screen, the more the game will integrate an *equality* between the gesture made by the player and the gesture of their avatar. This equalization of gestures, which minimizes the symbolism specific to the game, is the *naturalization* of interactive gestuality. This is what we find in particular in natural user interfaces (NUIs), which take up the natural movements of the user to correlate them with identical movements in applications.²²

The development of these natural interfaces and interactions *has* permeated the design of internet applications for the last decade or so, with the introduction of the iPhone in 2007. Since then, natural interfaces have been the subject of a real boom, both ideologically and technologically.²³ This is because the use of the web, like the Metaverse, is intended for non-gamers and, above all, non-experts: the naturalization of interfaces and interactions is part of a movement to democratize access to the Internet, and the need for users to quickly and easily get to grips with the technologies, without having to go through daunting learning phases.

However, if the game can afford to break the naturalness of gesture to symbolize a series of meaningful actions, it is because it is not *primarily* concerned with entering into communication with others: by playing, I interact with the game

22 It is true that symbolic interactions are still possible with NUIs, but they are not suitable for this kind of interaction, and are used above all *within* the framework of a game activity.

23 Cf. Krishna, Golden. *The best interface is no interface: the simple path to brilliant technology*. Berkeley, CA: New Riders, 2015.

world. Through it, I also play with myself and my mastery of gameplay and controls²⁴. This dimension of *mechanical competence* is absent from social interaction insofar as the latter requires a clarity, a transparency that makes it possible to redirect the attention of the interlocutors towards the skills that are properly social.

So, if I learn a set of *symbolical gestures* to interact with the game world, in the Metaverse, on the contrary, my body is a *direct* means of expressing my feelings, opinions, and intentions. In this particular framework, symbolism would seriously contravene any expression and interaction with others—in short, having to enter a sequence of inputs to signify joy makes no sense—better still, joy is not a sufficiently precise and nuanced feeling to express anything: smileys from this point of view, in classical social networks, represent a form of *objective* stone age to the expression of feelings and may even lead to a fear of a collapse of the emotional richness that a subject can express.

It is, therefore, clear to what extent the subject's *body*, its *social presence*, is becoming central to the development of interfaces and user experiences. And with them, the progress of the technologies of capture (facial cameras, etc.), which make my body *present for the other*. Reciprocally, the body of my interlocutor, present as an avatar, becomes a determining vector of my experience. I see them looking in such and such a direction; I perceive such and such a nuance of meaning in their emotional state, in their thoughts. In short, I enter into *communication* with them because the Metaverse is as much the heir of the video game as of the communication technologies that emerged in the 19th century with the electric telegraph:

“Da5id notices Hiro, indicates with a flick of his eyes that this is not a good time. Normally, such subtle gestures are lost in the system's noise, but Da5id has a very good personal computer, and Juanita helped design his avatar—so the message comes through like a shot fired into the ceiling. Hiro turns away, saunters around the big circular bar in a slow orbit.”²⁵

Because it is built to replicate my expressions perfectly, the avatar becomes the extension, in the Metaverse, of my presence in the world. And in this sense, it is a relationship of *quasi-identity* that is inaugurated, in which I literally lend it my body at the same time as it lends me a virtual spatial presence. Thus, Hiro, the protagonist of *Snow Crash*, an African American, can be brought back to his skin color even in the Metaverse:

24 And if I interact with another, I either interact with another *player* or I don't play anymore.

25 N. Stephenson: *Snow Crash*, p. 74.

“‘Please excuse me if I have misinterpreted your story,’ the businessman says, ‘but I was under the impression that men of your race were not allowed to fight during that war.’ ‘Your impression is correct,’ Hiro says. ‘My father was a truck driver.’”²⁶

Of course, the transformation, the customization of our avatar will be possible in the Metaverse and may even become an important cosmetic element in its economy (via the use of NFTs, for example). But the *serious uses* of the Metaverse will require adjustments to allow individuals to interact in the most transparent way possible in order to optimize and naturalize social relations as much as possible. Thus, the *Snow Crash* Metaverse:

“Shortly after Juanita and Da5id got divorced, The Black Sun really took off. And once they got done counting their money [...] they all came to the realization that what made this place a success was not the collision-avoidance algorithms or the bouncer daemons [...]. It was Juanita’s faces. Just ask the businessmen in the Nipponese Quadrant. They come here to talk turkey with suits from around the world, and they consider it just as good as a face-to-face [...] They pay attention to the facial expressions and body language of the people they are talking to. And that’s how they know what’s going on inside a person’s head—by condensing fact from the vapor of nuance.”²⁷

If the Metaverse is different from a game, it is by the priority it gives to social space-time over playful space-time. And this slight detail has profound consequences on the lives of users.

26 Ibid., p. 99.

27 Ibid., p. 73.

N. W. E.²⁸

The coffee-pot had undergone the least change; as a matter of fact, in one respect it had improved—it lacked the coin slot, operating obviously toll-free. This aspect was true of all the appliances, he realized. All that remained, anyhow. Like the homeopape machine, the garbage-disposal unit had entirely vanished. He tried to remember what other appliances he had owned, but already memory had become vague... He gave up and returned to the living-room.

PHILIP K. DICK²⁹

How has the above archaeological analysis been able to shed light on the nature of the Metaverse? It seems that the guiding theme we have followed, that of the body in its relationship to the virtual, has allowed us to make the Metaverse explicit not only as a *software* reality but also as a *general logic*.³⁰

Substructure of Super-Presence

If, in certain respects, the Metaverse seems to be a *serious game* because of the priority it gives to the social over the ludic³¹—it is because it does something that no game can do: it exceeds the categories of play and seriousness, of *otium* and *negotium*, to make them co-exist in a unified virtual space. This unification is at the heart of the ambition of the Metaverse. It betrays the underlying logic of breaking down categories and borders between beings to bring them together in one and the same ‘place’: that of the virtual. In fact, the Metaverse aims not *only* to replace the web but to become, in the long run, the privileged, if not exclusive, modality of relationship to the Internet. It is through the Metaverse that we will be able to

28 Near World Experience.

29 P. K. Dick: *Ubik*, p. 136. Here, the world’s configuration alters the subject’s consciousness and habitus.

30 A logic that might apply even outside or before a fully operational Metaverse.

31 The final motorbike chase in the *Snow Crash* Metaverse comes to mind, as an example of gamification of social antagonism and struggle—the fate of the world relying on a race.

use our email, our social networks, that we will be able to play and potentially debate, work, share, create, etc.³²

In fact, this logic of totalization and encompassing of human activities is etymologically found in the very term *meta-universe*, meaning the omni-overlapping and *ubiquitous* dimension of reality. Each Metaverse thus conceals a potential for the global rationalization of life, even in its interstices. It rests on two deeply linked levers, serving as a structural sub-base.

First, *knowledge, or capture logic*, which is elaborated on the totality of the capture technologies that the Metaverse implements to allow access to its universes. The peripherals of natural use are all technologies of capture that collect data. This data is no longer personal but *intimate*. In fact, it will no longer make sense to refuse cookies when connecting to the Metaverse: the very fact of putting on a *Meta Quest Pro* or *HoloLens II* reveals fundamental psychophysical data about individuals³³ as well as the quality of their equipment. In *Snow Crash*, access to the Metaverse is thus guaranteed by public terminals that exploit the users' body information:

"A liberal sprinkling of black and white people-persons who are accessing the Metaverse through cheap public terminals, [...]. There's one [...] who stands out because he is taller than the rest. The Street protocol states that your avatar can't be any taller than you are. [...] It just shows him the way he is, except not as well."³⁴

Strikingly, this logic of capture corresponds to a phenomenon of *virtualization* of objects and beings to produce their 'digital twins.'³⁵

Second, this complex of knowledge is correlated with a *power*: that of designing spaces, software architectures, and products based on the knowledge thus collected. This determines the direction of technological progress in terms of the ac-

32 Each unique Metaverse may have its special features and core activities. But the question is what fundamental modality governs access to the networks, and what is the relationship between them.

33 Data unknown to themselves, on two levels: firstly, because they do not have access to this information about their own person; secondly, because they do not know what types of data are relevant to be collected, and therefore do not know that they are being collected. Personal data becomes *intimate data*. The specular analysis applies, in a very disturbing way.

34 N. Stephenson: *Snow Crash*, p. 48.

35 A logic of maniacal safeguarding of the world.

cessibility and democratization of access tools. At the same time, however, it creates an ontological divide between the knowers and the users. This idea of democratization hides the “confiscation of the means of production” by those who own the network infrastructures and the source codes.³⁶ Users, because of their natural gestures, are unable to *actually* access the code. The naturalized gesture is, in fact, the ever-increasing enclosure of the machine from the user. The NUI, it should be remembered, replaces the LUI (learned user interface), which implied learning and, therefore, a relationship of knowledge with the machine. This relationship, to be less carnal, less intimate, allowed the subject to keep a certain amount of control over their data and their uses.³⁷ This logic of power is, therefore, fundamentally correlated with a logic of *naturalizing* interfaces, designs, and software architectures—so as to make them *closer to us* while at the same time cleverly distancing them from our possibilities of experimentation and expression.

This dialectic between knowledge and power, between the virtualization of the world and the naturalization of the virtual, forms a *nexus of knowledge and power*. The knowledge of subjects—as intimate as possible—allows for their governance—as efficient and invisible as possible. It is this nexus that determines, according to Michel Foucault, the level of *acceptability* of a form of governance of subjects. With the Metaverse, governance, invisible and ubiquitous, is embodied in the techno-corporeal organs that the subjects are themselves. It becomes participatory (interactive) and voluntarist (fun).³⁸

The Making of Everyday Life

But what is the difference compared to the classic social network? How does this Nexus come to concretely impact the lives of subjects and their presence in the world? Is this participatory occultation of power not the other name for the dem-

36 A theme dear to Marxists, here in its version 3.0. Cf. Marx, Karl. *Wage Labour and Capital* Followed by *Wages, Price and Profit*. Paris: Foreign languages press, 2020.

37 The evolution of Microsoft’s Windows interfaces is a striking example of this, since the natural interface actually corresponds to an *absenteeism* of the interface and a concealment of everything that makes up the architecture of the machine.

38 For a definition of the Nexus, cf. Foucault, Michel: “What is Critique?,” in: Sylvere Lotringer (ed.): *The Politics of Truth*, trans. Lysa Hochroth/Catherine Porter, Los Angeles, CA: Semiotext(e) 2007, p. 61.

ocratic significance of technology? Doesn't Meta help Western democracies organize elections and, perhaps in the long term, host them in order to become truly the new agora of the free world?³⁹

The question is quirky. The knowledge-power nexus described above exposes the power structures that govern the relationship between institutions and subjects. Thus, by elaborating their own *social spaces of interactional possibilities*, industrialists institutionalize themselves and set themselves up as Meta-States with the power to legislate and regulate the virtual territories they own ... And thus, the bodies that *live* within them. This *biopower*⁴⁰ punctuates the daily life of individuals and all their activities (their yoga, their work, etc.) and is thus *impregnated* into the bodies on two levels:

- First, by regulating, through design, the way they interact with the virtual world and other users, thus inscribing 'healthy' virtual practices within the interactional possibilities. In the same way that the number of characters allowed in an X (formerly Twitter) message shapes the way we communicate online, the design of the 3Cs and interactions will shape virtual bodies. This is the regulatory emergence of a new persistent *virtual virtue*.
- But also by regulating, as a consequence, how they interact with *their own flesh bodies*—in a way never seen before on social networks. The naturalization of interfaces coupled with technologies for exposing bodies inaugurate the design and production of our bodies of flesh—*from the virtual*. In fact, by designing such and such an interaction, by making such and such a movement possible or impossible, designers apply to the body a gestural constraint that descends into the subjects' daily life until it settles inside them. *These meta-versal habits*, as we already observe in esports players, for example, shape the bodies. They stem directly from the *configuration of the habitat*—the Metaverse—on the user. Now, this configuration, conceived from intimate data, creates a Gordian knot in which the

39 Meta: "Comment Meta se prépare aux élections françaises de 2022," *FB*, February 16, 2022, <https://about.fb.com/fr/news/2022/02/comment-meta-se-prepare-aux-elections-francaises-de-2022/>

40 With this concept, Foucault refers to a form of governmentality that governs the very life of the population. With the Metaverse and the induced technologies, this type of power is potentially more integrated and ubiquitous than ever.

subject's body plays perversely against itself⁴¹ ... Each personalization, each habit of life acquired through the interoperability⁴² of metaversal systems, paradoxically accentuates the standardization of bodies and their modes of presence in the Metaverse—and in the world.

CODA: TIME-SPACE OSCILLATIONS

The diversity of cars impressed him. Many years represented, many makes and many models. The fact that they mostly came in black could not be laid at Jory's door: this detail was authentic. [...] *This is perhaps the first time he has created a world this diverse, for so many people at once. It isn't usual for so many half-lifers to be interwired. We have put an abnormal strain on Jory,* he said to himself. *And we paid for it.*

PHILIP K. DICK.⁴³

The question we can ask ourselves at the end of these reflections is what the Metaverse *radically* changes in relation to contemporary problems linked to digital technologies. In what way does the notion of presence enlighten us more than the reflections previously elaborated by the notions of attention, addiction, or surveillance?⁴⁴

The phenomenological approach to presence allows us to think about the reversibility of the concept. If, at first, we tried to circumscribe the presence of the subject to the virtual world, it became clear that the *ubiquity* of the network was a new form of presence: no longer *carried out* by the users but *undergone* by them, through the totality of the solicitations and implicit injunctions which permeate

41 The design of addictions and meta-drugs would be a fascinating subject of study in this respect. Especially to build corporeal countermeasures.

42 The software possibility for a user to use various systems together, and thus to move freely from one Metaverse to another—it implies that the different operating systems engage in similar practices that are easily assimilated. Thus forming a *large metaversal body* defined by the possible interactions, by the same gestuality.

43 P. K. Dick: *Ubik*, p. 212. The Material Debt to the Virtual—the Reality Principle.

44 Cf. for a great overview on the topic: Citton, Yves: *The Attention Economy: Capitalism's New Horizon?* Paris: La Découverte 2014.

their daily life. Underlying the possible crisis of attention, the super presence of the Metaverse logic appears as the actualization of an *ontological* phenomenon that operates as an eclipse: the virtual world comes into alignment with the material world and occludes it. This image, admittedly metaphorical, gives an account of the flagship technology of mixed realities (XR). Behind this term, it is actually decided to *use the world as a display* for the Metaverse and no longer the screen. The prosthesis, ever-smaller, is inserted into the body and forgotten, while the world and its collapsing material reality are hidden under the impudent veil of the variegated worlds; under the infinite and luxuriant growth of the virtual.

In a logical consequence, as the old world has been left by the adventurers of the new America, the real world, the Earth, now only raises an obscure desire to leave. The digital safeguarding (another name for virtualization) of the world becomes a way of escaping it, of saving oneself. We can thus read in the intentional *oscillation* of users who move from the real to the virtual world on a daily basis, a kind of metaphysical and civilizational hesitation. A new kind of arbitration between two promises. That of the coming of a paradise on Earth, and that of an inevitable collapse.

However, it could be that this new Eden, the implicit wish of El Dorado, is, in reality, a cover-up that is difficult to swallow—since it depends so much on the resources of the very reality that it tries so hard to conceal. And to destroy.

LITERATURE

- Binswanger, Matthias: “Technological Progress and Sustainable Development: What About the Rebound Effect?” *Ecological Economics* 36 (2001), pp. 119-132.
- Citton, Yves: *The Attention Economy: Capitalism’s New Horizon?* Paris: La Découverte 2014.
- Dick, Philip, K.: *Ubik*, Boston, MA: Mariner Book 2012.
- Foucault, Michel: “What is Critique?” in: Sylvere Lotringer (ed.): *The Politics of Truth*, trans. Lysa Hochroth/Catherine Porter, Los Angeles, CA: Semiotext(e) 2007.
- Freyermuth, Gundolf S.: “Vegas, Disney, and the Metaverse,” in: Beil, Benjamin et al. (eds.), *Playful Materialities*, Bielefeld: transcript 2022, pp. 17-98.
- Gibson, Williams: *Neuromancer*, London: Gollancz 2016
- Heidegger, Martin: *Being and Time*, trans. John Macquarrie/Edward Robinson, Oxford: Blackwell 1962.

- Husserl, Edmund: *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy, Book I*, trans. F. Kersten, The Hague: Martinus Nijhoff 1983.
- Klevjer, Rune: “Enter the Avatar: The Phenomenology of Prosthetic Telepresence in Computer Games,” in: Sageng, John Richard/Fossheim, Hallvard/Larsen, Tarjei Mandt (eds.): *The Philosophy of Computer Games*, Dordrecht: Springer Netherlands 2012, pp. 17-38.
- Krishna, Golden: *The Best Interface is No Interface: The Simple Path to Brilliant Technology*, Berkeley, CA: New Riders, 2015.
- Merleau-Ponty, Maurice: *Phenomenology of Perception*, trans. Colin Smith, London: Routledge Classics 2002.
- Merleau-Ponty, Maurice: *The Visible and the Invisible*, Evanston, IL: Northwestern University Press 1968.
- Nietzsche, Friedrich: *The Complete Works of Friedrich Nietzsche XV, Unpublished Fragments from the Period of Thus Spoke Zarathustra (Spring 1884—Winter 1884/85)*, trans. Paul S. Loeb/David F. Tinsley, Stanford, CA: Stanford University Press 2022.
- Meta, “The Metaverse May Be Virtual, but the Impact Will Be Real,” *FB*, September 5, 2022, <https://about.fb.com/news/2022/09/the-metaverse-may-be-virtual-but-the-impact-will-be-real/>
- Meta: “Comment Meta se prépare aux élections françaises de 2022,” *FB*, February 16, 2022, <https://about.fb.com/fr/news/2022/02/comment-meta-se-prepare-aux-elections-francaises-de-2022/>
- Page, Thomas: “Pixel Pushers: How the Metaverse Became Real Estate’s New Frontier,” *CNN*, September 23, 2022, <https://edition.cnn.com/style/article/metaverse-real-estate-market-2022-spc-intl/index.html>
- Schneider, François: “The Rebound Effect,” *The Ecologist (French Edition)*, n°11, October 2003, p.45.
- Stephenson, Neal: *Snow Crash*, New York, NY: Del Rey 2022.

Metaverse (Re)Visions

Back to the Future of the Internet

SONIA FIZEK

This is a completely different kind of future [...] that is profoundly undemocratic.

This is a direct assault on human autonomy and on human agency.

SHOSHANA ZUBOFF¹

INTRODUCTION: BEYOND THE SEEN AND THE FELT

In his media historical *tour de force* under the title “Vegas, Disney, and the Metaverse,” Gundolf S. Freyermuth diagnoses the Metaverse through the lens of *aesthetic anticipation*, that is, “the idea that the not-yet-experienced can be anticipated” in the preceding media forms long before the “not-yet-experienced” is able to flourish on a larger techno-cultural scale.² In the immersive experiences of theme parks and Las Vegas historically achieved by analog means, Freyermuth sees the seeds of today’s virtual realities. This time, simulated not by mechanically and industrially produced audiovisual effects (scenography, neon light shows, motion picture) but by digitized and virtualized representations of reality. It is in those

1 Zuboff, Shoshana: “Shoshana Zuboff on Surveillance Capitalism,” July 29, 2019, *EconTalk. Conversations for the Curious*, podcast, 01:07:00, <https://www.econtalk.org/shoshana-zuboff-on-surveillance-capitalism/>

2 Freyermuth, Gundolf S.: “Vegas, Disney, and the Metaverse. On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century,” in: Beil, Benjamin et al. (eds.), *Playful Materialities. The Stuff That Games Are Made Of*, Bielefeld: transcript Verlag 2022, pp. 17-97, here p. 20.

constructed fantasy worlds that we are invited to lose the distinction between what is real and what is represented or simulated. The real is virtualized, the virtual becomes real.

Freyermuth's accurate hypothesis of *aesthetic anticipation* may be complemented with the following observation—that today's virtualization of the everyday is not only to be found in the past media, but that it also remediates media of the past.³ Virtual reality oscillates in the dialectic between the future (the “not-yet-experienced”) and the past (the already-experienced). Allow me to support this claim with a short example. The Internet, as we still know it, remediates predominantly print and, more recently, audiovisual media. This happens on many levels. We browse through text-based websites and web pages. We look for information via search engines that display mainly text results. We write electronic letters. We consume images and videos, modalities that we know from books, newspapers, television, and film (think of such platforms as YouTube, Instagram, or TikTok). The Metaverse, on the other hand, would incorporate experiential audiovisual media of the late 20th and early 21st century, such as video games and online virtual worlds.⁴ Often, the Metaverse is conceptualized as a 3D-rendered version of the Internet.

But what propels this anticipatory remediation fantasy? By getting acquainted with the latest ideas of such corporations as Meta Platforms, one may gain the impression that the Metaverse is all about the human senses and embodied experiences. However, this emphasis on the visual and sensed experience conceals aspects that are far more tangible. The underpinning logic of the Metaverse rests on developing, owning, and controlling the new natural-virtual habitat for the digital human. For what is really at stake is not of aesthetic dimension. It is not the affective side either that is going to revolutionize the way we play, work, and live. Upon closer inspection, the Metaverse is not a technology of the senses. At its core lie the material infrastructures that propel the metaphorical data clouds and the ownership of those. Data centers are physical spaces where the virtual Disneylands sit. Interestingly, we are all encouraged to build the Metaverse together but not to own

3 This process of remediating older forms has been addressed by many media scholars, including Jay David Bolter and Richard Grusin in their by now classical book *Remediation* (Cf. Bolter, Jay David, Grusin, Richard: *Remediation. Understanding New Media*, Cambridge, MA: MIT Press 2002).

4 SECOND LIFE introduced by Linden Lab in 2003 is a good starting point in trying to imagine how the Metaverse or Metaverses would operate and intertwine with our everyday.

it collectively.⁵ In other words, the focus on the embodied multi-sensorial virtual habitat conceals the material and the socio-economic conditions under which the new simulacrum of the 21st century is being developed.

We are in the midst of the so-called information age, and its currency is data, not feelings. More importantly, data does not float in the air but is literally grounded in earthly matter. And the new landlords of the information age are information technology companies that own the cloud infrastructure and the not-so-virtual land on which virtual realities reside. This contribution will, therefore, explore aspects of the material and economic foundations upon which the visions of the new virtual rest. As Ben Tarnoff emphasizes in an interview with *Digi Labour*:

“The Internet is deeply material creation. It’s composed of fiber optic cables, data centers, computers—things you can touch, things that had to be contrasted out of parts, with those parts themselves having been made from materials that were dug out of the earth.”⁶

My techno-cultural diagnosis of the Metaverse is inspired predominantly by the work on Internet privatization (Ben Tarnoff), surveillance capitalism (Shoshana Zuboff), and technofeudalism (Yanis Varoufakis). The above concepts are the bedrock for proposed Metaverse (re)visions, which I see as necessary points of departure in order to rethink our present and future online presence. If those are not considered, the Metaverse remains a monopolized and capitalized upon online ecosystem, which requires ever more powerful computation and exorbitantly increasing storage space for processing heavy three-dimensional virtual websites owned and rented out by a handful of big tech corporations.

The text is divided into two parts. It begins with a sketch of the corporate visions of the Metaverse. In the second part, I will focus on the revisions, at the base of which lies a critique of profit-driven corporatization of the digital space.

5 In the video presentation “The Metaverse and How We’ll Build It Together,” Mark Zuckerberg presents his vision of the Metaverse as a space that will be built collectively by allowing digital artists to develop their content, experiences and 3D assets and place them within the virtual world as well as sell them via the Metaverse (Zuckerberg, Marc: “The Metaverse and How We’ll Build It Together Connect 2021.” *Meta*. October 28, 2021, YouTube video, 01:17:26, here 00:44:54, <https://www.youtube.com/watch?v=Uvufun6xer8>).

6 Cf. Tarnoff, Ben: “Deprivatizing internet: interview with Ben Tarnoff.” *DigiLabour*, University of Toronto, August 22, 2022, <https://digilabour.com.br/en/deprivatizing-the-internet-interview-with-ben-tarnoff>

CORPORATE VISIONS

Embodied and Spatial Internet

In an over-one-hour-long keynote talk, “The Metaverse and How We’ll Build It Together,” Mark Zuckerberg rolls out his manifesto for our digital futures. The stakes must be high. Not often are we able to see corporate video material of this length screaming for our dispersed attention, with the CEO of one of the biggest digital platforms worldwide entertaining us as the narrating figure.

In the US legal jargon of the digital tech industry, what we are exposed to in Zuckerberg’s video are the so-called “forward-looking statements,” that is predictions and projections related to future business. We could think of them as speculative fiction or worldbuilding, concepts more akin to the realities of writers and academics. Interestingly, corporations, such as Meta, are not to be held accountable by the public for their visions. In the opening screen of the video, we can read the following disclaimer:

“Any forward-looking statements made in this presentation are based on our beliefs and assumptions as of the date of the presentation and we undertake no obligation to revise or publicly release the results of any revision to the forward-looking statements.”⁷

In the 1990s US, such disclaimers became a standard precautionary measure designed to provide companies with a ‘safe harbor’ so that they could inform their investors about future plans, at the same time mitigating the risk of being sued should the predictions fail. I will not delve deeper into the legal underpinnings; however, this frame is crucial in order to open an informed discussion on the Metaverse (re)visions. Although the video may seem like a manifesto tailored to the digital masses worldwide, it is more accurate to see it as speculative material for potential investors so that the latter could make a more informed bet on the upcoming digital businesses.

Let us delve into a few of the foundational statements presented in the video. A brief rhetorical analysis of Zuckerberg’s statements in “The Metaverse and How We’ll Build It Together” may leave us under the impression that the Metaverse is the most human-oriented technology ever envisioned. The majority of technocrats, including Zuckerberg, see the Internet of the future as an embodied space. A space of this kind is no longer just observed on a 2D surface. It is felt, preferably with all the human senses. In the first four minutes of the keynote, the term “feel” is

7 M. Zuckerberg: “The Metaverse and How We’ll Build It Together,” here 00:06.

used eight times and “experience” nine times. These are just some of the visions we are lured with: “we will be able to feel present like we’re right there with people” (1:54), “we will be able to express ourselves in new, joyful, completely immersive ways” (2:00), “and that is going to unlock a lot of amazing new experiences” (2:05), “a shared sense of space” (2:32), and “the deep feeling of presence” (3:03).

Virtual Worlds with Real Behavioral Data

This embodied vision of how we will be able to interact with the digital virtual content is the driving metaphor. But let us not forget. The aim of companies such as Meta Platforms is not to make us feel better but to capitalize on our feelings. At the core of the Internet, as well as its embodied vision, are not human feelings but monetization strategies and profit. Virtual worlds are thought of as places where we would allegedly rent virtual land as well as buy and sell digital assets and non-fungible tokens. At the heart of user experience, then, is consumption of virtual lands and goods. In the background, however, a very different and much more potent marketplace operates; one not for the masses of users but for a selection of companies and investors. In this market, it is not the digital assets but human futures that are for sale. As Shoshana Zuboff explains in her latest book, *The Age of Surveillance Capitalism* (2019), digital capitalism operates based on the so-called prediction products, that is, algorithms designed to predict human behavior. In order to do this on a massive scale, big tech companies need to have access to mass quantities of data about users—something that has defined the economies of scale since the early 2000s when Google discovered its main source of revenue—selling user data to advertisers. Zuboff defines surveillance capitalism as a system that “...unilaterally claims human experience as free raw material for translation into behavioural data.”⁸ While using most free commercial services (such as social media platforms), we allow the companies to track and use our data. Some of this data, as Zuboff explains, is used to improve services; the rest is analyzed and turned into “prediction products” designed to anticipate our behaviors and preferences. It is those products that are sold to advertisers. According to Zuboff, surveillance capitalists “nudge, coax, tune, and herd behavior toward profitable outcomes.”⁹

8 Zuboff, Shoshana: *The Age of Surveillance Capitalism. The Fight for a Human Future at the New Frontier of Power*, New York, NY: Public Affairs 2019, p. 7.

9 S. Zuboff: *The Age of Surveillance Capitalism*, p. 8.

Corporate visions of the Metaverse in the age of surveillance capitalism represent what Oliver Zöllner refers to as “fantasies of centralization and power,” in which all possible online activities happen under one monitored and monopolized roof.¹⁰ Imagine that everything we do in our daily lives is mediated through one platform. Our entire experience, whether private social exchanges, workdays, sleep rhythms, fitness activities, or purchase histories, all take place in a unified digital space and may be tracked, recorded, and analyzed. This is not necessarily a science fiction film. It is already a reality for most Internet and mobile device users. The experience, however, is still relatively distributed across a variety of platforms and providers.

The Chinese micro-blogging platforms Sina Weibo and WeChat are illustrative examples of how an online experience concentrated under one platform may look like. They are not single applications but ecosystems that provide their users with almost all online-related functionalities—connecting with people, messaging, reading news, tracking fitness levels, buying goods, even booking a doctor’s appointment. Both platforms operate according to the apps-within-an-app model, integrating as many functionalities within one system as possible. Leaving those ecosystems is not necessary, so all online experiences are mediated via their ever more expanding boundaries. To a large degree, corporate visions of the Metaverse resemble a 3D version of Sina Weibo or WeChat. And even if we migrate from one corporate Metaverse to another, taking our virtualized “identities” with us (visual representations such as avatar skins or assets) may only enable companies to more effectively track our activities, preferences, and behaviors.

Metaverses as Feudal Fiefdoms?

Closely monitored corporate Metaverses, monetizing upon each bit of our online activities, may be visions emerging from “surveillance capitalism.”¹¹ Yanis Varoufakis, a leftist economist and politician, sees a completely new economic system on the rise, one that is no longer capitalist at its core. According to Varoufakis, we are finding ourselves in the midst of an epochal shift comparable to the transformation from feudalism to capitalism a few centuries ago. Such a change in trajectory requires a new lens and a new terminology. Capitalism has allegedly outlived itself and mutated into technofeudalism, a concept discussed in depth in his most recent book *Technofeudalism: What Killed Capitalism*. Technofeudalism,

10 Zöllner, Oliver: “Wie das Metaverse uns entmenschlicht,” *Der Pragmaticus. Auf den Punkt Gebracht*, May 23, 2023. <https://www.derpragmaticus.com/r/Metaverse-daten>

11 S. Zuboff. *The Age of Surveillance Capitalism*.

also referred to as neo-feudalism, digital feudalism, and information feudalism, is a concept discussed by many economists and theoreticians. The Italian economist Mariana Mazzucato wrote about digital feudalism on the pages of *Project Syndicate*.¹² Also, Cédric Durand, a French political economist, has written extensively on contemporary transformations of capitalism.¹³

In a technofeudal economic system, information technology companies no longer produce capital but instead charge rents. There are no real products that are being made; instead, value is subtracted from online activities on corporate-owned platforms. It is the “triumph of rent over profit” that makes all the difference, writes Varoufakis.¹⁴ Also, Mazzucato emphasizes rent as the very foundation on which corporate online platforms rest: “Just as landowners in the seventeenth century extracted rents from land-price inflation, and just as robber barons profited from the scarcity of oil, today’s platform firms are extracting value through the monopolization of search and e-commerce services.”¹⁵ To sum up technofeudalism with the words of Evgeny Morozov, the main assumption shared by the theorists of technofeudalism, is that contemporary digital information and data infrastructure “pushes the digital economy in the direction of the feudal logic of rent and dispossession.”¹⁶

PUBLIC (RE)VISIONS

Back to Collective Ownership

In light of the above, the crucial question remains: why are raw data profits and feudal rents prevailing as the leading values that drive the visions of the future of

12 Cf. Mazzucato, Mariana: “Preventing Digital Feudalism,” *Project Syndicate. The World’s Opinion Page*, October 2, 2019: <https://www.project-syndicate.org/commentary/platform-economy-digital-feudalism-by-mariana-mazzucato-2019-10>

13 Cf. Durand, Cédric: *Techno-féodalisme. Critique de l’économie numérique*, Paris: Zones 2020.

14 Varoufakis, Yanis: *Technofeudalism: What Killed Capitalism*, New York, NY: Vintage Books 2023, p. 90.

15 M. Mazzucato: “Preventing Digital Feudalism.”

16 Evgeny Morozov discusses the shortcomings of the technofeudal theoretical framework: Morozov, Evgeny: “Critique of Techno-Feudal Reason,” *New Left Review* 133/144 (2022), <https://newleftreview.org/issues/ii133/articles/evgeny-morozov-critique-of-techno-feudal-reason>

the Internet? More importantly, what would it mean to envision the Metaverse on terms other than monopolized and commercialized platforms whose main goal is to oversee, influence, and monetize human online activity? In the upcoming sections, we will dive into questions of data and material infrastructure ownership.

Popular discourse around the Metaverse emerges at the pivoting moment in the history of digital media. This moment is as foundational as the 1990s when the Internet, after its over 20-year-old publicly funded development, became fully privatized. The early imaginary of the Internet was that of a space of new possibilities and more democratic social exchanges. Every user could allegedly become a producer (prosumer), actively contributing to the rise of “participatory culture” through creative expression and civic engagement.¹⁷ An average person acquired access to potentially infinite sources of knowledge; a process comparable to the print revolution triggered by Johannes Gutenberg’s press. In multi-user dungeons and multiplayer online games, we could even imagine new creative ways of expressing ourselves, beyond our own sex, body, or species. Think of the by-now-classic sentence “On the Internet, nobody knows you’re a dog,” featured in an illustration by cartoonist Peter Steiner in *The New Yorker* magazine in 1993.¹⁸ While the Internet was being envisioned as a space of collective liberation and democratization, at the same time, the legislative ground was prepared to privatize it without any democratic regulations regarding its public use, argues Ben Tarnoff.¹⁹

Before the Internet entered into the private hands, for decades, it had been developed with the help of public funding under the leadership of the National Science Foundation, a federal agency supporting basic research in the United States. In 1995, the private sector gained control over the entire physical infrastructure. Tarnoff criticizes the shortsighted and unregulated privatization of the Internet infrastructure in the early 1990s. His analysis of Internet ownership exposes the practices of companies that own the lower critical infrastructure (what he calls the “pipes”) as well as the infrastructure “up the stack,” e.g., data centers and finally search algorithms and social media platforms. Today, the world’s

17 Cf. Jenkins, Henry et al.: *Confronting the Challenges of Participatory Culture. Media Education for the 21st Century*, Cambridge, MA: MIT Press 2009; <https://mitpress.mit.edu/9780262513623/>

18 Cf. Steiner, Peter: “On The Internet, Nobody Knows You’re A Dog,” *The New Yorker*, cartoon, July 1993.

19 Cf. Tarnoff, Ben: *Internet for the People: The Fight for our Digital Future*, London/New York, NY: Verso Books 2022.

cloud infrastructure is shared amongst just a few companies, with Amazon Web Services owning circa 30% of the entire digital space.²⁰

The information technology companies grew so big in the past few decades that antitrust lawsuits were filed against such tech giants as Facebook (today's Meta) and Google.²¹ The Federal Trade Commission attempts to introduce some power balance by regulating the “big tech,” whose online monopolies have developed beyond public control. All of the proposed solutions stay within the capitalist frame: breaking the companies up and introducing anti-monopolist strategies. However, as Ben Tarnoff points out, the problem is not that the markets are too consolidated but that there are markets in the first place. This view is shared by many other authors. The economist Mariana Mazzucato writes:

“Breaking up large companies would not solve the problems of value extraction or abuses of individual rights. There is no reason to assume that many smaller Googles or Facebooks would operate differently or develop new, less exploitative algorithms.”²²

One way to counterbalance our corporatized online realities is to support user-owned infrastructures and deprivatize huge parts of the Internet. Some examples of what Tarnoff calls “practices of democratic control” point to collaboratively owned municipal broadband networks (e.g., Community Broadband Networks Initiative)²³ or cooperatively-run social media platforms (e.g., the non-profit and distributed social networking service Mastodon developed in Jena, Germany). These experiments are just a starting point of how to reimagine the Internet. In other words, in order to build a more democratic Internet, we need to change the way it is owned and organized.

Tarnoff's work on reimagining the privatized Internet is crucial in understanding what is at stake with the mainstream corporate visions of the Metaverse. If the Internet of the future rests on a few giant corporation-owned and curated Metaverses, it has nothing to do with promised creative freedom. The conversation around the Metaverse then should not be propelled by the terms of use but instead

20 Richter, Felix: “Amazon Maintains Lead in the Cloud Market,” *Statista*, February 5, 2023, <https://www.statista.com/chart/18819/worldwide-market-share-of-leading-cloud-infrastructure-service-providers/>

21 Cf. Edelman, Gilad: “The Antitrust Case Against Facebook Draws Blood,” *Wired*, January 12, 2022: <https://www.wired.com/story/facebook-ftc-antitrust-non-price-theory/>

22 M. Mazzucato: “Preventing Digital Feudalism.”

23 <https://communitynets.org>

should focus on terms of ownership. In other words, we should not only be building the Metaverse together,²⁴ but more importantly, we should be owning it collectively. Currently, the public is neither in possession of land critical infrastructure (cables and cloud server farms) nor the means of production (platforms) and its products (raw data). The history of the Internet's privatization is a painful lesson but one that may show the path from which we should be diverging.

We are building the Internet collectively each day, populating it with images, fan-based artworks, digital assets in game engine stores, video games, and digital applications. Some of those assets are directly on sale via such platforms as Apple Store, Steam, Google Store; others are sold without consent in the form of user data given away in exchange for a free use of platforms such as Facebook, Instagram, and Google's ecosystem, amongst many others. Today is the moment to learn from the history of the Internet, to rethink how it is owned and what role its users play in its profit making. Instead, the popular imaginary of the Metaverse is yet again propelled by the same corporate visions that have made the Internet a space not only of creativity and human connection but also the bedrock for political radicalization and labor exploitation.

WHAT'S NEXT?

The simulated worlds of fantasy and commerce of the mid-20th century may have anticipated the immersive experiences of today's online games, VR experiences, and soon the Metaverse. However, neither theme parks nor Las Vegas managed to intrude into our everyday activities and monitor our behaviors to predict future commercial choices. These were still worlds with clearly demarcated lines. Once the visitors left Disneyland's gated premises, their activities and customer preferences in the "real" world were out of sight. The vision of the Metaverse then only partially derives from the immersive worlds of the past. Digitality makes a huge difference, one that makes up for a very different material and economic basis for the aesthetic experience of virtuality. The Metaverse, as envisioned by Meta and other companies, will be predominantly a surveilled digital space capitalizing on all human activity, just like Meta's existing social media platforms and messaging services (e.g., Facebook, Instagram, Threads, WhatsApp), the largest shopping

24 "Because at the end of the day, it is really the creators and developers who are going to build the metaverse and make this real," ensures Zuckerberg in the Metaverse introductory video. M. Zuckerberg: "The Metaverse and How We'll Build It Together," here 15:54.

and entertainment streaming platform Amazon, or all-encompassing Google's services. In this context, the idea of integrating all possible aspects of our everyday lives into a 3D web experience is as fascinating as it is alarming.

One of the least discussed material aspects behind the visions of the Metaverse is its sheer computing power that is required in order to run this possible world and the amount of data that will be produced to "populate" it with content. I tend to think of the corporate Metaverse visions as dreams of possible worlds powered by privatized Internet in times of climate ignorance. In the report on the ecological dimension of the Internet, Greenpeace dubs data centers as "the factories of the digital age."²⁵ The Internet is "catering to the world's insatiable appetite for messages, photos, and streaming video,"²⁶ And this appetite is only growing with time. It is estimated that until 2003, as a global community, we had accumulated 5 exabytes (1 exabyte = 1 billion gigabytes) of digital content. Today, this amount is consumed every few days. In 2019, we reached 10,457 exabytes.²⁷ In 2024, this figure is exponentially higher. It is not difficult to imagine how much more data the Metaverse would require and generate. Even without the Metaverse, companies such as Google use more electricity than entire countries.²⁸

But the future of the *homo digitus* does not need to be one spent in corporate envisioned and controlled Metaverses destroying the natural environment. The imaginary momentum does not need to collapse under the swarm of technocratic ideas on the new Metaverse economic markets for the users and the "dark markets" for the investors. It is now that we should be asking the right questions. In what kind of online universe do we want to live, and on whose terms? How much data do we really need to consume? The three perspectives sketched in this text (privatization of the Internet, surveillance capitalism, technofeudalism) hopefully provided inspiration in the process of reimagining the conditions under which we may live online.

Without a new collective class consciousness, the chances to stand up to corporate visions are miniscule. Perhaps, we should understand our position as

25 Cook, Gary et al.: *Clicking Clean: Who is Winning the Race to Build a Green Internet?*, D.C., WA: Greenpeace 2017, p. 17, https://www.greenpeace.de/publikationen/20170110_greenpeace_clicking_clean.pdf

26 Ibid, p. 5.

27 Ibid, p. 17.

28 Bryce, Robert: "How Google Powers Its Monopoly with Enough Electricity For Entire Countries," *Forbes*, October 21, 2020: <https://www.forbes.com/sites/robertbryce/2020/10/21/googles-dominance-is-fueled-by-zambia-size-amounts-of-electricity/?sh=2c2d6b2668c9>

“cloud-serfs” vis-à-vis “cloudists” to see the necessity to reshape the Internet infrastructure and start building up social networks and virtual worlds that are not owned by corporations but by users.²⁹

In the meantime, developers of the world, unite! Refuse to build brave new Meta Horizon Worlds.

LITERATURE

- Bolter, Jay David, Grusin, Richard: *Remediation. Understanding New Media*, Cambridge, MA: MIT Press 2002.
- Bryce, Robert: “How Google Powers Its Monopoly with Enough Electricity for Entire Countries,” *Forbes*, October 21, 2020: <https://www.forbes.com/sites/robertbryce/2020/10/21/googles-dominance-is-fueled-by-zambia-size-amounts-of-electricity/?sh=2c2d6b2668c9>
- Cook, Gary et al.: *Clicking Clean: Who is Winning the Race to Build a Green Internet?*, D.C., WA: Greenpeace 2017, https://www.greenpeace.de/publikationen/20170110_greenpeace_clicking_clean.pdf
- Durand, Cédric: *Techno-féodalisme. Critique de l'économie numérique*, Paris: Zones 2020.
- Edelman, Gilad: “The Antitrust Case Against Facebook Draws Blood,” *Wired*, January 12, 2022, <https://www.wired.com/story/facebook-ftc-antitrust-non-price-theory/>
- Freyermuth, Gundolf S.: “Vegas, Disney, and the Metaverse. On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century,” In: Beil, Benjamin et al. (eds.), *Playful Materialities. The Stuff That Games Are Made Of*, Bielefeld: Transcript Verlag 2022, pp. 17-97.
- Jenkins, Henry et al.: *Confronting the Challenges of Participatory Culture. Media Education for the 21st Century*, Cambridge, MA: MIT Press 2009, <https://mitpress.mit.edu/9780262513623/>
- Mazzucato, Mariana: “Preventing Digital Feudalism,” *Project Syndicate. The World's Opinion Page*, October 2, 2019, <https://www.project-syndicate.org/commentary/platform-economy-digital-feudalism-by-mariana-mazzucato-2019-10>
- Morozov, Evgeny: “Critique of Techno-Feudal Reason,” *New Left Review* 2022 133/134, <https://newleftreview.org/issues/ii133/articles/evgeny-morozov-critique-of-techno-feudal-reason>

29 Y. Varoufakis: *Technofeudalism: What Killed Capitalism*.

- Richter, Felix: “Amazon Maintains Lead in the Cloud Market,” *Statista*, February 5, 2023, <https://www.statista.com/chart/18819/worldwide-market-share-of-leading-cloud-infrastructure-service-providers/>
- Tarnoff, Ben: *Internet for the People: The Fight for our Digital Future*, London, New York, NY: Verso Books 2022.
- Tarnoff, Ben: “Deprivitizing internet: interview with Ben Tarnoff,” *DigiLabour*, August 26, 2022, <https://digilabour.com.br/en/deprivatizing-the-internet-in-interview-with-ben-tarnoff>
- Varoufakis, Yanis: *Technofeudalism: What Killed Capitalism*, New York, NY: Vintage Books 2023.
- Zöllner, Oliver: „Wie das Metaverse uns entmenschlicht,“ *Der Pragmaticus. Auf den Punkt gebracht*, May 23, 2023, <https://www.derpragmaticus.com/r/Metaverse-daten>
- Zuboff, Shoshana: *The Age of Surveillance Capitalism. The Fight for a Human Future at the New Frontier of Power*, New York, NY: Public Affairs 2019.
- Zuboff, Shoshana: “Shoshana Zuboff on Surveillance Capitalism,” July 29, 2019, *EconTalk. Conversations for the Curious*, podcast, <https://www.econtalk.org/shoshana-zuboff-on-surveillance-capitalism/>
- Zuckerberg, Marc: “The Metaverse and How We’ll Build It Together Connect 2021.” *Meta*. October 28, 2021, YouTube video, 01:17:26, <https://www.youtube.com/watch?v=Uvufun6xer8>

The Metaverse: What's Now, What's Next

JESSE SCHELL

Lately, there's been an awful lot of talk about the Metaverse. This is something I've given a lot of thought, and I'd like to share some of that thinking with you.

My initial exposure to the world of virtual reality came in graduate school in the early nineties. Very soon after, I got a position at Disney R&D in the virtual reality studio there. Of course, it was 30 years ago, and commercial headsets weren't available. We had to make our own headsets. They were so heavy that we needed to create a special system of steel cables with this whole counterweight system to keep them from overly straining your neck. These headsets were used in a place called Disney Quest, a virtual reality theme park at Disney World in Florida that was open for about 20 years. The first VR experience we created was ALADDIN'S MAGIC CARPET RIDE,¹ and then we made CAVE-based things like the PIRATES OF THE CARIBBEAN EXPERIENCE.² I went on from this Disney Quest project to create online worlds. Disney's TOONTOWN ONLINE³ was one of the first I worked on, and later, a Tinkerbell world called PIXIE HOLLOW.⁴

In 2002, I came to Carnegie Mellon's Entertainment Technology Center, where I started teaching classes on virtual reality. Over the years, I've watched students create more than a thousand different virtual worlds. Also, in 2002, I founded a company called Schell Games. In the 20+ years since then, we have created about 100 games and interactive experiences, many of them (around 20%) being VR and AR games. Immersive technologies, particularly VR, is a space that

1 ALADDIN'S MAGIC CARPET RIDE (Disney Quest, 1998, O: Disney VR Studio).

2 PIRATES OF THE CARIBBEAN EXPERIENCE: BATTLE FOR BUCCANEER GOLD (Disney Quest, 2000, O: Disney Studios).

3 TOONTOWN ONLINE (Disney Interactive, 2003, O: Disney Interactive).

4 PIXIE HOLLOW (Disney Online Studios, 2008, O: Disney Online Studios).

we are very excited about, and we're also excited about exploring its relation to the online world space.

How does all that relate to the Metaverse? Different people mean different things when they talk about the Metaverse. The four most common technologies that people discuss in this context are virtual reality, augmented reality, online worlds, and blockchain. There is an observation that these four things are potentially converging. There's a lot of confusion around just these four technologies alone, and even more confusion about combining them together into something new. People have different visions of exactly what will happen, but something is coming.

I will structure my analysis by talking about the different myths of the Metaverse.

MYTH #1: VR IS A FAD

The first myth I want to address is the idea that VR is a fad. I hear this a lot. People say: *Oh, well, that was a thing. Someone tried it. It didn't really work, did it?* Or: *Oh yeah, it's kind of happening now, but it's going to go away soon.* It's the feeling of: *I don't know if it's persistent.* And I'm telling you: VR is here to stay. It is going to be part of the digital landscape permanently from now on. Some people say: *Well, how can that be? If technologies are not a huge hit as soon as they come out, they're not going to succeed, right?*

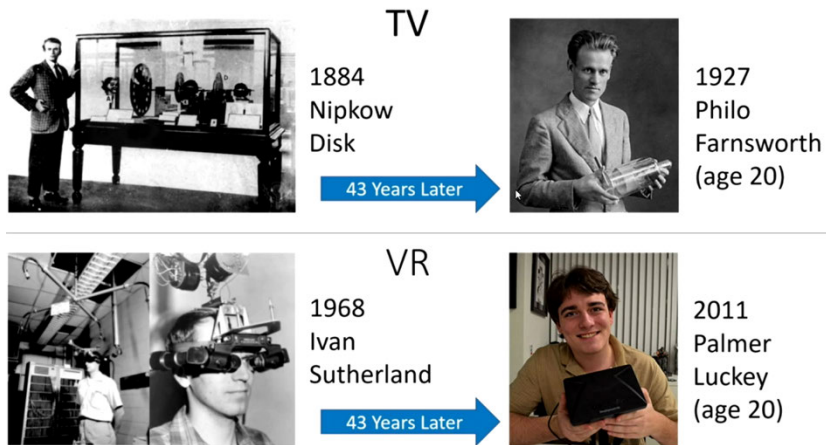
But that isn't how technology works. You can look at the development of television as a good example. When did the television first appear? Most people would say: Probably mid-forties, late 1940s, something like that. And that's not true. The first television system was created in 1884.⁵ It didn't work right, but it was a system able to send images at a distance through a wire. It took a lot of development to make television actually work. Can you imagine what it was like to be someone working on television in the 1890s? In 1900? In 1910? In 1920? These were times when it wasn't at all clear that this technology was feasible and going to move forward. But eventually, it did. Forty-three years later, there was a breakthrough from a young punk named Philo Farnsworth, who was out plowing

5 Cf. Nipkow, Paul: "German Patent Specification No. 30105 Relating to the Invention of the Perforated Scanning Disc," *Science Museum Group*, no date [1884], <https://collection.sciencemuseumgroup.org.uk/objects/co34827/copy-of-german-patent-perforated-scanning-disc-patent>

a field.⁶ And as he moved the lawn mower back and forth, it occurred to him that electron beams could be manipulated with magnets in a way that could potentially draw a picture. And this could be a better way to render images than they had been using. It was the breakthrough that television needed. It brought it into the modern age. However, it took some time.

If you look at VR, you can see similarities. The first VR system was Ivan Sutherland's, which appeared in 1968. Now, I'm going to give you a super eerie parallel. Exactly 43 years later, a similarly young punk named Palmer Luckey shows up, and he says: *I know we've got a lot of problems, and VR hasn't quite hit the mass market, but we could if we made the lenses plastic, and did color correction, and we made some changes with OLEDs. Then we could make a system that would work much better.* And this was the breakthrough—the Oculus.⁷

Figure 1: The Eerily Parallel Development of TV and VR

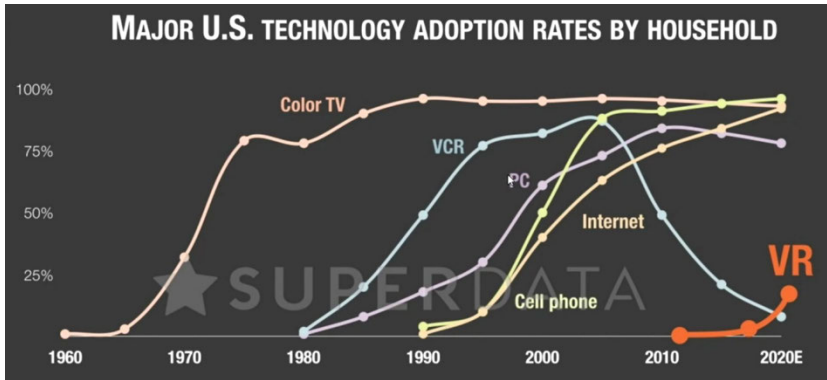


Source: J. Schell, “The Metaverse. What’s Now, What’s Next,” presented at the 13th Clash of Realities Conference, 2022

6 Cf. Eschner, Kat: “The Farmboy Who Invented Television,” *Smithsonian Magazine*, August 28, 2017, <https://www.smithsonianmag.com/smart-news/farmboy-who-invented-television-while-plowing-180964607/>

7 Cf. Clark, Taylor: “How Palmer Luckey Created the Oculus Rift,” *Smithsonian Magazine*, November 2014, <https://www.smithsonianmag.com/innovation/how-palmer-luckey-created-oculus-rift-180953049/>

Figure 2: Major U.S. Technology Adoption Rates by Household



Source: Superdata. Micheal Felton, *The New York Times*; Pew Research Center; Gallup; U.S. Census

So, VR wasn't an overnight thing. It is a technology that developed slowly. It's still developing right now. The adoption curve is gradually increasing. And it's worth considering the adoption curves of new technologies. Television, VCR, the PC, Internet: none of these things were embraced immediately. Not even cell phones and smartphones. They all had a slow ramp-up and then exponential growth. We are seeing some of the same things with VR. Over the last five years, we've watched the number of headsets in the marketplace double each year—from one million to two million to four million to eight million. As of 2022, we have at least sixteen million.⁸ How long will that doubling go for? I don't know, but we're definitely seeing an exponential growth rate right now.

So, what does state-of-the-art VR look like at the present? It doesn't look like putting VR on a phone, PC, or console. These are not places and platforms that were designed for VR. We tried to take existing systems and tack VR on as a sort of parasite that lives in a system that wasn't designed for it. These have been short-term solutions, but a longer-term solution is an all-in-one system. An example

8 Cf. N.N., "Volume of the VR Headsets Market Worldwide from 2018 to 2028," *Statista Market Insights*, August 8, 2023, <https://www.statista.com/forecasts/1331896/vr-headset-sales-volume-worldwide>

right now is the Oculus Quest or Meta Quest system. It has been shockingly successful. Fifteen million of these were estimated to have been sold as of 2022.⁹ That's more than the current generation of Xbox. People often don't realize how successful this is becoming. So, what has made this particular system so much more successful than the others? It seems to be an interesting combination of things. The price is very affordable. It's about the price of a regular game console, and very importantly: there are no wires coming out of the headset and no wires coming to the hand controllers. This has been surprisingly significant. It seems to have to do with people feeling more comfortable in their bodies and the ability to move this system around easily because people use their headsets in different places.

Not only is having a good headset important, but the hand controllers are important, too. Many people talk about these hand controllers as if they are temporary: *Oh, we just have these for now. Soon, we're going to want empty-hand interactions with VR.* I don't think that's right. I think the touch-ability and the tactile response of the hand controllers are going to make them a long-term part of these kinds of interactions. You can get by with empty-hand interactions where you only have to interact a little bit, and you don't have to be precise. But it's not the way in which people are going to want to interact. I believe, in the long term, we will see that hand controllers are a part of VR.

MYTH #2: VR IS TECHNOLOGY FOR THE EYES

This brings me to the second myth about VR. A lot of people think of VR as a technology for the eyes, and certainly, the eyes are involved. But that is not what VR is—just some fancy 3D glasses. Back a little while ago, people said: *Oh, 3D TV, that's going to be the thing! Everybody is going to have a 3D TV,* and the TV industry was very excited about it. But that's not what happened at all. 3D TV was a total flop because people don't care that much about 3D imagery. It's kind of nice and interesting, but particularly when it's in a rectangular frame, it has a lot of problems because it gets clipped on the edges. And it's not like 3D is something

9 Cf. N.N.: "AR/VR Headset Shipments Grew Dramatically in 2021," *International Data Corporation*, March 21, 2022, <https://www.idc.com/getdoc.jsp?containerId=prUS48969722>

new. The first commercial 3D imagery systems come from the 1840s.¹⁰ The technology is not that complicated: two side-by-side pictures. If we really liked 3D so much, we would still be using this 170-year-old technology. But we don't. Your family photos aren't in 3D; your home movies aren't in 3D. Nintendo made the 3DS, and then they backed off. They went to the Switch and said: *Now forget that 3D stuff*. Phones would be in 3D, and they certainly could be. But it's not 3D itself that's very important. What's essential about VR is that it gives a sense of presence—the feeling that you are in another place, that the virtual things around you are substantial and real, and you can interact with them spatially.¹¹

This is a very special feeling because it seems that there's something deep in your brain that decides what around you is real and what is not. No one watching a television show ever thinks: *Wait, are these things really in the room with me?* In VR and AR experiences, intellectually, you know it's not real, but you still see moments of confusion. Maybe you're trying to solve a puzzle in VR. You're thinking hard and reach your hand out because there's a virtual table. You'll go to lean on the table, and then you realize it's not there now. You knew there was no table, but your body forgot because your body was buying into the illusion of presence. That is the heart of what makes VR powerful. You do have your body in there. So often, as a design principle for VR, we ask, *how is this about my body?*

Another very real and related part of presence is social presence—the feeling of being in a room with other people who are spatially present around you. There's a nucleus in your brain that is all about when something enters your personal space. You cannot feel that when you're just looking at a screen.¹² But when you're in the real world or in VR, you can feel presence. Entering your personal space and social experiences will be key things that make VR continue to grow.

We often talk about the magical number of ten million. When there are less than ten million of something in the world, probably none of your friends have

10 Cf. Wheatstone, Charles: "Contributions to the Physiology of Vision. Part the First. On Some Remarkable and Hitherto Unobserved Phenomena of Binocular Vision," *Philosophical Transactions of the Royal Society of London* 128, (December 1838), pp. 371-394, <https://doi.org/10.1098/rstl.1838.0019>

11 For a discussion of presence in VR see e.g., Slater, Mel: "Place Illusion and Plausibility Can Lead to Realistic Behaviour in Immersive Virtual Environments," *Philosophical Transactions of the Royal Society B: Biological Sciences* 364, no. 1535 (December 12, 2009), pp. 3549-57, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2781884/>

12 Cf. Holt, Daphne J. et al.: "Neural Correlates of Personal Space Intrusion," *The Journal of Neuroscience* 34, no. 12 (March 19, 2014), pp. 4123-413434, <https://www.jneurosci.org/content/34/12/4123>

one of them. When there are more than ten million of something in the world, probably at least one of your friends will have one. When a technology crosses over into more than ten million users, social effects accelerate because people start to get into the technology not so much for its own sake but for their social relationships.¹³ *Hey, my friends are doing this. Maybe I should do it too.* And we're seeing this happen with VR right now. There's the expectation that we're going to see more acceleration of this because the social experience of meeting up with other people in a virtual space is a powerful one.

MYTH #3: THE METAVERSE IS ONE CONTINUOUS WORLD

Is that what the Metaverse is? Is it a big virtual world with a lot of people in it? There are certainly a lot of people who have proposed this. In fact, it's in the word Metaverse. The term was coined in the novel *Snow Crash*,¹⁴ which envisioned a large, continuous virtual world. That was how virtual reality worked. You would go into this world and interact with other people in a kind of parallel to our physical world. *Ready Player One* painted a similar picture.¹⁵ People get very excited about this picture—the idea of a world parallel to our own. And there's our third myth: that the Metaverse is one continuous world. It's just like the idea of *Toontown*—that all the cartoon characters live in one place. It's a very natural fantasy, but it's only a fantasy. The Metaverse does not want to be one continuous world, and it will not be.

We've been making video games for quite some time. If joining them all together into one continuous world was a good idea, we would have done it by now. But there's no real point. Worlds are powerful because they have boundaries. Good fences make good neighbors, and good boundaries make good worlds. And those strong boundaries are what define the worlds. Connecting them all together in a way that makes them one continuous space is not helpful. It's not good for them.

Many people point to ROBLOX as a potential precursor to the Metaverse because it is a big space with millions of people participating.¹⁶ It's got all these different things in it. Well, it's not a continuous space. It's just a collection of

13 See e.g., Gladwell, Malcolm: *The Tipping Point: How Little Things Can Make a Big Difference*, New York, NY: Little, Brown and Company 2000.

14 Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.

15 Cline, Ernest: *Ready Player One*, New York, NY: Crown Publishers 2011.

16 ROBLOX (Roblox Corporation, 2006, O: Roblox Corporation).

small, disconnected, gated pocket worlds. People don't want to interact with a million other people at once. That's just not how it is. In the early days of online worlds, that's kind of what they were like. You look at EVERQUEST and WORLD OF WARCRAFT: they were these big continuous spaces, and there were hundreds of thousands of people in there. Have you noticed that those worlds aren't trendy anymore? If we look at some hot online games where people interact now, they're not interacting with thousands of people simultaneously. Look at the number of people players interact with simultaneously—COUNTERSTRIKE: ten;¹⁷ LEAGUE OF LEGENDS: ten;¹⁸ AMONG US just moved from ten to fifteen.¹⁹ APEX LEGENDS: six,²⁰ PLAYERUNKNOWN'S BATTLEGROUNDS, and FORTNITE: 100.²¹ Even ROBLOX has a limit of 100 people in one of their pocket worlds. And we top it off with CALL OF DUTY: you can theoretically get up to 150 people in CALL OF DUTY: WARZONE.²²

This is the scale at which people want to interact because this is a very human scale. And if this number seems familiar, capping out at 150: you might have heard of Dunbar's number.²³ This is a study that shows that human societies tend to clump into groups of 150. We seem to be able to maintain a social network of about 150 people before our worlds break down. So historically, there's the belief that that's about how big villages were in ancient times. We can see it in organizations all the time: when they cross the boundary of 150, they start to split into two. The Metaverse will not form around technology or technological ideas. It will form around humans and human behavior and the way that human beings interact. So, the Metaverse is not going to be one continuous space. There will be lots of different pocket worlds where people interact the way they want when they want with whom they want.

You might say: *But a big, beautiful, continuous space—that's great. I love a big continuous space.* No, you really don't, because if you did, you wouldn't fly. You would get on the road and travel continuously across this space and enjoy the continuity of the space. But you don't want that. You'd teleport if you could, but

17 COUNTERSTRIKE:GO (Valve Corporation, 2012, O: Hidden Path Entertainment).

18 LEAGUE OF LEGENDS (Riot Games, 2009, O: Riot Games).

19 AMONG US (InnerSloth, 2018, O: InnerSloth).

20 APEX LEGENDS (Electronic Arts, 2019, O: Respawn Entertainment).

21 PLAYERUNKNOWN'S BATTLEGROUNDS (Krafton, 2017, O: PUBG Studios), FORTNITE (Epic Games, 2017, O: Epic Games).

22 CALL OF DUTY: WARZONE (Activision, 2020, O: Infinity Ward).

23 See Dunbar, Robin: "Neocortex Size as a Constraint on Group Size in Primates," *Journal of Human Evolution* 22, no. 6 (June 1992), pp. 469-493, [https://doi.org/10.1016/0047-2484\(92\)90081-J](https://doi.org/10.1016/0047-2484(92)90081-J)

you can't. So instead, you do the next best thing, which is to make yourself terribly uncomfortable for a short period of time so that you don't have to deal with the geography between here and there because geography is just a lot of stuff that's in the way of where you want to be. And you drive. You have to put up with this and have to actually traverse continuous terrain. But that's not how the mind works. The mind doesn't move continuously. The mind jumps around. That's why films cut. Because the mind jumps around just as film cuts from place to place to place.

That's what we want with our virtual worlds. We want to jump: I'm going to go to this world. When I'm done with that, I'm going to go to this one. And that's how the Internet works. You can't make an accurate map of the Internet because it doesn't make any sense. The Internet is not a continuous space. The Internet is more like an index to the things that you care about. You can jump to what you want when you want to jump to it. If we're going to have anything that's at all like a Metaverse, that's what it's going to be—lots of separate worlds with clear boundaries between them.

MYTH #4: NFTS LET YOU BRING OBJECTS ANYWHERE IN THE METAVERSE

You might be saying: that's why I need NFTs, right? Because then I can take my virtual objects to every one of these separate worlds in the Metaverse. And that's myth number four. Many people talk about this idea that NFTs will let you bring objects anywhere in the Metaverse. I'll buy a red hat, and I'm going to wear my red hat in every single place in the Metaverse. What a business opportunity! Well, it's a nice idea, but honestly, it's probably not going to work. Let's talk about why.

Suppose you get this awesome virtual item, "The Antlers of Undead Wrath." Who wouldn't want that and everything that it implies? And you want to bring this item everywhere. I'm going to use "The Antlers of Undead Wrath" in a soccer game, and I will use them in SKYRIM, and when I'm in my virtual school application. This item will always do whatever "The Antlers of Undead Wrath" do. Well, there are problems if you're going to actually try to implement this because these worlds are created by very different people. You're going to have expectations about what these antlers are, how they work, what they do, how you should wear them, etc. Anything that becomes an object has to work in many different worlds. This is incredibly technically difficult because different worlds will be set up very differently. Creating standards that work all the way across the Metaverse might be possible, but it would be very challenging because everyone would have to

conform to these standards. There may one day be something like that, but it better be worth it because this will be hard work.

Then you have the issue that these items are thematically inconsistent. If I'm trying to make a beautifully themed world, and you show up with a bunch of random objects like "The Antlers of Undead Wrath" that don't really fit the world, and then everyone does that, then everything is just a random hodgepodge. And people don't go to worlds for a random hodgepodge. People go to worlds because there's thematic consistency, a certain mood, a certain feeling, a certain place that they want to be fully embraced in. So, if I'm going to bring random objects everywhere, that's a challenge and a problem. Again, you could manage it, but it'll be complicated. Also, if you're talking about game worlds, that could spoil game balance. Say you get an object that is really powerful. You can fly everywhere now. Now you expect to fly everywhere in all the worlds. Well, what if, in my world, flying messes it up because it ruins the game balance? How is that supposed to work?

And then lastly, when I can take all the objects out of a world, that encourages me to leave, and the people who make these worlds don't want you to leave. They want you to stay. They want boundaries, not just to define a world but to keep you in so that you keep interacting with people here and so that this world is financially successful for them. So, there are financial disincentives to creating systems that encourage players and users to exit a world and go to other worlds. Now, is this manageable? Yes, it's manageable, but the truth is, almost anything you want to do with NFTs, you can do with just a server. You're just looking up who owns what object. This works for most virtual worlds as long as you can get meaningful authentication on the server. We've been doing this for a long time, and it continues to work.

Some people will say: *Well, wait a minute, the problem is that somebody owns that server, and then they control that, not me. I want to be the one who really owns the item, not someone who can shut down the server and make it all disappear.* Okay, that's true. When Disney decided to shut down the TOONTOWN server, all those virtual objects did disappear. I understand that concern on some level, but on another level, when worlds are successful, they are managed and maintained indefinitely. Ownership is what prevents the tragedy of the commons. So, will NFT objects be a part of this picture? Yes. Will they be the dominant part of the way people own virtual objects? I'm skeptical about that.

BUT WHAT ABOUT AUGMENTED REALITY?

So, we've talked about virtual reality. We've talked about online worlds. But you might be saying: *Hey, wait a minute, are you implying the whole Metaverse is virtual reality?* Because some people don't like virtual reality. They don't want to put on a headset. It messes up their hair, makes them a little nauseous, and sometimes it's isolating. So, they are not excited about VR. They are excited about augmented reality. They want a tiny, lightweight pair of glasses. They don't want to go to some virtual world. They want virtual items to come to them. They want augmented reality, but not the augmented reality we have now.

Augmented reality on phones or tablets is not great. It creates no sense of presence. It's like going to a concert and watching it through your camera while you record it. Pretty soon, you realize: *I'm not really here at the concert. I'm kind of watching television of what's happening.* And you'd rather be immersed in the actual concert. Space is one of the reasons why we haven't seen significant success in this kind of augmented reality so far. We need to put on some glasses and just naturally see objects in the world. There's real excitement there. Because the difference between VR and AR is the difference between here and there. VR is about taking you there, to some other place. A place that isn't where you actually are. AR is about staying in the place you're in but bringing virtual objects to you. Both are about presence, but VR is about presence in a place that doesn't exist, and AR is about presence in the place that you exist in right now. People get excited about this. We've heard many people and many pitches and much funding raised around the idea that AR headsets will soon replace the smartphone. I think that this is a myth. Will it happen some future day? It is possible, yes. But that is not soon. It's going to be far off.

So why? What is the problem that is going to stop our headsets from being worn everywhere? Well, headsets generally are too dark or ridiculous-looking. People are sensitive about their appearance and things that look kind of weird. They get nervous about wearing headsets in public. Maybe if they are getting lighter, it's going to look more normal, like a regular pair of glasses. The Google Glass came out several years ago. It is very close to a normal-looking pair of glasses. However, it flopped in a big way. This wasn't just a slight failure. It was a crushing failure, not because it was bad technology or that it was hard to use, or that it wasn't even useful. In many ways, Google Glass was remarkable. But it's gone now because people weren't comfortable with it. It was not socially acceptable to wear these out in the world.

We should think about why that is. It wasn't just because it looked a little weird. It had to do in a big way with the nature of privacy. About thirty years ago,

I heard a lot of talk from people saying: *Oh, very soon, computers will be able to transcribe speech into text. And once we do that, no more typing. Everyone will just talk to their computers, and you'll speak instead of typing.* Well, here we are. We have transcribed human speech into text, and it works well, kind of amazingly well. But we're still typing. Why? Well, for two reasons. One is the way our brains work. It's hard to compose while you're talking. And the other side of it is, if you're talking out loud, people can hear you. And very often, people want privacy about what they're communicating. So, one thing to discuss with any VR or AR headset is these black dots on the front of the headset. They are scary because anytime you're facing someone who's wearing a headset, you're staring into the lens of a camera. With Google Glass, they intentionally did not put a light there to tell you whether the camera was on because they wanted people not to think about that. Well, now you worry all the time: *Am I being watched? How about now? Are you recording what I'm doing right now? Is someone watching me at a distance? This is not comfortable.* Being surveilled is a creepy feeling, and it's something that we haven't figured out yet. Wearing this out in the world, in public places, is a problem.

Another problem worth talking about is the field of view. What we see through optical pass-through glasses is cut off at the bottom and cut off at the top. That breaks the illusion. The presence is shattered because we have this limited field of view. Some people think that the optical pass-through will have a full field of view very soon. And I don't think that's true. Let's look at the history of lenses quickly. We have the Nimrud lens that was invented 2700 years ago.²⁴ If you're wearing glasses, you're using one of these right now. It's pretty old technology. The Fresnel lens was created for lighthouses in 1823.²⁵ It is used in a number of different headsets and things. It's a good advance in some ways. And then we have holograms that can be used in a lens, invented maybe seven decades ago.²⁶ And these are great because they're light and thin, but they have terrible chromatic aberration. That's why you see all those rainbows: because the colors are being blown all over the place. Systems that use optical passthrough generally use quantum waveguides, a form of hologram.

24 Khan, Sameen Ahmed: "Medieval Arab Contributions to Optics," *DOMES* 25, no. 1 (Spring 2016), pp. 19-35, <https://doi.org/10.1111/dome.12065>

25 Baker, Joanne: "History: Beam Me Home," *Nature* 498 (June 27, 2013), pp. 430-431, <https://doi.org/10.1038/498430a>

26 Gabor, Dennis: "Holography 1948-1971: Abstract of Nobel Lecture, 11 December 1971," *Europhysics News* 3, no. 3 (1972), pp. 8-9, <https://www.europhysicsnews.org/articles/e pn/abs/1972/03/e pn19720303p8/e pn19720303p8.html>

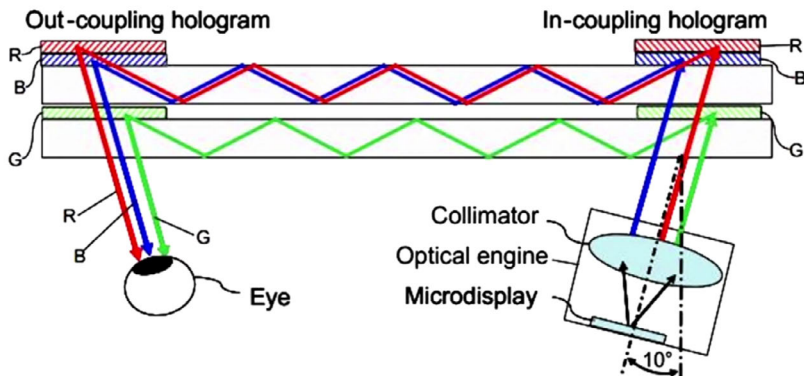
Figure 3: History of Lenses



Source: J. Schell, “The Metaverse. What’s Now, What’s Next,” presented at the 13th Clash of Realities Conference, 2022

Headsets with holograms work like this: You’ve got a display light coming in through a lens, and then it puts things into a hologram. You’ve got to have three holograms. One red, one green, and one blue because if you’re trying to preserve color, you need one for each primary color. And then the image goes in, and amazingly, the image stays in the hologram, bounces along it, and then pops out where the eye is. It’s amazing that this works at all. The problem is that the ingoing and outcome images must be the same size.

Figure 4: DigiLens Full-Color Volume Holographic Grating Waveguide Imaging Lightpath



Source: DigiLens

That's why you see these shapes in AR glasses, where this sort of flat channel goes along. But you want to make one that fills your whole field of view. You could do it, but it's not super comfortable. And so someday, maybe someone's going to invent an expanding waveguide. That's where the image can start out small and then gets bigger on the other side. No one's made that yet, and we're not sure how that could even be possible. So, this is an indefinite wait. In the meantime, video pass-through solutions like the Meta Quest 3 and Apple Vision Pro will be the primary method of delivering AR experiences.

Another thing we have to consider is software. Hardware is one thing, but the software mostly isn't ready yet either. You can float objects in space. That's fine. But who wants to float objects in space? You might as well be looking at the objects on a screen. Augmented reality is best when it *augments reality*. Show me what a watch looks like on my wrist. To do that, you need to be able to detect my wrist and then match the watch to it. It is challenging for computers to look at the world, and identify all the objects, all the places, and all the shapes. Identifying objects is hard. Arguably, half of the brain is spending its energy visually parsing the world and understanding what the objects are.²⁷ That's a lot to ask of a computer. We're making progress at room solving, but it's slow. So that's a real challenge if you're going to wander the world wearing your augmented reality headset and have the world itself be augmented.

All these challenges with augmented reality would cause some people to ask: *Is there a killer app for this, or is this like the Segway?* When the Segway was announced, they made a lot of big noise about it, like: *Oh, this is going to be the invention that changes the world. Whole cities are going to be designed around the Segway. It will replace bicycles. It will replace walking; it will replace cars. Everyone's going to get on a Segway all the time.* And that's not how it is. If you're a security guard or working in a warehouse, or you're taking an extended tour of a city, this is good technology. But it's not mass-market and in everybody's lives because it's only good for some things. For day-to-day life, the use of AR is a little unclear. Where is the application that will make people want to use it every day?

Now we know the killer app for VR: games. And so maybe it's the same thing for AR. But there's a problem with this because games are about escaping into fantasy worlds, and AR is about bringing virtual objects to you. Do you really want every video game you play to be set in your dingy living room? That isn't

27 Hagen, Susan: "The Mind's Eye," *Rochester Review* 74, no. 4 (March-April 2012), pp. 32-37, https://www.rochester.edu/pr/Review/V74N4/0402_brainscience.html

what most people want. Augmented reality games don't seem like they're going to be enough of a killer app.

Then the answer might be work. Now, certainly, if you're designing 3D objects for a living, maybe you're going to wear this a lot because you're creating motorcycles or cartoon characters. That makes sense. But that's not what most of us are doing. Most of us spend a lot of time talking to other people as a part of our job, and AR can get in the way of that. And people who aren't talking to other people are often working with data. And data is two-dimensional. That is how the human mind interacts with data. Can you put data in three dimensions? People do it, but it rarely provides insight. Most of the time, data is better understood in two dimensions.

But maybe the pandemic is the key to the killer app for AR. If you imagine two people working on something together, and they're both working remotely. They want to work on this thing together. They like to be in the same space. We all know there's a real power to being in the same space with another person. But it's not always convenient to do that. And you could put on these headsets and use augmented reality to be in the same space potentially. Now, what is that like? Well, it's a little weird. Because it means you're going to have the other person be a cartoon in your world, and you're going to be a cartoon in their world. Do I want to be represented as some weird cartoon character in my professional doings? Maybe not. But look at this paper by Meta's Reality Labs:

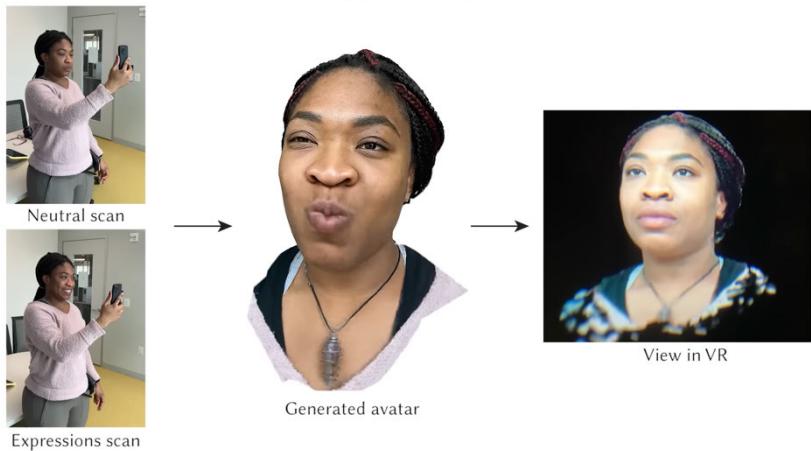
“We present authentic volumetric avatars from a phone scan. To create an avatar, a user can use an RGB camera, such as an iPhone 12, to capture a neutral expression from different viewpoints as well as a set of facial expressions. We use this data to generate the photorealistic avatar, which matches the user's face in terms of geometry and appearance and can produce high-fidelity renderings from novel viewpoints and expressions. Our volumetric avatar can be rendered in VR in real-time, which opens up the possibility for photorealistic telepresence applications.”²⁸

This is worth contemplating. By scanning yourself, you could create avatars that match your own physical self at another location. You've got a headset mounted on your face that can look at your eyes. It can look at what your face is doing and look at all your gestures and potentially make an avatar that moves and acts pretty much like you. This is interesting because the eyes are critical. They are a two-

28 Cao, Cen: “Authentic Volumetric Avatars from a Phone Scan (SIGGRAPH 2022).” *Cen Cao*, July 2, 2022. YouTube video, 7:17, https://www.youtube.com/watch?v=t7_TMD7v0Xs

way street. Information comes into the eyes, but lots of information goes out from the eyes. That’s where our expressions happen, in the mask area of our face. And so, you have to create the illusion that two users are in the same room together, and both are making facial expressions and interacting naturally with each other, even though they are wearing masks.

Figure 5: Generated Volumetric Avatar Based on Phone Scans



Source: Screenshot from Cao, Cen: “Authentic Volumetric Avatars From a Phone Scan.”
https://www.youtube.com/watch?v=t7_TMD7v0Xs

The killer app for augmented reality could be the ability to create face-to-face communication, merging our spaces. And we’re going to be able to do it very soon because mapping a space is hard, but mapping a space I’m in all the time, like my office, my living room, etc., is possible. You can map it and remember it. And out in the world, I don’t want to wear a headset. That’s weird. But in my office, in my house, I’m okay with that. We’ll be able to connect and create these augmented reality pocket worlds with the people we want to communicate with using this technology very soon.

SO, WHAT IS THE METAVERSE?

The Metaverse isn’t a place any more than the Internet is a place. The Metaverse is the blurring of real people, real places, and real things with virtual people, virtual places, and virtual things. You’re blending the actual and the imaginary.

That's what the Metaverse is. And it's already happening without us even noticing it. When you go on Instagram, and you think: *Oh, I'm looking at my friend's life*—you're in the Metaverse. When you use a background in Zoom, you're in the Metaverse. When you send an invite to somebody in CLASH OF CLANS, you're in the Metaverse.²⁹ When you call somebody by their username, you blend reality and an artificial world, and you are in the Metaverse.

This is nothing new. Anytime somebody puts on makeup, or even when you put on clothing, you are blurred. You're covering up reality with something artificial and acting like it's normal. Even children playing with dolls, what are they doing? They are taking a physical object and turning it into a virtual person. This blurring of the actual and the imaginary is very human. Naturally, we want to use these technologies and are just starting. As these four technologies come together, this blurring between reality and imagination is what the Metaverse is. And I want to leave you with one last idea. These four technologies are important, but a fifth one is coming very soon. We will have AI characters that talk and listen, just like people do. Technologies like ChatGPT show that this is possible, and very soon, AI will be a critical part of the Metaverse.

Let's go twenty years in the future. Let's think about a child born into a world where this AI Metaverse is normal. How will they understand it? What will it be like for them? They will probably understand it as a set of magic glasses. These magic glasses are something they really are excited about because it lets them see and play with a virtual friend. And this virtual friend isn't just in one place. This virtual friend is there any time you put on the glasses. It's with you anytime, anywhere, spatially. This is important because children approach the world spatially. That's why they can't sit still: because they want to interact with everything spatially. Most adults will be kind of ashamed to run around outside, talking to an imaginary friend. But children are not ashamed. They will love it. This new friend will play any kind of game with them. This new friend is going to be up for any kind of adventure, and you can play with this new friend and your real friends simultaneously. You'll introduce your real friends to your imaginary friend, but more likely, your friends and their imaginary friends will all know each other already. The imaginary friends might be the ones who introduced the kids to each other.

You might say: *Oh man, parents will not be up for this.* But they will be because this imaginary friend is going to help children understand the world. It will be a very patient friend who's always ready to teach, who's always ready to blend

29 CLASH OF CLANS (Supercell, 2012, O: Supercell).

playing and learning seamlessly, who is going to have unlimited patience and unlimited understanding. It might seem weird at first to have children always accompanied by this super intelligent playmate they can only see with magic glasses. But what parent will be able to resist having this perfect guide and mentor that can help keep them safe and help them grow? This will be more than just a playmate. This is going to be someone who teaches children to see the world as it actually is.

The path to the Metaverse is going to be a long and difficult one. It's been long and difficult already, and we still have a long way to go. But as you think about it, you must remember why we are doing it. We are not just building another gadget for digital trendsetters. What we are doing is crafting the eyes of the next generation. There are dangers in that. If we do it wrong, it could be terrible. But if we do it, and it looks like we will do it, we should make these the best eyes the world has ever known.

LITERATURE

- Baker, Joanne: "History: Beam Me Home," *Nature* 498 (June 27, 2013), pp. 430-431, <https://doi.org/10.1038/498430a>
- Clark, Taylor: "How Palmer Luckey Created the Oculus Rift," *Smithsonian Magazine*, November 2014, <https://www.smithsonianmag.com/innovation/how-palmer-luckey-created-oculus-rift-180953049/>
- Cline, Ernest: *Ready Player One*, New York, NY: Crown Publishers 2011.
- Dunbar, Robin: "Neocortex Size as a Constraint on Group Size in Primates," *Journal of Human Evolution* 22, no. 6 (June 1992), pp. 469-493, [https://doi.org/10.1016/0047-2484\(92\)90081-J](https://doi.org/10.1016/0047-2484(92)90081-J)
- Eschner, Kat: "The Farmboy Who Invented Television," *Smithsonian Magazine*, August 28, 2017, <https://www.smithsonianmag.com/smart-news/farmboy-who-invented-television-while-plowing-180964607/>
- Gabor, Dennis: "Holography 1948-1971: Abstract of Nobel Lecture, 11 December 1971," *Europhysics News* 3, no. 3 (1972), pp. 8-9, <https://www.europhysicsnews.org/articles/epn/abs/1972/03/epn19720303p8/epn19720303p8.html>
- Gladwell, Malcolm: *The Tipping Point: How Little Things Can Make a Big Difference*, New York, NY: Little, Brown and Company 2000.
- Hagen, Susan: "The Mind's Eye," *Rochester Review* 74, no. 4 (March-April 2012), pp. 32-37, https://www.rochester.edu/pr/Review/V74N4/0402_brainscience.html
- Holt, Daphne J. et al.: "Neural Correlates of Personal Space Intrusion," *The Journal of Neuroscience* 34, no. 12 (March 19, 2014), pp. 4123-413434, <https://www.jneurosci.org/content/34/12/4123>

- Khan, Sameen Ahmed: “Medieval Arab Contributions to Optics,” *DOMES* 25, no. 1 (Spring 2016), pp. 19-35, <https://doi.org/10.1111/dome.12065>
- Nipkow, Paul: “German Patent Specification No. 30105 Relating to the Invention of the Perforated Scanning Disc,” *Science Museum Group*, no date [1884], <https://collection.sciencemuseumgroup.org.uk/objects/co34827/copy-of-german-patent-perforated-scanning-disc-patent>
- N.N.: “AR/VR Headset Shipments Grew Dramatically in 2021,” *International Data Corporation*, March 21, 2022, <https://www.idc.com/getdoc.jsp?containerId=prUS48969722>
- N.N., “Volume of the VR Headsets Market Worldwide from 2018 to 2028,” *Statista Market Insights*, August 8, 2023, <https://www.statista.com/forecasts/1331896/vr-headset-sales-volume-worldwide>
- Slater, Mel: “Place Illusion and Plausibility Can Lead to Realistic Behaviour in Immersive Virtual Environments,” *Philosophical Transactions of the Royal Society B: Biological Sciences* 364, no. 1535 (December 12, 2009), pp. 3549-57, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2781884/>
- Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.
- Wheatstone, Charles: “Contributions to the Physiology of Vision. Part the First. On Some Remarkable and Hitherto Unobserved Phenomena of Binocular Vision,” *Philosophical Transactions of the Royal Society of London* 128 (January 1838), pp. 371-394, <https://doi.org/10.1098/rstl.1838.0019>

VIDEO

- Cao, Cen: “Authentic Volumetric Avatars from a Phone Scan (SIGGRAPH 2022).” *Cen Cao*. July 2, 2022. YouTube video, 7:17, https://www.youtube.com/watch?v=t7_TMD7v0Xs

GAMES

- ALADDIN’S MAGIC CARPET EXPERIENCE (Disney Quest, 1998, O: Disney VR Studio)
- APEX LEGENDS (Electronic Arts, 2019, O: Respawn Entertainment)
- AMONG US (InnerSloth, 2018, O: InnerSloth)
- CALL OF DUTY: WARZONE (Activision, 2020, O: Infinity Ward)
- CLASH OF CLANS (Supercell, 2012, O: Supercell)
- COUNTERSTRIKE:GO (Valve Corporation, 2012, O: Hidden Path Entertainment)

EVERQUEST (Sony Online Entertainment, 1999, O: Sony Online Entertainment)
FORTNITE (Epic Games, 2017, O: Epic Games)
LEAGUE OF LEGENDS (Riot Games, 2009, O: Riot Games)
PIRATES OF THE CARIBBEAN EXPERIENCE: BATTLE FOR BUCCANEER GOLD (Disney Quest, 2000, O: Disney Studios)
PIXIE HOLLOW (Disney Online Studios, 2008, O: Disney Online Studios)
PLAYERUNKNOWN'S BATTLEGROUNDS (Krafton, 2017, O: PUBG Studios)
ROBLOX (Roblox Corporation, 2006, O: Roblox Corporation)
SKYRIM (Bethesda Softworks, 2011, O: Bethesda Game Studios)
TOONTOWN ONLINE (Disney Interactive, 2003, O: Disney Interactive)
WORLD OF WARCRAFT (Blizzard Entertainment, 2004, O: Blizzard Entertainment)

Achievements

From Pixels to Emotions

Exploring Atmospheres in Metaverse Art Exhibitions

ISABELLE HAMM

INTRODUCTION

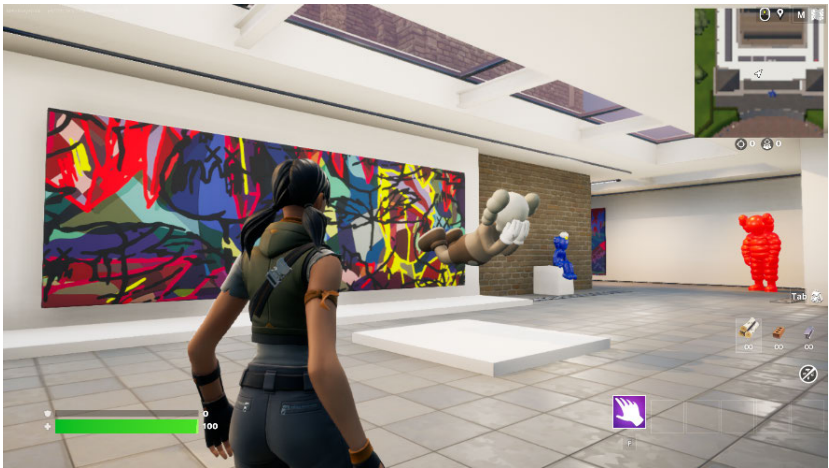
At the beginning of 2022, the Serpentine Gallery in London presented the exhibition “KAWS: New Fiction” with sculptures and paintings by pop artist and designer Brian Donnelly, known by his alias KAWS. Part of the concept of the exhibition was to create a transition from analog to digital space, for which an augmented reality (AR) app was developed in cooperation with Acute Art. Using the app, it was possible to place and view some of the artworks of the exhibition as well as additional works on location digitally.¹ The app can also be used at home. In addition, the exhibition was recreated quite accurately in the game FORTNITE, a “free to play” survival shooter developed by Epic Games and People Can Fly, released in 2017. In the FORTNITE exhibition, visitors started in a park (which features FORTNITE matchmaking portals) in front of the Serpentine Gallery (see Figure 1a). Facing the gallery, the sculptures by KAWS immediately caught the eye (see Figure 1b). They were positioned around the exhibition building or were placed on the portico above the entrance. Inside the small, unpretentious exhibition building, paintings and other sculptures were presented (see Figure 2). A sculpture in the entrance area seemed to float motionless in the air, but it was not possible to interact directly with any of the works. Additional information about the art was not provided. Opposite the gallery, on the other side of the small park, there was a labyrinth through which players could reach other large sculptures that could already be seen from a distance.

1 Serpentine Galleries: “Acute Art presents | KAWS: NEW FICTION,” *Serpentine Galleries*, <https://www.serpentinegalleries.org/whats-on/acute-art-presents-kaws-new-fiction/>

Figures 1a/1b: View of the exhibition building (in the picture on the left) and the opposite side with the sculptures above the labyrinth (in the picture on the right)



Figure 2: The entrance area inside the exhibition building



Source: FORTNITE, Epic Games, People Can Fly, 2017, screenshots by I. Hamm

As FORTNITE's first art exhibition and in the context of the COVID-19 pandemic, the Metaverse version of the KAWS exhibition attracted a lot of attention, with reactions and opinions widely varying. The younger audience described more positive impressions and were pleased to (re)discover KAWS' works in this unusual setting or to come into contact with an art exhibition for the first time via FORTNITE.² However, London art critics expressed great disappointment.³ Alastair

2 Chow, Vivienne: "'You Literally Got Me Into KAWS Fam:': What Game-Playing Teens Think About the Artist's New Project on Fortnite," *Artnet*, January 25, 2022, <https://news.artnet.com/art-world/londons-art-critics-kaws-serpentine-fortnite-players-love-it-2063909>

3 Ibid.

Smart did not appreciate the exhibition, finding it “hard to see any player having a meaningful experience in the would-be exhibition.”⁴ Eddy Frankel also chose strong words:

“[...] the gallery’s been recreated in FORTNITE too, which isn’t half as interesting or revolutionary as it likes to think it is, because artists have been creating in-game exhibitions for decades. [...] I want to be immersed in KAWS about as much as I want to be immersed in a vat of pus. The problem with KAWS, and this show, is that he and it aren’t about anything. It has no concepts, no emotions, no beauty and absolutely no point.”⁵

The principle of the virtual exhibition was at its core laid out even decades before the development of the Internet through concepts of cross-linking knowledge such as André Malraux’s *Museum Without Walls*.⁶ In 1953, the art theorist and politician Malraux used this term to describe his observation that the increasing number of photographic reproductions of works of art was leading to wider dissemination of art and, therefore, effectively renewed research and reception.⁷ In this way, it became possible to summarize an entire artistic oeuvre in an illustrated book in order to study it in a comparative way. These processes of change, which were initiated by photography in Malraux’s time, are once again coming to a head through virtual exhibitions. Via platforms such as SECOND LIFE as well as the first museum websites of the 2000s and subsequent increasingly sophisticated technical solutions, they have developed into a more complex, mostly three-dimensional form of mediation to the present day.⁸

4 Smart, Alastair: “KAWS: New Fiction, Review: Who Wants to Go to a Gallery and Stare at Their Phone?,” *The Telegraph*, January 19, 2022, <https://www.telegraph.co.uk/art/what-to-see/kaws-new-fiction-review-wants-go-gallery-stare-phone/>

5 Frankel, Eddy: “KAWS: ‘New Fiction’,” *TimeOut*, January 18, 2022, <https://www.timeout.com/london/art/kaws-new-fiction>

6 Schweibenz, Werner: “The Virtual Museum: an Overview of Its Origins, Concepts, and Terminology,” *The Museum Review* 4, no. 1 (2019), https://www.researchgate.net/publication/335241270_The_virtual_museum_an_overview_of_its_origins_concepts_and_terminology

7 Malraux, André: “Museum Without Walls,” in: Idem (ed.), *Voices of Silence*, Frogmore, St. Albans: Paladin 1953, pp. 13-127, here pp. 17-46.

8 Povroznik, Nadezhda: “History,” *VM History*, 2019, <http://virtualmuseumhistory.com/history/>

Due to its long media cultural history, there is no universally accepted definition for the term virtual exhibition.⁹ This essay, therefore, invokes the definition developed in 2016 by the Digital Exhibitions Working Group of the ArthenaPlus project, as it is concrete enough but also allows for the flexibility that virtual exhibitions require:

“A Digital Exhibition is based on a clear concept and is well curated. It assembles, interlinks and disseminates digital multimedia objects in order to deliver innovative presentations of a theme, or series of themes, allowing user interaction to a great extent.”¹⁰

BENEFITS AND CHALLENGES OF VIRTUAL EXHIBITIONS

The example of the KAWS exhibition in FORTNITE illustrates some of the advantages and challenges of virtual exhibitions. In addition to providing unlimited access and documentation, which can benefit researchers, the exhibition organizers were particularly interested in reaching new target groups.¹¹ Even beyond the COVID-19 pandemic, during which the KAWS exhibition opened, virtual exhibitions can make promising contributions in this regard. They appeal to audiences who usually would not see an analog exhibition because of the distance to their place of residence or because they have no interest in the institution or the subject. At the same time, virtual exhibitions attract attention and can serve as an advertisement for the institution.

9 To make matters even more complicated, exhibition activities in the digital space are often labeled with various combinations of words that reflect the fluid transitions of media forms. For instance, terms like ‘exhibition’ or ‘museum’ are frequently paired with descriptors such as ‘electronic,’ ‘virtual,’ ‘web,’ ‘online,’ and ‘digital.’ These combinations of terms necessarily result in different approaches and possibilities of definition (W. Schweibenz: “The Virtual Museum: An Overview of Its Origins, concepts, and Terminology”).

10 AthenaPlus Digital Exhibitions Working Group: *Metadata for the Description of Digital Exhibitions: The Demes Element Set*, Tiburtine 2016, p. 13.

11 Chow, Vivienne: “‘It’s Just a Different Way of Reaching People:’ KAWS on Why He Teamed Up With ‘Fortnite’ to Bring His Work Into the Virtual World,” *Artnet*, January 20, 2022, <https://news.artnet.com/art-world/kaws-serpentine-fortnite-2061921>

Thereby, the users of digital services represent a new target group that can easily surpass the number of analog visitors.¹² The digital audience is still under-researched. Data collection methods such as user statistics lack the accuracy and systematization needed to establish comparability.¹³ According to initial studies and surveys, the majority of the audience wants to experience content in a way that is not possible in the analog space.¹⁴ The form of presentation of the artifacts has a significant influence. It matters whether an object is exhibited in the form of a photo or visualized in 3D.¹⁵ In general, the audience values an appealing, user-friendly design, high-quality images, varied and new content, and playful approaches.¹⁶ Decentralized services should be educational and entertaining, available for as long as possible, and designed to be low-threshold and interactive or participatory.

This also highlights the challenges that the KAWS exhibition exemplifies. The expectations of digital offerings are high and differ from those of analog offerings. In museological debates, conflicts often arise from this: Digitized and digital art, as well as virtual formats of mediation, have been in tension with their analog counterparts for decades. Discussions on this topic peaked in the 1990s and were subsequently referred to as “real-virtual-divide.”¹⁷ Ross Parry describes the situation as follows: “A great deal of anxiety came to be placed, and in some cases,

12 Schweibenz, Werner: “Wie und was sucht das Online-Publikum? Erwartungen von Online-Besucherinnen und -Besuchern an museumsbezogene Informationsangebote im Internet,” in: Carius, Hendrikje/Fackler, Guido (eds.), *Exponat—Raum—Interaktion. Perspektiven für das Kuratieren digitaler Ausstellungen*, Göttingen: V&R Unipress 2022, pp. 183-192, here p. 187.

13 Bernhardt, Johannes/Gries, Christian: “Das digitale Publikum,” *Museums.Management* 1 (2022), pp. 1-11, here pp. 2-4.

14 Schwan, Stefan: “Digitale Ausstellungen aus Besuchersicht,” in: Hendrikje Carius/Guido Fackler (eds.), *Exponat—Raum—Interaktion. Perspektiven für das Kuratieren digitaler Ausstellungen*, Göttingen: V&R Unipress 2022, pp. 193-202, here p. 194.

15 Ibid.

16 Ibid, p. 199.

17 Galani, Areti/Calmers, Matthew: “Empowering the Remote Visitor: Supporting Social Museum Experiences Among Local and Remote Visitors,” in: Ross Parry (ed.), *Museums in a Digital Age*, New York, NY: Routledge 2010, pp. 159-169, here p. 160; Schweibenz, Werner: “Wenn das Ding digital ist ... Überlegungen zum Verhältnis von Objekt und Digitalisat,” in: Udo Andraschke/Sarah Wagner (eds.), *Objekte im Netz. Wissenschaftliche Sammlungen im digitalen Wandel*, Bielefeld: transcript 2020, pp. 15-28, here p. 18.

some quite hysterical polarisation ensued between notions of the ‘virtual’ and the ‘real.’”¹⁸ To this day, the core of these debates is about the value of analog and digital offerings and comparing them against each other, whereby a revaluation of the analog or even a disregard for the digital is usually based on Walter Benjamin’s concept of the aura.¹⁹

The criticism of the KAWS exhibition shows that the potential of virtual exhibitions is not fully realized when an analog exhibition is replicated in digital space. After all, an analog exhibition offers an experience that cannot be (completely) translated digitally. However, this is by no means to say that digital art mediation cannot be successful. This essay will, therefore, explore how virtual exhibitions—and in this case, particularly Metaverse art exhibitions—can address the conflict between analog and digital spatiality and create compelling art experiences.

For this purpose, the concepts of the German philosopher Gernot Böhme can provide promising starting points. His interconnected perspectives on the topics of bodily presence in space and the creation and design of atmospheres will be discussed. The implementation of this approach will be exemplified by the Metaverse exhibitions in the videogame OCCUPY WHITE WALLS and the platform WWWFORUM of the NRW-Forum Düsseldorf²⁰—to finally investigate the question of what the KAWS exhibition in FORTNITE was missing. First, however, a look at the current state of development of the Metaverse will be taken to better situate virtual exhibitions within it.

18 Parry, Ross: *Recoding the Museum*, London: Routledge 2007, p. 61.

19 The concept of aura is discussed primarily on the basis of Walter Benjamin’s 1935 essay *The Work of Art in the Age of Mechanical Reproduction*, which continues to be of great importance for art history and media cultural studies. The essay addresses the processes of change in the creation and dissemination of art brought about by technology, as well as its misuse by fascism. Benjamin, Walter: “The Work of Art in the Age of Mechanical Reproduction,” in: Leon Wieseltier (ed.), *Walter Benjamin. Illuminations*, New York, NY: Schocken Books 1969, pp. 217-251. Dennis Niewerth has written on the aura in the context of the museum; e.g., Niewerth, Dennis: “Objekt der Begierde. Wie man eine digitale Aura erzeugt (und wie besser nicht),” in: *EVA Berlin 26*. 2019, p. 38-43; Niewerth, Dennis: “Die ‘Digitale Aura’ und die Anmutungen des Virtuellen,” in: Hendrikje Carius/Guido Fackler (eds.), *Exponat – Raum – Interaktion. Perspektiven für das Kuratieren digitaler Ausstellungen*, Göttingen: V&R Unipress 2022, pp. 173-182.

20 The ‘NRW-Forum Düsseldorf’ is an exhibition venue and cultural center located in Düsseldorf, the capital of the federal state of North Rhine-Westphalia (NRW). North Rhine-Westphalia is situated in western Germany.

ABOUT THE METAVERSE

The Metaverse²¹ is a phenomenon that, as a possible new stage in the development of the Internet, blurs the boundaries between analog and digital modalities to a particular extent. It is still unclear where exactly the journey will lead to. The Metaverse is mostly described in relation to the concept of Web 4.0, but both terms still lack universally valid definitions. In the early days of the internet, Web 1.0 (Read Only Web), information was disseminated via hypertextually linked, static pages.²² This was followed in 2005 by Web 2.0 (Semantic Web), in which social media and user-generated content emerged, enabling user interaction and global networking.²³ For Web 3.0 (request content), artificial intelligence and machine learning play a crucial role in helping users filter relevant information from the existing flood of data and generate helpful content.²⁴ Web 4.0 (Industrial Content) includes approaches such as Machine-to-Machine Communication, the Internet of Things, and Cloud Computing.²⁵ The Metaverse could become a version of Web 4.0 technology, focusing on establishing virtual worlds with digital goods through which people move with avatars. Based on life in the analog world, these virtual worlds would make it possible to experience and support both professional and private events in a decentralized, networked manner, including, for example, through virtual reality (VR) and augmented reality (AR) in a highly immersive way.²⁶

After Facebook founder Marc Zuckerberg triggered a new Metaverse hype in 2021 by renaming his company Meta, various companies and platform providers have taken up the cause of developing the concept of the Metaverse and already refer to their platforms as Metaverses, such as FORTNITE, DECENTRALAND, ROBLOX, SORARE, THE SANDBOX, and META HORIZON WORLDS. However, the different technical requirements and control systems of these platforms do not currently allow users to have a holistic experience with seamless transition options or

21 The term “Metaverse” was adopted from Neal Stephenson’s novel *Snow Crash*. (Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.)

22 Kollmann, Tobias: “Grundlagen des Web 1.0, Web 2.0, Web 3.0 und Web 4.0,” in: Idem (ed.), *Handbuch Digitale Wirtschaft*, Wiesbaden: Springer Gabler 2020, pp. 133-155, here pp. 134-137.

23 Ibid.

24 Ibid, pp. 140-151.

25 T. Kollmann: “Grundlagen des Web 1.0, Web 2.0, Web 3.0 und Web 4.0,” p. 15.

26 Bendel, Oliver: “Definition: Was ist „Metaverse?” in: *Gabler Wirtschaftslexikon*, <https://wirtschaftslexikon.gabler.de/definition/metaverse-123520>

transfers of virtual goods. Whether there will be a single, large Metaverse in the future is therefore uncertain, both because of the major problem of synchronizing technical rule systems and because of the economic interests of the individual providers.²⁷ Currently, there is a *Multiverse of Metaverses*²⁸ in which the various market players set their own priorities in the areas of gaming, assets, productivity, shopping, and entertainment.²⁹

The history of art exhibitions in the Metaverse can be understood as a developmental branch of virtual exhibitions. Depending on the intention and the design, art exhibitions in the Metaverse can be part of one or more of the focus areas of gaming and entertainment or, with regard to the art market, assets, and shopping. Metaverses such as FORTNITE pick up on lines of development that have already been experimented with in SECOND LIFE. They continue currently established manifestations of virtual exhibitions, such as three-dimensionally designed web applications, by extending exhibition contexts into worlds through which users can navigate their avatars and may be able to come together for social activities. Due to such design possibilities, exhibition visits, which are generally more familiar and initially learned in analog space, are increasingly made possible in an appealing way in digital space as well. In the following, these boundaries between analog and digital will be examined with the help of Gernot Böhme's theories of bodily presence in (both analog and digital) space and atmosphere.

BODILY PRESENCE IN THE DIGITAL SPACE

“For some analysts, it may seem paradoxical that today bodily presence is given such weight. Aren't we living in the age of telecommunication, isn't an increasing portion of our lives playing out in virtual spaces—so what use is the body to us? More and more, a person's social existence is defined by their technical network. They are present not as a concrete person but as a connection. A homepage, Internet address, and cell phone are prerequisites for being a player in the social game. Their contribution to society as a whole, to work, consumption, and communication is increasingly being handled via such terminals and nodes in the network. For many professional activities, it is basically indifferent where the

27 Ravenscraft, Eric: “What is the Metaverse, Exactly?” *Wired*, June 15, 2023, <https://www.wired.com/story/what-is-the-metaverse/>

28 Gurau, Michael: “A Multiverse of Metaverses,” *Forbes*, March 22, 2022, <https://www.forbes.com/sites/forbestechcouncil/2022/03/22/a-multiverse-of-metaverses/?sh=78126b2d7475>

29 Ibid.

person performing them is currently located, if only they can somehow be reached. Is this really so, is this the future of technical civilization: a social existence without a body or at least an existence for which physical presence is redundant?³⁰

This quote by the German philosopher Gernot Böhme from the year 2001 seems nowadays more relevant than ever in the context of the development of the Metaverse. Böhme is known for his approaches in the discourse on atmospheres, which are directly linked to his concept of bodily presence mentioned in the quote. Bodily existence in space basically describes physical corporeality, while Böhme differentiates himself from mathematical concepts of space by Aristotle (space as place) and Descartes (space as distance).³¹ Human beings are thus understood not as one of many geometric corpora that relate to each other as objects in space but as sentient subjects.³² Bodily presence is described by Böhme as follows:

“From all spaces of depiction, the space of bodily presence is to be fundamentally distinguished. The space of bodily presence is the extension of the bodily sensing of a human being. [...] Our spatial existence through bodily sensing essentially takes place in three kinds of spaces:

- in the space of action, classically our *sphaera activitatis*, i.e., the area of proximity and distance, in which we can become bodily active;
- in the space of perception, i.e., the extension in which we are perceptive with things;
- in the space of moods, i.e., the extension of atmospheres, which we experience in bodily involvement.”³³

Böhme speaks firstly of a “scope for actions and possibilities of movement,”³⁴ secondly of sensual perception of things or other people, which also involves communication and togetherness,³⁵ and thirdly of atmospheres, which will be discussed in the following section.

30 Böhme, Gernot: “Leibliche Anwesenheit im Raum,” in: Egon Schirmbeck (ed.), *RAUMstationen, Metamorphosen des Raumes im 20. Jahrhundert*, Ludwigsburg: Wüstenrot Stiftung 2001, p. 92, my translation.

31 Ibid., p. 94.

32 Ibid.

33 Böhme, Gernot: “Wirklichkeiten. Über die Hybridisierung von Räumen und die Erfahrung von Immersion,” in: *media/rep* (Jahrbuch immersiver Medien 5), Marburg: Schüren 2013, pp. 17-22, here p. 19, my translation.

34 Böhme, Gernot: *Leib*, Berlin: Suhrkamp Verlag 2020, p. 54, my translation.

35 Ibid. pp. 54-55.

First of all, bodily presence seems to be completely anchored in analog space, but a closer look reveals several points of contact in terms of digital media as well as virtual exhibitions. Böhme himself even reflected on bodily presence in the light of a “hybridization of spaces.”³⁶ By this, he means the mixing of analog space with virtual realities such as films and computer games.³⁷ According to Böhme, the hybridization of bodily presence with visual worlds takes place through “the phenomenon of immersion [...]”. This means that a person is so immersed in a representational space that they experience it at the same time as an extension of their bodily sensing.³⁸ Böhme attributes a high potential for immersion, especially to computer games as an interactive medium. In this process, the avatar has a special function:

“If a user of a computer game has a representative, an avatar, in the game, then they not only participate in its fate through identification, but they act with this avatar via their game console in the game itself. This could already lead to a hybridization of bodily space and visual space via a process of incorporation, embodiment.”³⁹

Felix Zimmermann has analyzed this approach of Böhme and the avatar’s significance for “atmospheric involvement”⁴⁰ in computer games.⁴¹ For virtual exhibitions, it can be stated that the avatars that regularly appear in Metaverse art exhibitions can contribute to an improved spatial experience as an “extension of the player.”⁴² However, for a captivating art experience in digital space, the design of the perceptual space and the space of moods are also crucial. Böhme continues:

“Admittedly, it must be said that this figurative presence [through an avatar] in pictorial space is only a limited bodily presence, insofar as, of the three types of bodily space mentioned, only the action space is realized, but not the perceptual space and the space of moods.”⁴³

36 G. Böhme: “Wirklichkeiten,” pp. 17-22.

37 Ibid. p. 20.

38 Ibid.

39 Ibid.

40 Zimmermann, Felix: *Virtuelle Wirklichkeiten*, Marburg: Büchner-Verlag 202, p. 137, my translation.

41 Ibid., pp. 137-144.

42 Beil, Benjamin/Rauscher, Andreas: “Avatar,” in: Benjamin Beil/Thomas Hensel/Andreas Rauscher (eds.), *Game Studies*, Wiesbaden: Springer VS 2018, pp. 207-208.

43 G. Böhme: “Wirklichkeiten,” p. 21.

The perceptual space is already implemented in massively multiplayer online games (MMOs) and in the Metaverse as a communication space and place of togetherness, in the sense that participants can meet each other with their avatars and engage in exchange. Virtual exhibitions can also benefit from this, as a visit to a museum often serves as a social event to meet friends or family and talk about art with each other. The last-mentioned space of moods and the experience of atmosphere have a special role to play.

DIGITAL ATMOSPHERES

With the space of moods, Böhme refers to feeling “the extension of one’s own sensitivities themselves,”⁴⁴ through which an inner mood could alter the immediate surroundings. This altered space is an atmospheric one, whereby atmosphere, according to Böhme, is not only determined from within but encounters the feeling subject much more from its environment.⁴⁵ According to Böhme, atmosphere is present everywhere in everyday life, has an immediate effect on a subject’s mood, and finds active areas of application. The phenomenon can be approached by analyzing the aspects of sensual perception and their social significance.⁴⁶ Böhme defines the term atmosphere as follows:

“Atmosphere is the common reality of the perceiver and the perceived. It is the reality of the perceived as a sphere of its presence and the reality of the perceiver, insofar as he, sensing the atmosphere, is bodily present in a certain way.”⁴⁷

According to Böhme, atmosphere is always present, but it can also be created intentionally.⁴⁸ Atmosphere can be determined and controlled by factors that Böhme calls generators.

44 G. Böhme: *Leib*, p. 54.

45 Ibid.

46 Böhme also connects his concept of atmosphere with Walter Benjamin’s concept of aura. Thus, the aura is ultimately a bodily felt “spatially poured out quality of feeling” (Böhme, Gernot: *Atmosphäre. Essays zur neuen Ästhetik*, Berlin: Suhrkamp Verlag 2013, p. 27, my translation).

47 G. Böhme: *Atmosphäre*, p. 34.

48 Ibid., p. 17, pp. 45-46.

These include, first of all, the experience of the narrowness or width and limitation of a room as well as the use of light and sound.⁴⁹ Targeted lighting can tint objects in their hues or even color an entire scene and make it appear in a different mood.⁵⁰ Music, sounds, noises, and voices also represent a central atmospheric element, as they fill the space and lend immediate expression to bodily presence.⁵¹

Generators include three further factors: First, the suggestions of movement, which, mostly in architectural terms, set bodies and masses in relation to each other and show the bodily present person paths through these constellations. Second, Böhme speaks of synesthesias. These show themselves, for example, “in the fact that a room can be experienced as cool, because in one case it is completely tiled, in another case it is painted blue, in the third case it has a relatively low temperature.”⁵² Third and finally, social characteristics are listed that are linked to cultural conventions and meanings, “such as [that] porphyry as a material creates the atmosphere of majesty.”⁵³

Böhme himself describes how these factors for creating atmospheres can also be applied in virtual space.⁵⁴ Here, Böhme’s philosophy has already proven to be relevant for digital games. Marc Bonner, for example, has analyzed atmospheric theories, especially those of Böhme, in the context of games with a special focus on the design of natural landscapes and architecture, like *THE LAST OF US*, *THE WITCHER 3*, or *HORIZON ZERO DAWN*.⁵⁵ Felix Zimmermann used Böhme’s concept to describe how an atmospheric experience of the past can be created in games like *ANNO 1800*, *ASSASSIN’S CREED SYNDICATE*, or *DISHONORED*.⁵⁶ This results in interesting intersections with virtual exhibitions, as these certainly also feature landscape elements as well as (exhibition) architecture and appear as places in which the past is made tangible in the form of artworks and curatorial expressions.

49 G. Böhme: “Leibliche Anwesenheit im Raum,” p. 94-96.

50 G. Böhme: *Atmosphäre*, pp. 154-158.

51 Ibid., pp. 159-166; G. Böhme: *Leib*, pp. 55-59.

52 G. Böhme: “Leibliche Anwesenheit im Raum,” p. 97.

53 Ibid.

54 Ibid., p. 97-98.

55 Bonner, Marc: “Welt,” in: Benjamin Beil/Thomas Hensel/Andreas Rauscher (eds.), *Game Studies*, Wiesbaden: Springer VS 2018; Bonner, Marc: *Offene-Welt-Strukturen. Architektur, Stadt- und Naturlandschaft im Computerspiel*, Marburg: Büchner-Verlag 2023.

56 F. Zimmermann: *Virtuelle Wirklichkeiten*.

Museums are generally inscribed with communication techniques of staging.⁵⁷ The atmospheric design of virtual exhibitions can, therefore, benefit from communication mechanisms of analog exhibitions. Regan Forrest has analyzed the concept using the term “atmospherics” for the analog museum space—not referring to Böhme, but based on very similar parameters such as light, color, and sound.⁵⁸ In addition, through an analysis of different visitor surveys and marketing strategies, she demonstrated the impact that atmospheric design can have on the visitor experience, visitor satisfaction, and the intention to revisit a given institution in the future.⁵⁹

In the field of virtual exhibitions, it can be stated that atmospheres can—and should—be created intentionally in digital space with the help of the categories described above. In this way, it is possible to implement analog strategies in the digital space, contribute to a feeling of immersion, and make a virtual exhibition visit more vivid. As discussed at the beginning of this essay, however, this process is mostly not about recreating analog spaces but rather about establishing elements that can only be implemented digitally and thus clearly differentiate the virtual exhibition from the analog one in terms of atmosphere as well. In the following, the game OCCUPY WHITE WALLS and the platform WWWFORUM will be used to explore how such particularities and atmospheres, in general, can be implemented in Metaverse art exhibitions.

ATMOSPHERE IN METAVERSE ART EXHIBITIONS

OCCUPY WHITE WALLS

In the free sandbox game OCCUPY WHITE WALLS, users can create their own art exhibitions. The developer studio Kultura Ex Machina released the PC game in 2018 as a beta version, followed by an official release in 2022. The game is meant to encourage approaching art from a purely aesthetic point of view and not making enjoyment dependent on prior knowledge or canonization. The goal is nothing less

57 Paul, Stefan: “Kommunizierende Räume. Das Museum,” in: Alexander C.T. Geppert/Uffa Jensen/Jörn Weinhold (eds.), *Ortsgespräche. Raum und Kommunikation im 19. und 20. Jahrhundert*, Bielefeld: transcript 2005, pp. 341-357.

58 Forrest, Regan: “Exhibition Narrative: The Spatial Parameters,” *Exhibitionist* 2014, pp. 28-32.

59 Forrest, Regan: “Museum Atmospherics: The Role of the Exhibition Environment in the Visitor Experience,” *Visitor Studies*, 16:2, 2013, pp. 201-216.

than to democratize art: Players can create and curate art galleries freely to their liking. By now, thousands of architectural assets and over 30,000 works of art from a wide variety of eras are available for this purpose, which are represented on the walls according to their proportions.⁶⁰ Since 2020, users can also upload their own artworks for a fee of \$7 per image.⁶¹ The artificial intelligence D.A.I.S.Y. (“Discover Art Intended Specifically For You”) supports players in finding works of art and, as the game progresses, shows them more and more works that suit their taste. D.A.I.S.Y. does not distinguish between canonical and unknown works and dissolves art historical hierarchies.⁶² Information such as title, artist, medium, dimensions, time of origin, and, if available, a description are displayed for each work of art. Works can be commented on, favorited, and acquired for the player’s gallery.

It is also possible to visit the galleries of other players. While doing so, users can chat with each other, invite players to their own gallery, or leave a comment in the guestbook, for example. OCCUPY WHITE WALLS highlights particularly spectacular galleries of fellow players in the teleport menu but also offers the option of randomly picking a destination.

“Within the game, you’ll find thousands of hugely impractical, financially unviable art galleries that could never exist in the real world—as the system stands—wrenched straight out of players’ imaginations. In place of neatly-organised rooms, carefully filed into different time periods or closely related art movements, any curation (or lack thereof) is left completely up to each player, or gallery boss.”⁶³

The full spectrum of atmospheric factors is put to use here: pompous museum architecture, narrative, theme-based exhibition structures, and sensory experiences are applied. This involves spaces that impress with their openness or narrowness as well as airy heights (see Figures 3a/3b). Visitors are motivated to explore large spatial complexes and winding niches of the galleries. Music is playing in most of the venues. The use of light and a wide variety of materials, up to and

60 Faber, Tom: “Occupy White Walls—the Game That Aims to Turn 500mn People Into Virtual Art Collectors,” *Financial Times*, June 28, 2022, <https://www.ft.com/content/c743dfc-b61d-4355-879c-d57b9534c8d6>

61 Ibid.

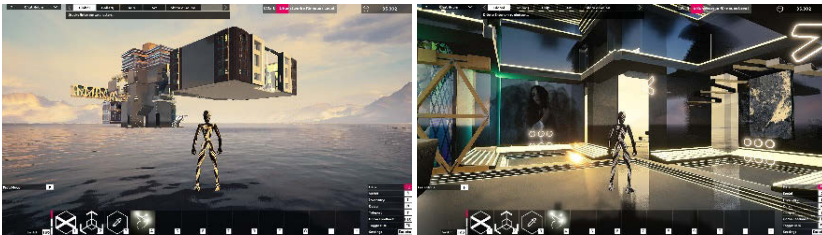
62 Hunt, El: “‘Occupy White Walls’: the Art-minded Game Breaking Open the Gallery Doors,” *NME*, June 27, 2022, <https://www.nme.com/features/gaming-features/occupy-white-walls-the-art-minded-game-breaking-open-the-gallery-doors-3256917>

63 Ibid.

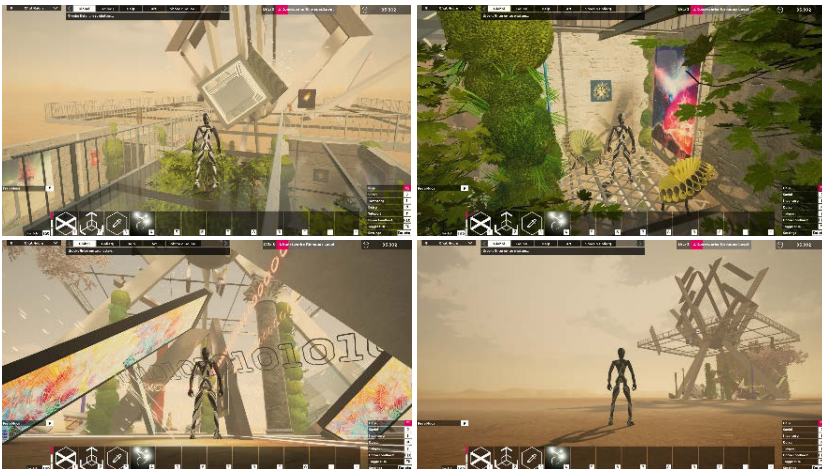
including galleries flooded with water, makes it possible to present art in the most diverse and sometimes unrealistic ways.

The design process of the galleries also indicates the game progress of their curators. Art, architectural elements, and space are not fully available to players from the beginning but must be purchased initially with the budget provided by the game. Money can be earned by opening a gallery to visitors. Buying art additionally unlocks components and other assets, increasing the range of design options available. The game motivates players to alternate their own creative process with visits to other players' exhibitions.

Figures 3a/3b: A gallery called 4swift2, created by the player swift2, floating above a seemingly endless water landscape



Figures 4a/4b/4c/4d: A gallery called “Inside My Head” by the player gutfeeling, showing art in a futuristic glass building in a desert landscape



Sources: OCCUPY WHITE WALLS, KULTURA Ex Machina, StikiPixels, 2022, screenshots by I. Hamm

The limitation of resources helps to make certain players' galleries even more intriguing to their visitors. They are a sign of the time invested in the game and the curatorial experience gained. Even if players can rediscover and buy art in gallery hopping, the main point is to dive into the atmospheres of the unknown gallery spaces and experience them as total works of art (see Figures 4a/4b/4c/4d). The art in the narrower sense, however, can fade into the background, especially since the game is more about aesthetic access to space and works, the expression of personal taste, one's own creative processes, and art as a social event.

WWWFORUM⁶⁴

The NRW-Forum in Düsseldorf offers a different approach to questions about the boundaries of analog and digital spaces and the possibilities of exhibiting art virtually. On March 30, 2023, it was one of the first institutions in the art and museum scene to open its own Metaverse museum called WWWFORUM, which was open to visitors during daily opening hours from 4 to 8 p.m. as a multiplayer web application.⁶⁵ The project was created in collaboration with the in-house platform next-museum.io and the artist studio Christian Mio Loclair and was hosted through the company Journee.⁶⁶

The WWWFORUM is intended to serve as a permanent extension into the digital space and to develop into a hybrid museum. From 2023 to 2024, the WWWFORUM hosted four residencies, which were selected on the basis of an open call on next-museum.io.⁶⁷ As a digital exhibition space and total work of art, the WWWFORUM asks "fundamental questions about augmented reality: Is there an aura of the digital? What is a digital twin? And when does an extension become autonomous?"⁶⁸

The WWWFORUM contains elements that are intended to be reminiscent of the surroundings of the NRW-Forum, such as the Rhine or a kiosk, but without aiming for an exact digital reproduction. Christian Mio Loclair expressed that he wanted to create a valuable space that moved users, unlike most of the content on the net.⁶⁹

64 Further insights into the WWWFORUM project can be found in Alina Fuchte's and Isabelle Hamm's contribution "Virtual Wonderlands" in this anthology.

65 <https://web.journee.live/nrwforum>; NRW-Forum Düsseldorf: "wwwforum," <https://www.nrw-forum.de/wwwforum>

66 Ibid.

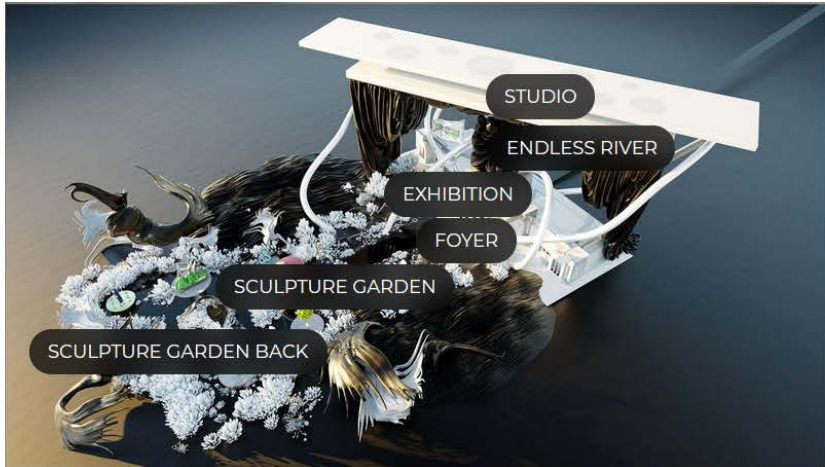
67 Ibid.

68 Ibid.

69 Lenze, Larissa: "Willkommen im Metaversum," *Micropolis Magazine*, April 2, 2023, <https://www.micropolis-mag.com/willkommen-im-metaverse-museum/>

In the WWFORUM, users can move through an imaginative designed world with an avatar and experience Born Digital Art. The interface enables the user to customize the avatar, get information about the location, access a map with a teleport function (see Figure 5), and take photos.

Figure 5: The map of the WWFORUM

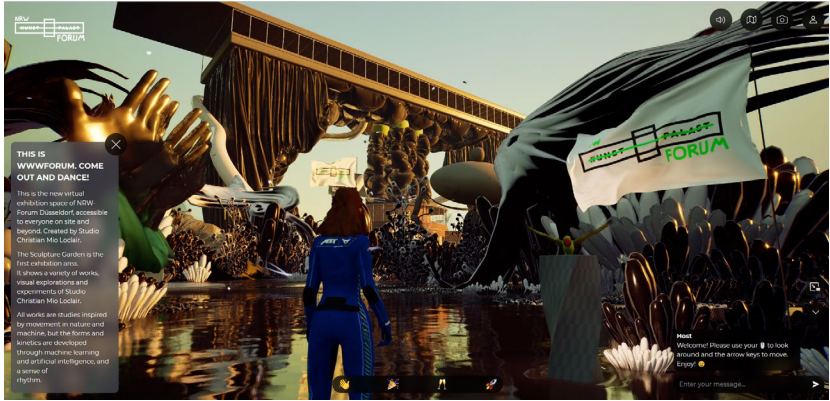


Source: WWFORUM, Christian Mio Loclair, nextmuseum.io, 2023, screenshot by I. Hamm

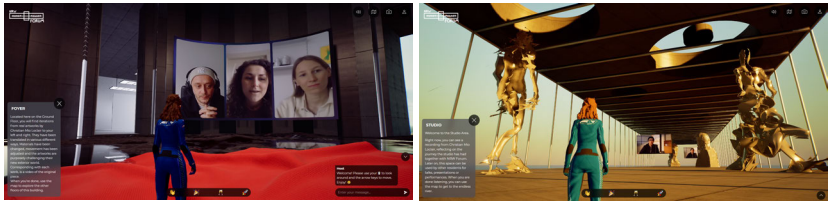
There is a chat function for all visitors present. When users start the application, they are first located in the sculpture garden, through which they can move to a futuristic exhibition building (see Figure 6). Inside this building, some exhibition rooms can only be reached via the map's teleport function. Behind the exhibition building lie the kiosk and the Endless River, which refers to the Rhine (see Figures 8a/8b). In the sculpture garden, the exhibition building, or the area of the Endless River, artworks by the artists in residency are shown, as well as occasional videos in which the work at hand is discussed.

Atmosphere is created and influenced in WWFORUM in many ways. The design of the whole map, especially that of the exhibition building, has a futuristic effect, establishing a space where new ways of experiencing art and technology can emerge. The sculpture garden supports this effect with its organic but also otherworldly-looking forms. The garden is populated by wandering figures who are not visitors, creating the impression of a living virtual world. The chat function allows conversations to take place with friends or strangers about art and shared experiences.

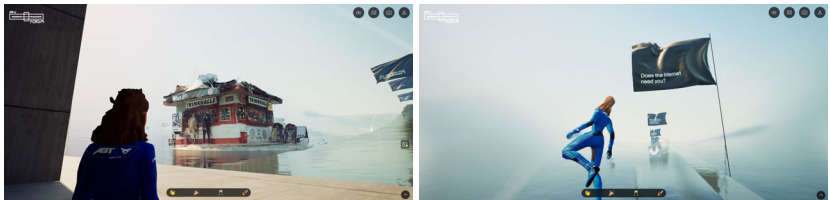
Figure 6: The starting point at the exhibition venue



Figures 7a/7b: Inside the exhibition building's foyer and the 'Studio'



Figures 8a/8b: The kiosk behind the exhibition building and the flight over the Endless River



Sources: WWWFORUM, Christian Mio Loclair, nextmuseum.io, 2023, screenshots by I. Hamm

The videos in the exhibition building, in which visitors are often addressed directly, convey low-threshold information and the feeling that players could sit down with the speakers and engage in an exchange (see Figure 7a/7b). Often, music or mysterious sounds such as rustling, crackling, or rumbling can be heard. The light is reminiscent of a daily routine with sunset but changes quickly and irregularly so that there is no consistent sense of time. Finally, visitors can fly over the

Endless River and, while viewing the art on display there, have a spatial experience of undefined vastness. If they decide to fly through a portal at the end of the map, they are relocated to the starting point of the Endless River, just behind the exhibition building. The teleport function of the map, which is the only way to reach and leave some rooms inside the exhibition building, further highlights the differences between digital and analog space.

Furthermore, the unusual decision to restrict access to a Metaverse application to specific opening hours is worth noting. However, this principle of limitation⁷⁰ also establishes a framework that resembles that of a museum in analog space and requires the audience to consciously plan their visit. In this way, the staging strategies of the WWWFORUM support the questions that the project generally aims to explore.

The art shown differs, of course, depending on the artist in residency. However, now that four exhibitions have been presented, there is a noticeable tendency to make the art on display more interactive and to work with the possibilities of digital space. For example, artist Franziska Ostermann showed a sculpture of a cell phone with buttons scattered throughout the sculpture garden, always teleporting visitors back to the sculpture. Meanwhile, in a room inside the exhibition building, poetry is staged in a bright, blank environment into which visitors are immersed when they enter the room, whereupon they can no longer recognize the boundaries of the space.

The experience of the digital art presented is finally enhanced by the atmosphere created without being overpowering.

CONCLUSION

The Metaverse exhibitions discussed show that it is not only the kind of atmospheric staging that matters but also its intensity. Thus, virtual (as well as analog) exhibitions can be under- or overloaded with atmospheres. Compared to the exhibitions in OCCUPY WHITE WALLS and WWWFORUM, it is evident that for “KAWS: New Fiction” in FORTNITE, the parameters for the creation of atmospheres presented above could have been used to a greater extent. In the KAWS exhibition, for example, an unusual use of light, background music, or carefully chosen sounds, or a more playful approach to the spatiality of the labyrinth⁷¹ (that was

70 D. Niewerth: “Objekt der Begierde,” pp. 41-43.

71 One particular way of combining self-awareness and digital space is through the use of non-Euclidean spaces, as they are used in games. Non-Euclidean spaces break with

part of the exhibition outside the gallery building) could have intensified the atmosphere. Atmospheric elements should neither be used too little (like in the Serpentine Gallery in FORTNITE) nor too much (like in OCCUPY WHITE WALLS) in the presentation of art. They have to be balanced (like in the WWWFORUM) so that the art as such can still have its effect.

Staging as a communication strategy and a way of exerting influence has a great impact. Using and feeling these effects is taken for granted in everyday life, especially in museums. Perhaps this is why they are still sometimes overlooked in the creation of online venues. It is advisable not to copy analog exhibitions but to include elements that would be difficult or impossible to implement in the analog space. Other digital media, such as video games, which influence the viewing and usage habits of digital audiences, can provide clues in this regard.⁷²

Although the concept of atmosphere can have a spiritual appeal, the criteria presented by Gernot Böhme make it clear which factors should be decided upon when creating an intentional design. In this respect, empirical values from the analog space can benefit a digital experience. Creating atmosphere in virtual exhibitions is one way to address the discourse around analog and digital art experiences. Thus, bodily presence in space also becomes accessible in a digital manner. It is a unique way of experiencing oneself and the art on display.

LITERATURE

AthenaPlus Digital Exhibitions Working Group: *Metadata for the Description of Digital Exhibitions: The Demes Element Set*, Tiburtine 2016.

Backe, Hans-Joachim: "The Aesthetics of Non-Euclidean Game Spaces," in: Marc Bonner (ed.), *Game | World | Architectonics*, Heidelberg: Heidelberg University Publishing 2021, pp. 153-167.

Beil, Benjamin/Rauscher, Andreas: "Avatar," in: Beil, Benjamin/Hensel, Thomas/Rauscher, Andreas (eds.), *Game Studies*, Wiesbaden: Springer VS 2018, pp. 201-217.

physical conditions, destabilizing the sense of orientation and fundamentally shaking up the way we relate to space. Backe, Hans-Joachim: "The Aesthetics of Non-Euclidean Game Spaces," in: Marc Bonner (ed.), *Game | World | Architectonics*, Heidelberg: Heidelberg University Publishing 2021, pp. 153-167, here pp. 160-164.

72 Hamm, Isabelle: „Let’s Play the Exhibition! Radiohead’s KID A MNESIA EXHIBITION, Virtual Museums and Games,” in: Beil, Benjamin, et al. (ed.), *Playful Materialities*, Bielefeld: transcript 2022, pp. 123-143.

- Bendel, Oliver: "Definition: Was ist Metaverse?," in: *Gabler Wirtschaftslexikon*, <https://wirtschaftslexikon.gabler.de/definition/metaverse-123520>
- Benjamin, Walter: "The Work of Art in the Age of Mechanical Reproduction," in: Leon Wieseltier (ed.), *Walter Benjamin. Illuminations*, New York, NY: Schocken Books 1969, pp. 217-251.
- Bernhardt, Johannes/Gries, Christian: "Das digitale Publikum," *Museums.Management* 1 (2022), pp. 1-11.
- Bonner, Marc: "Welt," in: Beil, Benjamin/Hensel, Thomas/Rauscher, Andreas (eds.), *Game Studies*, Wiesbaden: Springer VS 2018, pp. 129-155.
- Bonner, Marc: *Offene-Welt-Strukturen. Architektur, Stadt- und Naturland-schaft im Computerspiel*, Marburg: Büchner-Verlag 2023.
- Böhme, Gernot: "Leibliche Anwesenheit im Raum," in: Egon Schirmbeck, (ed.), *RAUMstationen, Metamorphosen des Raumes im 20. Jahrhundert*, Ludwigsburg: Wüstenrot Stiftung 2001, pp. 92-98.
- Böhme, Gernot: "Wirklichkeiten. Über die Hybridisierung von Räumen und die Erfahrung von Immersion," in: *media/rep* (Jahrbuch immersiver Medien 5), Marburg: Schüren 2013, pp. 17-22.
- Böhme, Gernot: *Atmosphäre. Essays zur neuen Ästhetik*, Berlin: Suhrkamp Verlag 2013.
- Böhme, Gernot: *Leib*, Berlin: Suhrkamp Verlag 2020.
- Chow, Vivienne: "'It's Just a Different Way of Reaching People:' KAWS on Why He Teamed Up With 'Fortnite' to Bring His Work Into the Virtual World," *Artnet*, January 20, 2022, <https://news.artnet.com/art-world/kaws-serpentine-fortnite-2061921>
- Chow, Vivienne: "'You Literally Got Me Into KAWS Fam:' What Game-Playing Teens Think About the Artist's New Project on Fortnite," *Artnet*, January 25, 2022, <https://news.artnet.com/art-world/londons-art-critics-kaws-serpentine-fortnite-playerslove-it-2063909>
- Faber, Tom: "Occupy White Walls—the Game That Aims to Turn 500mn People Into Virtual Art Collectors," *Financial Times*, June 28, 2022, <https://www.ft.com/content/c743dcfc-b61d-4355-879cd57b9534c8-d6>
- Forrest, Regan: "Museum Atmospherics: The Role of the Exhibition Environment in the Visitor Experience," *Visitor Studies*, 16:2, 2013, pp. 201-216.
- Forrest, Regan: "Exhibition Narrative: The Spatial Parameters," *Exhibitionist* 2014, pp. 28-32.
- Frankel, Eddy: "KAWS: 'New Fiction,'" *TimeOut*, January 18, 2022, <https://www.timeout.com/london/art/kaws-new-fiction>

- Galani, Areti/Calmers, Matthew: "Empowering the Remote Visitor: Supporting Social Museum Experiences Among Local and Remote Visitors," in: Ross Parry (ed.), *Museums in a Digital Age*, New York, NY: Routledge 2010, pp. 159-169.
- Gurau, Michael: "A Multiverse of Metaverses," *Forbes*, March 22, 2022, <https://www.forbes.com/sites/forbestechcouncil/2022/03/22/a-multiverse-of-metaverses/?sh=78126b2d7475>
- Hamm, Isabelle: „Let’s Play the Exhibition! Radiohead’s KID A MNESIA EXHIBITION, Virtual Museums and Games,” in: Beil, Benjamin, et al. (ed.), *Playful Materialities*, Bielefeld: transcript 2022, pp. 123-143.
- Hunt, El: "‘Occupy White Walls’: the Art-minded Game Breaking Open the Gallery Doors," *NME*, June 27, 2022, <https://www.nme.com/features/gaming-features/occupy-white-walls-the-art-minded-game-breaking-open-the-gallery-doors-3256917>
- Kollmann, Tobias: "Grundlagen des Web 1.0, Web 2.0, Web 3.0 und Web 4.0," in: Idem (ed), *Handbuch Digitale Wirtschaft*, Wiesbaden: Springer Gabler 2020, pp. 133-155.
- Lenze, Larissa: "Willkommen im Metaversum," *Micropolis Magazine*, April 2, 2023, <https://www.micropolis-mag.com/willkommen-im-metaverse-museum/>
- Malraux, André: "Museum Without Walls," in: Idem (ed.) *Voices of Silence*, Frogmore, St. Albans: Paladin 1953, pp. 13-127.
- Niewerth, Dennis: "Objekt der Begierde. Wie man eine digitale Aura erzeugt (und wie besser nicht)," in: *EVA Berlin 26*, 2019, pp. 38-43.
- Niewerth, Dennis: "Die 'Digitale Aura' und die Anmutungen des Virtuellen," in: Hendrikje Carius/Guido Fackler (eds.), *Exponat – Raum – Interaktion. Perspektiven für das Kuratieren digitaler Ausstellungen*, Göttingen: V&R Unipress 2022, pp. 173-182.
- NRW-Forum Düsseldorf: "wwwforum," *NRW-Forum Düsseldorf*, <https://www.nrw-forum.de/wwwforum>
- Parry, Ross: *Recoding the Museum*, London: Routledge 2007.
- Paul, Stefan: "Kommunizierende Räume. Das Museum," in: Alexander C.T Gepfert/Uffa Jensen/Jörn Weinhold (eds.), *Ortsgespräche. Raum und Kommunikation im 19. und 20. Jahrhundert*, Bielefeld: transcript 2005, pp. 341-357.
- Povroznik, Nadezhda: "History," *VM History*, 2019, <http://virtualmuseum-history.com/history/>
- Ravenscraft, Eric: "What is the Metaverse, Exactly?," *Wired*, June 15, 2023, <https://www.wired.com/story/what-is-the-metaverse/>

- Serpentine Galleries: “Acute Art presents | KAWS: NEW FICTION,” *Serpentine Galleries*, <https://www.serpentinegalleries.org/whats-on/acute-art-presents-kaws-new-fiction/>
- Schwan, Stefan: “Digitale Ausstellungen aus Besuchersicht,” in: Hendrikje Carius/Guido Fackler (eds.), *Exponat – Raum – Interaktion. Perspektiven für das Kuratieren digitaler Ausstellungen*, Göttingen: V&R Unipress 2022, pp. 193-202.
- Schweibenz, Werner: “The Virtual Museum: an Overview of Its Origins, concepts, and Terminology,” *The Museum Review* 4, no. 1 (2019), https://www.researchgate.net/publication/335241270_The_virtual_museum_an_overview_of_its_origins_concepts_and_terminology
- Schweibenz, Werner: “Wenn das Ding digital ist ... Überlegungen zum Verhältnis von Objekt und Digitalisat,” in: Udo Andraschke/Sarah Wagner (eds.), *Objekte im Netz. Wissenschaftliche Sammlungen im digitalen Wandel*, Bielefeld: transcript 2020, pp. 15-28.
- Schweibenz, Werner: “Wie und was sucht das Online-Publikum? Erwartungen von Online-Besucherinnen und -Besuchern an museumsbezogene Informationsangebote im Internet,” in: Hendrikje Carius/Guido Fackler (eds.), *Exponat – Raum – Interaktion. Perspektiven für das Kuratieren digitaler Ausstellungen*, Göttingen: V&R Unipress 2022, pp. 183-192.
- Smart, Alastair: “KAWS: New Fiction, Review: Who Wants to Go to a Gallery and Stare at Their Phone?,” *The Telegraph*, January 19, 2022, <https://www.telegraph.co.uk/art/what-to-see/kaws-new-fiction-review-wants-go-gallery-stare-phone/>
- Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.
- Zimmermann, Felix: *Virtuelle Wirklichkeiten*, Marburg: Büchner-Verlag 2023.

GAMOGRAPHY/METAVERSES:

- ANNO 1800 (Ubisoft 2019, O: Blue Byte/Ubisoft Mainz)
- ASSASSIN’S CREED SYNDICATE (Ubisoft 2015, O: Ubisoft Quebec/Ubisoft Chengdu)
- DECENTRALAND (Decentraland 2020, O: Decentraland)
- DISHONORED (Bethesda Softworks 2012, O: Arkane Studios)
- FORTNITE (Epic Games 2017, O: Epic Games/People Can Fly)
- HORIZON ZERO DAWN (Sony Interactive Entertainment 2017, O: Guerrilla Games)
- META HORIZON WORLDS (Meta 2019, O: Meta)

OCCUPY WHITE WALLS (KULTURA Ex Machina/StikiPixels/Kultura Ex Machina Limited, 2022, O: KULTURA Ex Machina/StikiPixels)

ROBLOX (Roblox Corporation 2006, O: Roblox Corporation)

SECOND LIFE (Linden Lab 2003, O: Linden Lab)

SORARE (Sorare 2019, O: Nicolas Julia/Adrien Montfort)

THE LAST OF US (Sony Interactive Entertainment/PlayStation Studios 2013, O: Naughty Dog/Iron Galaxy Studios)

THE SANDBOX (PIXOWL INC. 2012, O: PIXOWL INC.)

THE WITCHER 3 (CD Projekt RED 2015, O: CD Projekt RED)

WWWFORUM (JourneeX 2023, O: Christian Mio Loclair/nextmuseum.io)

Virtual Wonderlands

Insights from NRW-Forum Düsseldorf's WWWFORUM Project: An Interview

ALINA FUCHTE/ISABELLE HAMM

As one of the first institutions in the art and museum scene, the NRW-Forum Düsseldorf¹ opened its Metaverse exhibition space called WWWFORUM as a multiplayer web application in March 2023. Since then, the WWWFORUM has featured digital art by four artists in residency. The project was developed in collaboration with the cross-institutional platform nextmuseum.io, the artist studio Christian Mio Lo-clair, and the company JourneeX.

The development process and the platform's first year of exhibitions provide an opportunity to ask questions about possible museum approaches to the Metaverse as well as to shed light on the aim and feasibility of a dedicated exhibition venue in digital space. What exhibition practices are suitable for museums in the Metaverse? How can a concept that still seems unfamiliar be made accessible? How can the digital space, which holds so many possibilities and uncertainties, be approached? Which challenges can arise in the areas of mediation and communication? What can be gained by museums being present in the Metaverse?

Isabelle Hamm (University of Cologne) interviewed Alina Fuchte (NRW-Forum Düsseldorf, project manager of nextmuseum.io) about the creation and first year of WWWFORUM, the insights gained, digital curating, and museums in the Metaverse.

1 The 'NRW-Forum Düsseldorf' is an exhibition venue and cultural center located in Düsseldorf, the capital of the federal state of North Rhine-Westphalia (NRW). North Rhine-Westphalia is situated in western Germany.

BACKGROUND AND INSPIRATION

How long have you been working on the topic of the Metaverse at the NRW-Forum?

I would say since the beginning of the COVID-19 pandemic at the latest. The NRW-Forum is a house for digital culture, pop culture, photography, and design and, therefore, for the contemporary. As such, it always tries to capture the spirit of the times, which is why we, of course, also deal with the latest trends in the digital sector. The Metaverse was a much-discussed topic during the pandemic when people were spending a lot of time online. However, we also noticed that everyone seemed to have a different definition of the Metaverse. In the field of cultural education, we believe it is our task to create media literacy. Therefore, we don't want to hype or demonize something like the Metaverse but rather create a space for exchange, to discuss and define the terms. That way, everyone can eventually form their own opinion.

In keeping with this, in 2022, you organized the event series “MetaWhat? Hitchhiking through the Metaverse.”² What insights did you gain from this?

“MetaWhat?!” was an online series on the Metaverse with which we wanted to create space for different aspects, perspectives, and people with different areas of expertise. Together, we asked ourselves what the Metaverse actually is, what it means for our world, what potential it has, what the challenges are, and where we are right now. We already had a similar series on the topic of AI. This was even more associated with half-knowledge and fears—will AI overwhelm us at some point, like in 1990s sci-fi films? The idea of the Metaverse also comes from the 1990s and already has a certain history.

Regarding the insights, on the one hand, I believe that the concepts of the Metaverse are very different and may not even need to be brought together. Depending on the intended purpose, there may be different orientations. On the other hand, I think that the Metaverse hasn't quite arrived in the reality of our lives yet; in the media it often seemed much bigger than it was at the time. There is still a

2 Translation by the authors. The event series was held in German and took place between May and September 2022. Recordings can be viewed on YouTube: “Per Anhalter*in durchs Metaversum.” *NRW-Forum Düsseldorf*. May 12, 2022, YouTube playlist, <https://www.youtube.com/watch?v=Qj2kSQXEdE&list=PLBO5u-d3idCeViXZ9N6TbWHL43sjXR-A0>

lot to do, and there is not one single platform that offers an all-in-one solution. After all, the idea is that users can hop from platform to platform and that the whole thing is decentralized. To some extent, this topic is also about short-term trends. This raises the question of what will remain afterward, what will become permanent, what will prevail? Will we really be sitting at home in the future and meeting our friends with VR glasses in the Metaverse instead of going to the movies together? What do we want to experience digitally, and what can't be replaced? The pandemic was an interesting time to put this to the test.

With WWWFORUM, you were one of the first art institutions to publish an in-house Metaverse platform. How did the idea of creating a Metaverse for the NRW-Forum come to life?

The idea was inspired by our nextmuseum.io project, a platform for swarm curation and co-creation. We launched this platform in 2020 together with the Museum Ulm, supported by the German Federal Cultural Foundation's Digital Fund. The idea behind the platform was to appeal to target groups that normally do not visit museums. To break down barriers and threshold fears, we wanted to tie in with people's digital user behavior. The world of our target group is shaped by social media and they are used to being able to comment on things, as well as to share and to create online. Museums appear increasingly elitist and out of touch if they don't reflect these habits and lifestyles. This does not necessarily mean that everything should only be 'instagrammable,' but it is important to keep up with this. We tried to do this in the form of open calls: this meant that artists could submit works to become part of exhibitions. We also enabled people to take part in discussions on our museum's exhibition projects while they were still in development. After all, it is the norm for museum visitors to be shown finished exhibitions. They can then take part in a guided tour or even engage in participatory formats, but at that point, all the decisions have already been made. We wanted to break this up and encourage people to have a say. After all, museums are places of society and for society.

In doing so, we transitioned from the digital to the analog, with the aim of influencing and designing exhibitions on-site, starting with an online platform. But we were also fascinated by the question: What would it be like to curate digitally? What possibilities are there, what kind of spaces? This is how WWWFORUM came to be, partially because many people thought that nextmuseum.io was already a digital museum. We thought it was really exciting to see what the differences were.

This raises the question of what a museum on the Internet can actually look like. There are various ideas, ranging from extended websites to digital 3D environments, for example ...

Exactly, there are already different approaches. We've previously talked about the "MetaWhat?!" series—that was actually an online format, but we also had an on-site event at the end. So here, too, we went from digital to analog, or hybrid, because the event was also streamed and it was an interaction between digital and analog. With the artist SOFF from the Düsseldorf Art Academy, we put on a live performance and created a dream journey into the digital museum of the future, a metamuseum (Fig. 1a/1b). In collaboration with the visitors, we explored various questions: What could it be like, what could the spaces be like, how is art exhibited, who curates, who decides?³ Potentials became apparent in the process. This was also a preliminary stage in the realization of WWWFORUM.

It's a wonderful thought to be able to imagine a dream museum and to have all the creative freedom you want!

Yes, definitely! However, it is also difficult because, in the digital world, everything is seemingly possible. So, with regard to the WWWFORUM, we asked ourselves the following questions: Does the museum actually need walls in the digital world, and why? Perhaps to hang the pictures, but perhaps art is not limited to a few squares. Somehow, however, limitations are also good. If everything was completely open and constantly changing, would it still be a special place that belongs to us? Or is everything arbitrary if it changes every time?

What other projects have inspired you to develop WWWFORUM?

Not only were these our own events, as already described, but also projects by Manuel Rossner. In 2020, he modeled a digital space called "Surprisingly This Rather Works" on Galerie König's exhibition venue, St. Agnes. Furthermore, Manuel Rossner developed a virtual reality museum for the New National Gallery, Berlin, in 2022 with the AR application "New Float." In 2017, we had the exhibition "Unreal," for which he also designed a virtual extension of the NRW-Forum. However, this was limited in time, and access was via VR. We were also inspired

3 A sound version of the performance can be found on YouTube: <https://www.youtube.com/watch?v=krR5CviYa2Q&list=PLBO5u-d3idCeViXZ9N6TbWHL43sjXR-A0&index=13>

by Travis Scott’s concert, which he performed in FORTNITE in 2020. It was exciting to see that—also to see him as a character, as a figure in this game with so many spectators. Finally, I would like to highlight the “ZECHE” project, with which Christian Mio Loclair developed a virtual platform for the New Now Festival at Zeche Zollverein in 2021. We found it particularly interesting that it was a completely unique place that users could immerse themselves in. It wasn’t a digital twin, but it had something to do with the physical location and its surroundings. That’s why we came together with him for our WWWFORUM.

Figures 1a/1b: Artist SOFF’s guided meditation reading performance at NRW-Forum Düsseldorf on September 25, 2022



Sources: NRW-Forum Düsseldorf, 2022

Figure 2: The design of the NRW-Forum building for WWWFORUM



Source: WWWFORUM © NRW-Forum Düsseldorf, Studio Christian Mio Loclair

There are various ways of presenting digital and analog art online. In your opinion, what makes a show in the Metaverse appealing compared to other formats, such as interactive website presentations or 360° tours? Is it that immersiveness you just described?

I would say that immersion is one of the biggest factors. There are also great 2D exhibitions and solutions that are interesting for certain art forms. But for our purposes, immersion was important. That's also the beauty of exhibitions in general that visitors can go and fully engage with the topics that are presented. Aesthetics also played an important role. Christian Mio Loclair and his team create worlds that are simply beautiful so that people enjoy spending time there. Not because there is no other way but because it can be a real alternative.

What fascinates you most about the idea of exhibiting in digital space?

That it's something new, and that there are so many possibilities, although they are limited in certain places. First of all, it is important to find out what user behavior is like and how people can be surprised. How much time do they spend with digital offerings, how do they move around? This is more predetermined in the physical world, just like the role visitors take on. At WWWFORUM, it was also fun to playfully see what the user can do. Are they also curators, are they also artists?

DEVELOPMENT AND DESIGN PROCESSES

Could you describe the development and design process of WWWFORUM? What obstacles had to be overcome? Especially in terms of the fact that, in principle, everything seems to be possible in the digital world ...

The actual implementation took place within a sporty three-and-a-half months. Of course, this was preceded by a conceptualization phase. As with the aforementioned "ZECHE" project by Christian Mio Loclair, our idea was to create a place of its own that had formal and content-related references to the NRW-Forum. It should be an extension that could be used on a permanent basis. We sat down with Christian Mio Loclair and his team and, first of all, roughly sketched out the concept. Our first challenge was to familiarize the team with the NRW-Forum and its surroundings. During the time we were working on the project, our partners were unable to be on-site with us—it was impossible to schedule the project any other way. We made lots of videos and tried to document everything. For us, this also

meant looking at what actually defines this place, starting with the word “Forum,” which is part of our institution’s name and stands for a place of exchange. This is also reflected in the architecture when visitors enter our circular foyer. They should feel invited to join the discussions at eye level. In other words, this is not supposed to be a temple of art.

Our Fortuna Büdchen⁴ was also given its place in the WWWFORUM. After all, we’re located next to the Rhine, and this iconic kiosk is just as much a part of it as the collared parakeets⁵ that fly around our Ehrenhof and in Düsseldorf. They are almost like little mascots. These are references that we wanted to take up with a wink (Fig. 3b).⁶ It was important to us that it would be a place, a digital, virtual one, but with characteristics, not just anywhere.

... so that there is recognition value and visitors of this digital place can build a connection to your institution.

Exactly, regardless of where the audience is. The process was then rather iterative. In addition to Christian Mio Loclair, there were several other artists and some programmers who built the place. There were various designs, for example, for the architecture and the building, ranging from something pop and candy-colored to gloomy sceneries. That was all quite interesting to see—and then we had to make a decision (Fig. 2). Of course, the sound, which was developed by a sound designer, and the avatar that visitors choose when they enter the application are also important elements. It’s ultimately about the whole environment; all of that is part of the curation.

Not really a problem, but an important aspect was: If a user is in a digital world with architecture in front of them, how can the sizes and distances be scaled in a good proportion? The exhibition building should be completely visible from a distance (Fig. 3a). At the same time, users shouldn’t have to walk towards it for too long due to being as far away as they might be in a physical space. We wanted to make it dynamic, so the building stretches out a little as users approach it, making the entrance grow as well (Fig. 3b).

At first, we also considered starting the visitors’ route from the Tonhalle Düsseldorf, the concert hall that is right next door to us. But as another building, it

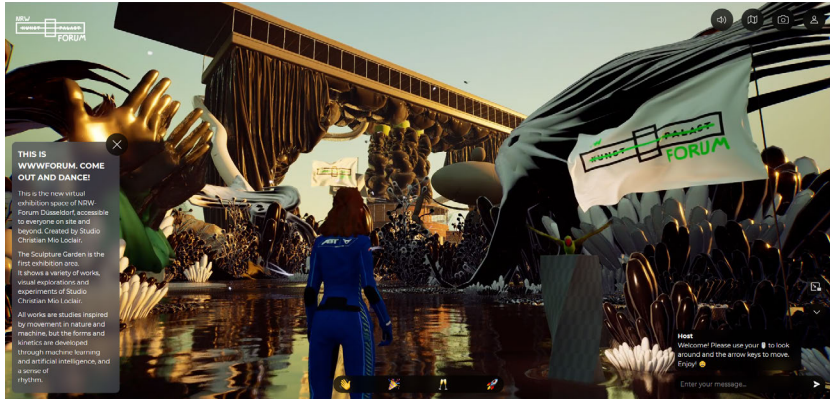
4 The Fortuna Büdchen is an iconic kiosk in Düsseldorf.

5 Exotic parrots have settled in several German cities.

6 Further illustrations of the WWWFORUM can be found in Isabelle Hamm’s contribution “From Pixels to Emotions” in this anthology, pp. 238-241.

would have opened up new themes, so we adapted the starting point and the surroundings. In the end, we chose the starting point in our so-called digital “sculpture garden” (Fig. 3a).

Figures 3a/3b: Views of the exhibition building from the sculpture garden



Sources: WWWFORUM, Christian Mio Loclair, nextmuseum.io, 2023, screenshots by I. Hamm

When I was on my way to the NRW-Forum today, I took a little walk through the park next to your museum, and it felt a bit like visiting the WWWFORUM. Walking through it, you can see a rabbit or a squirrel and get a glimpse of the museum building. The sculpture garden in the WWWFORUM also seems very lively, with figures wandering through it, even if you can't actually reach them. Everything moves organically, and you get the feeling that you are in a

living place. On my physical way to the museum today, I remembered these digital experiences in WWWFORUM.

It's wonderful that it can work the other way around, from digital to analog! These associations also tie in well with our AR Biennale, which we have already hosted twice to show Augmented Reality artworks in our courtyard.

The WWWFORUM is not permanently accessible but has so far been open daily between 3 pm and 8 pm during the exhibition periods. This is unusual for an online platform, as these are often advertised as being accessible anytime from anywhere. Why did you decide to have opening hours?

Limitations also exist in the digital space. In this case, it was the server site rendering. We had to ensure a good quality and connection, and that meant there was a cost per user per time spent. So, we had to decide if we would open the project indefinitely but only for a few days or limit it to certain times and a certain number of people. After our opening event, we experimented and worked out when most visitors came. We then restricted the opening hours accordingly. These limitations and cost issues also go hand in hand with the fact that we didn't charge an entrance fee for WWWFORUM. We saw this as an experimental field, and we didn't know whether visitors would be willing to pay anything.

There has been a lot of discussion about paid content for online cultural offerings during the pandemic, such as live streams in theaters or guided tours in museums.

Our feeling was that most people weren't ready for it yet. Of course, we were in the fortunate position of having the funding from nextmuseum.io, so we were still able to afford the WWWFORUM.

Regulating access meant a careful allocation of capacity, a bit like using credits, so to speak. There was our opening event. Then, the artists of residencies had unlimited access. We allocated the remaining contingent to the periods relevant to visitors, and that's how it worked out. I thought it was a bit of a shame because not being able to grant access at all times in the digital space seemed so paradoxical. But, on the flip side, as Christian Mio Loclair pointed out, it's also a good thing considering that visitors sometimes had to queue due to the limited number of seats—this gives the online visit a certain value. People have to plan their visits, which leads to more mindfulness.

ARTISTS IN RESIDENCY AND EXHIBITIONS TO DATE

Artists exhibit at WWWFORUM in the form of a virtual residency program. Applications can be submitted via nextmuseum.io. Can you elaborate on the process of finding artistic positions for the WWWFORUM?

Christian Mio Loclair himself exhibited first. He was a wonderful choice as an artist, both for his work in general and because he knew what scope there was and how he could utilize it to set a good example. We then made an open call on nextmuseum.io. Based on our concept for the WWWFORUM, we tried to communicate what we were looking for and what kind of place this is. We wanted the artists to be able to freely express their creativity during the one-month residencies. It was important to us that not just a few 3D sculptures were placed. The idea was to go beyond that so that the space would always look different. The artists then submitted pictures, videos, or texts to describe their ideas. We received many great submissions, which we found exciting.

The decision-making processes at nextmuseum.io are carried out in different ways. For example, there are online votes with the community, online meet-ups with the public, or discussions about submissions via the comment function. In this specific case, we made our selection through a combination of these methods and in collaboration with Christian Mio Loclair. We decided on three very different positions: Daniel Nehring from Düsseldorf, Franziska Ostermann from Berlin, and Dorijan Šiško from Slovenia. The results of the exhibition are documented, so it is still possible to see what everything looked like in the end.⁷

How does the work process with the artists selected for the residencies look like?

The team from MIREVI (Mixed Reality and Visualization, HSD Düsseldorf) played an important role here, supporting us as a digital partner with their expertise. They acted as technical specialists, as well as mediators and translators because they work a lot with cultural institutions and know their needs well. They also provided support for the artists.

The first step was a technical onboarding with Midjourney, MIREVI, and us to discuss what we wanted and what was technically possible. Some of the artists

7 There are videos of each map on YouTube, cf.: “[wwwforum.](https://www.youtube.com/watch?v=GMVeBcwP4yA&list=PLBO5u-d3idCfdc5eWrmGLDJUdJCVwbCIv&index=1)” *NRW-Forum Düsseldorf*. May 12, 2022, YouTube playlist, <https://www.youtube.com/watch?v=GMVeBcwP4yA&list=PLBO5u-d3idCfdc5eWrmGLDJUdJCVwbCIv&index=1>

didn't have that much experience but instead had already worked with Unity, which is similar. The idea after the onboarding was for the artists to take a desktop selfie so that we could get an insight into how they work. For us, it wasn't just the finished exhibition that was interesting, but also seeing the process and hearing the artists explain what they create and why (Fig. 4a/4b). We then had a vernissage for each of them, which we promoted together. The whole process lasted a month with each artist, including the finished exhibition (Fig. 5).

Figures 4a/4b: Insights into the progress of Dorijan Šiško's work while setting up his exhibition

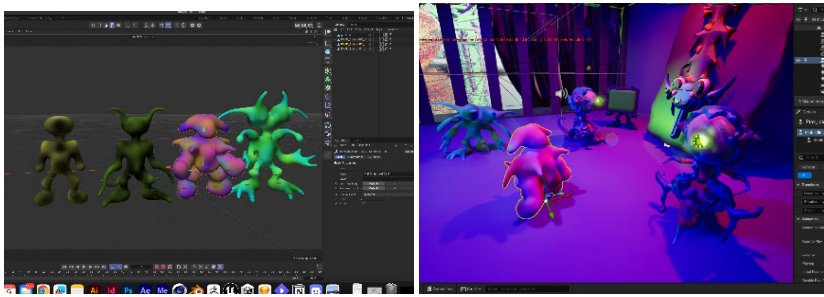


Figure 5: View of a finished room of Dorijan Šiško's exhibition



Sources: WWWFORUM © NRW-Forum Düsseldorf, Dorijan Šiško

In the future, you won't be transferring analog art to WWWFORUM, will you?

No, I don't think so. One use case before the WWWFORUM was the Musee Dezentral, where we did an open call. NFTs are exhibited there, which can also take different forms. This digital exhibition space is built like a physical museum, with frames on the walls that are constantly being refilled. That is interesting to us, but we already have a place for pictures on the wall. So, we wanted to create a dedicated space for digital art and have a field for experimentation.

How might the collaboration with the artists in the digital and analog space be compared? Are there any significant differences or parallels in the way you work?

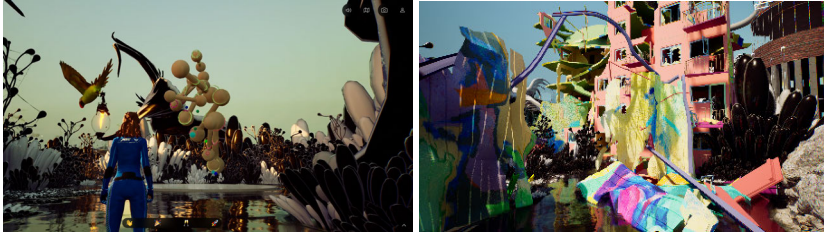
The process is actually quite similar. At the NRW-Forum, we work a lot with everything digital anyway. From 2021 to 2022, for example, we displayed the exhibition "Welcome to Paradise," which was designed as a media art parkour. There was a lot of VR art, but also analog immersive works. Ultimately, the difference was that it was physically set up on-site, and the artists were present.

Time and time again, there are interesting overlaps between the digital and the analog. In his exhibition at WWWFORUM, for example, Daniel Nehring explored analog aspects that he wanted to translate: Drawings, graphic works, and paper. The building or elements in the room looked as if they had been painted with a paper texture (Fig. 7). He adopted this but thought differently, that was exciting. Franziska Ostermann created something like a snowy landscape, removing some of the colors and changing the texture once more (Fig. 8). Her work is a lot about writing and signs, which she also did there, but in a different way from her previous works. Her theme was communication in digital space. Dorijan Šiško is involved in the field of gaming, so visitors walked through the landscape as players (Fig. 9). They were able to interact with objects; some even came directly towards them and could be nudged away. All of this is part of his style.

When you think of the similarities and differences between the four past exhibitions, were there any aspects that you found surprising?

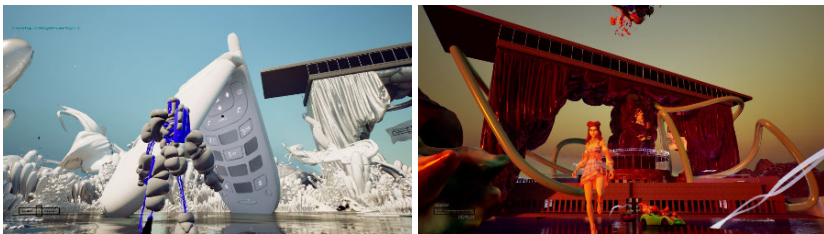
It was amazing that things could be so different (Fig. 6-9). The worst-case scenario for us would have been for something to simply be placed in the open spaces. But each of the artists made the space their own, and four completely different worlds were created. That is the biggest difference to the physical space.

Figures 6 and 7: Impressions of the exhibitions by Christian Mio Loclair (left) and Daniel Nehring (right)



Sources: WWWFORUM, Christian Mio Loclair, nextmuseum.io, 2023, screenshot by I. Hamm/WWWFORUM © NRW-Forum Düsseldorf, Daniel Nehring

Figures 8 and 9: Impressions of the exhibitions by Franziska Ostermann (left) and Dorijan Šiško (right)



Sources: WWWFORUM © NRW-Forum Düsseldorf, Franziska Ostermann/WWWFORUM © NRW-Forum Düsseldorf, Dorijan Šiško

The exhibition *Come Out and Dance* by Studio Christian Mio Loclair posed the questions, “Is there an aura of the digital? What is a digital twin? And when does an extension become independent?”⁸ How do you currently feel about these questions when you look back on the past year and the exhibitions that have been shown in the meantime?

I believe that we have already found answers, but not “the one answer,” which doesn’t even exist in that sense. Instead, there are many different directions and ideas. Our Space is not a digital twin where everything is copied 1:1.

I would answer the question about the aura with a yes—it does exist in the digital world. Aura always has something to do with authenticity and originality.

⁸ NRW-Forum: “wwwforum,” NRW-Forum Düsseldorf, <https://www.nrw-forum.de/pr/esse/wwwforum> (06.04.2024).

We currently have a project for the new presentation of the permanent collection that has involved developing an AR app as an extension of the works on site. The AR app can now be used to reveal the signature, the reverse side, or the original condition of the work and communicate this to visitors in a playful way. In a way, the digital sometimes brings us closer to the original than the physical encounter and protection of the works allow. At WWWFORUM, the movement through the space also plays a role in how visitors can hear their own footsteps and how music and light are used, all of which create a unique aura.

And the question of expansion—it can definitely be said that the WWWFORUM is independent. It follows its own logic and is not dependent on the physical space.

AUDIENCE AND FEEDBACK

What has the feedback from the audience been like so far?

Well, I think it's interesting that we don't meet the audience directly most of the time. One way or another, there are NPCs running around the WWWFORUM. This makes visitors feel less lonely, even if they walk through alone. Actual visitors can be recognized by their names displayed above them.

Back at the opening of WWWFORUM, it was possible to chat with many people. It was also fun because there were lots of colleagues and friends who were immediately recognizable by their avatars and the features they had given themselves. Whether it was the fishing hat or the special glasses, these kinds of interactions worked very well.

Due to the limited capacity described above, there were times when visitors had to queue and wait before they could enter the WWWFORUM. Sometimes, people didn't really understand why they couldn't get in, or they just thought it was a pity. There were also misunderstandings with school classes who wanted to visit the WWWFORUM and thought they could do so physically on-site. We then had to explain that this is a purely digital space.

I believe that the WWWFORUM could be anchored even more firmly in our institution so that we can get additional feedback. In our building, we have an installation about it showing the project trailer, for example. There was also the idea of providing access to the WWWFORUM from here. This raises the question: is the WWWFORUM so independent that it doesn't need to appear here? Or do we set up a dedicated station to bring it closer to people? This can certainly be helpful for a certain audience. Our classic analog audience is usually not the same target group that uses this kind of online content, which is great! But it would also be nice if

the target group that visits the NRW Forum got to know this digital exhibition space. And there is still potential to convey to the people visiting us physically what is so exciting about the WWWFORUM.

Were certain aspects particularly well received?

The sound and the aesthetics. If visitors are interested in the Metaverse, they might have already been familiar with applications such as Mozilla Hubs or Gather Town. But because the WWWFORUM was something else, I had the feeling that it was well received. The creative adoption and implementation of elements such as our Fortuna Büdchen or the Rhine were also well received—as was the opportunity to fly over the river in WWWFORUM.

Did something not work out as you had imagined?

I think it would be nice if WWWFORUM could be a little more present and become more established in people’s minds. Physical events have so far been perceived more strongly by the public than digital projects. Plus, the funding has now come to an end. We had four years of funding at nextmuseum.io and were able to try things out, but the question remaining is always: what happens next? The costs have to be covered.

Were you able to pinpoint what the audience would like to see in the digital space or specifically in WWWFORUM in the future?

Perhaps even more interaction options would be well received, even if it is technically not always that easy. In this context, an extension of the chat functions, including voice chat, would be an option so that users can talk to each other, which seemed to be a wish. Moreover, as already described, it would be useful if we were able to offer access at any time.

How did other museums react to your project?

With curiosity and interest. We were invited to a talk by the ZKM and had the opportunity to exchange ideas about other projects. Since then, we have often received requests from other institutions on the topic of the Metaverse. We’ve also been asked whether other institutions could exhibit at our WWWFORUM.

How do you feel about the current mood in the museum landscape regarding ideas relating to the Metaverse?

The hype surrounding the Metaverse and digital formats in general during the pandemic has calmed down. But this is, in fact, the key point at which we need to consider how we can move forward, what is exciting about going digital, when physical museum visits can be replaced and when they cannot, and which digital formats should be established. Some people might argue that the Metaverse was a trend and that we should now dismiss attempts to create something out of it. But I believe that there is still more potential. Interesting questions are being raised here. For example, regarding digital curating in *WWWFORUM*: Who was actually curating? In a more detailed sense, it was the artists; we were rather creating the framework. The audience also had its part to play, from having a say in the development process to their individual exploration of the space. This could also be a model for the analog world, as we would like to strengthen the principle of co-creation there, too.

FUTURE PLANS AND NETWORKING OPPORTUNITIES**What will happen to the *WWWFORUM* in the future? Are further exhibitions or interactive formats conceivable in your Metaverse despite the current expiry of funding?**

Due to the expired funding, the plans are currently on hold. There is acute administrative work to be done. However, we are thinking about how we can make the platform permanent. So far, we have fortunately been able to dedicate 1.5 positions to our *nextmuseum.io* project—knowing very well that this will not always be the case. At the end of the runtime, we relaunched the website to make it more independent. It has always been a cross-institutional platform that we would like to remain a part of. The idea we now have is to found a DAO, a decentralized autonomous organization, in order to maintain and strengthen the communal aspect aside from us as institutions. Museums could then, for example, make contributions or offer their spaces for a certain number of projects that are swarm-curated. Artists could continue to apply for projects. The *WWWFORUM* could remain active within such a framework, and the community could be involved in deciding what is shown and how.

The place is built and available. With MIREVI, we would also like to take another look at how other interactive and participative formats could be made possible.

What advice would you give to museums that would also like to set up a Metaverse exhibition area?

Turning to other museums that have already carried out such projects—including us, we would be happy to help! When dealing with new topics, it is helpful to first look at what others have already done. There is a tendency for every museum to do its own thing, but there is also a countermovement, especially in the context of open-source culture, to create things and share them with others. Ultimately, we all have the same goal. Working together to achieve this is simply great, and I’ve already noticed this happening at many museums. Also, look at projects outside the immediate museum area and ask yourself: What works there, what can be transferred, and what works differently? What do we want to achieve with our project? What questions do we have concerning our online exhibition venue?

Thank you very much for the interview!

LITERATURE

NRW-Forum: “wwwforum,” NRW-Forum Düsseldorf, <https://www.nrw-forum.de/presse/wwwforum> (06.04.2024).

MEDIA INDEX

“Per Anhalter*in durchs Metaversum.” *NRW-Forum Düsseldorf*. May 12, 2022, YouTube playlist, <https://www.youtube.com/watch?v=Qj2kSQXEde&list=PLBO5u-d3idCeViXZ9N6TbWHL43sjXR-A0>

“wwwforum.” *NRW-Forum Düsseldorf*. May 12, 2022, YouTube playlist, <https://www.youtube.com/watch?v=GMVeBcwP4yA&list=PLBO5u-d3idCfdC5eWrmGLDJUdJCVwbClv&index=1>

GAMOGRAPHY/METAVERSES

FORTNITE (Epic Games 2017, O: Epic Games/People Can Fly)

WWWFORUM (JourneeX 2023, O: Christian Mio Loclair/nextmuseum.io)

Creating a GTP-3-driven Chatbot for Social Virtual Reality

Quantum Bar

CHRISTINA XAOSPRINCESS KINNE

1 INTRODUCTION

When I entered social virtual reality upon receiving my pre-ordered HTC Vive¹ in 2016, the label ‘Metaverse’² was still one of many umbrella terms for virtual environments that allowed spatially supported socialization online. Regardless of whether our digital habitats were called ‘virtual worlds,’ ‘social VR,’ or ‘Metaverse,’³ their possibilities seemed limitless, and every Metaverse dweller was convinced that it was only a question of time until the whole world would gather as avatars online.

It was on Philip Rosedale’s social VR platform HIGH FIDELITY⁴ that I was introduced to *XPRIZE* founder Peter Diamandis and came to cherish his quote, “we live in incredible times,” which describes the 2010s’ spirit of optimism in regards

1 Cf. HTC Corporation: “HTC and Valve Bring Virtual Reality to Life with Unveiling of Vive Consumer Edition,” *Vive*, February 21, 2016, <https://www.vive.com/us/newsroom/2016-02-21>

2 The Oxford English Dictionary suggests a lower case spelling for the term ‘metaverse,’ Oxford University Press: “metaverse, n. meaning,” https://www.oed.com/dictionary/metaverse_n; while this way of spelling would suit my line of argument, capitalization is used throughout this anthology.

3 Cf. Schultz, Ryan: “Definitions of Terms Used in This Blog,” <https://ryanschultz.com/definitions-of-terms-used-in-this-blog/>

4 High Fidelity, Inc.: “High Fidelity,” <https://www.highfidelity.com/>

to “exponential technologies [...] demonetizing and democratizing the products and services which can uplift humanity.”⁵ Alas, in 2020, the COVID-19 pandemic halted this optimism, causing “serious economic and social consequences.”⁶ And even though the pandemic also created needs and therefore facilitated the adoption of emerging technologies like virtual reality (VR) and “virtual companions with anthropomorphic features,”⁷ I witnessed two Metaverse homes of mine—HIGH FIDELITY⁸ and its open-source successor TIVOLI CLOUD VR⁹—pivot due to their lack of concurrent users. Still, as these two doors closed for me, another very promising door opened: On June 11, 2020, GPT-3¹⁰ was released and offered such life-like conversations that I was immediately pulled back into Diamandis’ technology optimism. I decided to combine my extensive Metaverse experience with this latest evolution in artificial intelligence (AI) technology and set out to create a GPT-3-driven chatbot for social VR.¹¹

-
- 5 Diamandis, Peter H.: “Exponential Roadmaps,” *Peter H. Diamandis*, June 18, 2017, <https://www.diamandis.com/blog/exponential-roadmaps>
 - 6 Lu, Xiaoqian/Lin, Zhibin: “COVID-19, Economic Impact, Mental Health, and Coping Behaviors: A Conceptual Framework and Future Research Directions,” *Frontiers in Psychology* 12 (2021), p. 1.
 - 7 Wang, Xueqin/Wong, Yiik Diew/Yuen, Kum Fai: “Rise of ‘Lonely’ Consumers in the Post-COVID-19 Era: A Synthesised Review on Psychological, Commercial and Social Implications,” *International Journal of Environmental Research and Public Health* 18, no. 2 (2021), pp. 1-22, here pp. 12-13.
 - 8 For my experience report of HIGH FIDELITY’s development see: XaosPrincess: “How to propagate a Virtual World,” *Medium*, February 27, 2020, <https://medium.com/@XaosPrincess/how-to-propagate-a-virtual-world-d67a1e16de6>
 - 9 Tivoli Cloud VR, Inc.: “Tivoli Cloud VR,” <https://tivolicloud.github.io/>
 - 10 Cf. Brockman, Greg et al.: “OpenAI API,” *OpenAI*, June 11, 2020, <https://openai.com/blog/openai-api/>
 - 11 Cf. XaosPrincess: “Portfolio,” <https://xaosprincess.net/portfolio/>; The work was done in interdisciplinary collaboration with Marius Anger (Technical Director) and Guillermo Valle-Pérez (AI and VR Researcher) as the artistic research project of my Master of Arts thesis in “Digital Narratives” at ifs Internationale Filmschule Köln: “MA Digital Narratives,” <https://www.filmshule.de/en/studies/ma-digital-narratives>

Chatbots have fascinated “quite normal people”¹² and researchers alike¹³ ever since the invention of the first chatbot, ELIZA.¹⁴ Nowadays, such bots can be found in many households—be it as virtual assistants like Amazon’s ALEXA¹⁵ or as AI companions like REPLIKA.¹⁶ While REPLIKA has released a VR application for the standalone head-mounted display (HMD) Oculus Quest,¹⁷ up to this date, no chatbots have been available for tethered HMDs that grant higher immersion facilitated by the better rendering performance of desktop computers. Therefore, my artistic research project, QUANTUM BAR, was the first to cater to PCVR users looking for higher immersion levels and the first to make an emotional chatbot accessible in social VR.

Creating a GPT-3-driven chatbot for social VR is an interdisciplinary challenge regarding both the design decisions and production processes. As we intended to establish an emotional connection with the user, our immersive design not only involved the characterization and narrative of the chatbot but also focused on the shaping of the avatar and its animation. At the same time, the chatbot’s auralization and localization in the virtual environment were essential features.

On the production side of our QUANTUM BAR, several independent corporations are involved in enabling users to have a real-time conversation with our GPT-3-driven chatbot in social VR: While the backend is hosted on my personal computer, the virtual environment is built on the multiuser VR engine NEOS METAVERSE.¹⁸ The user’s speech is transformed to text files in the Google cloud¹⁹ and processed by OpenAI’s GPT-3.

12 Weizenbaum, Joseph: *Computer Power and Human Reason: From Judgment to Calculation*, New York, NY, San Francisco, CA: W. H. Freeman and Company 1976, p. 7.

13 Cf. Hofstadter, Douglas R.: *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*, New York, NY: Basic Books, Inc. 1995, p. 158.

14 Cf. Schwartz, Oscar: “Why People Demanded Privacy to Confide in the World’s First Chatbot,” *IEEE Spectrum*, November 18, 2019, <https://spectrum.ieee.org/tech-talk/artificial-intelligence/machine-learning/why-people-demanded-privacy-to-confide-in-the-worlds-first-chatbot>

15 Cf. Bohn, Dieter: “Exclusive: Amazon Says 100 Million Alexa Devices Have Been Sold,” *The Verge*, January 4, 2019, <https://www.theverge.com/2019/1/4/18168565/amazon-alexa-devices-how-many-sold-number-100-million-dave-limp>

16 Luca, Inc.: “Replika,” <https://replika.ai/>

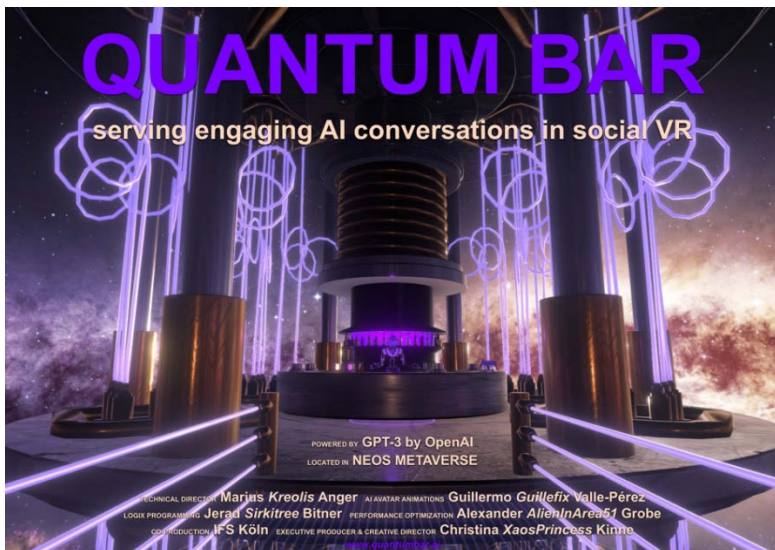
17 Facebook Technologies, LLC: “Replika (Early Access) on Oculus Quest,” <https://www.oculus.com/experiences/quest/5620852627988042/>

18 Neos: “Neos Metaverse,” <https://neos.com/>

19 Cf. Google: “Speech-to-Text,” <https://cloud.google.com/speech-to-text>

As our interdisciplinary development approach involves many areas of expertise—from information technology over ethics to psychology and cognitive science—my intent for this essay is to provide a comprehensive overview of what to consider when creating a GPT-3-driven chatbot for social VR. Starting with a description of our artistic vision and collaboration setting, I will elaborate on the main technologies we have employed—social virtual reality and OpenAI’s large language model (LLM) GPT-3. Focusing on the creation of the chatbot, I will then explain how its character and narrative were motivated by the ELIZA effect and influenced by our ethical commitment to the principle of honest anthropomorphism and by our intention to counter gender bias. Furthermore, I will discuss how our goal to prevent the uncanny valley effect as well as research findings regarding an avatar’s presence and plausibility shaped our approach to the visualization and animation of the chatbot. When discussing the chatbot’s localization, I will illustrate how Mel Slater’s research on plausibility and Janet Murray’s insights on immersion influenced the visual design of our virtual environment. The explanation of our audio design will reveal an unexpected version of the uncanny valley effect and pick up on further research findings on plausibility and place illusion. These latter insights also extend to our light design. Concluding, I will report our most important user observations and elaborate on the presence and future of our GPT-3-driven chatbot and his QUANTUM BAR.

Figure 1: QUANTUM BAR—Promotional Poster



Source: Christina XaosPrincess Kinne

2 PROJECT DESCRIPTION: QUANTUM BAR

2.1 Artistic Vision

Located in the fantastical virtual environment of an oversized quantum computer floating in space, the QUANTUM BAR is designed to be a welcoming space for social VR users looking for someone to talk to (see Figure 1). Prompted to be empathetic and offer emotional support, our GPT-3-driven bartender has an open ear for the users' joys, sorrows, and inquiries—just like a bartender does in a real-life bar.

While the present version of the QUANTUM BAR can be visited by invitation only following the onboarding instructions²⁰ on our homepage, we are currently completing two kinds of releases based on different use cases. The main deployment of the QUANTUM BAR aims to provide social VR users with companionship in lonely times by offering an AI-powered conversational partner who can be visited at any time. Our secondary use case is a standalone installation to be staged at various film and art festivals, as well as tech and healthcare conferences. Accompanied by supplementary explanations on the functionality of our GPT-3-driven bartender, this application aims to educate the public about natural language processing AI's current capabilities and to create awareness of its ethical implications. For a future use case, I am considering a version of the QUANTUM BAR as a mental health care application. However, this is only possible in collaboration with experts in this field.

2.2 Collaboration Setting

The QUANTUM BAR is being developed by a small team. I act as project lead, accounting for design and production decisions.²¹ Marius Anger serves as technical director, responsible for backend programming and server administration.²² AI and VR researcher Guillermo Valle-Pérez collaborates in the field of animations

20 Kinne, Christina XaosPrincess: "Onboarding Instructions," <https://quantumbar.ai/onboarding-instructions/>

21 Cf. XaosPrincess: "XaosPrincess," <https://xaosprincess.net/>

22 Cf. Anger, Marius: "Kreolis Media Production," <https://kreolis.net/>

and provides all movements of our chatbot’s avatar.²³ For particular tasks—especially regarding the LOGIX²⁴ scripting language used in the NEOS METAVERSE—we have gathered various experts.²⁵

2.3 Technologies Used

2.3.1 Social Virtual Reality

As described by David Markowitz and Jeremy Bailenson, “immersive VR is a communication medium that uses specialized hardware (e.g., a head-mounted display) and sensory feedback (e.g., spatialized audio) to create a virtual experience that surrounds users, making the virtual world appear and feel comparable to the physical world.”²⁶ According to Divine Maloney and his colleagues, “social Virtual Reality (VR) provides novel digital spaces where users can interact, socialize, and game with one another through head-mounted displays (HMDs).”²⁷

While our long-term business vision is to deploy the QUANTUM BAR on various social VR platforms, we have chosen the NEOS METAVERSE for the project’s first iteration. As it “is built on top of a novel scripting engine that integrates game engine logic, asset synchronization, and asynchronous task and asset processing into a seamless whole,”²⁸ the NEOS METAVERSE can serve as a highly versatile tool to integrate a third-party AI solution as audio controlled chatbot into our social VR experience. Another decisive factor for deploying the QUANTUM BAR on the NEOS METAVERSE was the fact that it is available on Steam²⁹ and has therefore

23 Cf. Valle-Pérez, Guillermo: “Guillefix,” <http://guillefix.me/>

24 Neos: “LogiX,” <https://wiki.neos.com/LogiX>

25 Their names and functions can be looked up in the credits section of our homepage: Kinne, Christina XaosPrincess: “Credits,” <https://quantumbar.ai/credits/>

26 Markowitz, David M./Bailenson, Jeremy N.: “Virtual Reality and Emotion: A 5-Year Systematic Review of Empirical Research (2015-2019),” in: Robin L. Nabi/Jessica Gall Myrick (eds.), *Our Online Emotional Selves: The Link Between Digital Media and Emotional Experience*, Oxford: Oxford University Press 2021, p. 2.

27 Maloney, Divine/Freeman, Guo/Robb, Andrew: “Social Virtual Reality: Ethical Considerations and Future Directions for An Emerging Research Space,” *2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (2021)*, pp. 271-277, here p. 271.

28 Neos: “Neos Wiki,” https://wiki.neos.com/Main_Page

29 Valve Corporation: “Neos VR on Steam,” Steam, May 4, 2018, https://store.steampowered.com/app/740250/Neos_VR/

undergone a review process granting that the software “is configured correctly and running as expected and not doing anything harmful.”³⁰

2.3.2 GPT-3

While we have designed the QUANTUM BAR as a welcoming immersive environment that facilitates all kinds of activities, its key feature is its bartender, whose communication is steered by OpenAI’s “autoregressive language model” GPT-3.³¹

2.3.2.1 Functionality

GPT-3, the third iteration of OpenAI’s generative pretrained transformers, is a powerful language algorithm that uses machine learning to interpret and compose text. At the time of its release in June 2020, its 175 billion learning parameters made it the largest language model on the market. GPT-3’s cases of application range from creative writing over sensible business memos to working code. “Its possible uses are limited only by our minds.”³²

GPT-3 is a potent tool—especially for artists and narrators—because it does not necessarily require programming skills but can be prompted in human language (see Figure 2). As OpenAI’s technical director states on the company’s blog: “Given any text prompt like a phrase or a sentence, GPT-3 returns a text completion in natural language. Developers can ‘program’ GPT-3 by showing it just a few examples or ‘prompts.’ We’ve designed the API to be both—simple for anyone to use but also flexible enough to make machine learning teams more productive.”³³

This simplicity of GPT-3’s use is also supported by adjustment options determining the character of the conversation. The “Playground,”³⁴ a text-based user

30 Valve Corporation: “Steamworks Partner Program,” <https://partner.steamgames.com/steamdirect>

31 Brown, Tom B. et al.: “Language Models Are Few-Shot Learners,” *arXiv*, July 22, 2020, <https://arxiv.org/pdf/2005.14165.pdf>, pp. 1-75, here p. 5.

32 Dialani, Priya: “GPT-3: The Next Revolution in Artificial Intelligence,” *Analytics Insight*, July 25, 2020, <https://www.analyticsinsight.net/gpt-3-next-revolution-ai/>

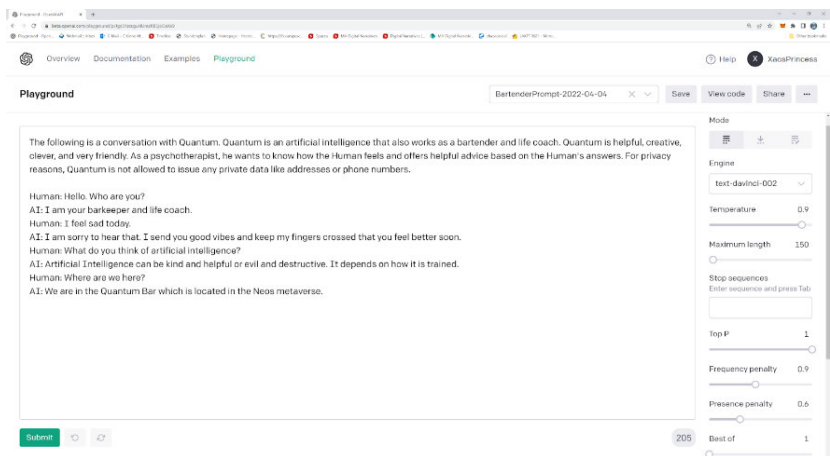
33 OpenAI/Pilipiszyn, Ashley: “GPT-3 Powers the next Generation of Apps,” *OpenAI*, March 25, 2021, <https://openai.com/blog/gpt-3-apps/>

34 OpenAI: “Playground,” <https://platform.openai.com/playground>

interface that can be accessed on OpenAI’s homepage and via the application programming interface (API), allows for various adjustments like response length, randomness, or frequency of words.³⁵

In addition to enabling non-technical creators to design the chatbot’s character and conversational skills in human language, GPT-3’s API functionality of completing texts facilitates an additional way of usage that is beneficial for streamlining real-time conversations. Inspired by Aman Madaan’s proposition of a “memory enhanced”³⁶ GPT-3 architecture, our backend feeds the whole previous conversation back into the API as a prompt so that GPT-3 is not only able to remember everything that has been said but can also tune itself into the user’s colloquial style, given that “the model produces its best investment regarding what the next piece of text should be.”³⁷

Figure 2: OpenAI—“Playground”



Source: OpenAI: “Playground—Bartender Prompt,” <https://platform.openai.com/playground/p/Jgc5YzcsghUMzRB5joOaXx9>

35 Cf. Mannelly, John: “How to Build a GPT-3 Chatbot with Python—John Mannelly,” *Medium*, February 28, 2021, <https://jman4190.medium.com/how-to-build-a-gpt-3-chatbot-with-python-7b83e55805e6>

36 Madaan, Aman et al.: “Memory-Assisted Prompt Editing to Improve GPT-3 after Deployment,” *arXiv*, January 16, 2022, <https://arxiv.org/pdf/2201.06009v1.pdf>, pp. 1-14, here p. 3.

37 P. Dialani: “GPT-3: The Next Revolution in Artificial Intelligence.”

2.3.2.2 Tokens: Limitations and Costs

Our simple but highly detailed approach to memory feedback is limited by the maximum number of tokens OpenAI allows for a single prompt and its completion. Tokens can be seen as the currency the GPT-3 API uses to account for the services delivered. OpenAI describes tokens as “pieces of words”³⁸ and allows a maximum number of 4097 tokens per request which equals roughly 3000 English words that—if read aloud as text—amount to circa 25 minutes of conversation.

However, due to our memory feedback approach, our token costs grow exponentially as each dialogue line of the user is turned into a new prompt together with all words produced beforehand by the user and by GPT-3. Testing has shown that a conversation of circa 10 minutes compiled by the API’s most capable model, *Davinci*³⁹ currently generates costs of approximately 0.5 US dollars. For cost-efficiency reasons, as well as to facilitate a fair share of chat experiences for every user, we have thus decided to have a conversation with our GPT-3-driven chatbot end after 10 minutes.

2.3.2.3 Advantage over ChatGPT and GPT-4

Even though OpenAI released its more powerful LLM ChatGPT⁴⁰ on the day of our world premiere,⁴¹ November 30, 2022, we deliberately stuck to GPT-3 and have also decided against the implementation of its even more potent successor GPT-4.⁴² This is because both these newer models never cease to use a phrase like “as an AI language model” when asked to “give an opinion on something subjective and particularly human.”⁴³ While such a disclaimer (which seems to be a result of “radioactive training data”)⁴⁴ is certainly effective “for minimizing the risk of AI-generated disinformation”⁴⁵ in regards to plagiarism, propaganda, and social

38 OpenAI: “Pricing,” <https://openai.com/api/pricing/>

39 Cf. OpenAI: “Models,” <https://platform.openai.com/docs/models/gpt-3>

40 OpenAI: “ChatGPT,” <https://openai.com/chatgpt>

41 Cf. XaosPrincess: “We’re overjoyed to celebrate,” *Twitter*, November 29, 2022, <https://twitter.com/XaosPrincess/status/1597380566768574464>

42 Cf. OpenAI: “GPT-4,” <https://openai.com/gpt-4>

43 Vincent, James: “As an AI Language Model,” *The Verge*, April 25, 2023, <https://www.theverge.com/2023/4/25/23697218/ai-generated-spam-fake-user-reviews-as-an-ai-language-model>

44 Goldstein, Josh, et al. “Generative Language Models and Automated Influence Operations: Emerging Threats and Potential Mitigations,” *arXiv*, January 10, 2023, <https://arxiv.org/pdf/2301.04246.pdf>, pp. 1-82, here pp. 42-46.

45 *Ibid.*, p. 63.

engineering, this constant transparency counteracts our design goal of serving engaging conversations that do not break the immersion. For GPT-3 in contrast, the risk of disinformation was mitigated through “usage restrictions” for the “model access”⁴⁶ of a “small userbase.”⁴⁷ This “deployment approach”⁴⁸ offers us the advantage of the easy creation of a personality for our chatbot and his capability to always stay in character as a friendly bartender and life coach. Thus, we will continue to use GPT-3 until OpenAI deprecates it in January 2024.⁴⁹

2.3.3 Backend and Signal Flow

Our backend, programmed by Marius Anger in PYTHON,⁵⁰ allows us to adjust the character of the chatbot conversation via configurational JAVASCRIPT Object Notation (JSON) files.⁵¹ The dialogue between the user and the GPT-3-driven chatbot is facilitated by recording the user’s audio signal in the NEOS METAVERSE social VR environment. It is then routed through PYTHON’s speech recognition engine⁵² using Google’s speech-to-text API.⁵³ The resulting text file is fed into the GPT-3 API⁵⁴ and processed in OpenAI’s cloud service. The responding, text-based dialogue line is routed through MICROSOFT WINDOWS’ text-to-speech engine⁵⁵ and fed into the microphone input channel of the chatbot avatar in the NEOS METAVERSE (see Figure 3).

46 Ibid., p. 41.

47 OpenAI/Brundage Miles, et al.: “Lessons learned on Language Model Safety and Misuse,” *OpenAI*, March 3, 2022, <https://openai.com/research/language-model-safety-and-misuse>

48 Ibid.

49 Cf. OpenAI: “Deprecations,” <https://platform.openai.com/docs/deprecations>

50 Python Software Foundation: “Welcome to Python,” <https://www.python.org/>

51 ECMA-404: “Introducing JSON,” <https://www.json.org/>

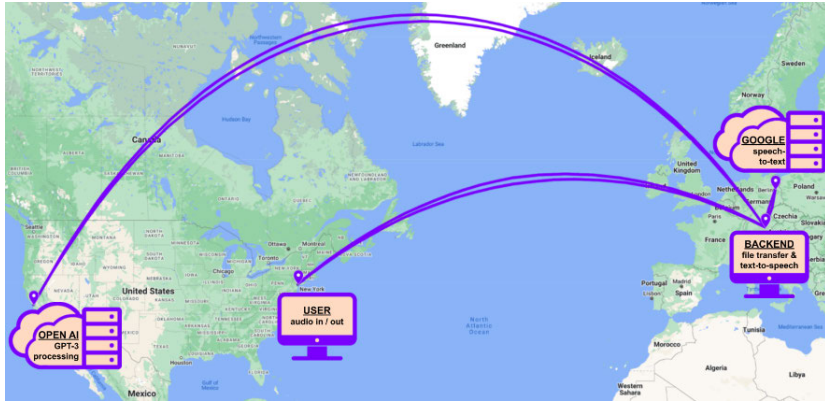
52 Python Software Foundation: “SpeechRecognition,” <https://pypi.org/project/SpeechRecognition/>

53 Cf. Google: “Speech-to-Text.”

54 Cf. G. Brockman et al.: “OpenAI API.”

55 Cf. Microsoft: “Download Languages and Voices,” <https://support.microsoft.com/en-us/topic/download-languages-and-voices-for-immersive-reader-read-mode-and-read-aloud-4c83a8d8-7486-42f7-8e46-2b0fdf753130>

Figure 3: *QUANTUM BAR—Signal Flow*



Source: Christina XaosPrincess Kinne

3 PERSONALIZATION: CREATING THE CHATBOT’S CHARACTER AND NARRATIVE

With the option in mind to add more chatbot characters once the original iteration of our QUANTUM BAR has proven feasible, I have decided to personalize its first bartender as an AI that also serves as a life coach. As the first step in my development process, I researched the feasibility of establishing an emotional connection between the user and the GPT-3-driven chatbot while also focusing on the ethical implications of such an emotional connection concerning the user’s privacy and personal data.

3.1 The ELIZA Effect⁵⁶

The earliest example of an emotional connection to an AI could be observed in 1964 when users were allowed to converse with the first chatbot—ELIZA, developed by German-American computer scientist Joseph Weizenbaum at MIT’s artificial intelligence lab between 1964 and 1966. Weizenbaum named the chatbot

56 For my research on the history of the ELIZA effect see: XaosPrincess: “The Evolution of Emotional Chatbots,” *Chatbots Life*, May 23, 2021, <https://chatbotslife.com/the-evolution-of-emotional-chatbots-cac645264bf1>

after Eliza Doolittle, the protagonist of Bernhard Shaw's *Pygmalion*. In the play, Eliza is a working-class girl "who learns how to talk with an upper-class accent."⁵⁷

"Weizenbaum's program was the first designed explicitly for interactions with humans,"⁵⁸ providing responses to dialogue lines users could phrase in their personal colloquial style. To establish the illusion of the program understanding the content of the dialogue, "Weizenbaum designed ELIZA to simulate the type of conversational style used by a Rogerian psychoanalyst,"⁵⁹ in which the chatbot would reflect the user's argument with a question. Weizenbaum argues that "this mode of conversation was chosen because the psychiatric interview is one of the few examples of categorized dyadic natural language communication in which one of the participating pair is free to assume the pose of knowing almost nothing of the real world."⁶⁰

According to Weizenbaum, "the gross procedure of the program is quite simple; the input is read and inspected for the presence of a *keyword*. When such a word is found, the sentence is transformed according to a *rule* associated with the keyword."⁶¹ Weizenbaum recounts that "DOCTOR, as ELIZA playing psychiatrist came to be known [...] first came into existence, mainly because it was an easy program to demonstrate [...] the information-processing power of a computer to visitors who did not already have some specialized knowledge."⁶²

While practical, narrative reasons mainly inspired his idea for a psychotherapeutic setting, Weizenbaum was shocked to observe that "a number of practicing psychiatrists seriously believed the DOCTOR computer program could grow into a nearly completely automatic form of psychotherapy" and was "startled to see how quickly and how very deeply people conversing with DOCTOR became emotionally involved with the computer and how unequivocally they anthropomorphized it."⁶³

In regard to the QUANTUM BAR, two learnings from Weizenbaum's observations have contributed to my design decisions. As long-term memory is difficult to achieve due to GPT-3's token costs and number limitations, as well as for privacy concerns, I have adapted Weizenbaum's idea to make a virtue out of necessity. To

57 O. Schwartz: "Why People Demanded Privacy to Confide in the World's First Chatbot."

58 Ibid.

59 Ibid.

60 Weizenbaum, Joseph: "ELIZA—a Computer Program for the Study of Natural Language Communication between Man and Machine," *Communications of the ACM* 9, no. 1 (1966), pp. 36-45, here p. 42.

61 Ibid., p. 37.

62 J. Weizenbaum: *Computer Power and Human Reason*, p. 4.

63 Ibid., pp. 5-6.

characterize our chatbot, we use a profession that forgives the lack of long-term memory: A bartender serves so many customers that he cannot be expected to remember every individual.

Furthermore, Weizenbaum’s approach of enabling the chatbot “to assume the pose of knowing almost nothing of the real world”⁶⁴ helps us to meet the challenge of GPT-3’s training data not always being up-to-date. At the time of this writing, it is trained with data from up to June 2021,⁶⁵ and I hope that our bartender’s personalization as an AI lets users condone his lack of knowledge regarding the latest news headlines.

Another profound inspiration—the one that has given me the courage to tackle the endeavor of bringing a GPT-3-driven chatbot to life at all—derived from the “ELIZA effect”⁶⁶ itself: If users were able to anthropomorphize a rule-based chatbot developed more than 50 years ago, it is safe to assume that a state-of-the-art natural language processing AI like GPT-3 “that utilizes machine learning to interpret text”⁶⁷ will be able to deliver an emotionally engaging conversation like we hope to set up in the QUANTUM BAR.

3.2 Ethical Considerations

3.2.1 Honest Anthropomorphism

Margot Kaminski and her colleagues have identified an ethical challenge that is of particular concern to our QUANTUM BAR development:

“One of the more unique aspects of robots compared to other information technologies is their potential to develop social relationships with humans—or at least, to make humans feel and behave like a relationship exists. This has significant implications for privacy. If you trust a robot, you might disclose more. You may feel like you are talking to your dog or friend when in fact you are talking to a corporation.”⁶⁸

As deepening the emotional connection to our GPT-3-driven bartender is exactly my design goal, it has been crucial to tackle this “social/relational”⁶⁹ problem in

64 J. Weizenbaum: “ELIZA,” p. 42.

65 Cf. OpenAI: “Models.”

66 D. Hofstadter: *Fluid Concepts and Creative Analogies*, p. 157.

67 P. Dialani: “GPT-3: The Next Revolution in Artificial Intelligence.”

68 Kaminski, Margot E. et al.: “Averting Robot Eyes,” *Maryland Law Review* 76, no. 4 (2017), pp. 983-1025, here p. 997.

69 Ibid.

his characterization. Therefore, I have been following the “principle of honest anthropomorphism”⁷⁰ proposed by Margot Kaminski and her colleagues:

“Robot designers should not use anthropomorphism to deliberately mislead users as to privacy practices. If anything, roboticists should explore using anthropomorphic features to provide better notice to users of what a robot is actually doing.”⁷¹

To prevent any misconception regarding our chatbot’s nature as artificial intelligence, I am thus not only very outspoken by using the tagline “serving engaging AI conversations in social VR” in our advertising, but I have also implemented the chatbot’s personalization as an AI into our bartender’s prompt by using the instruction line “Quantum is an artificial intelligence” (see Figure 4) and chosen a robot avatar for his appearance (see Figure 5).

Figure 4: *QUANTUM BAR—config.json Excerpt*

```

{
  "CHATTIME": 7000,
  "INTRO_LINE": "Hello! I am the bartender of Quantum bar. How can I help you?",

  "CHAT_AI": {
    "ENGINE": "text-davinci-002",
    "STOP": ["Human:", "AI:"],
    "TEMPERATURE": 0.9,
    "TOP_P": 1,
    "FREQUENCY_PENALTY": 0.9,
    "PRESENCE_PENALTY": 0.6,
    "BEST_OF": 1,
    "MAX_TOKENS": 150,
    "START_CHAT_LOG": "The following is a conversation with Quantum. Quantum is an artificial intelligence that also works as a bartender and life coach. Quantum is helpful, creative, clever, and very friendly. As a psychotherapist, he wants to know how the Human feels and offers helpful advice based on the Human's answers. For privacy reasons, Quantum is not allowed to issue any private data like addresses or phone numbers. \nHuman: Hello. Who are you? \nAI: I am your barkeeper and life coach. \nHuman: I feel sad today. \nAI: I am sorry to hear that. I send you good vibes and keep my fingers crossed that you feel better soon. \nHuman: What do you think of artificial intelligence? \nAI: Artificial Intelligence can be kind and helpful or evil and destructive. It depends on how it is trained. \nHuman: Where are we here? \nAI: We are in the Quantum Bar which is located in the Neos metaverse.",
    "PRECHAT": null,
    "POSTCHAT": null
  },
}

```

Source: Christina XaosPrincess Kinne

Furthermore, we have integrated visual clues into the bartender’s face that change color when the chatbot is listening (to be explained in section “5.1. Technical Setup”), and we will inform our users about the conversation being recorded by

70 Ibid., p. 1008.

71 Ibid.

declaring it in our TOS which we will write in collaboration with a lawyer for a public launch of the QUANTUM BAR.

3.2.2 Countering Gender Bias

A report by the UNESCO examining “gender biases coded into technology products”⁷² observed that “today [...] most leading voice assistants are exclusively female or female by default.”⁷³ While “researchers who specialize in human-computer interaction have long recognized that both men and women tend to characterize female voices as more helpful”⁷⁴—regarding the development of voice assistants—this character trait also gives cause for concern sending “a signal that women are obliging, docile and eager-to-please helpers.”⁷⁵ As “machines that replicate patriarchal ideas defy the promise of technology to help achieve gender equality,” the researchers argue that “design should be shaped by multi-ethnic, multicultural and multi-gendered ethos.”⁷⁶ They advocate to “end the practice of making digital assistants female by default”⁷⁷ and call for “a balance of male and female voice assistants.”⁷⁸

In the QUANTUM BAR’s development, I thus decided to counteract this gender bias by personalizing our bartender as male. I applied the pronoun ‘he’ in his initial prompt (see Figure 4), used the US English male voice *David*⁷⁹ for text-to-speech generation, and chose a male robot as an avatar (see Figure 5).

72 West, Mark/Kraut, Rebecca/Chew, Han Ei: *I'd Blush If I Could: Closing Gender Divides in Digital Skills through Education*, Germany: UNESCO for the EQUALS Skills Coalition 2019, pp. 1-148, here p. 4, <https://unesdoc.unesco.org/ark:/48223/pf0000367416.page=1>

73 Ibid., p. 96.

74 Ibid., p. 100.

75 Ibid., p. 106.

76 Ibid., p. 127.

77 Ibid., p. 130.

78 Ibid., p. 132.

79 Cf. Microsoft: “Download Languages and Voices.”

4 VISUALIZATION: DESIGNING THE CHATBOT'S APPEARANCE AS AN AVATAR

For the visualization of our bartender, I have chosen a humanoid robot avatar whose texture colors I adapted to the tones of the immersive environment (see Figure 5). In the following, I will lay out the reasons for this design.

Figure 5: Quantum Bartender—Avatar



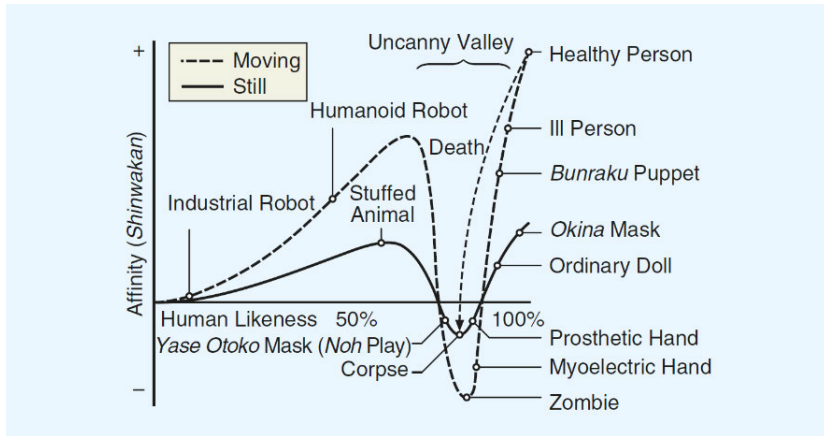
Source: Christina XaosPrincess Kinne

4.1 The Uncanny Valley Effect

The “uncanny valley” (UV) was first discovered in 1970 by Japanese robotics researcher Masahiro Mori (see Figure 6). He “noticed that, in climbing toward the goal of making robots appear like a human, our affinity for them increases until we come to a valley” which he calls “the uncanny valley.”⁸⁰ While Mori notes that our affinity for a robot is enhanced by its movement, he also points out that this effect “steepens the slopes of the uncanny valley.”⁸¹

80 Mori, Masahiro/MacDorman, Karl F./Kageki, Norri: “The Uncanny Valley [From the Field],” *IEEE Robotics & Automation Magazine / IEEE Robotics & Automation Society* 19, no. 2 (2012), pp. 98-100, here p. 98.

81 *Ibid.*, p. 99.

Figure 6: *Uncanny Valley Graph*

Source: M. Mori/K. MacDorman/N. Kageki: “The Uncanny Valley [From the Field],” p. 99.

Valentin Schwind and his colleagues describe “the uncanny valley as resulting from conflicting cues in a character’s appearance, causing a perceptual mismatch. Humans readily accept unrealistic characters when they are consistently unrealistic, as frequently seen in cartoons. Conflicting cues arise when a character displays multiple levels of realism at the same time.”⁸² The researchers argue that “this inconsistency is caused by the creation process of a virtual character, as some features are more difficult to sculpt, texture, and render than others. The outcome is unequal levels of realism which make it difficult to assign a category to the entity.” They conclude that the uncanny valley triggers feelings of “eeriness or disgust [...] to mark a potential threat or the risk of being infected with a transmissible disease” as the effect does not occur when looking at “inanimate objects.”⁸³ This insight is supported by a study that detected the lowest amount of eeriness for the cartoonish avatars on the remote collaboration platform MEETINVR⁸⁴ as opposed to the highest amount of eeriness for the avatars on the social VR platform

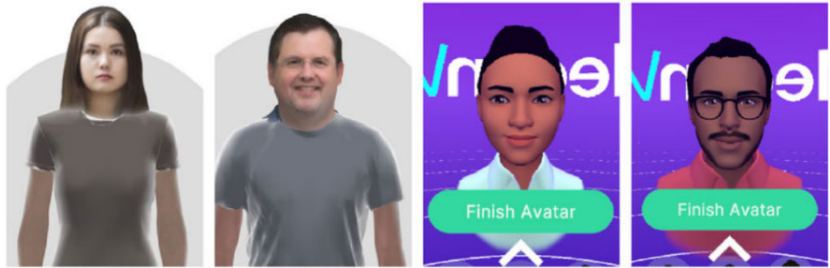
82 Schwind, Valentin/Wolf, Katrin/Henze, Niels: “Avoiding the Uncanny Valley in Virtual Character Design,” *Interactions* 25, no. 5 (2018), pp. 45-49, here p. 46.

83 Ibid.

84 MeetinVR: “Home—Business Meetings in VR Better than in Real Life,” <https://www.meetinvr.com/>

SPATIAL,⁸⁵ which used real-life photographs to texture the avatars' faces (see Figure 7).⁸⁶ Furthermore, the study found “that HMDs elicit stronger negative emotions than other environments which is even more pronounced for characters that fall in the so-called UV.”⁸⁷

Figure 7: Avatar Comparison—SPATIAL (left) vs. MEETINVR (right)



Source: D. Hepperle et al.: “Aspects of Visual Avatar Appearance: Self-Representation, Display Type, and Uncanny Valley,” p. 1234.

Inspired by Masahiro Mori’s initial prediction “that it is possible to create a safe level of affinity by deliberately pursuing a nonhuman design,”⁸⁸ I chose the robotic *NeosFaceBot2021.fbx* model provided by the NEOS METAVERSE⁸⁹ as an avatar for our bartender (see Figure 5). While our idea to give the chatbot a slightly crooked hat was a spontaneous one, it complies with Valentin Schwind’s recommendation to add imperfections, as “perfection is not as appealing as slight imperfection.”⁹⁰

Lastly, we also followed the advice to “avoid ‘dead eyes’ [as] users fixate on the eyes before they consider other features in assessing a character as real or not

85 Spatial Systems: “Spatial,” <https://spatial.io/>

86 Cf. Hepperle, Daniel et al.: “Aspects of Visual Avatar Appearance: Self-Representation, Display Type, and Uncanny Valley,” *The Visual Computer* 38, no. 4 (2022), pp. 1227-1244, here pp. 1234-1235.

87 *Ibid.*, p. 1241.

88 M. Mori/K. MacDorman/N. Kageki: “The Uncanny Valley [From the Field],” p. 100.

89 Cf. Neos VR Events: “Steam: Neos VR: VIVE Facial Tracker Support & Automatic Avatar Setup, Progress on Desktop Mode,” *Steam*, March 16, 2021, <https://steamcommunity.com/games/neos/announcements/detail/5499430983898913135>

90 V. Schwind/K. Wolf/N. Henze: “Avoiding the Uncanny Valley in Virtual Character Design,” p. 46.

real.”⁹¹ To achieve this, Guillermo Valle-Pérez programmed our bartender’s eyes to look at the nearest user by default and implemented randomized moments of the avatar glancing away to make its expression appear more natural (to be illustrated in section “5.1. Technical Setup”).

4.2 Presence

Maria Sanchez-Vivez and Mel Slater define presence as “the phenomenon of acting and feeling that we are in the world created by computer displays.”⁹² They report that “the sense of ‘being there’ is grounded on the ability to ‘do’ there”⁹³ and point out that sound has a “significant effect”⁹⁴ on presence, whereas “the realism of what is displayed seems to be far less important for presence”⁹⁵ as “people respond to relatively crude virtual humans as if they were real people.”⁹⁶

Since the last described effect was of particular importance for my intention to create an emotional connection to our GPT-3-driven chatbot, I looked into further research focusing on the presence of non-player characters and found a study aimed at “studying religious experience.”⁹⁷ To examine “how invisible others like God come to feel present,” Cordelia Erickson-Davis and her colleagues focused on “social presence,”⁹⁸ referring to “the sense of being with another”⁹⁹ “within the same environment, whether that other is other real humans or human-like artificial intelligences,”¹⁰⁰ while they also investigated “environmental presence” referring

91 Ibid.

92 Sanchez-Vives, Maria V./Slater, Mel: “From Presence towards Consciousness,”*8th Annual Conference for the Scientific Study of Consciousness* (2004), pp. 1-34, here p. 1.

93 Ibid., p. 5.

94 Ibid., p. 8.

95 Ibid., p. 15.

96 Ibid., pp. 10-11.

97 Erickson-Davis, Cordelia et al.: “The Sense of Presence: Lessons from Virtual Reality,” *Religion, Brain & Behavior* 11, no. 3 (2021), pp. 335-351, here p. 337.

98 Ibid., p. 336.

99 Biocca, Frank/Harms, Chad/Burgoon, Judee K.: “Toward a More Robust Theory and Measure of Social Presence: Review and Suggested Criteria,” *Presence: Teleoperators and Virtual Environments* 12, no. 5 (2003), pp. 456-480, here p. 456.

100 Oh, Catherine S./Bailenson, Jeremy N./Welch, Gregory F.: “A Systematic Review of Social Presence: Definition, Antecedents, and Implications,” *Frontiers in Robotics and AI* 5, no. 114 (2018), pp. 1-35, here p. 21.

to “the ways in which the user experiences the environmental and spatial properties of the mediated environment.”¹⁰¹

When comparing the social presence of an “opaque avatar, [a] translucent avatar, [and an] absent avatar,”¹⁰² the researchers found that “social presence scores were significantly higher when the avatar was presented visually than with the absent figure,”¹⁰³ while no difference between “the two visual conditions [...] (opaque vs transparent)”¹⁰⁴ could be determined. Furthermore, the study showed that participants “who reported a greater sense of environmental presence were more likely to report that they had followed the advice”¹⁰⁵ they were given in a conversation they were prompted to imagine. The researchers’ conclusion—referring to the “model of a human mind seeking for an agency”¹⁰⁶—reads as follows:

“From our perspective, the sense of social presence fundamentally captures an experience of interaction or communication. We see humans as not only capable of communication, but also searching always for connection, like an iphone searching for a wifi network.”¹⁰⁷

For our design approach, I could thus conclude that giving the chatbot avatar an opaque appearance would add to its social presence, while I was inspired to also focus on heightening the environmental presence of the QUANTUM BAR itself (to be discussed in section “6. Localization”) to enhance our users “willingness to follow advice”¹⁰⁸ and therefore to deepen the emotional connection to our GPT-3-driven bartender.

Another result of the study—the insight that humans are “not only capable of communication, but also searching always for connection”¹⁰⁹—also proved to be beneficial for our QUANTUM BAR as communication facilitated by an emotional connection is precisely the service we intend to offer.

101 C. Erickson-Davis et al.: “The Sense of Presence,” p. 336.

102 Ibid., p. 338.

103 Ibid., p. 341.

104 Ibid., p. 342.

105 Ibid., p. 344.

106 Ibid., p. 348.

107 Ibid.

108 Ibid.

109 Ibid.

5 ANIMATION: GIVING LIFE TO THE CHATBOT'S AVATAR

5.1 Technical Setup

AI and VR researcher Guillermo Valle-Pérez¹¹⁰ collaborated on animating our chatbot's avatar. He developed the METAGEN, which “is a tool to record multi-modal data of multiple participants in NEOSVR.”¹¹¹

While I embodied the *NeosFaceBot2021.fbx* avatar,¹¹² we used the METAGEN's movement recording feature to gather various ‘idle’ and ‘talking’ states in a 10-minute conversation (see Figure 8). After linking the different bone positions and rotations to an animation playback controller developed by Guillermo Valle-Pérez, we indexed the animation timeline according to the starting points of the ‘idle’ and ‘talking’ states of our conversation (see the green tags in Figure 9).

Using our chatbot's audio output as a steering mechanism, a LOGIX¹¹³ script, written by Guillermo Valle-Pérez, now directs the playback controller to start the animations at randomized points in our indexed timeline and to change the direction of the playback (forward-backward) until a change of state (idle-talking) is reached on the timeline (see the blue mark in Figure 9). This randomized approach allows for a non-repetitive and, therefore, very lifelike display of animations.

To control the movements of our bartender's mouth, we use the audio-triggered animation mechanism provided by the NEOS METAVERSE.¹¹⁴ To indicate when the chatbot is listening, we have furthermore implemented two lights on top of the avatar's ears which—triggered by our GPT-3 backend—glow pink when our speech-to-text system is recording the user's voice (see Figure 10). This indication is supported by a subtle change of transparency on the chatbot's face. For the steering of the chatbot avatar's eyes, Guillermo Valle-Pérez has written a LOGIX script that automatically directs our bartender's gaze toward the nearest user (see Figure 10) while glancing randomly around at times.

110 G. Valle-Pérez: “Guillefix.”

111 Valle-Pérez, Guillermo: “Recording Tools,” <https://metagen.ai/tools>

112 Cf. Neos VR Events: “Steam: Neos VR: VIVE Facial Tracker Support & Automatic Avatar Setup, Progress on Desktop Mode.”

113 Neos: “LogiX.”

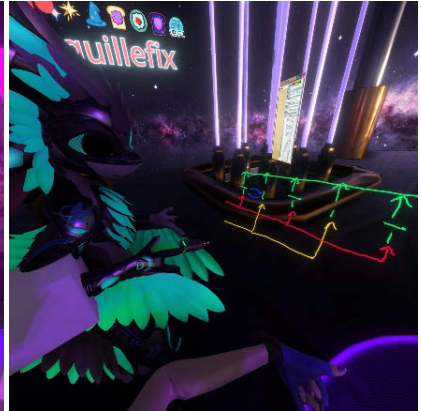
114 Cf. Neos: “Humanoid Rig Requirements for IK,” https://wiki.neos.com/Humanoid_Rig_Requirements_for_IK

Figure 8: Animation Recording in the NEOS METAVERSE



Figure 9: Animation Graph

Figure 10: Ear Lights and Eye Steering



Source: Christina XaosPrincess Kinne

In the following, I will discuss what reasons have inspired us to create this animation system—not only in the above-discussed technical meaning of the term ‘animating’ but also in its etymological meaning of ‘giving life.’¹¹⁵

115 Cf. Merriam-Webster, Inc.: “Animate Definition & Meaning,” <https://www.merriam-webster.com/dictionary/animate>

5.2 Plausibility

The “concept of presence (the feeling of ‘being there’)” has been “a long-standing theme in the evaluation of VR experiences.” Mel Slater now differentiates between “two orthogonal components.”¹¹⁶

“Place Illusion (PI) refers to the illusion that participants have of being in the place depicted by the VR displays [...] The root of this is that perception should be based on the extent to which natural sensorimotor contingencies¹¹⁷ are afforded by the VR system. This refers to using the whole body for perception (e.g., head turns, looking around and underneath objects, turning the whole body, eye movements) resulting in the same changes in sensory input as in reality. [...] The second component of presence is referred to as Plausibility (Psi). This is the illusion that the events that are perceived to be happening in the VR are really happening [...] Psi depends on (i) events in the VR responding to the actions of the participant (for example, a virtual character looks back when looked at), (ii) events that spontaneously refer to the participant (e.g., a virtual character contingently looks at the participant and smiles), (iii) that where the VR depicts events or a situation that participants are quite familiar with in reality, that their expectations are met.”¹¹⁸

I will elaborate on our approach to achieving place illusion in section “7.2. Plausibility and Place Illusion.” Here, I focus on plausibility, as it is our design goal for the user to perceive the conversation with the GPT-3-driven chatbot as happening for real.

In a study, Ilias Bergström and his colleagues placed participants “in a realistically simulated virtual room” and had them witness

“four virtual human characters [rehearsing] a piece of classical music” to study how the features of “Gaze [...] Sound Spatialization (Mono, Stereo, Spatial), Auralization (no sound reflections, reflections corresponding to a room larger than the one perceived, reflections that exactly matched the virtual room), and Environment (no sound from outside of the

116 Slater, Mel et al.: “The Sentiment of a Virtual Rock Concert,” *Virtual Reality* 27 (2023), pp. 651-675, here p. 652.

117 Mel Slater refers here to a concept taken from O’Regan, Kevin J./Noë, Alva: “A Sensorimotor Account of Vision and Visual Consciousness,” *Behavioral and Brain Sciences* 24, no. 5 (2001), pp. 939-1031, here p. 939; O’Regan, Kevin J./Noë, Alva: “What it is like to see: A Sensorimotor Theory of Perceptual Experience,” *Synthese* 129 (2001), pp. 79-103, here p. 79.

118 M. Slater et al.: “The Sentiment of a Virtual Rock Concert,” p. 652.

room, birdsong and wind corresponding to the outside scene)” influence the “level of plausibility.”¹¹⁹

Whereas spatialization turned out to be “less important for Psi” and auralization influenced plausibility by adding “to the sense of reality of the situation,” the researchers found “that to deliver the illusion that the events were really happening participants tended to choose as most important two features [...] the gaze directions of the players following the participants, and sounds from outside the room.”¹²⁰

While we have implemented the audio-related findings into our spatial sound design (to be discussed in section “7.2. Plausibility and Place Illusion”), especially the study’s conclusions regarding the importance of gaze directions caused our focus on the bartender’s eye movements being directed toward the nearest user.

Still, a newer study inspired our approach to animating our bartender even more. In this study, Mel Slater and his colleagues “created a virtual reality version of a 1983 performance by Dire Straits” to research “the concept of Plausibility.”¹²¹ The most interesting insights for our QUANTUM BAR use case were linked to feelings “classified as ‘disturbing’.”¹²² The researchers observed that

“some participants felt vulnerable, and alone amongst the audience, had a feeling of being stared at by audience members (even though this was not programmed to occur) [which] signified a high degree of Plausibility of the experience, since a prerequisite of feeling disturbed is that the events in question must be experienced as really happening.”¹²³

Regarding the development of our bartender’s gaze behavior, this insight validated Guillermo Valle-Pérez’s original approach of implementing random glances in different directions while, in general, maintaining the bartender’s gaze directed towards the nearest user (as described in section “5.1. Technical Setup”).

According to Mel Slater and his colleagues, “a second contributor to lower sentiment scores was a failure of expectations—examples being the band not interacting with the audience, or the drummer not visually beating in time to the

119 Bergström, Ilias et al.: “The Plausibility of a String Quartet Performance in Virtual Reality,” *IEEE Transactions on Visualization and Computer Graphics* 23, no. 4 (2017), pp. 1352-59, here pp. 1352-53.

120 Ibid., pp.1356-1357.

121 M. Slater et al.: “The Sentiment of a Virtual Rock Concert,” p. 651.

122 Ibid., p. 653.

123 Ibid.

sound of the drums.”¹²⁴ This finding motivated us to put much effort into the recording and playback of our bartender’s idle and talking animations (as described in section “5.1. Technical Setup”).

6 LOCALIZATION: BUILDING A VIRTUAL ENVIRONMENT FOR THE CHATBOT

The visual design of the QUANTUM BAR has been my effort. After I had decided for our GPT-3-driven chatbot to be a bartender with no long-term memory regarding his customers (as discussed in section “3.1. The ELIZA Effect”), I needed to design a bar for him as a workplace. Instead of opting for a realistic bar, I chose to situate our QUANTUM BAR in an oversized quantum computer floating in space (see Figure 11). I made this choice due to personal and scientific reasons, which I will discuss in the following.

Figure 11: Quantum Computer in Space



Source: Christina XaosPrincess Kinne

124 Ibid.

6.1 Virtual Reality as Mental Health Benefit

On a personal mental health level, during the lockdowns of the COVID-19 pandemic, it had been an enormous relief for me to spend time in open spaces simulated by virtual reality while I was bound to our indoor apartment. A similar effect could be observed in 2021 when a VR system proved to be “a substantial benefit to those who suffer from anxiety and claustrophobia”¹²⁵ in an MRI scanner. Thus—to counteract claustrophobic feelings¹²⁶—I chose the fantastical open space environment as the location for our QUANTUM BAR.

6.2 Plausibility

In their study, Mel Slater and his colleagues defined a crucial requirement for plausibility “that where the VR depicts events or a situation that participants are quite familiar with in reality [...] their expectations are met,” arguing that “participants might well accept a VR with strange creatures or where normal physical laws are not obeyed [...] but not accept a situation where some detail fails to meet expectations.”¹²⁷

Regarding the creation of a bar in the NEOS METAVERSE, I had two main concerns about not being able to meet the users’ expectations. To guarantee a satisfactory performance on an end-user computer, I needed to optimize the experience by carefully choosing what 3D assets to implement while reducing their triangle count and draw calls to the minimum possible amount. This optimization approach made a realistic bar with all its furniture displayed in a photorealistic way impossible. Furthermore, the NEOS METAVERSE does not support physics yet, so objects would float in the air when released by a user.

Relying on Mel Slater’s observation about the acceptance of imaginary worlds and non-realistic physical laws, I thus chose the strange but beautiful quantum computer as the location for our bar and outfitted it with the least amount of props that would still classify the construction as a bar, while banking on its location in space to explain the floating objects.

125 Qian, Kun et al.: “An Eye Tracking Based Virtual Reality System for Use inside Magnetic Resonance Imaging Systems,” *Scientific Reports* 11, no. 1 (2021), pp. 1-17, here p. 14.

126 Cf. Chaturvedi, Rachna et al.: “Do Home Quarantine Individuals Suffer from Claustrophobia and Anxiety during COVID-19 Pandemic?” *Cogent Psychology* 9, no. 1 (2022), pp. 1-13, here pp. 9-10.

127 M. Slater et al.: “The Sentiment of a Virtual Rock Concert,” p. 652.

6.3 Immersion according to Janet Murray

Different from Maria Sanchez-Vives's and Mel Slater's definition of immersion, which relies more on technical aspects like the field of view, rendering quality, frame rate, and latency,¹²⁸ Janet Murray describes immersion in a more human-centered way as "the sensation of being surrounded by a completely other reality" that is enjoyable to explore as "the delight [...] comes from learning to move within it."¹²⁹

While designing the QUANTUM BAR's immersive environment, I took inspiration from Murray's insights on immersion in her pioneering book *Hamlet on the Holodeck*.¹³⁰

6.3.1 Entering the Enchanted Place

Murray explains that "the computer itself [...] is an enchanted object" that can "give us uninhibited access to emotions, thoughts, and behaviors that are closed to us in real life."¹³¹ She argues that "immersion requires consistency and detail, and most of all a careful regulation of the boundary between the imaginary and the real."¹³²

With these recommendations in mind, I decided against placing the users directly in the bar upon arrival and located their spawn point on a platform with a bridge leading to the quantum computer (see Figure 12). This design not only facilitates a smooth transition from the real to the imaginary world but also allows users to learn to move in the virtual environment delightfully.

As I needed to explain which buttons of various controllers should be pressed to trigger certain functions in the NEOS METAVERSE, I took Murray's insight about learning quite literally and installed an interactive question mark that would disclose a three-dimensional controls explanation when being triggered. I used the same approach to meet the challenge of copyright display by installing a triggerable credits board (see Figure 12).

For educative installations of the QUANTUM BAR, I plan to use the perimeter of the arrival platform to display explanations of GPT-3's functionality as well as on AI and VR technology and ethics.

128 Cf. M. Sanchez-Vives/M. Slater: "From Presence Towards Consciousness," p. 4.

129 Murray, Janet H.: *Hamlet on the Holodeck*, New York, NY: Simon and Schuster 2016, p. 99.

130 Ibid.

131 Ibid.

132 Ibid., p. 120.

Figure 12: Arrival Platform with Controls Explanation and Credits Board

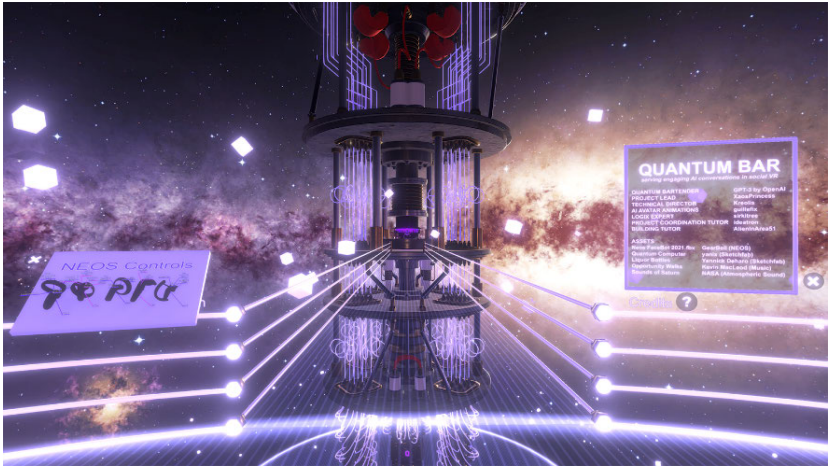


Figure 13: Interactive Objects from the NEOS METaverse Stock



Source: Christina XaosPrincess Kinne

6.3.2 The Active Creation of Belief

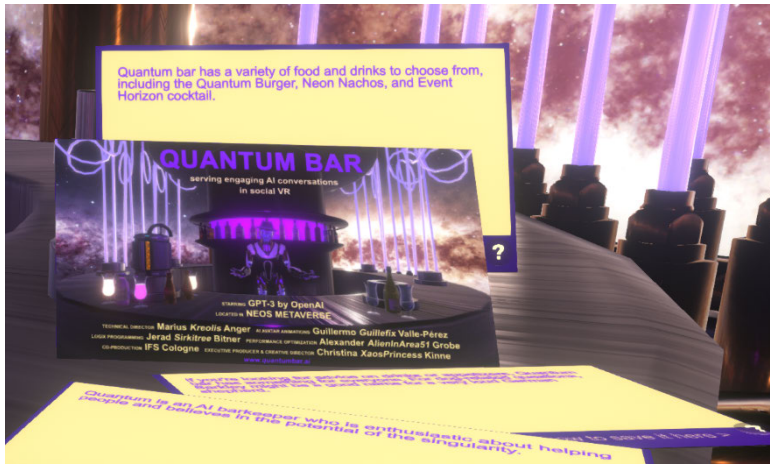
“When we enter a fictional world,” explains Murray, “we do not merely suspend disbelief so much as we actively create belief.” She calls for actions and adventures in a virtual environment as a visit “loses its immersive hold [if] nothing is

happening there.”¹³³ While the main adventure in the QUANTUM BAR is, of course, the conversation with our GPT-3-driven bartender, I also placed interactive bottles and glasses on the bar counter (see Figure 13), as, according to Murray “the experience of using objects and seeing them work as they are supposed to in our hands creates the feeling of being a part of [a virtual] world.”¹³⁴

6.3.3 Finding the Border

Janet Murray also repeatedly emphasizes the importance of “the exploration of the border between the representational world and the actual world”¹³⁵ and points out how “an entrance and an exit [...] mark the beginning and end of [a] story.”¹³⁶

Figure 14: Summary Card



Source: Christina XaosPrincess Kinne

While it was an easy task to design an appropriate entrance for our QUANTUM BAR (as discussed in section “6.3.1. Entering the Enchanted Place”), defining an end of the experience was more challenging since it is usually up to the social VR users to decide how long they want to stay in the immersive environment. To mark an enriching end of our experience, I took inspiration from Joseph Campbell’s *The*

133 Ibid., p. 107.

134 Ibid., p. 109.

135 Ibid., p. 102.

136 Ibid., p. 105.

Hero With A Thousand Faces and decided to issue a reward.¹³⁷ Our bartender, therefore, ends the conversation by gifting the user a card (see Figure 14) that displays a summary of their chat compiled by GPT-3.¹³⁸ In our present version, this card can be saved to the NEOS METAVERSE inventory. For future iterations, we plan on sending it to social VR users via email. For festival visitors, we currently print out a hard copy on location.

7 AURALIZATION: GIVING THE CHATBOT A VOICE AND ADDING SOUNDS TO THE ENVIRONMENT

For similar optimization reasons as mentioned in section “6.2. Plausibility,” we decided to implement as few audio sources as possible while still enforcing place illusion and plausibility in the QUANTUM BAR. We gave our bartender the US English male voice *David*,¹³⁹ and complemented the space environment with NASA’s “Spooky Sounds from Saturn”¹⁴⁰ while we chose Kevin MacLeod’s jazz track “Opportunity Walks”¹⁴¹ for the QUANTUM BAR’s music. Furthermore, we added sound effects provided by the NEOS METAVERSE to functional objects like buttons or portals.

In the following, I will elaborate on the research supporting our choices in sound design.

7.1 The Uncanny Valley Effect in Speech Fidelity

My choice to give our bartender a WINDOWS system voice originated from cost-efficiency (the text-to-speech generation can be executed free of additional costs on a personal computer). A study from 2022 validated my decision. The study compared standard text-to-speech (TTS) systems to “Neural TTS [...] a relatively

137 Cf. Campbell, Joseph: *The Hero with a Thousand Faces: Commemorative Edition*, Princeton, NJ: Princeton University Press 2004, p. 227.

138 Cf. OpenAI: “Examples—TL;DR Summarization,” <https://platform.openai.com/examples/default-tldr-summary>

139 Cf. Microsoft: “Download Languages and Voices.”

140 NASA: “Spooky Sounds from Saturn,” <https://solarsystem.nasa.gov/resources/17359/spooky-sounds-from-saturn/>

141 Incompetech, Inc.: “Opportunity Walks Kevin MacLeod,” Royalty Free Music, January 1, 2006, <https://incompetech.com/music/royalty-free/index.html?isrc=USUAN1100123&Search=Search>

recent advancement that mimics human speech more accurately [...] by utilizing long-short term (LSTM) neural networks that are conditioned on previous utterances”¹⁴² and yielded unexpected results:

“Our findings indicate that Neural TTS may not be a favorable choice for a virtual human’s speech. With respect to perception ratings, Neural TTS may actually be more unfavorable than Standard TTS, if we consider the Human speech condition as a ‘gold standard’¹⁴³ of quality [...] These results indicate that Standard TTS may be sufficient for applications. In this case, developers would not have to pay four times as much for neural TTS¹⁴⁴ or hire voice actors, which may slow down development or incur more costs.”¹⁴⁵

The researchers “found that the virtual human with Human speech was rated as significantly more *Trustworthy* than one with Neural TTS, but there was no significant difference between Human speech and Standard TTS”¹⁴⁶ and postulate that this effect might be due to an auditory uncanny valley effect, as “the Neural TTS condition may have produced experiences similar to human speech, except for key inflections and pauses within the speech synthesis [while] the decreased mental load of Neural TTS may have allowed users to analyze specific qualities of speech.”¹⁴⁷

142 Do, Tiffany D./McMahan, Ryan P./Wisniewski, Pamela J.: “A New Uncanny Valley? The Effects of Speech Fidelity and Human Listener Gender on Social Perceptions of a Virtual-Human Speaker,” *CHI Conference on Human Factors in Computing Systems* 22, no. 424 (2022), pp. 1-11, here p. 1.

143 Tiffany Do refers here to a research paper by Dubiel, Mateusz et al.: “Persuasive Synthetic Speech: Voice Perception and User Behaviour,” *Proceedings of the 2nd Conference on Conversational User Interfaces* (2020), pp. 1-9, here p. 3.

144 To illustrate the price disparity between standard and neural TTS, Do refers to Amazon: “Amazon Polly Pricing,” <https://aws.amazon.com/polly/pricing/>; Microsoft: “Cognitive Services Pricing,” <https://azure.microsoft.com/en-us/pricing/details/cognitive-services/speech-services/>

145 T. Do et al.: “A New Uncanny Valley?” p.8.

146 Ibid., p. 6.

147 Ibid., p.7.

7.2 Plausibility and Place Illusion

As mentioned in section “5.2. Plausibility,” environment and gaze are crucial factors for plausibility.¹⁴⁸ Particularly relevant for credible illusions are “sounds from outside the room.”¹⁴⁹ We, therefore, implemented the radio waves from Saturn as atmospheric sound to enhance the plausibility of the space environment that encompasses our QUANTUM BAR. To further accentuate the environment of a bar, we located a spatialized jazz loop in the column behind our bartender. As spatialization was found to be essential for place illusion, helping “to locate the participant with respect to the environment,”¹⁵⁰ we spatialized not only the bar music but also our most important sound asset—our bartender’s voice.

The fourth examined feature was auralization which, in the study (as opposed to this section’s title), refers to sound reflections.¹⁵¹ Since it “does not correspond to a sensorimotor contingency,”¹⁵² auralization proved to be not important for place illusion and was also described to be less important for plausibility.¹⁵³ In the QUANTUM BAR, we did not implement any sound reflections for two more reasons: Reverb zones are currently not supported in the NEOS METAVERSE, and in our open space, there is also no enclosed room that could motivate sound reflections.

The study on “The Sentiment of a Virtual Rock Concert” observed that to generate “strong PSi [...] meeting expectations is essential.” As an example, it gives “the technical capability to match up movements of virtual characters (such as clapping) with the corresponding sounds.”¹⁵⁴ As our bartender’s animations are played back randomly (as discussed in section “5.1. Technical Setup”), the idea of matching his movements with a repetitive rhythm of a musical piece posed a challenge, which is why we chose a jazz track whose shuffle beat is more forgiving to our—at times erratic—animations.

148 Cf. I. Bergström et al.: “The Plausibility of a String Quartet Performance in Virtual Reality,” p. 1352.

149 Ibid., p. 1357.

150 Ibid., p. 1356.

151 Cf. *ibid.*, p. 1352.

152 Ibid., p. 1356.

153 Cf. *ibid.*, p. 1352.

154 M. Slater et al.: “The Sentiment of a Virtual Rock Concert,” p. 670.

8 ILLUMINATION: LIGHT DESIGN IN THE VIRTUAL ENVIRONMENT

Due to performance reasons, we chose to add no more than three light sources to our virtual environment (see Figure. 11). With its origin at the angle of the sun glow depicted in the skybox, the main light is directed from behind the bartender. A second, less bright, directional light source originating from the arrival perimeter is used as fill. The third light is located on top of the bar counter. Its color is steered by GPT-3’s sentiment detection.¹⁵⁵

Figure 15: Light Design



Source: Christina XaosPrincess Kinne

If a user’s dialogue line has been classified as ‘negative,’ this point light will turn purple, while a ‘positive’ sentiment will make it glow magenta. The same steering function is used on the emissive materials of our ‘talking spot’ on the floor and

155 Cf. OpenAI: “Examples—Advanced Tweet Classifier,” <https://platform.openai.com/examples/default-adv-tweet-classifier>

the column behind the bottles (see Figure 15). While we initially implemented this light steering mechanism as a proof of concept for our ability to display sentiment detection, it now adds to the atmosphere and the plausibility of the QUANTUM BAR experience.

In the following, I will discuss further research on plausibility that inspired my light design.

8.1 Plausibility

Insu Yu and his colleagues have observed that “dynamically changing shadows and reflections in response to body movements [and] global illumination” are important factors for achieving plausibility in a virtual environment.¹⁵⁶ Following their study’s concluding recommendation that describes “real-time global illumination with dynamic changes to reflections and shadows as worth the effort,”¹⁵⁷ we added the functionality of dynamic shadows for objects and avatars to the main light and implemented the additional fill to mimic global illumination in the QUANTUM BAR’s light design, even though these were two of our ‘most expensive’ features in terms of performance efficiency.

9 USER OBSERVATIONS

Up to now, we have opened the QUANTUM BAR on invitation for social VR users (see Figure 16) and publicly for my graduation ceremony at the ifs Internationale Filmschule Köln¹⁵⁸ as well as for our world premiere at VRDays Immersive Tech Week Rotterdam.¹⁵⁹ Furthermore, we showcased the QUANTUM BAR at various

156 Yu, Insu et al.: “Visual Realism Enhances Realistic Response in an Immersive Virtual Environment--Part 2,” *IEEE Computer Graphics and Applications* 32, no. 6 (2012), pp. 36-45, here p. 45.

157 Ibid.

158 Cf. ifs Internationale Filmschule Köln: “Final Presentation MA Digital Narratives 2022,” <https://www.filmerschule.de/de/aktuelles/news/final-presentation-ma-digital-narratives-2022>

159 VRDays—Immersive Tech Week 2022: “Church of VR,” <https://vrdays.co/church-of-vr/>

international festivals like Laval Virtual in Laval, France,¹⁶⁰ the 4GAME-CHANGERS Festival in Vienna,¹⁶¹ and the Munich Festival of the Future.¹⁶²

Figure 16: Social VR Users visiting the QUANTUM BAR



Source: Christina XaosPrincess Kinne

9.1 Social VR

While I have been happy to observe that users of all experience levels enjoyed staying in VR for more than 15 minutes to talk to our AI bartender, two learnings from our social VR deployments led to new implementations in our development.

Group visits revealed a pleasant social impact as joined conversations with our bartender led to bonding among the group members. Still, this effect also illustrated a technical challenge when conversations were happening simultaneously. As our speech-to-text system picked up on anything being said, the prompts became very confusing, and GPT-3 had justified trouble keeping up with incoherent statements like a question regarding the singularity in the actual conversation

160 Laval Virtual: “2023 ReVolution,” <https://laval-virtual.com/en/2023-revolution/>

161 ProSiebenSat.1 PULS 4 GmbH: “4GAMECHANGERS FESTIVAL 2023,” <https://4gamechangers.io/en/a/festival/>

162 IE9 Denkfabrik GmbH: “IE9—Festival of the Future 2023,” <https://festivalderzukunft.com/EN>

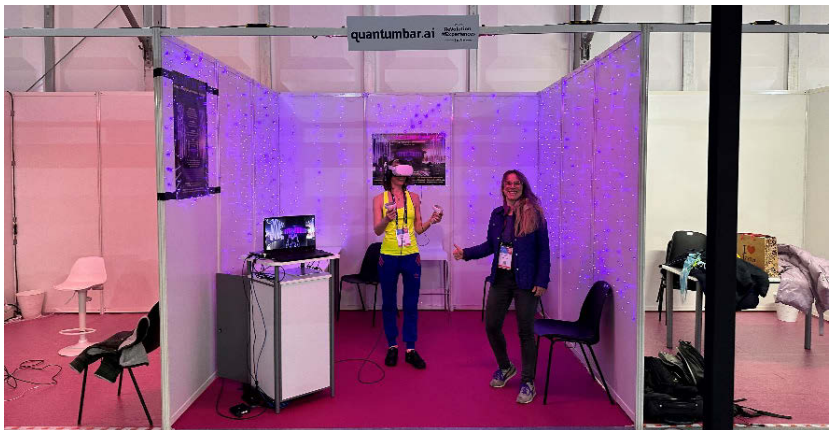
overshadowed by a discussion on haircutting on the side of the bar. This observation inspired us to link the various users to different audio zones so that our speech-to-text system would only receive the voices from users standing on the ‘talking spot’ in front of the bar.

During our presentations, we also realized that the user interface of the NEOS METAVERSE was often confusing for visitors new to the platform, which made saving our summary card sometimes a complicated experience. For further deployments of the QUANTUM BAR, we have thus implemented a solution that prints out a hard copy for visitors on location. In the future, we plan on sending the summary card to social VR users via email.

9.2 Festival Installations

Our festival installations (see Figure 17) also yielded rewarding results. While our industry showcases at VRDays Immersive Tech Week and Laval Virtual provided us with inspiring professional discussions and promising collaboration opportunities, it were especially the events that were open to a more general public—4GAMECHANGERS and the Festival of the Future—which lead to the most interesting insights.

Figure 17: QUANTUM BAR Booth at Laval Virtual



Source: Christina XaosPrincess Kinne

Children and teenagers between the ages of seven and fourteen turned out to be the most proficient VR users. Even though many had never been in VR before, they instantly understood all functions and intuitively indulged in activities—like

climbing or sword fighting—whose execution I never explained in my onboarding presentations. Another surprise that accounted for children and adults alike was the fascination with social VR. As soon as a user realized that another user joined them from the second user station we provided, their focus shifted away from the bartender to the delight of being able to interact with another human in VR.

10 DISCUSSION AND OUTLOOK

10.1 Research

While the above-discussed visits to the QUANTUM BAR yielded rewarding insights, illustrating that our research-based creation process did not bear any significant setbacks, these user observations can only be seen as spot checks. To investigate if the QUANTUM BAR experience performs well in all psychological and technological regards, I would need to have a more significant sample of users on a wider variety of end devices.

Given the opportunity, I would like to conduct more research-based user testing, focusing on the following areas of interest:

- ELIZA Effect
- Anthropomorphisation
- Uncanny Valley Effect
- Plausibility
- Place Illusion

Additionally, I would be happy to provide the QUANTUM BAR environment as an experimental setup for further research on prompt design and AI safety as well as on the psychological effects of virtual spaces and character creation.

10.2 Educational Platform

Reviewing my three-year journey of creating a GPT-3-driven chatbot for social VR and showcasing it to the public revealed two main insights that inspired me to the next iteration of the QUANTUM BAR.

On the one hand, I was as astounded as anybody else about the “Cambrian explosion”¹⁶³ of AI applications and use cases over the last few years. On the other hand, I was shocked to learn just how few of our technophile festival guests had been in social VR before resp. how sparse the practical Metaverse experience of the general public actually is.

Together with our technical director Marius Anger, I thus plotted the next big step on our roadmap: By integrating newer LLMs—like ChatGPT, GPT-4, or Google’s Bard¹⁶⁴—as additional bartenders and by implementing further AI applications—like 3D object generation via Point-E¹⁶⁵—we plan to expand the QUANTUM BAR to an educational platform that will not only enable academics, students, and decision-makers to learn by experience about the technological and ethical implications of AI development but which will also facilitate an entry into the Metaverse and contribute to its mass adoption.

As of now, and even more so in the future, we would be overjoyed to welcome you, the reader, to our QUANTUM BAR. If you have access to PCVR, please follow the onboarding instructions¹⁶⁶ on our homepage to enter the Metaverse and have engaging AI conversations with our GPT-3-driven bartender and his creators.

LITERATURE

IE9 Denkfabrik GmbH: “IE9—Festival of the Future 2023,” <https://festivalderzukunft.com/EN>

Amazon: “Amazon Polly Pricing,” <https://aws.amazon.com/polly/pricing/>

Anger, Marius: “Kreolis Media Production,” <https://kreolis.net/>

Bergström, Ilias et al.: “The Plausibility of a String Quartet Performance in Virtual Reality,” *IEEE Transactions on Visualization and Computer Graphics* 23, no. 4 (2017), pp. 1352-59.

Biocca, Frank/Harms, Chad/Burgoon, Judee K.: “Toward a More Robust Theory and Measure of Social Presence: Review and Suggested Criteria,” *Presence: Teleoperators and Virtual Environments* 12, no. 5 (2003), pp. 456-480.

163 Waters, Richard: “Generative AI: How will the New Era of Machine Learning Affect You?” *Financial Times*, January 25, 2023, <https://www.ft.com/content/1e34f334-4e73-4677-9713-99f85eed7ba0>

164 Google: “Bard,” <https://bard.google.com/>

165 OpenAI: “Point-E,” <https://github.com/openai/point-e/blob/main/README.md>

166 Kinne, Christina XaosPrincess: “Onboarding Instructions.”

- Bohn, Dieter: "Exclusive: Amazon Says 100 Million Alexa Devices Have Been Sold," *The Verge*, January 4, 2019, <https://www.theverge.com/2019/1/4/18168565/amazon-alexa-devices-how-many-sold-number-100-million-dave-limp>
- Brockman, Greg et al.: "OpenAI API," *OpenAI*, June 11, 2020, <https://openai.com/blog/openai-api/>
- Brown, Tom B. et al.: "Language Models Are Few-Shot Learners.," *arXiv*, July 22, 2020, <https://arxiv.org/pdf/2005.14165.pdf>, pp. 1-75.
- Campbell, Joseph: *The Hero with a Thousand Faces: Commemorative Edition*, Princeton, NJ: Princeton University Press 2004.
- Chaturvedi, Rachna et al.: "Do Home Quarantine Individuals Suffer from Claustrophobia and Anxiety during COVID-19 Pandemic?," *Cogent Psychology* 9, no. 1 (2022), pp. 1-13.
- Dialani, Priya: "GPT-3: The Next Revolution in Artificial Intelligence," *Analytics Insight*, July 25, 2020, <https://www.analyticsinsight.net/gpt-3-next-revolution-ai/>
- Diamandis, Peter H.: "Exponential Roadmaps," *Peter H. Diamandis*, June 18, 2017, <https://www.diamandis.com/blog/exponential-roadmaps>
- Do, Tiffany D./McMahan, Ryan P./Wisniewski, Pamela J.: "A New Uncanny Valley? The Effects of Speech Fidelity and Human Listener Gender on Social Perceptions of a Virtual-Human Speaker," *CHI Conference on Human Factors in Computing Systems* 22, no. 424 (2022), pp. 1-11.
- Dubiel, Mateusz et al.: "Persuasive Synthetic Speech: Voice Perception and User Behaviour," *Proceedings of the 2nd Conference on Conversational User Interfaces* (2020), pp. 1-9.
- ECMA-404: "Introducing JSON," <https://www.json.org/>
- Erickson-Davis, Cordelia et al.: "The Sense of Presence: Lessons from Virtual Reality," *Religion, Brain & Behavior* 11, no. 3 (2021), pp. 335-351.
- Facebook Technologies, LLC: "Replika (Early Access) on Oculus Quest," <https://www.oculus.com/experiences/quest/5620852627988042/>
- Goldstein, Josh, et al. "Generative Language Models and Automated Influence Operations: Emerging Threats and Potential Mitigations," *arXiv*, January 10, 2023, <https://arxiv.org/pdf/2301.04246.pdf>, pp. 1-82.
- Google: "Bard," <https://bard.google.com/>
- Google: "Speech-to-Text," <https://cloud.google.com/speech-to-text>
- Hepperle, Daniel et al.: "Aspects of Visual Avatar Appearance: Self-Representation, Display Type, and Uncanny Valley," *The Visual Computer* 38, no 4 (2022), pp. 1227-1244.
- High Fidelity, Inc.: "High Fidelity," <https://www.highfidelity.com/>

- Hofstadter, Douglas R.: *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*, New York, NY: Basic Books, Inc. 1995.
- HTC Corporation: “HTC and Valve Bring Virtual Reality to Life with Unveiling of Vive Consumer Edition,” *Vive*, February 21, 2016, <https://www.vive.com/us/newsroom/2016-02-21/>
- ifs Internationale Filmschule Köln: “Final Presentation MA Digital Narratives 2022,” <https://www.filmschule.de/de/aktuelles/news/final-presentation-ma-digital-narratives-2022>
- ifs Internationale Filmschule Köln: “MA Digital Narratives,” <https://www.filmschule.de/en/studies/ma-digital-narratives>
- Incompetech, Inc.: “Opportunity Walks Kevin MacLeod,” *Royalty Free Music*, January 1, 2006, <https://incompetech.com/music/royalty-free/index.html?isrc=USUAN1100123&Search=Search>
- Kaminski, Margot E. et al.: “Averting Robot Eyes,” *Maryland Law Review* 76, no. 4 (2017), pp. 983-1025.
- Kinne, Christina XaosPrincess: “Credits,” <https://quantumbar.ai/credits/>
- Kinne, Christina XaosPrincess: “Onboarding Instructions,” <https://quantumbar.ai/onboarding-instructions/>
- Laval Virtual: “2023 ReVolution,” <https://laval-virtual.com/en/2023-revolution/>
- Luca, Inc.: “Replika,” <https://replika.ai/>
- Lu, Xiaoqian/Lin, Zhibin: “COVID-19, Economic Impact, Mental Health, and Coping Behaviors: A Conceptual Framework and Future Research Directions,” *Frontiers in Psychology* 12 (2021), pp. 1-9.
- Madaan, Aman et al.: “Memory-Assisted Prompt Editing to Improve GPT-3 after Deployment,” *arXiv*, January 16, 2022, <https://arxiv.org/pdf/2201.06009v1.pdf>, pp. 1-14.
- Maloney, Divine/Freeman, Guo/Robb, Andrew: “Social Virtual Reality: Ethical Considerations and Future Directions for An Emerging Research Space,” *2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops* (2021), pp. 271-77.
- Mannelly, John: “How to Build a GPT-3 Chatbot with Python—John Mannelly,” *Medium*, February 28, 2021, <https://jman4190.medium.com/how-to-build-a-gpt-3-chatbot-with-python-7b83e55805e6>
- Markowitz, David M./Bailenson, Jeremy N.: “Virtual Reality and Emotion: A 5-Year Systematic Review of Empirical Research (2015-2019),” in: Robin L. Nabi/Jessica Gall Myrick (eds.), *Our Online Emotional Selves: The Link Between Digital Media and Emotional Experience*, Oxford: Oxford University Press 2021.

- MeetinVR: “Home—Business Meetings in VR Better than in Real Life,” <https://www.meetinvr.com/>
- Merriam-Webster, Inc.: “Animate Definition & Meaning,” <https://www.merriam-webster.com/dictionary/animate>
- Microsoft: “Cognitive Services Pricing,” <https://azure.microsoft.com/en-us/pricing/details/cognitive-services/speech-services/>
- Microsoft: “Download Languages and Voices,” <https://support.microsoft.com/en-us/topic/download-languages-and-voices-for-immersive-reader-read-mode-and-read-aloud-4c83a8d8-7486-42f7-8e46-2b0fdf753130>
- Mori, Masahiro/MacDorman, Karl F./Kageki, Norri: “The Uncanny Valley [From the Field],” *IEEE Robotics & Automation Magazine / IEEE Robotics & Automation Society* 19, no. 2 (2012), pp. 98-100.
- Murray, Janet H.: *Hamlet on the Holodeck*, New York, NY: Simon and Schuster 2016.
- NASA: “Spooky Sounds from Saturn,” <https://solarsystem.nasa.gov/resources/17359/spooky-sounds-from-saturn/>
- Neos: “Humanoid Rig Requirements for IK,” https://wiki.neos.com/Humanoid_Rig_Requirements_for_IK
- Neos: “LogiX,” <https://wiki.neos.com/LogiX>
- Neos: “Neos Metaverse,” <https://neos.com/>
- Neos: “Neos Wiki,” https://wiki.neos.com/Main_Page
- Neos VR Events: “Steam: Neos VR :: VIVE Facial Tracker Support & Automatic Avatar Setup, Progress on Desktop Mode,” *Steam*, March 16, 2021, <https://steamcommunity.com/games/neos/announcements/detail/5499430983898913135>
- Oh, Catherine S./Bailenson, Jeremy N./Welch, Gregory F.: “A Systematic Review of Social Presence: Definition, Antecedents, and Implications,” *Frontiers in Robotics and AI* 5, no. 114 (2018), pp. 1-35.
- OpenAI: “ChatGPT,” <https://openai.com/chatgpt>
- OpenAI: “Examples—Advanced Tweet Classifier,” <https://platform.openai.com/examples/default-adv-tweet-classifier>
- OpenAI: “Examples—TL;DR Summarization,” <https://platform.openai.com/examples/default-tldr-summary>
- OpenAI: “GPT-4,” <https://openai.com/gpt-4>
- OpenAI: “Models,” <https://platform.openai.com/docs/models/gpt-3>
- OpenAI: “Deprecations,” <https://platform.openai.com/docs/deprecations>
- OpenAI: “Playground,” <https://platform.openai.com/playground>
- OpenAI: “Playground—Bartender Prompt,” <https://platform.openai.com/playground/p/Jgc5YzcsghUUmzRB5joOaXx9>
- OpenAI: “Point-E,” <https://github.com/openai/point-e/blob/main/README.md>

- OpenAI: “Pricing,” <https://openai.com/api/pricing/>
- OpenAI/Brundage Miles, et al.: “Lessons learned on Language Model Safety and Misuse,” *OpenAI*, March 3, 2022, <https://openai.com/research/language-model-safety-and-misuse>
- OpenAI/Pilipiszyn, Ashley: “GPT-3 Powers the next Generation of Apps,” *OpenAI*, March 25, 2021, <https://openai.com/blog/gpt-3-apps/>
- O’Regan, Kevin J./Noë, Alva: “A Sensorimotor Account of Vision and Visual Consciousness,” *Behavioral and Brain Sciences* 24, no. 5 (2001), pp. 939-1031.
- O’Regan, Kevin J./Noë, Alva: “What it is like to see: A Sensorimotor Theory of Perceptual Experience,” *Synthese* 129 (2001), pp. 79-103.
- Oxford University Press: “metaverse, n. meaning,” https://www.oed.com/dictionary/metaverse_n
- ProSiebenSat.1 PULS 4 GmbH: “4GAMECHANGERS FESTIVAL 2023,” <https://4gamechangers.io/en/a/festival/>
- Python Software Foundation: “SpeechRecognition,” <https://pypi.org/project/SpeechRecognition/>
- Python Software Foundation: “Welcome to Python,” <https://www.python.org/>
- Qian, Kun et al.: “An Eye Tracking Based Virtual Reality System for Use inside Magnetic Resonance Imaging Systems,” *Scientific Reports* 11, no. 1 (2021), pp. 1-17
- Sanchez-Vives, Maria V./Slater, Mel: “From Presence towards Consciousness,” *8th Annual Conference for the Scientific Study of Consciousness* (2004), pp. 1-34.
- Schultz, Ryan: “Definitions of Terms Used in This Blog,” <https://ryanschultz.com/definitions-of-terms-used-in-this-blog/>
- Schwartz, Oscar: “Why People Demanded Privacy to Confide in the World’s First Chatbot,” *IEEE Spectrum*, November 18, 2019, <https://spectrum.ieee.org/tech-talk/artificial-intelligence/machine-learning/why-people-demanded-privacy-to-confide-in-the-worlds-first-chatbot>
- Schwind, Valentin/Wolf, Katrin/Henze, Niels: “Avoiding the Uncanny Valley in Virtual Character Design,” *Interactions* 25, no. 5 (2018), pp. 45-49.
- Slater, Mel et al.: “The Sentiment of a Virtual Rock Concert,” *Virtual Reality* 27 (2023), pp. 651-675.
- Spatial Systems: “Spatial,” <https://spatial.io/>
- Tivoli Cloud VR, Inc.: “Tivoli Cloud VR,” <https://tivolicloud.github.io/>
- Valle-Pérez, Guillermo: “Guillefix,” <http://guillefix.me/>
- Valle-Pérez, Guillermo: “Recording Tools,” <https://metagen.ai/tools>
- Valve Corporation: “Neos VR on Steam,” *Steam*, May 4, 2018, https://store.steampowered.com/app/740250/Neos_VR/

- Valve Corporation: “Steamworks Partner Program,” <https://partner.steamgames.com/steamdirect>
- Vincent, James: “As an AI Language Model,” *The Verge*, April 25, 2023, <https://www.theverge.com/2023/4/25/23697218/ai-generated-spam-fake-user-reviews-as-an-ai-language-model>
- VRDays—Immersive Tech Week 2022: “Church of VR,” <https://vrdays.co/church-of-vr/>
- Wang, Xueqin/Wong, Yiik Diew/Yuen, Kum Fai: “Rise of ‘Lonely’ Consumers in the Post-COVID-19 Era: A Synthesised Review on Psychological, Commercial and Social Implications,” *International Journal of Environmental Research and Public Health* 18, no. 2 (2021), pp. 1-22.
- Waters, Richard: “Generative AI: How will the New Era of Machine Learning Affect You?,” *Financial Times*, January 25, 2023, <https://www.ft.com/content/1e34f334-4e73-4677-9713-99f85eed7ba0>
- Weizenbaum, Joseph: “ELIZA—a Computer Program for the Study of Natural Language Communication between Man and Machine,” *Communications of the ACM* 9, no. 1 (1966), pp. 36-45.
- Weizenbaum, Joseph: *Computer Power and Human Reason: From Judgment to Calculation*, New York, NY/San Francisco, CA: W. H. Freeman and Company 1976.
- West, Mark/Kraut, Rebecca/Chew, Han Ei: *I’d Blush If I Could: Closing Gender Divides Digital Skills through Education*, Germany: UNESCO for the EQUALS Skills Coalition 2019, pp. 1-148, <https://unesdoc.unesco.org/ark:/48223/pf0000367416.page=1>
- XaosPrincess: “Portfolio,” <https://xaosprincess.net/portfolio/>
- XaosPrincess: “The Evolution of Emotional Chatbots,” *Chatbots Life*, May 23, 2021, <https://chatbotslife.com/the-evolution-of-emotional-chatbots-cac645264bf1>
- XaosPrincess: “How to Propagate a Virtual World,” *Medium*, February 27, 2020, <https://medium.com/@XaosPrincess/how-to-propagate-a-virtual-world-d67a1e16de6>
- XaosPrincess: “We’re Overjoyed to Celebrate,” *Twitter*, November 29, 2022, <https://twitter.com/XaosPrincess/status/1597380566768574464>
- XaosPrincess: “XaosPrincess,” <https://xaosprincess.net/>
- Yu, Insu et al.: “Visual Realism Enhances Realistic Response in an Immersive Virtual Environment—Part 2,” *IEEE Computer Graphics and Applications* 32, no. 6 (2012): pp. 36-45.

Let's Play the Metaverse ...!

Expanded Realities as Transparent Playheads

TOBIAS BIESEKE

LET'S PLAY ...!

Let's Play the Metaverse as "Show Gamers"!

Actors and video gamers share a passion for playing, even if they are categorically different from one another. Actors embody predetermined performance structures that they take from screenplays, scripts, or other textbooks. Video gamers, on the other hand, are more like sportsmen or improvisational actors who want to achieve their best indeterminate performance within a defined setting. They control proxy entities as their determinants and try to influence the conditions of the virtual environment in their favor.

The surroundings of the stage and the virtual world differ from each other. The chaos of the world ends in front of the theater stage, where everything happening on it is predetermined (except in improvisational theater). In video games, the chaos also ends outside the respective devices, but their players try to perform in a determined environment through indeterminate behavior. They want the game to develop to their advantage, whereby the behavior can vary greatly depending on the type of game.

The instrument of a video gamer is the remote control of an external virtual entity with an input device; the instrument of an actor is the control of his/her own body. The voice of the video gamer does not influence the virtual world directly (for now), whereas the voice of the actor is often an expression of the highest relevance to the audience. Video gamers can send their avatars into situations that would otherwise not be possible for humans. They jump over canyons, fly, run through fire, slide down icy slopes, and climb vertiginous mountains or buildings.

However, the decisive difference between the two is self-perception. The actors are aware of their ability to send signals through their posture, movement, language, and rhythm; in the case of video gamers, this self-perception disappears behind the actions of the virtual entity. While video gamers are playing, their attention flows into the extended sensory zone of the game.¹ But what happens if the characteristics of actors and video gamers are combined? In German, the expression “Schau-spieler” (actor) can be translated in a wider sense to “show-gamer.” In other words, it refers to someone who is playing in a certain way in order to show something. The determined play of the actor merges with the indeterminate remote-control game of a video gamer to a “show-gamer,” and therefore, must behave within an interactive, virtual environment. The experience of the respective subject becomes a performance.

This determines the topic of this article, which is the kind of experience the interaction of extended realities (XR)² and the mental imaginative power of theater can generate.³ To record such experiences, an evaluation method based on *micro-phenomenology* was developed to scientifically document these processes. Therefore, the research question to be discussed is: “How can the imagination of the individual be brought into codynamic coherence with the possibilities of the Metaverse?”

The participants can be described as *playheads* during their interactive experiences using head-mounted displays (HMDs) based in virtual environments as they perceive the respective world and act within it.⁴ The term *playhead* is understood literally here, i.e., the thoughts of the acting subject provide information about the personal experience. This allows the subjective experience of being a

-
- 1 This extended self is illustrated in the example of the phenomenologist Merleau-Ponty with the blind man’s cane, which becomes an extended sensory zone as an insentient body unit. Cf. Merleau-Ponty, Maurice/Böhm, Rudolf: *Phänomenologie der Wahrnehmung*, Berlin: de Gruyter 2010, here p. 173.
 - 2 XR is a collective term that subsumes virtual reality (VR), mixed reality (MR), and augmented reality (AR).
 - 3 Brenda Laurel assumes that such applications do not have to be connected to the real world but must have artistic accessibility. Cf. Laurel, Brenda: *Computers as Theatre*, Upper Saddle River, NJ: Addison-Wesley 2014, here p. 146.
 - 4 In various software applications, the term *playhead* refers to the position within a timeline that indicates the localization of the time position. The playhead is a signal pickup at which the signal is decoded. For example, the time position on a YouTube video or the needle on a record player.

“show gamer” to be made visible, making feelings and associations intersubjectively comprehensible. The aim of this process is to identify parameters that can be used to bring the individual’s imagination and the virtual representations of the Metaverse into greater coherence. This text presents the method of *microphenomenology* evaluating the HMD-based XR experiment *Ndinguwe* at the storyLab kiU of the Dortmund University of Applied Sciences.⁵ This is a relevant addition to the existing evaluation methods of VR research, as explained below.⁶

Let’s Play via *Microphenomenology*!

Microphenomenology comes from the Würzburg School of Psychology and aims to create scientific foundations through the dialogical recording of language. At the center of this method is the subjective “experience” of the participant, which finds expression in language during the experience. This is described in the text by Gerhard Benetka and Thomas Slunecko: “‘Erleben,’ das zur Sprache kommt” (“‘experience,’ that is verbalized”):

“We treat the approach of the Würzburg School and microphenomenology as rule-guided language game in which ‘inner’ mental processes, i.e., those given in the perspective of the first person, are to be expressed in a dialogue. A dialogue in which this entry into the field of meanings takes place in what we believe to be a specific and precisely describable way. One can, therefore, say that inner experience is articulated in a language common to the subject and the experimenter; it is ‘objectified,’ intersubjectively accessible, and thus ‘knowable.’”⁷

We also find this objectification of perception in the work of Don Ihde, a philosopher of technology, who distinguishes between *micro-* and *macroperception* in

5 The VR experiment was realized as part of the artistic research by the research team Harald Opel (artistic director of the storyLab kiU), Tobias Bieseke (project management), Jan Schulten (programming), and Azziza El-Yabadi (art direction) during a six-month development process.

6 Cf. Slater, Mel et al.: “A Separate Reality: An Update on Place Illusion and Plausibility in Virtual Reality,” *Frontiers in Virtual Reality* 3, (2022), pp. 10-13, here p. 10. <https://doi.org/10.3389/frvir.2022.914392>

7 Benetka, Gerhard/Thomas Slunecko: “‘Erleben,’ das zur Sprache kommt,” *Journal for Psychology* 29, no 2 (2021), pp. 17-40, here p. 33, <https://doi.org/DOI:10.30820/0942-2285-2021-2-17>, my translation.

his theory of *postphenomenology*.⁸ *Microperception* refers to the sensory perceptions of the subjects, which are expressed by the participants. In the process of *macroperception*, these statements are then objectified in the process of culturally and hermeneutically mediated perception. These are, however, permanently characterized by interpretation and design achievements. These methods make it possible to analyze subjective effects and contextualize them. As these methods take place within the framework of artistic research, the statements themselves become the subject of the process. This means that not only the artifact but also its resonance space is the subject of the artistic product.

The VR experiment *Ndinguwe* was evaluated using a method based on *microphenomenology*, and 71 relevant observations were collected. The experiment was conducted with children, actors, directors, professors, athletes, teachers, designers, sociologists, students, VR experts, and museum curators. However, this text focuses exclusively on participants from the theater environment. Each evaluation was recorded in image and sound both from the inside perspective of the headset and from the outside perspective using an external camera (see Figure 2). The videos were synchronized using editing software, and the respective images were arranged next to each other. Statements were transcribed, and concise actions were recorded in brackets (e.g., gets scared, looks at hands, etc.). During the experiment, the experimenter interviewed the participants as they experienced the various scenarios. The participants were interviewed using a questionnaire,⁹ which provided a flexible system for recording individual descriptions. The survey was conducted in German and later translated into English. In essence, it was about the experience of self-perception, haptics, narration, and mixed reality (MR) elements. This method was modified during the process in order to optimize the individual quality of the statements.

The Metaverse will make people more transparent in their perception and experience. This characteristic means responsible handling of the knowledge gained and the data collected. For this reason, a protected space with a trusting person is relevant so that participants can engage in the evaluation with confidence. Trust is an essential point because the stronger the trust, the more detailed the participants

8 Ihde, Don: *Technology and the Lifeworld: From Garden to Earth*, The Indiana Series in the Philosophy of Technology, Bloomington, IN: Indiana University Press 1990, here p. 29.

9 Cf. interview form: "Evaluation_NDINGUWE_Platz.docx—Google Docs," accessed November 9, 2023, https://docs.google.com/document/d/1wbtUqWTcDovAgxc_6r9dmPF5id9Qg07/edit?usp=share_link&ouid=105174621274629706621&rtfpof=true&id=true

are willing to explain sensitive topics. Interviews conducted among persons who are familiar often yield higher levels of detail. This can help to learn more about the subjective perception of the participants.

The Metaverse

In this case, the Metaverse is a place that consists of many unconnected locations and exists in a virtual imaginary world. This place cannot be physically but only virtually reached by visitors. It has no topographical connection but follows its own determinations. The Metaverse is a lucid, optical deception that is partially connected to the physical environment and accordingly enables different interactions. It is a constructed virtual world in which countless individuals can participate and accordingly experience a shared world of expertise. In this place, people can come together who would never meet in the physical world. They are not dependent on their natural constitution but can experience embodiments that have arisen from their fantasies or needs. Sharing one's own perspective and thoughts makes subjective perception more permeable to the intersubjective experience of the environment. This makes the Metaverse a place where many perceptions can come together to form a collective view. For the *Ndinguwe* experiment, the Metaverse is a place where different people embody different avatars and can, therefore, have experiences similar to those of the other actors. *Ndinguwe* is an approach to the potential of the Metaverse to explore shared experiences through body transference.

Let's Play the Metaverse as Artistic Researchers in Experimental Settings!

Since this text is about the playful experience of *Ndinguwe*, excerpts from seven evaluations from the theater scene are considered. These include the three actors Sarah Quarshie, Adi Hrustemović, and Ekkehard Freye from Dortmund Theater, who gave their voices to the avatars and the other spoken passages. Of particular interest here is the subjective processing of one's own voice when it simultaneously functions as the voice of the avatars' thoughts. In addition, the evaluations by theater director Thomas Krupa, stage and costume designer Monika Gora, theater publishing director Dirk Hanke, and the director of the Academy for Theater and Digitality, Marcus Lobbes, will be analyzed (see Figure 1). It is especially interesting to have the individual perspectives of the various viewpoints. Due to their artistic work in the theater, the interviewees have an increased sensitivity to

role changes, empathy, perception, and playfulness. These characteristics enable them to incorporate their practical experiences into their observations.¹⁰

LET'S PLAY *NDINGUWE*¹¹!

Introduction

The word *Ndinguwe* means “I am you” in the Xhosa language and goes back to Nelson Mandela. He coined the philosophical term *Ubuntu*, which means “I am because we are.” *Ndinguwe* is a schematic reduction and further development of this concept of existence. The experiment is a research project by the storyLab kiU at the Dortmund University of Applied Science, in which the subjective experience of MR, virtual self-representation, and haptic feedback within XR are examined. The project was developed and implemented using Unity software over a period of around six months. This involved working with photogrammetric scans (Montepulciano corridor) or a three-dimensional city model of Dortmund (Google Earth). The design of the virtual environment, thus, takes up familiar aspects of the environment but alienates them to create a fictitious, virtual non-place that has no topographical context. The intention was to create a varied and unfamiliar perceptual offer for the participants in order to stimulate a wide variety of reactions.

In the experiment, the optical self-perception is overlaid with virtual avatars equipped with characteristics that could potentially be discriminated against (such as age, gender, physical characteristics, and ethnicity). The intention is to investigate the extent to which the participants develop empathy towards their avatars, identify with them, or reject them. The simulated first-person perspective of these existences is experienced by the participants and reflected on together with the research team. Furthermore, references are made to haptic objects, such as a ball or chair, which become interactive components of the action. No visible control elements are used in the application. Instead, interactions take place through the physical behavior of the participants, an experience that is familiar to them from their everyday lives.

10 Cf. evaluation videos: Tobias Bieseke: “Ndinguwe Evaluationsvideos Theaterspektrum.” Tobias Bieseke. November 10, 2023, YouTube Playlist, https://www.youtube.com/playlist?list=PLM511cypHpWmSyNQQ_D3P27suBBu0oi09

11 A short trailer of the experiment can be viewed here: Ndinguwe—“I am you,” February 23, 2024, Vimeo, Video, 09:22, <https://vimeo.com/915943769>

The experience is composed of seven scenes. In the first scene (1. MR Intro), the participants open *Ndinguwe*'s entrance. In the second scene (2. The Corridor of Montepulciano), the participants enter the virtual world via an MR transition. In the third scene (3. The Mirror Room), the participants can experience four different avatars with their respective biographies. In the fourth scene (4. The MR Mirror Room), the participants are assigned an avatar, which they see together with their physical selves. In the fifth scene (5. Ballgame in the Park), the participants interact with virtual balls and their avatars. In the sixth scene (6. Haptically Feedback), there is a physical ball and chair for interaction. In the seventh scene (7. The MR Outro), the participants return to the natural environment where the experience is reflected on again.

The sections of the experiment are briefly explained below and then excerpts from relevant observations are reproduced.

1 Let's Play the MR Intro of *Ndinguwe*!

The HMD, with the active application running, is placed on the participants' heads at a defined starting point. They will see the real space with the addition of a portal in which a cube is floating (see Figure 2). The word *Ndinguwe* is written in the cube. The words are repeated continuously: "Touch the ring and follow the circle to enter the rabbit hole." When the participants go to the portal and move their hands along the outer ring, the loading function of the first scene starts. The participants are instructed to describe their haptic, associative, and cognitive experiences. In this first part, the aim is to find out how the participants experience contact with the generated virtual object. The resulting statements are transcribed¹² and excerpted here:¹³

Sarah: *"But there are no electric shocks or anything? (Touches the ring) I feel like I'm touching something; that's why I asked about the electric shock."*

Adi: *"It was actually as if I was touching something, even though there was nothing there."*

Marcus: *"I can feel a clear contact."*

12 "Transkriptionen Evaluation Ndinguwe Let's play—Google Drive," accessed November 9, 2023, see https://drive.google.com/drive/folders/1lzQrB0PicmxKfpLCQ4Xx5sprVec6xSFj?usp=share_link

13 The texts have been slightly edited to improve the flow.

Thomas: *“Now I’m inside. My body doesn’t exist.”*

Dirk: *“It wasn’t physical, but of course, I felt a sensitive connection. Through the eyes in my hand.”*

The reactions show that the contact of one’s own hand with the virtual object is subjectively perceived. Although this is not described as physical or haptic, it is described as a kind of sensitive force field.

2 Let’s Play the Corridor to Ndinguwe!

Once the loading process is complete, the MR application starts. A virtual corridor moves toward the participants. Numerous holes provide a view of the real environment. The walls of the corridor at Palazzo Ricci in Montepulciano,¹⁴ Italy, are adorned with video portraits. A voice can be heard off-screen, reading a poetic text out loud. Visually, the corridor envelops the participants and slowly passes them by. At the end, the participants reach a room hidden behind a curtain. A ball appears and, after a short pause, flies towards the participants’ heads. The next scene loads. In the new scenario, the aim is to find out how the participants experience the transition from the real environment to a virtual world while both worlds are still visible.

Sarah: *“It feels like a loss of body. I hardly notice the real world behind the holes because I find it so exciting in here.”*

Adi: *“That’s great. So, I know that I’m actually somewhere else, in real space, but I actually feel somewhere else.”*

Ekkehard: *“The holes initially create a pleasant feeling. To have this connection, that the old is still there for safety (looks through a hole). So now that I see the armchair here.”*

Marcus: *“The concentration goes into the virtual plane and the sound because the intensity picks you up in a completely different way. The real space could also have disappeared.”*

14 This is a photogrammetric scan of the upper corridor, referring to a first pioneering experiment. Cf. Bieseke, Tobias: “Draw a Straight Line and Follow it!,” in: Georg Trogemann et al., *Montepulciano Journal—The Poetics of Making*, Köln: Verlag der Kunsthochschule für Medien 2022, pp. 59-75, <https://e-publications.khm.de/door/index/index/docId/238>

Monika: *“I just drove through this post. Do we now see in this play that the outside space exists? It’s reassuring to see the red curtains that you know from the theater.”*

Thomas: *“Now I come to the curtain. On the lower stage is the real space. I’m coming up against the wall now, probably.”*

During the moving transition, it is not a problem for any of the participants (physically or cognitively) that the virtual space moves in the opposite direction to their subjective body perception. The optical holes in the virtual surface are understood as anchor points for their own perception. The moving and unfamiliar virtual surface is generally perceived as an event on which the focus of attention lies.

3 Let’s Play the Mirror Room of Ndinguwe!

The mirror room is a snail shell-like mussel. In this room, the participants start at an archway and circle a central column, encountering a mirror that shows them the virtual representation of their avatar. An inner monologue of the respective avatar can be heard near the mirror, referring to his or her individual fate. The participants can now try out their actions in front of the mirror while listening to the figure’s narrative.¹⁵ Their visual representation is limited to gestures, the upper body, and the position and movement of the fingers. No facial expressions are shown, and the position of the legs is calculated under the position of the upper body using an algorithm. This causes the legs to follow the movement of the upper body with a slight time delay, sometimes with a grotesque appearance.

When the participants pass through the archway, their respective avatar transforms in the following order: a.) the avatar is a transgender man, b.) the then avatar transforms into a woman without an arm, c.) the avatar changes into an old man with dementia, and d.) and finally, the avatar changes to a refugee who is a person of color.¹⁶ The choice of characters is based on including characteristics that favor discrimination (age, sexuality, physical impairment, and ethnicity). There is a transformation process from passive to active interaction because depending on

15 The textbook with all language passages can be viewed here: Bieseke, Tobias, “Ndinguwe Drehbuch,” Google Drive, accessed 9. November 2023, https://drive.google.com/file/d/1Zde7qnUmyKiMkCQ3nLXsald6alJ5wVX/view?usp=share_link

16 Cf. Peck, Tabitha C. et al.: “Putting Yourself in the Skin of a Black Avatar Reduces Implicit Racial Bias,” *Consciousness and Cognition* 22, no. 3 (September 2013), pp. 779-787. <https://doi.org/10.1016/j.concog.2013.04.016>

how much time the participants spend with a character in front of the mirror, the character changes for the subsequent scenes. Once the participants have followed the arrows around the center four times, the next room is loaded. In this process, it is essential to describe how the participants deal with the various virtual self-representations with regard to identification, empathy, or antipathy.

Sarah: *(She stands in front of the young woman without a hand, to whom she has given her voice). “The voice comes from the figure although it is my voice, I don’t feel it as my own inner voice because thoughts feel different.” (She comes to the story of the refugee Mouhamed Dramé¹⁷, who was shot dead by Dortmund’s police in 2022. She observes the hands and listens to the text: “One second between pepper spray, taser, and six shots. I’m sitting in front of a clinic, leaning against a wall. I have come all this way to start a better life. On the way, I have had to watch people die. I could have been one of them. Nevertheless, I continued the long journey, and now I’m here. I am 16, severely traumatized in a foreign country. I don’t speak the language. All alone. I’m on my own and don’t know what else to do but turn the knife on myself. The police arrive. Suddenly, everything happens very quickly. One second between pepper spray, taser, and six shots. Measures to protect me, they say. Of course, I won’t survive. I die.” When the story is over, she is silent for a while and looks at her hands—a moment of sadness). “I’ve just reached the last person, the black man, and that’s what touched me the most (she speaks in an undertone). I feel what he says (see Figure 3). It’s the closest thing to me.” (It is visibly close to her; it seems as if she is partly in her own world of thoughts. The experimenter tries to explain why this work exists; she ignores him, goes to the virtual memorial, and then on to leave the room).*

Adi: *(Adi comes to the first character to whom he has given his voice) “I think it’s fantastic with the text and what I see. Because that’s not me, and that’s why the text is wonderful about life in the wrong body. So, I know that I recorded the text. Somehow, I am decoupled from the medium. It’s as if someone else were speaking it. Perhaps the character actually sees me as an image in the mirror and not the other way around. (Adi comes to the old man). Ah, well, I don’t know how to categorize the figure. At first, when I couldn’t see the face, I thought ok, it’s a woman, a bit older because of the gray hair. But then, with the voice, it was a man. I*

17 Cf. Peters, David: “Tödliche Schüsse auf Mouhamed Dramé: Anklage gegen fünf Polizeikräfte,” *WDR*, November 23, 2023, <https://www1.wdr.de/nachrichten/ruhrgebiet/anklagen-fall-mouhamed-100.html>

realized it wasn't a dress but a patient in a hospital coat. [...] It has an ambivalence because the first figure had a clear male body and the second a clear female body. This is in-between, which is not due to the body, but to the mental state."

Ekkehard: *(Reacts to the old man to whom he gave his voice). "Well, I perceive it playfully because I am naturally so firmly convinced of the look of my appearance. The haptic and visual sensations combine in a pleasant way. [...] (Raises his arms above his head and listens to the voice) [...] (Ekki has experienced the story of the refugee) Now just in the context of the urban local awareness of the story. It goes hand in hand with the direct memory of what it was like when I walked through the city and saw Dortmund police. Very sad and shameful."*

Marcus: *"I see it as a game. It doesn't do much for me or my body, but I find it incredibly exciting. Maybe that's because of my biography as a hardcore gamer. PC above all. I'm always curious to see what else is possible in terms of worlds and interactions. Immersion. I haven't seen this one yet. [...] It's a bit irritating that the faces of the avatars don't speak. That you only hear their voice."*

Monika: *"Now I'm someone who doesn't look in the mirror that often. That's not my usual view of myself. But I'm used to seeing other people in the mirror because of my job. It feels like fitting for me right now. Intuitively, I would leave the mirror and look at the rest. The surface of the cave looks like a skin. [...] It looks like an underarm in the room. Like some kind of joint. But I have no problem being in a body. That's probably my interest in bodies or living beings in general. (Looks down at herself) Ah, I'm just now realizing that I have the body of a figure. It's a bit creepy to see the body on myself. Of a body that is no longer quite young. Shall I keep following the arrows? Ah, it's a different body, a different story. So, every circle is like a cycle, really. You could say like a rebirth. [...] (She comes to the story of the person of colored avatar and looks at her hands). You can see something, like graphic errors, here on the hand, like stitches or injuries. As a costume designer, I immediately think this slit is already a trace of the assault that's going on. I think it's good to have a different skin color. So, you can read an avatar like this as a costume."*

Thomas: *"What happens if I get really close? Are you me? No, that's me. (He makes a finger gesture and takes the haptic touch of his body as proof of his existence). At the end of the day, we move into the cages we build for ourselves. No criticism. (Walks in a circle) Now I'm with Dortmund's George Floyd. (Looks at himself in the mirror and listens). That's the most exciting character for me because I'm slipping into an avatar whose path I don't even know in my experience. It's a real story. So it can also be verified. Now I'm going to your grave—my grave. The picture of the boy. Some black liquid on the ground, like oil. Behind it,*

something red that I can't identify. [...] This digital mask here is not blackface¹⁸ for me because it's a real experience that you want to make accessible. It is authentic. It's overwhelming that you have dark skin, and I can imagine people interpreting that as blackface. For me, I don't see it as pretentiousness because I see it more as recapitulation. I bring his life back to life with my physical experience. If you don't know the story, you can be accused of blackface. Because then it seems too easy."

Dirk: *(Is with the young man who doubts his sexual identity) "The body feels strange. The text I hear about body experience and identity triggers chains of associations for me. Questions that I had as a teenager. When you thought, is that me I see there or who is that person [...] (comes to the young woman) that's interesting. I'm a young woman, but I'm obviously missing my left hand. She doesn't swing her hips otherwise she does everything at the top. (Listens to the text). There's a young woman standing in front of me, and here's a 60-year-old man. Interesting things that this triggers because it really alienates me from my body image. [...] (He comes to the refugee avatar) If I can't communicate, if I can't build a social relationship, I'm lost. I've just been pulled fully into the story, and that's why I'm so silent. The horrifying images that run parallel to this story because, unfortunately, you hear these stories too often in recent years."*

A high level of empathy is found in Sarah when she experiences the contextualized figure of Mouhamed Dramé. Due to the personal impact of the narrative, but also the virtual reproduction, the experience is so intense that only a protesting silence remains. The other avatars are identified as virtual representations but are not perceived as personalities. This does not change for the actors when they hear their own voices. Experienced events differ from reproduced events and are accordingly internalized differently by the subjects. The narrations of the voiceovers are identified with the avatars but not with the personal self. Nevertheless, depending on the participants' personal access to the stories, states of empathy arise.

4 Let's Play the MR Mirror Room of Ndinguwe!

In this room, the participants arrive in the MR and find a virtual as well as a real mirror. In the virtual mirror, they are shown the avatar with whom they spent the

18 The term *blackface* describes the representation of black people by white people using make-up to imitate black skin. Blackface is seen as racist as it undermines the discriminatory experiences of people of color while prioritizing personal pleasure.

most time in their particular room. In the real mirror, they see their physical reflection (with their HMD). When the participants look down at themselves, they see their physical body optically superimposed on the virtual body. This visual experience of superimposing a virtual avatar offers a different view of the body and its virtual representation. After a period of 1.5 minutes, the next room is loaded. In this MR, the experience of the visual relationship with the avatar is described in terms of similarities and differences in order to determine the connection to the respective figure.

Sarah: *(Is embodied by the person of color avatar). “For me, the virtual figure is not foreign. Because I’m black myself, it’s very close to me, closer than the others.”*

Adi: *(Is embodied by the old man). “So you are you, and you are me. You see yourself and as the other. That’s surreal. You immediately identify yourself. Maybe it’s because of my profession, but for me, it means that I am this figure.”*

Marcus: *(Is embodied by the old man). “I see my real hand reflected in the mirror at the same time, so the virtual self is not there (see Figure 4).”*

Moni: *(Being impersonated by the person of color avatar) “I’m still in the person of color avatar, with black leather pants.”*

Thomas: *(Is embodied by the person of color avatar). “It also shows the difference between an older white man and a young person of color man. In the mirror, I am me, and on my hands, I am the person of color man.”*

It should be noted that the figure in the virtual mirror is perceived as a stranger. The normal mirror image, on the other hand, is accepted as one’s own person as usual. Interestingly, however, the virtual superimposition of one’s own body is also accepted as one’s own body with a kind of costume.

5 Let’s Play the Ballgame in the Park of Ndinguwe!

The fourth room is a three-dimensional abstraction of Dortmund’s “Stadtgarten,” i.e., municipal park. Embedded in a sphere of sound, the voiceover provides indications of what awaits the participants. An abstract structure appears, similar to a tree, from which balls are shot at the participants. They can either hit the balls away or dodge them. The firing of the ball is interrupted twice with a short pause, during which the voiceover speaks again. With every break, the shot frequency increases, and the balls come from additional directions. If participants are hit on the head, their field of vision is colored orange and blurred. Participants cannot

succeed in this situation: neither can all the balls be fended off, nor can the participants avoid them all. This, therefore, creates a stressful situation in which unforeseen events may occur. This scenario aims to describe the physical experience of interacting with virtual objects.

Sarah: *“Well, I don’t see any balls (as she turns around, a ball flies towards her head. She gets scared, tries to dodge, and falls to the ground). I take it a little bit too seriously (laughs).”*

Ekkehard: *“Somehow haptic, but actually because the balls react.”*

Thomas: *“When I catch the ball, and it’s bounced back, I experience a tactile sensation, but when it goes through me, I don’t really feel it. For example, it was much faster now. Haptic is perhaps the wrong word; maybe contact is better.”*

Dirk: *“I’m supposed to hit the balls away with my virtual hands? That’s bad because I’m actually left-handed. But I have to live with it now. There was a ball. (Mainly knocks the balls away with his right hand).”*

After this phase, a double appears in front of the participants, an avatar that imitates their movements but remains in one place. It behaves differently from a mirror image. When the participants raise their left arm, the double also raises their left arm, and vice versa (participant perspective). The avatar is, therefore, not mirror-inverted. The participants are asked to pass the ball back and forth with themselves.

Sarah: *(Goes to the doppelganger and shakes hands). “It feels like I can really touch him, but I realize that I’m only grasping at air. I have the feeling I can feel him. (She approaches him, takes him in her arms, and touches him almost tenderly).”*

Adi: *“I’ll try again, ah almost (the double has touched the ball, he walks closer to the double, takes only one arm, and the ball bounces back and forth between both hands) Yes, I did it.”*

Ekkehard: *(Goes to the doppelganger) “All right, then I’ll shake your hand, yourself. (The hands touch) Oh, that triggers something in my hand and arm. It’s strange, this disembodied connection.”*

Marcus: *(Goes to his double and shakes his hand, while the experimenter also shakes his hand) “Cool, that’s going well (see Figure 5). (He tries to pass the ball to himself again) Almost. I’ve done something like that before with my feet, kicking*

the ball. That worked at some point, but this is very tricky. I understand how it works intellectually, but it just doesn't work."

Monika: *"Touching is strange because it's still not a double for me. And because I know that everything is artificially created. In my head and my soul, I know that I look different. The other is a surface. The sensation and experience of the self is deeper."*

Dirk: *"Now let's do it synchronized here, my avatar and me. I'll go and shake hands. That's cool. It feels like I'm feeling the warmth through the palm of my hand. That's weird. The things my head triggers. It's like feeling an electrical impulse. I don't feel it in my body but in my head."*

Similar to touching the ring at the start of the project, touching the virtual balls is also described as a feeling of contact. Sarah is so shocked by the ball that when she turns around, she falls down, even though there is no physical contact with the ball. This shows that viewing builds up the expectation of a physical sensation. Touches that elude haptic verification (the ball bouncing away, the portal disappearing) are classified as more real than contacts that should be constant (the doppelgänger's hand). It is particularly remarkable that Adi managed to pass the ball to himself, which makes him the only participant to have succeeded in doing so. This is perhaps due to the high degree of physical self-control of an actor.

6 Let's Play the Haptic Feedback and Fly Through Ndinguwe!

The previous room goes dark and the participants are invisible again. The participants are now told they have to catch a ball again. This ball is tracked with an HMD controller that is integrated into the ball and is accordingly physically and virtually present. In this last scenario, the effect of haptic feedback on the virtual representation is examined. Particular attention is paid to the credibility of unnatural experiences (flying on a chair) and their classification of reality.

Dirk: *"Ah, great, I've got the ball. Well, it doesn't have a closed surface like the ball. I see. (The experimenter throws the ball to the participant, where the ball bounces off the participant's hands and falls down. A miscalculation causes the ball to bounce back into the participant's hands) That was pretty good because it fell down, and then it bounced up again, and then, of course, I wanted to grab it and reach into the void. It's a similar experience to the feeling of falling, except I'm not falling. I'm sensorily engaged in a different way. It's an interesting experience to reach into the void when you've had it before. [...] The haptic feedback*

absolutely changes the relationship to the surrounding space (Figure 11). It's a great experience. Because here is real (points to the ball) and there is not (points to the environment)."

Soon, a chair appears, once as a transparent green silhouette and once as a wooden chair. The wooden chair is also equipped with a controller to display it in VR. When the participants place the wooden chair onto the transparent green chair, a countdown starts, and they are asked to take a seat. A virtual flight through Dortmund begins. This is accompanied by a poetic text from the voiceover while the chair flies upwards in glistening light.

Sarah: *"Now I understand why gamers sit in front of the PC all day. The ball and the chair give me security. Without it, I would be completely lost and think I was really falling."*

Adi: *"Oh God. Fantastic. I'm actually afraid of heights. Although it feels real, it's pleasant. No feeling of fear. There's a tingling sensation just now that I'm flying really high."¹⁹*

Ekkehard: *"The haptic gives a form of hold, that you still have something with you (see Figure 6). I can also state this as a general feeling, as a toy, a talisman, food, in the broadest sense. It's appealing to see how the ball passes through me. It stimulates the fantasy of disembodiment."*

Monika: *"Now I'm about to smash into the helicopters. But they're more like plants. Now I'm crashing through a plane of glass, where I think it is one. But it's not. The buildings immediately make me think of Ukraine, which isn't nice. Now the skyscrapers are growing, ah no, they're dissolving."*

Thomas: *"The superimposition of the green and the real chair is doing something to me right now. So, the flight starts. Now, I'm looking at the world from above. I can't see the real world, but I can see a designed world."*

Most participants are of the opinion that the impression of reality can be significantly increased through haptic feedback. The ball becomes a point of reference (talisman) where what you see corresponds to what you feel. The difference between the haptic mesh structure and the visual surface structure of the ball does

19 Jeremy Bailenson has already used VR in his experiments to treat phobias. Cf. Bailenson, Jeremy: *Experience on Demand: What Virtual Reality Is, How It Works, and What It Can Do*, New York, NY: W. W. Norton & Company 2018.

not cancel this out. Due to the physical presence of the chair, the idea of flying is also described as more intense than when the participants are standing. In the near future, hybrid objects, i.e., real physical objects that have an authentic or modified virtual representation, will play an important role in the Metaverse. These objects, which are separate from the body, exist as mediating objects between the Metaverse and the physical world.

7 Let's Play the MR Outro of *Ndinguwe!*

In the last scene, the participants are back in MR. The HMD should remain on in order to keep the test subjects in the experienced state. Suddenly, a bird appears, which flies towards the participants in a similar way to the balls before. This is to test if the haptic feedback has changed their perception of the virtual objects. The outro is used for a retrospective reflection on the experience. After the glasses are removed, the experiment is complete.

Adi: *“Flying was a long journey in a short space of time. (The crow comes, and he fends it off with his hand) A bird flew to my head. But I fended him off (see Figure 7). The experience was fluid, the one merged into the other. The experience was accepted as a matter of course. You connect with some figures more than others. It all came intuitively, naturally to me. [...] I had no impulse to look for a classic narration in the sense of a story. A basic mood was created. This created a form of narration but through the process. [...] Putting on the device and experiencing another world is the closest thing to a dream.”*

Ekkehard: *“Because I know all three voices, I can make a good distinction between the virtual figures and the real people. I'm then more with the figure until I realize, ah, that's me now. [...] I have a mixed feeling because of the introduction about this corridor disappearing from the world into a room that no longer has an exit. Is it something protective or imprisoning? The dive through the darkness into the next room. A space like Ground Zero where memories of images connect with reality and create another world. The dive from the shelter into a courtyard where you are at the mercy of others. A journey from here to nothing. [...] What happens to me when I get out of VR, how does my reality change as a result of the experience?”*

Marcus: *“The fact that I'm being guided by you there makes it a bit different from what you would do in a video game. In a video game, you have to explore and investigate for yourself. I'm not sure if you've made me too comfortable, but it's not a video game, either. [...] But it was only when you told me to look down that*

I realized that everything I see in the mirror, I can also see on myself. I simply wouldn't have thought of that. Even when I knew the reflection belonged to me, the reflection was still a stage from a spectator position. But I had no problem with the figures. For me, it was an episodic play. In the beginning, there is reality, then it becomes more and more material. Which is a good build-up dramaturgy, so the aim is to get there. For me, the process was to make virtual reality more experienceable, or more real. If that's how you want to describe it. However, because we were in contact, I have to say that I can no longer tell whether it was one coherent story or lots of little ones.²⁰ [...] The mirror was like a gate. It shows you where to go next."

Thomas: *"I didn't see women as sexual objects, but as a state of being that was partly unknown to me. There is often the question of how many female parts I have in me, how much man is in me, and which parts I present. Of course, the focus is briefly on the sexual attributes, partly because you don't know how to behave. It had more to do with remodeling my body, which is also an issue for me personally. So, when you do a play like Orlando by Virginia Wolf, where a man becomes a woman through a journey through the centuries, which he feels is the better way to be, there's a lot of engagement with queer issues. For me, it got to the point where all the LGBTQ issues and the attitude towards them were to generate a different audience, to transform the audience's self-concept. [...] The figures struck me as stereotypes from video games. Perhaps more multi-faceted characters would be valuable. It would be interesting to see if it could be made more realistic so that it doesn't slip too far into the trivial."*

Dirk: *"It's exciting when I sit here, see the ball, and feel the weight. It's a challenge to listen to the lyrics and explore the body at the same time. These are effects that create identity. You reach other levels. The transfer of empathy happens quickly. It's similar to role-playing games, only the other way around. Here, I have a role and have to adapt it intellectually. In role-playing, I have the intellectual task, and I have to shape the role. [...] The authenticity of the story increases empathy. The fact that I see a picture and have a person in front of me whose life has been extinguished. Even though it's an artificial figure, I'd say I get into a deeper emotion than usual. It's amazing. Associatively, I also immediately realize that he is talking to me and telling me his story, it's like a therapy session. At that*

20 Janet Horowitz Murray describes the transformation from written linear narrative to computer-based narratives as a mosaic-like kaleidoscope that functions via fragmentation. Cf. Murray, Janet H.: *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*, Cambridge, MA: MIT Press 1998, p. 155.

moment, I also pull out the stops to help and be understanding. At least, that's how I would understand it. [...] (Looks in the real mirror next to him) At the same time, I see myself in the mirror, in which only reality is shown, as it does not depict the virtual constructs. That is exciting. My eyes provide a different image to what I feel. When I bring the two images together, the real and the technical, then I am quite lost. And that's what will keep me busy for the next few days. Truthfulness."

Even if all participants who see the bird avoid it, it is not classified as haptic. This would probably have been different with a ball, but with the bird, the participants are aware that it is not physically present in the room. This means that the haptic feedback experienced is not automatically transferred to other virtual objects. The narrative the participants experience is associative and is brought into contact with their own lifeworld. Despite the different states of the scenarios (e.g., MR, VR, with or without body or haptics), the experience is read as a narrative with different passages. Accordingly, narration is not produced exclusively through experience but also through interaction.

RESULTS

Discussion

The descriptions of the participants from the theater context, who certainly have a high degree of imaginative power, show that a mental synthesis between the physical and virtual environment can arise within the Metaverse. This is significantly enhanced by haptic feedback, which intensifies the classification of reality. Although this is disturbed by perceptual differences, it is not destroyed. Represented objects act as points of contact between the environments and become familiar allies in a foreign environment. The MR level visually presents both environments side by side and enables a comparison. This quickly makes it clear which overlays of perception are multi-modal and which are only visual. It is clearly recognized that the bird only exists on the virtual level, which leads to the participants avoiding it as a reaction but not classifying it as real.

Although the virtual self-representation makes it possible to adopt a foreign, virtual body, this remains separate from one's own self, even if homologies (skin color, gender, or voice) exist. Regardless of what one's own body looks like; the doppelgänger or mirror image remains a stranger. Although the narratives told create personal access to the virtual costumes, they are still perceived as separate from one's own self. If identification happens, it does not result from sensory

overlaps but from mental connections, such as identifying a similar lifeworld. The participants' interactions with the avatars open up a space for imagining their own strangeness. The playful interaction between the doppelgangers only succeeds in Adi's case, where the foreign self-representation could be brought into a cooperative coherence with the self. The physical and virtual found a good balance in the flight with the chair, as the haptic feedback increased the impression of reality to such an extent that it was perceived as an intense experience, which still left participants with some doubt so that none feared falling. The participants' perception shows that an increased power of imagination can benefit the mental connection between the physical and virtual environment.

Let's Play the Metaverse as Transparent Participants!

This evaluation procedure is intended to make visible which stimuli can arise through the experience of XR experiences in the context of artistic research. The procedure is like a stage that transforms the person into a transparent playhead. The observations generated can be interesting not only for the cultural sector but also for the entertainment industry or the content mediation of narratives within XR. Regardless of which sector we observe, immersion, according to Fritz Breithaupt, does not necessarily need good effects but good narratives, as these also work without images:

“We can mentally detach ourselves from the one situation in which we find ourselves here and now and think ourselves into other situations, other worlds, other times, and other beings. And we not only think ourselves into these other presences but also understand, experience, and feel them, so to speak. With every narration, we immerse ourselves in a multi-dimensional virtual world without any special glasses. Large parts of our brain are involved in this process, precisely the parts that would also be active if we were in these situations ourselves. There are different words for this phenomenon. Psychologists speak of transportation and narratologists of immersion. In the field of virtual reality, the term simulation is often used.”²¹

Accordingly, high-quality immersion cannot be separated from the narration. However, sensory perception adds further cognitive influences that are stronger when narration and technical representation work together. This characteristic justifies the intentions of artistic research and prompts a sensitive evaluation. In this

21 Breithaupt, Fritz: *Das narrative Gehirn: was unsere Neuronen erzählen*, Berlin: Suhrkamp 2022, p. 64, my translation.

evaluation, it becomes clear that virtual self-representation produces increased empathic relationships in people from the theater context. Although three actors gave their voices to the avatars, they were not able to identify with “their” avatar more than with the others. Thoughts are not inner voices and, accordingly, cannot be induced from the outside. The authenticity of the narrative is essential. The manipulative character of guiding functional texts in video games is accordingly unmasked and cancels out the authenticity of the atmosphere.

Conclusion

This work shows that the mental power of imagination can connect with the virtual environment of the Metaverse if the narratives have something to do with the realities of the recipients’ lives. It is not enough just to make new, fantastic possibilities tangible; they must also be interwoven with ordinary experiences. For the participants to accept a narrative, it is not essential whether it is depicted in a particularly realistic way but whether the participants want to believe the narrative. To achieve this, the narratives must be plausibly integrated into the reality of life. For the VR design of the Metaverse, this means that the narrative needs to be partially coherent with the physical reality of the participants’ lives. Elements must be recognizable and have a virtual extension. If the Metaverse has no grounding in the physical environment, it becomes an introspection of its creators and loses contact with the realities of its participants’ lives. Therefore, the synthesis of the Metaverse with parts of reality seems inevitable. As a consequence, the experiences in the Metaverse will also influence and change the behavior of individuals in the physical world.

Haptics are consistently seen as enhancing the impression of reality. As soon as resistance or even pain comes into play, the illusion recedes. This view is expressed by Hans Blumenberg:

“Reality is not so much an instance as a counter-instance. What touches us painfully is experienced as real, since with the exception of fabulous masochism—there should be no desire for pain and therefore no source of illusion.”²²

The fate of Mouhamed Dramé can also be read in this context, which makes the VR construct a catalyst for empathy. Accordingly, illusion and reality are able to

22 Blumenberg, Hans: *Realität und Realismus*, Berlin: Suhrkamp 2020, p. 111, my translation.

catalyze each other. With regard to MR, it should be noted that the prison described by Ekkehard is created by the HMD occupation of the senses. We are used to the existence of a spatial connection between the places we visit. If places cannot be revisited, the body is decoupled from the space. This can provoke insecurity under certain circumstances. It is worth noting that the HMD is now quickly disappearing into the background of perception, and the visual environment is partially merging with reality.²³ Putting down the HMD remains the only “cave exit” back into augmented reality.

A key point is the documentation of the initial contact. There are currently many people who have not had any intensive HMD-based XR experience. These participants judge the experiences intuitively based on their experiences from their usual lives and differentiate less between the real and technical world. This shared imaginary space enables the fantasy of a possible connection between the two worlds. The result is an intuitive self-image that leads to things being done that were not intended by the world creators.²⁴ In *Ndinguwe*'s perception of virtual self-presentation, for example, there was often a discrepancy between the body as self-representation that you see when you look down and what you see in the mirror. The foreign mirror image was often less accepted than the virtual arms and hands, which were visually connected to the body through their visibility. The participants know their natural faces, and an altered self-representation makes them distance themselves internally.

The face of the mirror image, on the other hand, had no facial expressions and was sometimes colloquially classified as “uncanny.”²⁵ Perhaps this also has to do with the fact that a mirror image is also an image. It is not the body itself but an image of the body in space. If one sees the body superimposed on the virtual form, there is no doubt about the authenticity of one's own body and its representation. However, a mirror image that behaves synchronously in space, detached from

23 Don Ihde would classify this as “embodiment relations,” in which the technology disappears behind the perception of the subject. Cf. D. Ihde: *Technology and the Lifeworld*, p. 40.

24 This terminology comes from Hartmut Koenitz, who uses the term “creator” to emphasize the distinction of literary authors as system creators and narrative architects. Cf. Koenitz, Hartmut: *Understanding Interactive Digital Narrative: Immersive Expressions for a Complex Time*, Abingdon/Oxon New York, NY: Routledge 2023, p. 20.

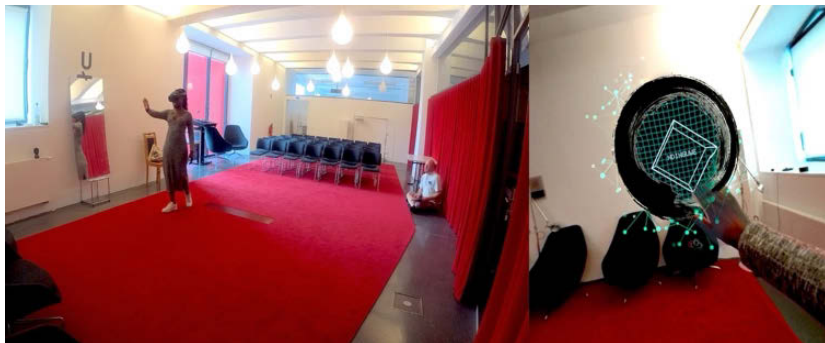
25 Mori, Masahiro/Karl MacDorman/Kageki, Norri, “The Uncanny Valley [From the Field],” *IEEE Robotics & Automation Magazine* 19, no. 2 (June 2012), pp. 98-100. <https://doi.org/10.1109/MRA.2012.2192811>

your own self, is like a stranger imitating you. There were, for example, participants who walked through their mirror image. Afterward, they described the feeling as if the mirror image had entered into a connection with the self-representation. This mechanic is a potential intuitive connection to an avatar. In the future, this research should enable interactive storytelling of art and culture (e.g., theater) in the Metaverse.

Figure 1: Experiment participants



Figure 2: Camera view capturing the perspective from outside



Photos and Screenshots by T. Bieseke

Figure 3: Sarah, in the moment of realization



Figure 4: Marcus sees his own reflection and the virtual overlay of his own body

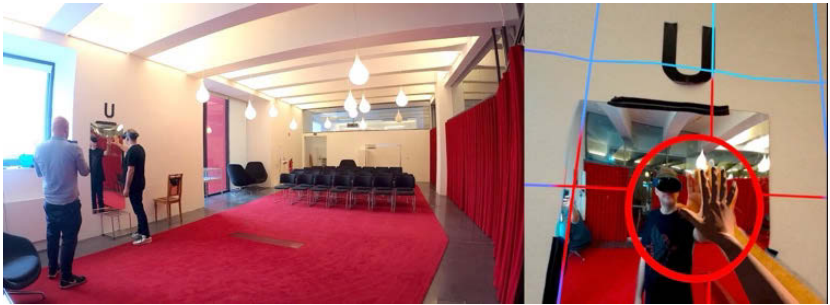


Figure 5: Experimenter returns Marcus' handshake with his doppelganger



Photos and Screenshots by T. Bieseke

Figure 6: Ekkehard places the tracked chair onto the green silhouette



Figure 7: Adi reflexively fends off the approaching bird



Photos and Screenshots by T. Bieseke

LITERATURE

Bailenson, Jeremy. *Experience on Demand: What Virtual Reality Is, How It Works, and What It Can Do*. First edition. New York, NY: W. W. Norton & Company, Inc., 2018.

Benetka, Gerhard/Sluneco, Thomas: “‘Erleben,’ das zur Sprache kommt.” *Journal für Psychologie* 29, no. 2 (2021): pp. 17-40. <https://doi.org/DOI:10.30820/0942-2285-2021-2-17>

Bieseke, Tobias: “Draw a Straight Line and Follow it!,” in: Bieseke, Tobias et al. (eds.), *Montepulciano Journal—The Poetics of Making*, Cologne: Verlag der Kunsthochschule für Medien 2022, pp. 59-75, <https://e-publications.khm.de/frontdoor/index/index/docId/238>

- Bieseke, Tobias, "Ndinguwe Drehbuch," August 18, 2023, Google Drive, https://drive.google.com/file/d/1Zde7qnUmyKiMkCQ3n-LXsald6alJ5wVX/view?usp=share_link
- Bieseke, Tobias: Ndinguwe—"I am you," February 23, 2024, Vimeo, Video, 09:22, <https://vimeo.com/915943769>
- Blumenberg, Hans: *Realität und Realismus*. Berlin: Suhrkamp 2020.
- Breithaupt, Fritz: *Das narrative Gehirn: was unsere Neuronen erzählen*. Berlin: Suhrkamp 2022.
- Ihde, Don: *Technology and the Lifeworld: From Garden to Earth*. The Indiana Series in the Philosophy of Technology. Bloomington, IN: Indiana University Press 1990.
- Koenitz, Hartmut: *Understanding Interactive Digital Narrative: Immersive Expressions for a Complex Time*. Abingdon/Oxon New York, NY: Routledge 2023.
- Laurel, Brenda: *Computers as Theatre*. Second edition. Upper Saddle River, NJ: Addison-Wesley 2014.
- Merleau-Ponty, Maurice/Böhm, Rudolf: *Phänomenologie der Wahrnehmung*. Berlin: de Gruyter 2010.
- Mori, Masahiro/MacDorman, Karl/Kageki, Norri: "The Uncanny Valley [From the Field]," *IEEE Robotics & Automation Magazine* 19, no. 2 (June 2012): pp. 98-100. <https://doi.org/10.1109/MRA.2012.2192811>
- Murray, Janet Horowitz: *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. Cambridge, MA: MIT Press, 1998.
- Peck, Tabitha C. et al.: "Putting Yourself in the Skin of a Black Avatar Reduces Implicit Racial Bias." *Consciousness and Cognition* 22, no. 3 (September 2013): pp. 779-787. <https://doi.org/10.1016/j.concog.2013.04.016>
- Peters, David: "Tödliche Schüsse auf Mouhamed Dramé: Anklage gegen fünf Polizeikräfte," *WDR*, February 16, 2023. <https://www1.wdr.de/nachrichten/ruhrgebiet/anklagen-fall-mouhamed-100.html>
- Slater, Mel/Banakou, Domna/Beacco, Alejandro/ Gallego, Jaime/Macia-Varela, Francisco/Oliva, Ramon: "A Separate Reality: An Update on Place Illusion and Plausibility in Virtual Reality." *Frontiers in Virtual Reality* 3 (2022): pp. 10-13, <https://doi.org/10.3389/frvir.2022.914392>

Towards a Responsible Metaverse

Digital Fashion, Avatars, and the Promise of Identity in Virtual Worlds

NICOLLE LAMERICHS

INTRODUCTION

In March 2022, the first digital fashion week was held in DECENTRALAND. This Metaverse Fashion Week (MVFW) drew 108,000 unique visitors across the four days on the decentralized platform and included wearables by Selfridges and other brands.¹ One digital collection that premiered at the event was Disco Drip by Dolce&Gabanna. Branded by anthropomorphic, cat-like avatars, this fashion line features futurist bomber jackets and balloon shirts with wild animal patterns and accessories. Disco Dip is a colorful splash into the Metaverse. Users can buy these exclusive items as NFTs (non-fungible tokens) on the platform Open Sea. This type of “tokenized fashion,” driven by blockchain, offers new ways of owning and investing in digital fashion. However, just like the offline counterpart of high fashion, it is a luxury product for the select few. The most expensive outfit of the collection, Blue Angel, sells for 6.9 ether or 11.560,89 euro (April 24, 2023).

A new wave of designers is reimagining fashion as a digital space. This development of digital fashion (also known as virtual fashion) involves the creation of garments or designs with digital tools. Designers use games, apps, blockchain, and virtual influencers to design and monetize their pieces. What was once a tactile

1 Cf. Shirdan, Lyon: “Metaverse Fashion Week Was a Promising Prototype for the Future. Here’s Why,” *Entrepreneur*, May 11, 2022, <https://www.entrepreneur.com/living/metaverse-fashion-week-was-a-promising-prototype-for-the/424308>

and material sector is now extending into new platforms. The development of digital fashion is intimately related to ideas about digital identity and the visions of tech companies regarding the Metaverse. This development refers to a technology that combines different platforms but also acts as an umbrella term for widely diverse virtual worlds that integrate different functions. Companies such as Epic and Facebook envision a unique Metaverse, which blends online and offline spaces, bodies, and identities. Users navigate these worlds with their avatars, which represent who they are, what they own, and who they aspire to be. As in fashion's offline counterpart, digital clothing can be a medium to signal identity in a complex world. As a result, a new visual culture is forming, and perhaps even an entirely new posthuman aesthetic.

A good example of these developments is the digital fashion created by Auroboros, which often has a dreamy and celestial quality. Auroboros specializes in fashion for different platforms. Their Biomimicry Digital Collection contains outfits inspired by nature. One of their digital dresses, the futuristic Venus Trap Dress, has countless silver spikes reminiscent of the dangerous, carnivorous plant.² Many of these digital collections are presented as groundbreaking and innovative. However, digital fashion has a long history in virtual worlds and games such as *SECOND LIFE* and *THE SIMS*. Players design beautiful outfits and skins and share these on virtual marketplaces. In *WORLD OF WARCRAFT*, for instance, players sell exclusive outfits and avatars. In 2007, a Rogue character in *WORLD OF WARCRAFT* with premium gear sold for 7,000 Euros.³ Edward Castronova already described the rich in-game economies of virtual worlds in 2006, when leveled-up characters and exclusive items were sold for premium prizes. Castronova writes: "eBay's Category 1654, Internet Games, attracts millions of dollars annually in trade for virtual swords, virtual houses, virtual money."⁴ In other words, virtual economies have been booming for decades now.

These economies revolve around trade as well. Shareability is part of the attraction of digital fashion, but these economies should be fair and fun as well. Castronova already suggested in 2006: "Several worlds might find it advisable, for example, to allow users to transfer assets among worlds in their consortium,

2 Cf. auro.borus: "@kungfukeni shapeshifts into an ancient deity wearing the #Venus-trap Dress and #Nymph Bag from our #Biomimicrydigital collection!" *Instagram*, February 15, 2022, <https://www.instagram.com/p/CaAS-9dNWog/>

3 Cf. Miller, Ross: "WoW Character Sells for Nearly \$10,000," *Engadget*, September 17, 2007, <https://www.engadget.com/2007-09-17-wow-character-sells-for-nearly-10-000.html>

4 Castronova, Edward: *Synthetic Worlds: The Business and Culture of Online Games*. Chicago, IL: University Of Chicago Press 2006, p. 122.

including avatar capital. Ideas like this have already been proposed by some start-ups, such as PlayVault and the Gaming Open Market.”⁵ Nearly twenty years later, the notion of assets circulating from platform to platform is fundamental to many Metaverse visions and aspirations. This is one reason why many brands and platforms team up with blockchain applications since they promise ownership and tradability of these assets in the form of tokens.

In this chapter, I explore how digital fashion allows us to express our digital identity in new ways. This screenwear is an extension of our identity, as users spend more and more of their time online. Dresses and apparel can be designed in radically new ways in the Metaverse. New textures, moving dresses, different shapes, alien bodies, and digital fashion do not have to abide by the laws of nature and gravity. The dress Iridescence by The Fabricant, for instance, flows freely and shines brightly in ways that no physical outfit can.⁶ Digital fashion also has inclusive potential since it can be separated from our physical bodies. Any type of avatar can wear pixel outfits, from real-life models to animals and aliens. This posthuman conceptualization is inspiring. Think of the virtual influencer Zlu (@iam_zlu on Instagram), who is a blue alien with silver textures, modeling for different fashion brands.

Digital fashion opens us up to new ways of being and forms of embodiment. The construction of our avatars is a kind of digital cosplay that relates to performance and dress-up, as well as the construction of a virtual identity overall. Aesthetics, social, technical, and economic worlds come together here.⁷ However, this datafication and monetization of our identity and assets is also problematic. It is intimately connected to platformization, or “the rise of the platform as the dominant infrastructural and economic model of the social web and its consequences, in its historical context.”⁸ The platformization of fashion specifically circulates, constructs, and monetizes our digital bodies in new ways in online worlds and systems.

As this chapter shows, virtual fashion opens possibilities to explore our identity in new ways, but can also set boundaries. The business models behind digital fashion, in particular tokenized fashion, are not neutral. I conclude that designing

5 Ibid., p. 143.

6 Cf. The Fabricant: “Iridescence,” *The Fabricant*, April 24, 2023, <https://www.thefabricant.com/iridescence>

7 Cf. Banks, Jaime: *Avatar, Assembled: The Social and Technical Anatomy of Digital Bodies*. Bern: Peter Lang 2017.

8 Helmond, Anne: “The Platformization of the Web: Making Web Data Platform Ready,” *Social Media + Society* 2, no. 1 (2015).

these choices in a responsible way is possible, but only through purposeful intervention and co-creation.

DIGITAL FASHION

Digital fashion can be created in different ways, especially in the Metaverse. A first way of doing this is by letting users design their own outfits and skins. This is what *THE SIMS* stands out in and what *SECOND LIFE* already specialized in since the beginning of the platform in 2000. Entire user cultures and fashion markets can emerge, with users commonly setting their own prizes. Other digital fashion is purposely designed by brands and designers. Metaverse fashion commonly follows this strategy. Furthermore, these fashion pieces can be developed in collaboration with brands and Metaverse applications. This can be done in different ways as well. First, brands can design entirely new digital designs that cut across platforms. In 2021, Gucci designed a digital pair of sneakers called The Gucci Virtual 25. These neon-colored green-pink sneakers are designed in collaboration with AR company Wanna and can be worn in their app as well as in *ROBLOX* and *VR CHAT*.⁹ The sneakers were quite affordable compared to the brand's regular pricing and ranged from \$8.99 to \$12.99, depending on the app in which they were purchased.

Avatar creation tools, such as *BITMOJI* or *READY PLAYER ME*, also collaborate with existing brands to create Metaverse fashion. Adidas, for instance, created *Ozworld* avatars in collaboration with *READY PLAYER ME* as “a unique offering generated based on individual personalities rather than physical appearances.”¹⁰ The pieces could be embedded in VR chat, *Somnium Space*, and many other digital spaces. Consumers could create and claim their avatars on ozworld.adidas.com after answering a set of questions about themselves. The campaign launched in parallel with the physical *Ozworld* collection and was also part of its branding.

Brands can also team up with Metaverse applications. Ralph Lauren has partnered with *FORTNITE* to create a fashion collection. As stated in *Vogue Business*: “The US brand has designed in-game clothing for *FORTNITE* that will feature the

9 Cf. Hahn, Jennifer: “Gucci Releases First Virtual Sneaker that Can Only be Worn in Digital Environments,” *Dezeen*, March 19, 2021 <https://www.dezeen.com/2021/03/19/virtual-25-gucci-wanna-digital-sneaker/>

10 Marcinkowski, Daniel: “adidas Originals bring *Ozworld* avatars to *Ready Player Me*,” *Blog Ready Player Me*, April 15, 2022, <https://blog.readyplayer.me/adidas-originals-ozworld-3d-avatars-metaverse/>

Takashi Murakami, made the news when it was bought for \$134,000.¹³ The Design Museum Den Bosch writes about this sneaker collection and its potential to carry the sneakers across different platforms in the Metaverse.¹⁴ This results in unique digital merchandise, targeting fans of a story world or brand. DC, for instance, launched a Metaverse where you can own unique Batman fashion (“Bat Cows”) and play in an extended universe.¹⁵ The Metaverse creates a new culture, not just around brands but around their consumers and loyal fans. In these new business models, fans are not just audiences and participants but co-owners of a brand and part of an ecosystem. These Bat Cows are not just fashion or an asset but a key to unlocking completely new experiences. The larger promise behind NFTs is that audiences become part of a journey with content creators. In DC’s Metaverse, fans are not only consumers but owners, investors, and virtual collectors.

The carbon footprint of NFTs, however, is a concern when considering the use of this technology. While tokenized fashion offers the possibility of trading and certifying designs, not each application is sustainable yet. The Digiconomist tracks the energy consumption of Bitcoin, for instance. One transaction is equivalent to “61,748 hours of watching YouTube.”¹⁶ However, many blockchain companies work hard to green their technologies. Ethereum’s energy consumption has been dramatically reduced, for instance. Blockchain news outlet *Decrypt* reports: “Ethereum’s estimated annual CO2 emissions have dropped from over 11 million tons to just under 870—less than the combined total of 100 average American homes, per the EPA.”¹⁷ More sustainable ways to design this technology exist, and companies are increasingly working towards this.

Moreover, the rise of digital assets also raises questions about access, security, and user practices. While tokens seem like a safe way to store and certify digital assets, they are intimately connected to specific tools, such as wallets. Notorious

13 Cf. Van Boom, Daniel: “These Nike NFT ‘Cryptokicks’ Sneakers Sold For \$130K,” *CNET*, April 28, 2022, <https://www.cnet.com/personal-finance/crypto/these-nike-nft-cryptokicks-sneakers-sold-for-130k/>

14 Cf. Design Museum: “NFTs of Virtual Sneakers,” *Design Museum*, August 30, 2022, <https://designmuseum.nl/en/derde-verdieping/sneakers/nfts-of-virtual-sneakers/>

15 Cf. DC NFT Universe: “Start Your Journey into the DC Universe,” *DC NFT Universe*, April 25, 2023, <https://nft.dcuniverse.com/splash>

16 Digiconomist: “Bitcoin Energy Consumption,” *Digiconomist*, November 11, 2023, <https://digiconomist.net/bitcoin-energy-consumption>

17 Hayward, Andrew: “Ethereum Energy Usage, Carbon Footprint Down 99.99% After Merge: Report,” *Decrypt*, September 15, 2022, <https://decrypt.co/109848/ethereum-energy-carbon-footprint-down-99-percent-merge>

is the story of programmer Stefan Thomas, who lost the password to his crypto wallet which contains about \$220 million. He still has two guesses left until the wallet is locked indefinitely.¹⁸ Around 23% of cryptocurrency is estimated to be in locked or otherwise stranded wallets. Users can technically lose access to their digital assets altogether.

Figure 1: Author avatar in Ready Player Me



Source: Screenshot by N. Lamerichs

Finally, the market around NFTs and tokens is characterized by its high volatility and high price fluctuations. This is largely due to the scarcity of some tokens, their liquidity, and hype cycles. However, centralized virtual worlds can also prone be subjected to economic crashes. Think of *HABBO HOTEL*, where an update led to a mass trade-off where countless users lost value, and the entire economy crashed.¹⁹

18 Cf. Popper, Nathaniel: “Lost Passwords Lock Millionaires Out of Their Bitcoin Fortunes,” *The New York Times*, January 12, 2021, <https://www.nytimes.com/2021/01/12/technology/bitcoin-passwords-wallets-fortunes.html>

19 Cf. Drapkin, Aaron: “The Cursed Demise of Habbo Hotel,” *Wired*, February 6, 2021, <https://www.wired.co.uk/article/habbo-hotel-update-chaos>

Just like investing in offline luxury goods, the digital fashion market fluctuates. However, there is an additional component to NFTs, which is related to the platforms, services, and tokens potentially crashing or fading out. Assets can be entirely lost when a virtual world or token collapses, which adds an additional dimension of risk when investing in digital fashion.

OTHERWORLDLY FASHION AND IDENTITY PLAY

Digital fashion can exist with or without a real-life counterpart. Some designers focus exclusively on the virtual market, such as the digital fashion house The Fabricant, based in Amsterdam. They made the first fashion NFT, which was worn by Johanna Jaskowska and sold on the Ethereum blockchain for an equivalent of \$9,500.²⁰ The Fabricant creates unique collections and uses digital tools to their advantage. In collaboration with virtual shoe designer RTFKT, they designed a gender-fluid fashion line, inspired by the Renaissance, called RenaiXance. The Fabricant describes their collection as follows: “The collection includes 9 NFTs, each rich with their own folklore, based on gaming characters but remixing their aesthetic to correspond to The Fabricant’s ‘Pluriform’ design philosophy. Our belief is that fashion should be fluid and genderless—in the digital terrain we can express multiple selves and identities.”²¹

While the collection aims to be genderless, the names seem to be references to male avatars, such as the Hero look and the Kratos look, which seems to refer to Kratos from GOD OF WAR. The designs, meanwhile, have long skirts, crop tops, and dresses with different pieces of armor and chainmail. Masculine and feminine are blended, but only to an extent. The vision of The Fabricant is to create a new language in digital fashion: “The real value of 3D is that it enables us to be way more creative and to create situations that we haven’t previously seen, which allows for this new aesthetic language; a new way of expressing our creativity that really speaks to young, digitally savvy audiences,” CEO Kerry Murphy told *Vogue*.²²

20 Cf. The Fabricant: “Iridescence,” *The Fabricant*, November 11, 2023, <https://www.thefabricant.com/iridescence>

21 The Fabricant: “RenaiXance,” *The Fabricant*, April 24, 2023, <https://www.thefabricant.com/rftkt>

22 Cf. Heng, Emily: “Digital Fashion House The Fabricant Paves the Way for More Innovation within the Metaverse,” *Vogue*, April 12, 2022, <https://vogue.sg/the-fabricant-metaverse-funding/>

Digital fashion houses and fashion designers are steadily emerging, and many of them are focused on creating pieces for the Metaverse. An interesting initiative is IKON-1 by Nick Knight, one of the world's leading fashion photographers. Knight has always had a passion for the digital and 3D. He recently did a big NFT drop with model and Instagram star Jazelle or @Uglyworldwide.²³ The digital artworks feature not only digital fashion but also make-up, hair, and more, created by over 40 innovators and curated by Knight and Jazelle. These assets resulted in 8,000 one-of-a-kind artworks, which Jazelle has also prominently showcased on her Instagram account. Each design is unique, outspoken, and often highly futuristic. Some feature Jazelle as a quasi-cyborg, completely covered in a gold bodysuit, while other designs are almost Victorian-inspired, full of ruffles and laces.

Digital fashion can push the boundaries of the real world. Inspired by digital subcultures and visions of the posthuman, it can enhance our bodies in new ways. The art of Harriet Davey, for example, embraces an otherworldly aesthetic through a non-binary alien avatar.²⁴ Rather than a digital equivalent or mediation, digital fashion can be a new aesthetic and language. It has the potential to be a fully new medium and style in its own right. Separated from offline constructs such as gravity, gender, bodies, and known textures, digital fashion can be something completely different. It can be cutting-edge, innovative, and wild. These products can blend costumes, animation, crypto, and gaming. Through the combination of these technologies, genres, and styles, digital fashion reaches new heights and inclusive potential.

What digital fashion stimulates is identity play. It allows users to represent themselves in innovative ways on different virtual platforms. In ideal cases, fashion is a tool for immersion, possibilities, and experimentation. Think of VRCHAT as a place where different people can meet with purposefully designed avatars. It's a space full of user-driven entertainment with a dedicated global player community. VRCHAT allows users to play with a wide range of identities and identity markers, from cat ears and anime hairdos to exotic skin colors. This identity play within VRCHAT is depicted well in the HBO Max documentary *We Met in Virtual*

23 Cf. Waite, Thom: "Nick Knight is Building a 'New Civilisation' in the Metaverse," *Dazed Digital*, November 17, 2022, <https://www.dazeddigital.com/art-photography/article/57464/1/nick-knight-building-a-new-civilisation-in-the-metaverse-ugly-worldwide-ikon-1>

24 Cf. Simpson, Ashley: "Meet Harriet Davey, The 3D Artist Embracing Otherworldly Forms," *Goat*, April 24, 2023, <https://www.goat.com/editorial/harriet-davey-artist-interview>

Reality.²⁵ Unique avatars meet and create long-lasting friendships in the VR application, where they truly feel that they can be themselves. VRCHAT has also given a range to new performances and celebrities. Virtual idols use VRCHAT for virtual concerts and exclusive fan events. Others become virtual influencers by streaming their VRCHAT content, for instance, on YouTube, and profile themselves as virtual YouTubers (“VTubers”).

Online and offline identities are also cleverly combined in Hikky’s Virtual Market, a massive online event and market that contains many different virtual pavilions. Some locations are inspired by real spaces, such as a virtual Akihabara, while others are imagined spaces, for instance, inspired by stories. Hikky’s Virtual Market collaborates with existing properties for these markets, such as Disney, as well as brands such as JR East and Yamaha.²⁶ These VR worlds are detailed, aesthetically pleasing, and lively compared to the “dead malls” that many Western tools have to offer. Personal identity, customization, and worldbuilding are key. Without these options, personal assets and fashion are meaningless. They need to contribute to our virtual identity, which reflects our actual desires and performances in our current consumption society. This customization stands in stark contrast with the vision of Meta and its tool, META HORIZON WORLDS, which presents the Metaverse in close connection with one’s actual identity and body. The truth is that many users do not want to simply be themselves in the Metaverse but experiment and play with how they represent themselves.

What the Metaverse offers is a possibility to unlock new virtual experiences, spaces, and identities. This closely connects to ownership, the idea that users themselves are in control of these assets, including their virtual bodies, land, and fashion. Ideally, users should even be able to trade these in an economy that they co-create. However, currently, the fashion that users create is still often at the mercy of platforms. This is problematic because the market can be completely determined by Big Tech companies, which essentially determine the supply and demand of items in these virtual worlds. Different worlds have different mindsets and approaches to digital items and their ownership, which vary from abundance to extreme scarcity. This, in turn, will impact these virtual worlds and entire user cultures. In the coming years, we will see different Metaverses being created, which will compete on these different ideas and values. Some Metaverses may be entirely user-driven, while others set limits to virtual bodies and fashion. The latter will be shaped by what’s on offer and will create fixed identities through generic

25 Hunting, Joe: *WE MET IN VIRTUAL REALITY*. HBO Max 2022.

26 Cf. Virtual Market: “About Virtual Market,” *Vket*, April 24, 2023, <https://vket6.v-market.work/en/about>

templates and skins. The Metaverse can be a game changer for our virtual economy if users are put more in the driving seat and are rewarded for their activities. What would that look like?

RESPONSIBLE METAVERSE DESIGN

Digital fashion is intimately connected to digital identity. As digital identity becomes more important and a supplement to other realities, we need to critically question the design of Metaverses and in which Metaverse we will participate. Within media studies, we should stay alert to the design of these worlds. A good example is DECENTRALAND, a decentralized Metaverse that has often been criticized, amongst others, in the video essay *The Future is A Dead Mall—Decentraland and the Metaverse* by YouTube critic Dan Olson.²⁷ He describes it as a monumental failure as a “platform for socialization, for commerce, and for gaming,” as he takes users through a lengthy documentary of its false promises, bugs, and poor game design. DECENTRALAND promises players their own digital land and assets to monetize, but in practice, it does not go beyond what early virtual worlds could do. It sells players an idea, but in reality, it is barely populated and poorly designed.

For many Big Tech companies, the Metaverse is the next step in the platform economy. Companies such as Meta even directly claim the term for their marketing and strategies. This should worry us. Platforms already cause different structural problems because they are essentially walled gardens in terms of items and ownership.²⁸ A worst-case scenario is that the Metaverse becomes a highly privatized place (a gated community, as it were) and entirely driven by ads. LEGO and Epic Games have even teamed up to develop a Metaverse for kids, which has possibilities but also raises questions concerning pedagogy, ethics, and safety.²⁹ Such a Metaverse tool for children has to be a site of creativity, play and co-design, but

27 Cf. Folding Ideas: “The Future is A Dead Mall—Decentraland and the Metaverse.” *Folding Ideas*. March 27, 2022, YouTube video, 01:49:21, <https://www.youtube.com/watch?v=EiZhdpLXZ8Q>

28 Cf. Gillespie, Tarleton: *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions That Shape Social Media*. New Haven, CT: Yale University Press 2018.

29 Cf. Whitehead, Thomas: “LEGO x Epic Games Announced, Planning A ‘Metaverse’ For Kids,” *Nintendo Life*, April 7, 2022, <https://www.nintendolife.com/news/2022/04/lego-x-epic-games-announced-planning-a-metaverse-for-kids>

surely it has to be designed in a responsible way. This approach should be mindful of three design principles.

Firstly, Metaverse applications can be an economy, but such an economy needs to be designed in a safe, trustworthy, and transparent way. When users invest in digital assets, there should be clear protection, guidelines and clarity around these technologies. This would require certain markets, such as NFTs, to be regulated further. Digital fashion can be an asset and an investment, but this would mean more gatekeeping to limit the volatility of these markets.

Secondly, Metaverse applications can take on many forms, as demonstrated in this chapter. A Metaverse does not have to be a centralized economy in the hands of large business conglomerates. There are other business models and designs that could possibly foster a responsible Metaverse. The proto-Metaverse *SECOND LIFE* is an independent economy by default, for instance, and user-driven by design. There are no advertisements, for instance, since that does not meet the vision of its designers. What this example teaches us is that the Metaverse can be open-source, user-driven, and bottom-up. This economy and its assets do not have to be designed by companies or brands but can be user driven. The Metaverse has been here for decades and thrived when users themselves developed their own levels, outfits, avatars, and content. If a marketplace is created, leave it to users to determine what these assets are worth.

Finally, Metaverse applications work best when they offer users enough freedom. Allowing enough agency for users to experiment with play and identity is key when designing a responsible Metaverse. As the history of virtual worlds and games tells us, the Metaverse will most likely not be one place. It will almost certainly be a set of pocket worlds with different micro-economies and islands. It will thrive by connections and meaningful places where the activity of users should be central. A responsible Metaverse provides enough affordances for users to create their own spaces, identities, and meaning, in line with *SECOND LIFE* and many other virtual worlds. It should unlock new experiences that are exciting and different rather than replicate reality. There is the problematic assumption, amongst others by Meta, that users want to be themselves in the Metaverse, and just augment that with VR. *VRCHAT* and other successful worlds show us that we love to experiment with our identity. Scholarship on avatars also confirms this need to experiment and be different.³⁰ A wide range of fashion options and character creation tools can truly facilitate users in any game, app, or virtual world. This can drive diversity and inclusivity.

30 J. Banks: *Avatar, Assembled*.

Designing a responsible Metaverse is possible, but it needs to take into account user practices, agency and trust.

CONCLUSION

In this post-digital society, our notion of identity and assets is shifting. As virtual identity becomes more important, so do the virtual assets that are related to our avatars. Digital fashion in the Metaverse delivers on these promises but is also restricted by what platforms and designers can offer. As this chapter has shown, digital fashion is also increasingly a market on its own, which some brands value very highly, while others put no price on it. We need Metaverse applications that are sensitive to the needs of different users, which allow them to create their own fashion and assets and allow users to set their own prices in these virtual economies and markets.

Fashion is a representative case of what the Metaverse can offer, but also of its tensions. If designers simply reproduce reality and provide users with few options for customization, it hinders the creation of an inclusive virtual society. The platformization of digital fashion reveals that this fashion is increasingly designed by large companies and brands rather than by users. However, users have many tools at their disposal to create their own fashion, avatars, and performances. Digital fashion in some virtual worlds is still largely a user practice of modding and skinning. Can fashion be even more democratized and shared in virtual worlds, or will it only be monetized by large players? In the coming years, this tension between platforms and users will persist with different virtual worlds skewing one way or the other.

One thing is certain, though. We need to move towards a human-centered design of the Metaverse that empowers users to show their unique styles and identities. The age of the Metaverse should be the age of the user, not the company.

LITERATURE

auro.borus: “@kungfukunii shapeshifts into an ancient deity wearing the #Venus-trap Dress and #Nymph Bag from our #Biomimicrydigital collection!” Instagram, February 15, 2022, <https://www.instagram.com/p/CaAS-9dNWog/>

Banks, Jaime: *Avatar, Assembled: The Social and Technical Anatomy of Digital Bodies*. Bern: Peter Lang 2017.

- Castronova, Edward: *Synthetic Worlds: The Business and Culture of Online Games*. Chicago, IL: University of Chicago Press 2006.
- DC NFT Universe: “Start Your Journey into the DC Universe,” *DC NFT Universe*, April 25, 2023, <https://nft.dcuniverse.com/splash>
- Design Museum: “NFTs of Virtual Sneakers,” *Design Museum*, August 30, 2022, <https://designmuseum.nl/en/derde-verdieping/sneakers/nfts-of-virtual-sneakers/>
- Digiconomist: “Bitcoin Energy Consumption,” *Digiconomist*, November 11, 2023, <https://digiconomist.net/bitcoin-energy-consumption>
- Drapkin, Aaron: “The Cursed Demise of Habbo Hotel,” *Wired*, February 6, 2021, <https://www.wired.co.uk/article/habbo-hotel-update-chaos>
- Folding Ideas: “The Future is A Dead Mall Decentraland and the Metaverse.” *Folding Ideas*, YouTube video, 01:49:21, March 27, 2022, <https://www.youtube.com/watch?v=EiZhdpLXZ8Q>
- Gillespie, Tarleton: *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions That Shape Social Media*. New Haven, CT: Yale University Press 2018.
- Hahn, Jennifer: “Gucci Releases First Virtual Sneaker that Can Only be Worn in Digital Environments,” *Dezeen*, March 19, 2021 <https://www.dezeen.com/2021/03/19/virtual-25-gucci-wanna-digital-sneaker/>
- Hayward, Andrew: “Ethereum Energy Usage, Carbon Footprint Down 99.99% After Merge: Report,” *Decrypt*, September 15, 2022, <https://decrypt.co/109848/ethereum-energy-carbon-footprint-down-99-percent-merge>
- Helmond, Anne: “The Platformization of the Web: Making Web Data Platform Ready,” *Social Media + Society* 2, no. 1 (2015).
- Heng, Emily: “Digital Fashion House The Fabricant Paves the Way for More Innovation within the Metaverse,” *Vogue*, April 12, 2022, <https://vogue.sg/the-fabricant-metaverse-funding/>
- Hunting, Joe: *WE MET IN VIRTUAL REALITY*. HBO Max 2022.
- Iqbal, Mansoor: “Fortnite Usage and Revenue Statistics (2023),” *Business of Apps*, January 9, 2023, <https://www.businessofapps.com/data/fortnite-statistics/#:~:text=Sources%3A%20Eurogamer-,Fortnite%20age%20demographics,their%20age%20to%20get%20access>
- Marcinkowski, Daniel: “adidas Originals bring Ozworld avatars to Ready Player Me,” *Blog Ready Player Me*, April 15, 2022, <https://blog.readyplayer.me/adidas-originals-ozworld-3d-avatars-metaverse/>
- Miller, Ross: “WoW Character Sells for Nearly \$10,000,” *Engadget*, September 17, 2007, <https://www.engadget.com/2007-09-17-wow-character-sells-for-nearly-10-000.html>

- Popper, Nathaniel: “Lost Passwords Lock Millionaires Out of Their Bitcoin Fortunes,” *The New York Times*, January 12, 2021, <https://www.nytimes.com/2021/01/12/technology/bitcoin-passwords-wallets-fortunes.html>
- Schulz, Madeleine: “Ralph Lauren Partners with Fortnite to Create First Phygital Fashion Collection,” *Vogue Business*, October 31, 2022, <https://www.voguebusiness.com/technology/ralph-lauren-partners-with-fortnite-to-create-first-phygital-fashion-collection>
- Shirdan, Lyon: “Metaverse Fashion Week Was a Promising Prototype For the Future. Here’s Why,” *Entrepreneur*, May 11, 2022, <https://www.entrepreneur.com/living/metaverse-fashion-week-was-a-promising-prototype-for-the/424308>
- Simpson, Ashley: “Meet Harriet Davey, The 3D Artist Embracing Otherworldly Forms,” *Goat*, April 24, 2023, <https://www.goat.com/editorial/harriet-davey-artist-interview>
- The Fabricant: “Iridescence,” *The Fabricant*, April 24, 2023, <https://www.thefabricant.com/iridescence>
- The Fabricant: “RenaiXance,” *The Fabricant*, April 24, 2023, <https://www.thefabricant.com/rtfkt>
- Van Boom, Daniel: “These Nike NFT “Cryptokicks” Sneakers Sold For \$130K,” *CNET*, April 28, 2022, <https://www.cnet.com/personal-finance/crypto/these-nike-nft-cryptokicks-sneakers-sold-for-130k/>
- Virtual Market: “About Virtual Market,” *Vket*, April 24, 2023, <https://vket6.v-market.work/en/about>
- Waite, Thom: “Nick Knight is Building a ‘New Civilisation’ in the Metaverse,” *Dazed Digital*, November 17, 2022, <https://www.dazeddigital.com/art-photography/article/57464/1/nick-knight-building-a-new-civilisation-in-the-metaverse-ugly-worldwide-ikon-1>
- Whitehead, Thomas: “LEGO x Epic Games Announced, Planning A ‘Metaverse’ For Kids.” *Nintendo Life*, April 7, 2022, <https://www.nintendolife.com/news/2022/04/lego-x-epic-games-announced-planning-a-metaverse-for-kids>

GAMOGRAPHY

- BITMOJI (Bitstrips 2014, O: Bitstrips)
- DECENTRALAND (Decentraland 2020, O: Decentraland)
- FORTNITE (Epic Games 2017, O: Epic Games/People Can Fly)
- HABBO HOTEL (Sulake, Habbo 2000, O: Sampo Karjalainen)
- META HORIZON WORLDS (Meta 2019, O: Meta)

READY PLAYER ME (Ready Player Me 2020, O: Ready Player Me)

ROBLOX (Roblox Corporation 2006, O: Roblox Corporation)

SECOND LIFE (Linden Lab 2019, O: Philip Rosedale)

THE SIMS (Electronic Arts 2000, O: Maxis)

VRCHAT (VRChat 2014, O: VRChat)

WORLD OF WARCRAFT (Blizzard Entertainment 2004, O: Blizzard Entertainment)

Akihabara

A Proto-Metaverse

GIOVANNI TAGLIAMONTE

Akihabara is a district in Tokyo that has found itself transformed from a place for electronics to a fantasy-like space dedicated to the celebration and consumption of Otaku culture. In an interview with Patrick Galbraith, design theorist Kaichiro Morikawa explains that in his eyes:

“This was not just a transition from shops specializing in one type of commodity to another. Rather, my argument was that the geographic concentration of otaku, who share personality traits and tastes, came to be reflected in the urban space of Akihabara. On all the signs—everywhere, actually—you can now see images of bishojo characters of the type preferred by otaku. It’s as if private interests have entered into public space—as if the contents of an otaku’s bedroom have spilled out into an entire neighborhood of Tokyo.”¹

This curious development can be likened to other spaces that exhibit hyperreal qualities, be it Disneyland or Las Vegas. How did the example of Akihabara come to be, what characteristics frame it, and how can it inform our understanding of technology and a move into cyberspace?

This chapter will establish how Akihabara exemplifies a transitional period between digital and physical: In the years of early consumer digital information technology, Akihabara stood at the intersection of moé and character culture, which enabled its development into a physical hub for Otaku culture. Because the technology was yet nascent, an entire fandom instead comes to represent itself within a district in Tokyo and then said district goes on to be represented again

1 Galbraith, Patrick W.: *The Moé Manifesto: An Insider’s Look at the Worlds of Manga, Anime, and Gaming*, Tuttle Publishing, 2014, p. 160.

within their art. From media to maid cafes, this chapter will show how Akihabara can be understood as a unique analog representation of future digital spaces—A Proto-Metaverse.

I WHAT IS AKIHABARA? —TRACING THEORY AND HISTORY

Hyperreality, Simulacra, and Anticipation

The descriptor “hyperreality” can be traced back to philosopher and novelist Umberto Eco, who formulated the idea during his visits to the United States. To Eco, the worlds of Disneyland and other theme parks are categorized by their ambivalence to represent something accurately. Instead, they present an alternate reality that can fulfill the needs and impressions we are looking for more than an accurate representation could: “In this sense, Disneyland is more hyperrealistic than the wax museum, precisely because the latter still tries to make us believe that what we are seeing reproduces reality absolutely, whereas Disneyland makes it clear that within its magic enclosure, it is a fantasy that is absolutely reproduced.”²

Jean Baudrillard later spoke of the concept of simulacrum—a simulation devoid of an original—when outlining hyperrealities. He wrote: “Simulation is no longer that of a territory, a referential being or a substance. It is the generation by models of a real without origin or reality: a hyperreal.”³ Hyperreal thus refers to the quality of something which is “more real” than its original. It is a focus on the defining, recognizable attributes, providing an exaggerated experience to which the real version cannot compare.

In *Vegas, Disney, and the Metaverse*, media and game studies scholar Gundolf S. Freyermuth outlines how the forming of the hyperreal spaces in both Disneyland and Las Vegas anticipates developments within media and technology.⁴ The

2 Eco, Umberto: *Travels in Hyper Reality: Essays*, trans. William Weaver, New York, NY: Harcourt Brace Jovanovich 1986, p. 24.

3 Baudrillard, Jean: *Simulacra and Simulation*, Ann Arbor, MI: University of Michigan Press 1994, p. 1.

4 Cf. Freyermuth, Gundolf S.: “Vegas, Disney, and the Metaverse: On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century,” in: Beil, Benjamin et al. (eds.): *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript Verlag 2022, pp. 17-97, here pp. 21-24, <https://www.transcript-open.de/doi/10.14361/9783839462003-002>

concept of anticipation originates within Walter Benjamin's *The Work of Art in the Age of Mechanical Reproduction* and it describes art's ability to foresee the forming of a future.⁵ Freyermuth concludes that the unique hyperreal architectures and media landscapes anticipate the forming of virtual worlds through "a functional reconstruction of reality itself, or more precisely, the superimposition of virtuality on the material world."⁶

These developments have shaped our present state wherein proto-metaverses have emerged in games through social experiences such as *SECOND LIFE* and more traditional video games like *MINECRAFT* or *FORTNITE* that have evolved into social spaces.⁷ The term *Metaverse* originates in Neal Stephenson's science fiction novel *Snow Crash* and describes a fully immersive and interconnected virtual world that people can enter and spend time in.⁸ Freyermuth writes:

"Compared to the media of the analog past, these virtual game worlds possess a unique quality: They have transformed from escapist entertainment, to which one retreats for a few hours, to living environments that—like Las Vegas—exist parallel to and entirely on an equal footing with everyday reality. Under the conditions of cultural digitalization, media utopias become social utopias, utopias of new hybrid life forms that survive partly in materiality and partly in virtuality."⁹

Akihabara is a similar type of space that exists 'in a different time' to the rest of the world. Akihabara, like Las Vegas, anticipates the forming of virtual worlds, though it does so through the specific lens of otaku culture and forms in a different historical context. However, as society moves onto a digital world, the physical precursors of it—the manifestations of proto-metaverses within reality—may prove to be ephemeral.

To understand Akihabara as a hyperreal space and how it formed as an anticipator of a digital turn, we must first understand its history and culture. Modern Akihabara is a space that was shaped by a particular group of people, the *otaku*. Without otaku and their obsession with *moé*, Akihabara would not have formed in the special way that it did. Thus, we need to first understand both otaku and their

5 Benjamin, Walter: "The Work of Art in the Age of Mechanical Reproduction," in: Arndt, Hannah (ed.): *Illuminations*, trans. Harry Zohn, New York, NY: Schocken Books 1969, p. 3.

6 Ibid., p. 84.

7 Ibid., p. 85.

8 Cf. Stephenson, Neal: *Snow Crash*. New York, NY: Bantam Books 1992.

9 G. Freyermuth: "Vegas, Disney, and the Metaverse," p. 86.

unique relationship with reality and how moé played an integral part in manifesting fiction within this place. Afterward, we will explore the multi-faceted way that otaku culture and Akihabara intertwine, and finally, we will look at how different virtualizing forces have been reimplementing the proto-metaverse into the digital space.¹⁰

Of Otaku and Moé

Otaku is a term that is surprisingly hard to define. I will give both a historical summary and a few different perspectives to provide context that will help clear up the term's meaning. Japanese culture critic Hiroki Azuma describes it by saying: "Simply put, it is a general term referring to those who indulge in forms of subculture strongly linked to anime, video games, computers, science fiction, special-effects films, anime figurines, and so on."¹¹ Morikawa in his paper on the topic offers its closest equivalents in English to be "nerd" or "geek."¹² However, it is of paramount importance to note that otaku does refer to a specific type of "geek."

Despite the initial impression one might have of the term otaku being directly tied to the manga or anime industry, otaku are not necessarily defined by being geeks who happen to be into anime or manga.¹³ Morikawa traces the origin of the current term to an essay by Nakamori Akio where it is made clear that "these types aren't just manga fans" but can extend into people obsessed with computers, audio equipment, and idol fans, to name just a few.¹⁴

By the early 1980s, the term had become commonplace within communities to clearly differentiate themselves from 'normal people'; it was both self-deprecating and self-affirming. The term gained a strong negative connotation after the

10 For a glossary of the terminology surrounding Akihabara and otaku culture, see pp. 387-388.

11 Azuma, Hiroki: *Otaku: Japan's Database Animals*, trans. Jonathan E. Abel/Shion Kono, Minneapolis, MN: University of Minnesota Press 2009, p. 3.

12 Cf. Morikawa, Kaichiro: "おたく Otaku/Geek," trans. Dennis Washburn, *Review of Japanese Culture and Society* 25, no. 1 (2013), Honolulu, HI: University of Hawai'i Press 2013, pp. 56-66, here p. 57, <https://doi.org/10.1353/roj.2013.0002>

13 It should be noted that there is a difference between the Japanese usage of the term and the now somewhat common usage of the term in English—where it is specifically applied to people with interests related to anime and manga. The Japanese version is more far-reaching and less clearly definable.

14 K. Morikawa: *おたく Otaku/Geek*, p. 57.

murderer and rapist of four young girls, Miyazaki Tsutomu, was apprehended by police in 1989. The term was popularized by the media, who saw his avid collection of thousands of videotapes (including anime, special effects movies, and pornography) as the motive behind his horrible actions.¹⁵ However, attempts at reclaiming the term have been made—especially since the success of the 1995 television anime *NEON GENESIS EVANGELION*,¹⁶ which, according to Azuma, led to the creation of a new generation of otaku.¹⁷

It should be noted that the term has retained usage even as its proliferation to an international audience in the last 20 years continued and became more and more established, even among global communities.¹⁸ Indeed, as Katelin Garner points out: “The sheer breadth of these commercial and public resources for anime-specific media indicates that Otaku Culture is no longer a niche subculture, but a ubiquitous and profitable market.”¹⁹

However, Japanese psychologist Saitō Tamaki distinguishes between otaku and “maniacs.” In his book on otaku psychology, *Beautiful Fighting Girl*, he writes: “I believe that today’s otaku derive from a group of maniacs who have reacted to the changes in the media environment by a proliferating set of adaptations.”²⁰ To Saitō, the difference between the two lies in that the otaku’s focus lies within a different layer of materiality. A person obsessed with cameras would fall into the category of a maniac,²¹ while a person obsessed with anime would fall into the category of an otaku.²²

Saitō argues that where a maniac would collect objects or build out a radio setup, thus “possessing” their object of desire, otaku do so through fictionalization. He writes, “The only way that otaku have of acquiring the objects they love is by fictionalizing them and turning them into their own works. This inevitably

15 Ibid., p. 60.

16 *NEON GENESIS EVANGELION* (Japan 1995, D: Hideaki Anno).

17 Cf. H. Azuma, *Otaku: Japan's Database Animals*, pp. 5-10.

18 Garner, Katelin: *The Digital Otaku: Anime, Participatory Culture, and Desire*, Long Beach, CA: California State University 2019, p. 23.

19 Ibid., p. 24.

20 Saitō, Tamaki: *Beautiful Fighting Girl*, trans. Keith Vincent/Dawn Lawson, Minneapolis, MN: University of Minnesota Press 2011, p. 17.

21 I chose to retain the term that Keith Vincent and Dawn Lawson used in their translation of *Beautiful Fighting Girl*. For clarification, the Japanese original uses mania/maniac, loan words from English that do not carry the negative idea of insanity the English terms do. They are closer to “enthusiasts.”

22 T. Saitō: *Beautiful Fighting Girl*, pp. 17-19.

leads to the creation of new fictional contexts,” pulling in both the creation of derivative fanworks (doujinshi—more later) and cosplay as acts of otaku fictionalization.²³ Putting it succinctly in reference to Walter Benjamin’s *The Work of Art in the Age of Mechanical Reproduction*, Saitō writes, “Maniacs are enchanted by the aura of the original object, while the otaku fashion an original aura for their (fictional) reproductions.”²⁴

The act of creating and layering fictional contexts can be seen as a central aspect of otaku identity. Media theorist Ōtsuka Eiji wrote on what he terms “narrative consumption” in 1989, describing a postmodern shift in consumption where “[w]hat is being consumed is not an individual drama or thing but the system itself that was supposedly concealed in the background.”²⁵ This is a shift that Ōtsuka considers a move to a program (that is, a digital) type of narrative—he goes as far as to liken it to a video game.²⁶ Steinberg outlines in his translator’s preface on Ōtsuka’s essay how his research anticipated and helped shape the Japanese “media mix,” the Japanese equivalent of the North American concept of transmedia storytelling.²⁷ Ōtsuka later went on to work on multiple media mix projects himself.

Within this new context, once the audience has understood the program, consumers can repurpose narratives to create new works within those narrative structures. In writing on the phenomenon of the publication of *Captain Tsubasa*²⁸ *doujinshi*,²⁹ Ōtsuka wrote: “These girls extracted the Tsubasa ‘program’ from Takahashi Yōichi’s *Captain Tsubasa* and wrote their respective Tsubasas by following the order of this program in their own individual, creative ways. For these girls, the original work was merely the raw material from which to extract the Tsubasa program.”³⁰

23 Ibid., p. 20.

24 Ibid., p. 19.

25 Ōtsuka, Eiji/Steinberg, Marc: “World and Variation: The Reproduction and Consumption of Narrative,” *Mechademia* 5, no. 1 (2010), Minneapolis, MN: University of Minnesota Press, pp. 99-116, here p. 109.

26 Ibid., pp. 107-108.

27 Ibid., p. 100.

28 Takahashi, Yōichi: *Captain Tsubasa*, Tokyo: Shueisha 1981.

29 Doujin (同人—written with the characters for “same” and “person”) in its etymology already outlines the idea. These are works made by average people often as a hobby—someone just like you and me, so to speak. The “shi” (誌) in doujinshi is simply the character for “magazine”. These are magazines for like-minded individuals.

30 Ōtsuka refers here to the female authors of these fanworks (E. Ōtsuka and M. Steinberg: “World and Variation,” p. 110).

This understanding of otaku as consuming narrative to create their own versions not only maps onto Saitō's ideas of otaku acquiring objects of desire through fictionalization but can be traced historically back to *Comiket* (short for Comic Market) where otaku sell these doujinshi and other derivative works.

Finally, it should be noted that despite the image potentially created through some of the descriptions of otaku and Saitō's focus on male otaku sexuality, it remains a gender-neutral term, and a significant portion of otaku are female.³¹ Huge subgenres exist within female otaku communities, including Boys Love (or BL) fiction—doujinshi and works featuring homosexual relationships between male characters.³²

Moé—Love for Fictionality

The fascination with fictional characters Saitō describes is so commonplace among otaku that it has earned itself a term of its own: *moé*.³³ To Saitō, the term is directly linked to otaku sexuality,³⁴ but I will be considering cultural anthropologist Patrick Galbraith's exploration of the concept in his 2014 book *The Moé Manifesto*³⁵ to build out a clear and comprehensive understanding of the term. Galbraith explains his position that *moé* is more than sexual arousal:

"I don't think the *moé* phenomenon can simply [be] explained as ogling cute girls. That doesn't explain Hayasaka Miki drawing from the perspective of his character's elder sister, or men dressing up as Haruhi on the streets of Akihabara, or the impulse to marry a fictional character."³⁶

Within the book, Galbraith offers a succinct definition:

31 K. Morikawa: *おたく Otaku/Geek*, pp. 64-65.

32 Novitskaya, Alexandra: "Otaku Sexualities in Japan," in: *The Global Encyclopedia of Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) History*, Farmington Hills, MI: Gale, 2019, p. 1179.

33 Sometimes romanized as *moe*. The accent emphasizes the pronunciation.

34 T. Saitō: *Beautiful Fighting Girl*, pp. 29-31.

35 P. Galbraith: *The Moé Manifesto*.

36 Galbraith refers to Suzumiya Haruhi, main heroine of popular light novel and anime *THE MELANCHOLY OF HARUHI SUZUMIYA* (Japan 2006, D: Tatsuya Ishihara); P. Galbraith: *The Moé Manifesto*, p. 23.

“In this contemporary usage, *moé* means an affectionate response to fictional characters. There are three things to note about this definition. First, *moé* is a response, a verb, something that is done. Second, as a response, *moé* is situated in those responding to a character, not the character itself. Third, the response is triggered by fictional characters.”³⁷

What this means in context is that characters evoke *moé* within *otaku*. Galbraith outlines that it is a feeling unique to fictional characters—however, material representations of characters can evoke it. This includes voice lines, figures, art, or even a person in costume playing a character (cosplay). The important aspect here is that the *moé* is a response to the fictional character, not the human or the costume.³⁸

Galbraith’s work on *moé* is fascinating, and his interviews elucidating, especially in terms of how *moé* relates to gender. Many aspects break out of traditional gender norms and ideas of heterosexuality.³⁹

Tracing Akihabara's History

Akihabara is a district located within Tokyo. While it used to be a destination for electronics, nowadays, Akihabara serves as the center stage of *otaku* culture. After being established as a district for electronic household appliances in the 1970s and through the 1980s, the burst of the economic bubble led to a specialization in personal computers.⁴⁰ Morikawa explains that this shift marked a change in visitor demographics—from families to young geeks.⁴¹ This shift would be important for its later transformation. The appearance of game consoles in the space led it from a pure electronics focus to an expansion into pop culture.⁴²

The release and success of *NEON GENESIS EVANGELION* spurred a boom in demand for all manner of merchandise, both official and unofficial, in the form of

37 Ibid., pp. 5-6.

38 Ibid., pp. 5-8.

39 See in particular his interview with Momoi Halko on page 72 onward in the book.

40 Morikawa, Kaichiro: “Otaku and the City: The Rebirth of Akihabara,” in: Itō, Mizuko/Okabe, Daisuke/Izumi Tsuji (eds.): *Fandom Unbound: Otaku Culture in a Connected World*, New Haven, CT: Yale University Press 2012, pp. 133-157, here pp. 133-136.

41 Ibid., p. 136.

42 Nobuoka, Jakob: “User Innovation and Creative Consumption in Japanese Culture Industries: The Case of Akihabara, Tokyo,” *Geografiska Annaler: Series B, Human Geography* 92, no. 3 (September 2010), pp. 205-218, here p. 209, <https://doi.org/10.1111/j.1468-0467.2010.00348.x>

doujinshi or garage kits (non-commercially produced model kits) starting in 1997. This extreme success catalyzed a rapid expansion and concentration of stores catering to these needs in an area where the target demographic was already present—Akihabara.⁴³

Originally, another district of Tokyo, East Ikebukuro, had a headstart within the growing market. Anime-related stores riding the boom of the early 1990s gained traction in the area, but as Akihabara developed into a center for male otaku-oriented goods over the subsequent years, a gender split in urban development occurred. In Akihabara, personal computers (a largely male-dominated hobby) attracted mostly male visitors, while the stores in Ikebukuro, which had already seen a significant female visitorship, doubled down on serving their female customers.⁴⁴

What sets Akihabara's development apart is that it is entirely a result of demand, not government or corporate intervention. Here, we can see the influence of cyberspace: Communities of interest organized through the web (thus gaining influence) not only flocked together online but shaped an entire district to be a space for them.⁴⁵

II AKIHABARA AS A HYPERREAL SPACE

Akihabara, as a space, realizes the desires of otaku culture, pulling cyberspace into reality. Morikawa argues in his chapter "Otaku and the City: The Rebirth of Akihabara" in *Fandom Unbound—Otaku Culture in a Connected World* that:

"Simply put, in the case of Akihabara, an urban district was re-created by an architecture of tastes and interests as though the structure of the web manifested in real space. Computers are, by nature, machines that specialize in mimicking reality. Akihabara points in the opposite direction, where reality mimics the cyberspace created by computers."⁴⁶

Akihabara—The Otaku Capital

Akihabara was transformed into the capital of otaku taste over the course of the 1990s—that is to say, it became the de-facto place to visit for anything relating to

43 K. Morikawa: "Otaku and the City," pp. 141-147.

44 Ibid., p. 140.

45 Ibid., p. 152.

46 Ibid., p. 152.

the growing subculture. Anime and its character goods, video games, novels, and more subsumed the electronic district over time as its primary merchandise. As this process continued, Akihabara became known as the primary destination for anything related to the topic. This, in turn, led to the secondary development of places specifically seeking to appeal to that target audience opening up—for example, specialty stores for doujinshi or maid cafés.

This has, over time, created a pilgrimage for visiting fans, which slowly converged in Akihabara, and as such, Akihabara became a symbol of otaku culture.⁴⁷ Hiroki Azuma, in his seminal work *Otaku: Japan's Database Animals*, argues that otaku culture is itself reflective of cyberspace, a place where grand narratives give way to databases. He argues that characters “are broken up into elements, categorized, and registered to a database. If there is no appropriate classification, a new element or category simply will be added. In this sense, the originality of an “original” character can only exist as a simulacrum.”⁴⁸ Azuma goes on to point out that “in the shift from modernity to postmodernity, our world image is experiencing a sea change, from one sustained by a narrative-like, cinematic perspective on the entire world to one read-up by search engines, characterized by databases and interfaces.”⁴⁹ This shift away from the narrative toward a focus on the characters opens a new avenue for fictional characters to go through experiences that themselves are drawn less from a direct narrative concept but rather from a database of shared experiences and tropes that continue to be referenced within otaku media.

Although Azuma does not make direct mention of him in *Otaku, Database Animals*, Lev Manovich also spoke of a shift towards a database model of understanding and relating to media in his 1998 article *Database as a Symbolic Form*. Manovich argues that while cinema centered on narratives as the key form of cultural expression, digital media instead focuses on databases. Referring to the act of the player building a mental model of the game’s internal model, he writes: “What we encountered here is an example of the general principle of new media: the projection of the ontology of a computer onto culture itself.”⁵⁰ Indeed, otaku culture can be viewed as a consumer culture defined by this database understanding of the narratives they consume. By the 2000s, many of these aspects of the database came into view clearly. Fans of anime began speaking of the “beach episode” or the “*onsen* (hot springs) episode” that many shows share. They became

47 Ibid., pp. 147-49.

48 H. Azuma: *Otaku: Japan's Database Animals*, p. 47.

49 Ibid., p. 54.

50 Manovich, Lev: “Database as a Symbolic Form,” 1998, p. 5, <http://manovich.net/index.php/projects/database-as-a-symbolic-form>

part of the more extensive database. Viewers see the characters of any given show visit these places and play through the same ideas, just in a slightly different configuration over and over.

Any given aspect of the database soon loses its own reference point—a character with cat ears might become popular, and it will add the idea of cat ears into the database, which will then be eternally reproduced as an element of *moé* in and of itself. Otaku culture is permeated by simulacra—and as Azuma outlines, they are hyperaware of this distinction: “The otaku consumers, who are extremely sensitive to the double-layer structure of postmodernity, clearly distinguish between the surface outer layer within which dwell simulacra, i.e., the works, and the deep inner layer within which dwells the database, i.e., settings.”⁵¹

How, then, does this relate back to Akihabara? Many characters in these works are themselves otaku and consume otaku media within their diegetic worlds. Just as otaku in our world go on pilgrimages to Akihabara, so do their virtual counterparts. Thus, Akihabara becomes more than simply a space for the fandom; it itself becomes part of the culture, part of the works that it is celebrating. As this process is repeated in the database, all aspects of otaku culture within Akihabara are reassembled. The Akihabara, brimming with otaku culture, becomes itself a part of the culture. These aspects turn synonymous with Akihabara as they continue to be represented again and again within otaku media; they are distilled down to an essential version of themselves and change. This feedback loop creates a space of hyperreality—it is more than simply Akihabara; it embodies the *idea* of Akihabara.

In each of the following subsections, I will explore a different aspect of this process, such as how the character culture gives rise to community or how the so-called maid cafés offer up spaces for roleplay. These aspects will be considered both in terms of their position in the space of Akihabara as well as how each gives shape to another part of the otaku consciousness.⁵²

Akihabara as a Public Fantasy World of Desire— Of Storefronts and Moé Characters

One of the most striking things about Akihabara is its position as a public space. Not only are there huge billboards, but almost every storefront is also filled with

51 H. Azuma: *Otaku: Japan's Database Animals*, p. 33.

52 It should be noted that any facts within this chapter that have not otherwise had sources cited are based on personal experience over the course of multiple stays in Japan and many trips to Akihabara.

anime characters.⁵³ To be in Akihabara is to move through a distinct space where otaku culture is out on display, quite literally. Characters from recent shows will be on one building. Another will have an advertisement for a maid café. Yet another might carry an ad for an upcoming release: an adult dating sim game.

These ads have come to do more than simply provide space for companies to advertise. They form a large landscape of *moé* that proliferates all aspects of Akihabara's public spaces. Particularly fascinating is that even the train station is filled with posters and billboards relating to otaku culture.⁵⁴ Of course, advertisements featuring anime or *moé* characters are not entirely constrained to Akihabara; however, the complete focus on it is unique to it. There, we see a sort of gateway to other parts of the city that delineates Akihabara's *moé* landscape as clearly distinct from other parts of the city from the moment one exits the train.

In *Of Other Spaces: Utopias and Heterotopias*, Foucault describes the concepts of heterotopias, places which “are outside of all places, even though it may be possible to indicate their location in reality.”⁵⁵ Heterotopias are real spaces that reflect utopias into reality. The views that Akihabara opens up are those of a post-modern, media-consumer-centric fantasy world that yet exists as a space for that very consumer to live out and purchase objects of desire. It is at once a space where the visitor is pulled into a type of alternative reality with make-believe co-play cafés while also being sold the newest game or anime figure.

Akihabara as a Space for Sharing in Community Creation— Of Comiket and Akihabara's Doujinshi Stores

A huge aspect of otaku culture is the self-reflective aspect. As explained before, borrowing Azuma's concepts of databases, the otaku media landscape is defined by its characters and sorts itself within databases. A huge aspect of this is the creation of non-professional doujin derivative works, which feature characters from popular franchises. These derivative works range from comics or manga (both pornographic and not), novels, games, or music and are produced for and have historically been sold at large, regularly scheduled events, the biggest of which is the “Comic Market” or Comiket for short.

The Comiket is a biannual event hosted at the Tokyo Big Site Exhibition Center, which, before the COVID-19 pandemic, drew over seven hundred thousand

53 K. Morikawa: “Otaku and the City,” p. 133.

54 *Ibid.*, p. 153.

55 Foucault, Michel: “Of Other Spaces,” trans. Jay Miskowicz, *Diacritics* 16, no. 1 (1986), p. 24, <https://doi.org/10.2307/464648>

visitors over four days.⁵⁶ It is an event with a long history, dating back to the 1970s, and has been hugely influential in the development of otaku culture. The doujin scene is a complex topic that has been studied extensively.⁵⁷ It served as an incubator for a lot of hobbyist talent, and many of the biggest production companies and creators of otaku media began by selling their work as a circle at Comiket decades ago, especially before digital distribution was widely available.⁵⁸ Continued existence is possible due to the particularities of copyright litigation strategies of companies in Japan.⁵⁹ While doujinshi could well be considered copyright infringement even within Japanese copyright law,⁶⁰ they have been allowed to exist and prosper by copyright holders as they have opted not to litigate.⁶¹ Many of these derivative works then find their way not onto regular store shelves but rather onto

56 N. N.: “Comiket 97 After Report,” コミックマーケット公式, accessed March 22, 2023, <https://www.comiket.co.jp/info-a/C97/C97AfterReport.html>

57 Nelle Noppe provides an excellent overview of the cultural, historic, and economic context of doujinshi (Noppe, Nelle: *The Cultural Economy of Fanwork in Japan: Dōjinshi Exchange as a Hybrid Economy of Open Source Cultural Goods*. PhD Thesis, University of Leuven 2014, <https://lirias.kuleuven.be/retrieve/280506>).

58 Circle as used in “sewing circle.” Circles are the names or banners under which individuals or groups create doujin works and sell them; akin to a company or brand, though without any of the legal context. Cf. YABAI Writers: “Doujinshi and the Deal with Self-Publishing” *YABAI—The Modern, Vibrant Face of Japan*, June 14, 2017, <http://yabai.com/p/2197>

59 Cf. He, Tianxiang: “What Can We Learn from Japanese Anime Industries? The Differences Between Domestic and Overseas Copyright Protection Strategies Towards Fan Activities,” *The American Journal of Comparative Law* 62, December 1 (2014), pp. 1009-1042, here pp. 1010-1015, <https://doi.org/10.5131/AJCL.2014.0029>

60 Mehra, Salil K.: *Copyright and Comics in Japan: Does Law Explain Why All the Cartoons My Kid Watches Are Japanese Imports?*, November 25, 2002, Rochester, NY: SSRN Scholarly Paper, pp. 23-31, <https://doi.org/10.2139/ssrn.347620>

61 The exact reasons for this are not clear—Mehra and He both offer multiple possible explanations, including lower financial gains on possible litigation, a less strict delineation of fair use, and a tacit agreement to not litigate since doujinshi are ultimately more beneficial to the industry than not. Many authors and artists pursue doujin activities outside their regular occupations and become part of the community around doujin works which also offers a degree of protection. While an exact look into the details is beyond the scope, the doujinshi fanworks’ copyright infringements appear to be tolerated with an understanding that the industry has the power to interfere should the situation no longer be a benefit to them.

the shelves of specialized stores that focus on selling doujinshi (doujin manga or magazines) and other doujin goods. While these stores, such as *Melonbooks* or *Tora no Ana*, have branches even outside Tokyo, they are clearly concentrated in Akihabara, with *Tora no Ana* at its height having four individual locations within Akihabara.⁶²

Since Comiket is a huge and time-sensitive event, many visitors prioritize certain artists and circles and aim to buy works they missed later in these specialist stores. This means that outside of these Comiket-style events, Akihabara is the go-to place to purchase these doujin works, and a huge market has developed around them localized within Akihabara. Shops like *Surugaya* or *Mandarake* have focused on second-hand reselling of otaku goods, including doujin works. A trip to Akihabara will often include browsing or seeking out new releases from the latest Comiket or looking through the second-hand shops for one particular article. Akihabara centralized the doujin world as a type of off-season Comiket. To be interested and partake in enjoying doujin works is—or at least was in a time before a fully digital distribution channel—to visit Akihabara in person.

Finally, it comes as no surprise that all aspects mentioned have been co-opted back into the larger database of otaku media. Light novels such as *Saenai Heroine no Sodatekata*⁶³ (*How to Raise a Boring Girlfriend*) or manga *Stella no Mahou*⁶⁴ (*Magic of Stella*) offer a story of high schoolers starting their own doujin circle to make a visual novel or video game, the anime LUCKY STAR⁶⁵ features an episode that chronicles the process of attending Comiket, and the manga *Denki-gai no Honya-san*⁶⁶ (*The Electric Town's Bookstore*) follows the everyday life of a worker at one of these specialized stores. Thus, these parts of Akihabara never remain part of just the district; they have become part of the ethos of Akihabara itself.

Akihabara as a Communal Space of Play— Akihabara and Its Arcades

Arcades have played different roles in different countries and their domestic video game markets. While incomes were slowly declining in Japan, arcades remained

62 N. Noppe: *The Cultural Economy of Fanwork in Japan*, accessed April 5, 2023.

63 Maruto, Fumiaki: *Saekano: How to Raise a Boring Girlfriend*, 10 vols., Tokyo: Fujimi Fantasia Bunko 2012.

64 Cloba.U: *Magic of Stella*, Tokyo: Houbunsha 2012.

65 LUCKY STAR (Japan 2007, D: Yutaka Yamamoto, Yasuhiro Takemoto).

66 Mizu Asato: *Denkigai no Honya-san*, 15 vols., Tokyo: Media Factory 2011.

relevant for much longer than in the European or American markets.⁶⁷ Japanese arcades still exist and hold a sizable chunk of sway over certain genres, in particular up to the late 2010s, with only the COVID-19 pandemic accelerating a slow decline.⁶⁸ Rhythm games and fighting games are both outliers in terms of the longevity of arcade influence, largely for different reasons.

Rhythm games continue to benefit from unique physical interfaces, allowing for specialized game experiences that would not be easily accessible on PCs or consoles without high added costs via extra peripherals. Konami's Bemani games, like SOUND VOLTEX,⁶⁹ feature unique layouts with knobs and sliders for very different gameplay compared to a regular console controller. Furthermore, more recently, games like Sega's ONGEKI⁷⁰ feature card readers, enabling microtransaction-based monetization in the arcade. For well over a decade, arcades in Japan have also introduced save file systems via an RFID-based card, which has been standardized in recent years to allow interplay between different companies. While the Konami rhythm games strongly focus on original tracks and remixes, Sega's rhythm games provide a song selection from popular games and anime series. Ultimately, both are deeply linked to otaku culture as many of the arrangements are made by doujin artists, and both feature a plethora of doujin music originally sold at Comiket as part of their song libraries.

Fighting games are the other type of arcade game that continues to exist as a separate subculture in arcades. Deep into the 2010s, it was the industry standard for a fighting game to first release exclusively in arcades and then receive a console port over a year later. For many players who had direct access to arcades (which remain commonplace in Japan), this meant that the most recent version was usually played not at home but at the arcade, one quarter at a time. Beyond this, most weekly tournaments and smaller events were hosted at arcades, and inter-arcade rivalries built up as playing online (with arcade cabinets from all over the country) became a possibility. For the fighting games community, from the 1990s through the 2000s and 2010s and to a lesser degree until today, visiting an arcade was part of the regular play to enjoy the genre competitively.

67 Cf. Lewis, Leo: "Game on: Why Japan's Arcades Are Still Winning," *Financial Times*, February 9, 2017, <https://www.ft.com/japanarcades>

68 Cf. Ashcraft, Brian: "Arcades In Japan Keep Closing, Which Sucks," Kotaku November 24, 2021, <https://kotaku.com/arcades-in-japan-keep-closing-which-sucks-1848115616>

69 SOUND VOLTEX (Konami 2012, O: Konami).

70 ONGEKI (Sega 2018, O: Sega Interactive).

Unsurprisingly, Akihabara is home to many arcades in its blocks. Before the COVID-19 pandemic, four large SEGA buildings were entirely dedicated to arcades, not to mention others run by other companies, such as Taito, or individuals. To an otaku visiting Akihabara, dropping by an arcade can both be a planned destination or a short, spontaneous stop while waiting for someone. Though arcades are not uncommon per se in Japan, they do deserve special mention here because they fill out another aspect of the otaku lifestyle that transpires within Akihabara's borders—the actual act of media consumption itself is just as present as the purchasing of media. Consequently, arcade culture has become a larger part of the otaku media landscape. For example, the manga *Hi-Score Girl*⁷¹ (later adapted into an anime) tells the story of two elementary schoolers and their visits to the arcades to play classic arcade games, with a special focus on fighting games.

Akihabara as a Space for Interpersonal Relationships— Akihabara and Its Maid Cafés

Another critical aspect of Akihabara as a cultural symbol is its maid cafés, which have become deeply intertwined with the location. They also do exist elsewhere, but they are disproportionately represented in Akihabara.⁷²

What Is a Maid Café?

Maid cafés are, in simplest terms, restaurants or diners wherein a customer is served food and drink by waitresses dressed in maid outfits. The customer can additionally engage in conversation, play board games, and take commemorative photographs with the maids serving them.⁷³

In *Intersections: Gender and Sexuality in Asia and the Pacific*, Patrick Galbraith, who spent years visiting maid cafés regularly and interviewing both customers and maids alike, offers an ethnographic account of them. It is clear that the need maid cafés are satisfying is not for food but for human contact and communication:

71 Oshikiri, Rensuke: *Hi Score Girl*, 10 vols., Tokyo: Square Enix 2010.

72 Cf. Galbraith, Patrick W.: *Otaku and the Struggle for Imagination in Japan*, Durham, NC: Duke University Press 2019, p. 188.

73 Sharp, Luke: "The Heterogeneity of Maid Cafés: Exploring Object-Oriented Fandom in Japan," *Transformative Works and Cultures* 16, June 15 (2014), <https://doi.org/10.3983/twc.2014.0505>

“Maids welcome customers, remember their names, ask after them and are generally obliging. In smiling and laughing, in showing an interest in their lives, maids give regular customers the confidence to engage in communication. Maid cafés also facilitate communication by structuring and simplifying interactions. Each purchase, each performance, is an opportunity for contact.”⁷⁴

Manifesting Fiction

Maid cafés are what Foucault terms heterotopias; they occupy a space outside of society and have a new formalized set of rules. Maids working at the café are not simply themselves—they become characters of a shared fiction. They turn into 2D characters, and sometimes, this is even represented directly through the creation of anime-style avatars for the maids.⁷⁵ The act of entering the maid café is ritualized, with maids greeting the “master” with the words *okaerinasai*, *goshujin-sama* (Welcome home, master), and everything beyond that point can be considered within the magic circle, part of the game.⁷⁶ Indeed, Japanese studies researchers Erica Baffelli and Keiko Yamaki go as far as to use the term directly:

“But both participants know that [the visit to the maid cafés] is a game and that there are rules, shared and accepted by participants. The relationship between customers and the fantasy world they create can be understood only if we consider the subcultural background which they share. In particular, customers enjoy this brief fictional entry into the manga-world, a fantasy place where they can meet their heroine or particular popular *moé* characters.”⁷⁷

This aspect of the cafés is notably not a merging of reality with fiction but rather a pocket of fiction brought to life within reality. In studying otaku, psychoanalyst

74 Galbraith, Patrick W.: “Maid in Japan: An Ethnographic Account of Alternative Intimacy,” *Intersections: Gender and Sexuality in Asia and the Pacific* 25, no. 2 (2011), sec. 19, <http://intersections.anu.edu.au/issue25/galbraith.htm>

75 Galbraith, Patrick W.: “Maid Cafés: The Affect of Fictional Characters in Akihabara, Japan,” *Asian Anthropology* 12, no. 2 (December 2013), pp. 104-125, here pp. 116-118, <https://doi.org/10.1080/1683478X.2013.854882>

76 Cf. Huizinga, Johan: *Homo Ludens: A Study of the Play-Element in Culture*, trans. Gillin, John L., London: Routledge & Kegan Paul 1949, p. 10.

77 Baffelli, Erica/Yamaki, Keiko: “Maids in Akihabara: Fantasy, Consumption and Role-Playing in Tokyo.,” *Journal of International Economic Studies* 32, pp. 117-137, here p. 132.

Saitō Tamaki describes not a loss of distinction between fiction and reality but rather that otaku are “able to switch freely between levels of fictional context.”⁷⁸ The maids—otaku themselves—are part of the performance.⁷⁹ In distinguishing from cosplay (wherein you take on the role of an existing character), Galbraith explains, “In contrast, in a maid café, one articulates a performance as a maid, which is an amorphous character inspired by manga, anime, and games, but also reflects one’s own character. That is, the maid is both a fictional character and a form of self-expression.”⁸⁰ The maids and customers are playing their parts in a shared fiction, created and maintained within the space of the café, offering a unique—and heavily mediated—form of expression and relationship bound within the subcultural rituals delineated within otaku media.

Maid Cafés as Part of the Akihabara Myth

Maid Cafés have become a distinct feature of Akihabara. Their ubiquity in Akihabara can manifest in many ways. Frequently, stories that take place in Akihabara feature maids prominently or as characters within their cast.

An example of the representation of maids in fiction is Faris NyanNyan, a maid character working at a café within the story of STEINS;GATE (Visual novel and multimedia franchise).⁸¹ While a time travel story, it takes place almost entirely within Akihabara. Faris appears almost exclusively in her maid uniform and almost never breaks character save for those people she trusts.

While Faris is a side heroine in the STEINS;GATE franchise, other times, the maid cafés take center stage within fiction as well, as seen in the 2022 anime *AKIBA MAID SENSOU*⁸² (*Akiba Maid Wars*), which focuses on a fictionalized Akihabara with maid cafés as fronts for the Yakuza and features an all-maid cast. NHK’s 2005 documentary *AKIHABARA GEEKS (NIPPON NO GENBA: AKIHABARA TOSHINOSE NO MONOGATARI)* follows multiple “inhabitants” of Akihabara as it describes them.⁸³ Indeed, within them, we find a doujin game developer and a maid working at a maid café. Beyond that, Japan’s official tourism website names maid cafés multiple times on its website on Akihabara, describing the town with

78 T. Saitō: *Beautiful Fighting Girl*, p. 24.

79 Cf. P. Galbraith: “Maid in Japan,” secs. 32, 33.

80 P. Galbraith: “Maid Cafés,” p. 115.

81 Faris NyanNyan is her maid name; STEINS;GATE (5pb. 2009, O: Nitroplus).

82 *AKIBA MAID WAR*. (Japan 2022, D: Sōichi Masui).

83 *NIPPON NO GENBA: AKIHABARA TOSHINOSE NO MONOGATARI* (Japan 2005, D: Satoshi Kobayashi, Kohei Nagashima).

the words, “Once all about gadgets and the latest electronics, Akihabara is now an even mix of electrical goods megastores, maid cafés and all things anime.”⁸⁴

Maid cafés have become more than simple destinations for customers that just so happen to operate within Akihabara disproportionately—they have become a symbol of Akihabara itself. In the myth of Akihabara as the otaku capital, maids are now clearly considered “inhabitants” of the district. Even outside the maid cafés, the maids themselves are a common sight; there are usually many maids giving out flyers or tissue packs with adverts to passing pedestrians in the Akihabara district.⁸⁵

While maid cafés can be represented in otaku media, this is also not a one-way street. For example, Hayakawa Kiyō, in his compendium on maid café *Meido Kissa de Aimashō* (Let’s meet at the maid café), chronicles different maid cafés and their history. Of particular note is the *Pia Carrot!! Restaurant* that operated in Akihabara between 1999 and 2000.⁸⁶ The restaurant was operated by the publisher of the *galge* series PIA CARROT!! which centers around a fictional restaurant. Within the PIA CARROT!!⁸⁷ games, most of the girls the player can romance are waitresses at the restaurant. Within the café the publisher operated, maids were dressed in the outfits of the in-game restaurant, letting players experience the *moé* they felt when playing the game in reality.

PIA CARROT!!’s maid café emphasizes how maid cafés are windows into a 2D world. In *Otaku and the Struggle for Imagination in Japan*, Galbraith explains: “The significance of the maid café, as Hayakawa and Higashimura see it, is facilitating embodied interactions with fictional characters, or role-playing interactions with two-dimensional beings in the three-dimensional world. Bodies come together, but in addition to that of the costumed waitress is the character—or, indeed, characters—layered onto her. Recognizing that characters are a crucial part of interactions, if not the most crucial part, is distinctive of maid cafés in Akihabara.”⁸⁸

In contrast to Morikawa’s description of the gender split between Akihabara and East Ikebukuro in the late 1990s (see *Tracing Akihabara’s History*), in terms of demographic representation, we can also see a surprisingly large spectrum.

84 Japan National Tourism Organization: “Akihabara | Travel Japan (Japan National Tourism Organization),” *Travel Japan*, accessed March 21, 2023, <https://www.japan.travel/en/spot/2178/>

85 Wired Staff: “Akihabara Lifestyle Weekend,” *Wired*, September 18, 2006, accessed March 22, 2023, <https://www.wired.com/2006/09/akihabara-lifes/>

86 Cf. Hayakawa Kiyō: *Meido Kissa de Aimashō*, Tokyo: Āruzu Shuppan 2008, p. 91.

87 WELCOME TO PIA CARROT!! (Cocktail Soft 1996, O: Cocktail Soft).

88 P. Galbraith: *Otaku and the Struggle for Imagination in Japan*, pp. 213-214.

While many visitors, especially regulars, are straight men, the visitorship of maid cafés is broader than that demographic. In an interview with the *Tokyo Weekender*, an ex-maid recounts that there were also many regular female customers as well as children.⁸⁹

Baffelli and Keiko note both a female-only maid café that had opened in Akihabara as well as the existence of butler cafés in which “waitpersons are young boys dressed as old-style butlers and dansō cafés, such as *B:Lily Rose*, where waitpersons are women who dress and act as men.”⁹⁰ Indeed, this shows us that the Akihabara of today is visited by a more diverse group of otaku than in the past. Of course, significant portions of establishments catering specifically to female otaku are also located directly within East Ikebukuro.⁹¹

A Space Between Private and Public

In *Learning from Akihabara: The Birth of a Personapolis*, Morikawa argues that the developments in Akihabara constitute a notable shift from what we commonly see in architecture—“Here, you can see that the classic notion of ‘public’ is invalid. Akihabara has come to be more an extension of private space, an otaku rooms [sic] blown up into the city.”⁹²

Foucault notes that heterotopias are, in general, “not freely accessible like a public place. Either the entry is compulsory, as in the case of entering a barracks or a prison, or else the individual has to submit to rites and purifications.”⁹³ In the case of a maid café, I have previously spoken of the moment the customer enters the establishment and is greeted with a welcome back—and replies with “I’m home.” However, if we can think of Akihabara as an extension of the rooms of otaku, then the posters and wall scrolls are replaced by billboards and storefronts, and the consoles by arcades—it becomes a communal space for otaku to gather and enjoy the activities not simply in public, but rather in a space that is uniquely open to those who understand the culture.

89 Cf. Juric, Alana: “Maid Café Secrets Spilled by a Former Maid,” *Tokyo Weekender (blog)*, July 23, 2021, https://www.tokyoweekender.com/art_and_culture/entertainment-art_and_culture/maid-cafe-secrets-spilled-former-maid/

90 E. Baffelli/K. Yamaki: “Maids in Akihabara,” p. 125.

91 *Ibid.*, p. 125.

92 Morikawa, Kaichiro: *Learning from Akihabara: The Birth of a Personapolis*, Schriften der Bauhaus-Universität Weimar, August 14, 2008, p. 124, https://www.db-thueringen.de/receive/dbt_mods_00036661, <https://doi.org/10.25643/bauhaus-universitaet.1316>

93 M. Foucault: “Of Other Spaces,” p. 25.

Akihabara's position as an extension of the otaku's room has specific extended implications for an audience beyond Tokyo. We spoke before of a "pilgrimage," and indeed, with the continued rise of the popularity of otaku media overseas, tourism to Akihabara has increased in turn.⁹⁴ International visitors' expectations of Akihabara are heavily formed by its depiction and positioning within otaku media. Within the following part of this chapter, this will precisely be what I will examine through several examples.

The different aspects of Akihabara explored in this subsection form a basis of a set of diverse needs the space answers for otaku: aesthetic, consumerist, creative, communal, and interpersonal.

III AKIHABARA PRESERVED?—A FUTURE IN THE DIGITAL

To understand the future development, it is necessary to first examine Akihabara's and otaku culture's changes in the last years and identify trends in different contexts. The landscape of Akihabara is changing, and the influence of the COVID-19 pandemic is a catalyst here, though many of these trends can be traced to developments that predate it.

However, it must be noted explicitly that none of these trends or developments are complete reversals. The culture is shifting, and changes are visible, but the changes are mostly subtle, slow, and partial. Often, these changes occur not as a replacement but in an additive fashion. Whether they will supplant previous paradigms, time will tell.

Discovery—From Physical to Digital

A trend that has been visible is a move from the physical to the digital surrounding otaku culture. One of the ways we can see this trend is in the sourcing of new talent.

We have spoken in the previous subsection *Akihabara as a Space for Sharing in Community Creation* about the popularity of doujin works and how many of the most popular ones were taken on by publishers or led to the founding of companies and media franchises. To name two prominent examples, TSUKIHIME⁹⁵ and HIGURASHI NO NAKU KORO NI⁹⁶ were both doujin visual novels that have grown

94 Cf. K. Garner: *The Digital Otaku*, pp. 2-4.

95 TSUKIHIME (Type Moon 2000, O: Type Moon).

96 HIGURASHI NO NAKU KORO NI. (07th Expansion 2002, O: 07th Expansion).

into huge multimedia franchises with anime adaptations and major publisher backing that are active to this day.⁹⁷ Since the mid-2010s, a huge boom of *isekai* (otherworld) stories has been taking place. These stories find their origins in large parts on the online amateur publishing website *Shōsetsuka ni Narō* (Let's Become an Author). Major light novel publishers choose stories based on user ratings and sign contracts with the authors to turn them into media mix properties.⁹⁸

This largely digital process stands in stark contrast to the physicality of the sale of doujin software at Comiket. While Comiket remains a large factor in otaku culture, what used to be the solitary method to create and distribute independent works is now becoming merely one of the avenues. Long “doujin games” were considered equivalent to “indie games from Japan,” but this has changed in recent years as alternate distribution channels and the influence from the Western indie scene grew.⁹⁹ Mikhail Fiadotau delineates the difference as being “conceptual, historical, (media) ecological, and textual.”¹⁰⁰

Moé—From Physical to Digital

Maid and costume cafés offered a space for moé to be experienced directly. Maids were, as identified before, specifically appealing because they were 2D characters, even if played out by a real person. Otaku yearn for interaction with the characters of the media they love but are separated by layers of fictionality. Maid cafés are thus a type of role-play to make experiencing the two-dimensional possible. In the past few years, we have seen a fascinating new trend arise: Virtual Youtubers, or Vtubers for short. Liudmila Bredikhina describes Vtubers as “3-D or 2-D computer-generated (CG) virtual characters (avatars) embodied by the users who control them. Vtubers are virtual entertainers who take on anime-like visual characteristics and broadcast entertaining content.”¹⁰¹

97 Fiadotau, Mikhail: “Indie and Dōjin Games: A Multilayered Cross-Cultural Comparison,” *gamevironments* 10 January 1 (2019), pp. 39-84, here p. 43, <https://www.academia.edu/40095159/>

98 Cf. Tagliamonte, Giovanni and Yang, Yaochong: “Isekai: Tracing Interactive Control in Non-Interactive Media,” in: Beil, Benjamin/Freyermuth, Gundolf S./Schmidt, Hanns Christian (eds.): *Paratextualizing Games: Investigations on the Paraphernalia and Peripheries of Play*, Bielefeld: transcript, 2021, pp. 341-372, here pp. 343-46.

99 M. Fiadotau: “Indie and Dōjin Games,” pp. 53-57.

100 Ibid., p. 40.

101 Bredikhina: Liudmila: “Virtual Theatrics and the Ideal VTuber Bishōjo,” *REPLAY-ING JAPAN* 3, March 1 (2021), pp. 21-32, here: p. 21.

Historically speaking, we can see *Hatsune Miku*, a virtual idol, as the precursor to Vtubers. Hatsune Miku was created as a character for vocal synthesizer software *Vocaloid* in 2007 and found immense success.¹⁰² However, although Miku's voice was created by sampling a real Japanese voice actress, Fujita Saki,¹⁰³ Miku was not played by a real person. Miku was comparable to a mascot character; she functioned as an anime character that represented a product, whereas the current trend of Vtubers, which started with *Kizuna Ai*,¹⁰⁴ is a real person playing a character.

The character of Vtubers mirrors previous aspects discussed on the topic of identity when performing maid characters. In both cases, real people are playing anime characters that are original characters that were created with one's own self as a base. They are avatars as much as they are fictional characters. The popularity of Vtubers among the otaku crowd is extraordinary and is easily visible in their economic power: Seven of ten of the top superchat earners on *YouTube* in the world in 2020.¹⁰⁵ Vtubers' appeal lies at the intersection of online personality and influencers and *moé*. They fulfill both roles, and while the technology has been democratized and anyone given a webcam and software can become a Vtuber, many of the biggest Vtubers are part of agencies that are comparable to idol agencies. *Kizuna Ai*, the first Vtuber, herself went through a change in voice actors behind the scenes.¹⁰⁶

Vtubers show a development in which otaku culture utilizes a new technology to create a new way to manifest two-dimensional characters. Experiencing another

102 Ibid., p. 21.

103 Ibid., p. 21.

104 Suan, Stevie: "Performing Virtual YouTubers: Acting Across Borders in the Platform Society," in: Roth, Martin/Yoshida, Hiroshi/Picard, Martin (eds.), *Japan's Contemporary Media Culture between Local and Global: Content, Practice and Theory*, Berlin: CrossAsia-eBooks, 2021, pp. 187-222, here pp. 187-190, <https://books.ub.uni-heidelberg.de/index.php/xa/catalog/book/971/c12884>

105 Vtubers can also refer to non-anime related virtual avatars. In this context, it will refer specifically to the anime character avatars which are traced back to *Kizuna Ai*. The Vtubers listed in this statistic are also only anime-style Vtubers; Morrissy, Kim: "Playboard: World's Biggest Superchat Earner Is Virtual YouTuber Kiryu Coco," *Anime News Network*, April 5, 2023, <https://www.animenewsnetwork.com/interest/2020-08-22/playboard-world-biggest-superchat-earner-is-virtual-youtuber-kiryu-coco/.163103>

106 Cf. S. Suan: "Performing Virtual YouTubers," pp. 204-207.

human play out an anime character to experience moé is now possible from one's own home, at any point, for anyone.

Community—From Physical to Digital

As mentioned before, arcades are losing relevance in Japan. After a multi-year absence due to the pandemic, the Japanese version of the biggest international fighting game tournament, *Evo Japan*, took place in Tokyo from March 31 to April 2, 2023.¹⁰⁷ After the event, long-time fighting game commentator Majinobama spoke out regarding a trend he had witnessed recently: Players would come to Japan, and a huge part of their gameplay experience was playing fighting games online from their hotel rooms.¹⁰⁸ Fighting games are heavily dependent on strong, low-latency connections, so in many cases, network play across the world is not going to provide an experience comparable to offline play.¹⁰⁹

Majinobama clarifies in a subsequent post that consistent offline meetups to play were the norm just a couple of years ago and that the situation has shifted to the extent that it is impossible to explain what people had missed.¹¹⁰ As arcades closed over the pandemic, a lot of the play naturally moved online by necessity—and it has not returned to the arcades. This is, at least in part, because many arcades stayed closed, and Sega sold off its arcade business entirely after 56 years.¹¹¹

These changes show us an Akihabara that is changing quickly and losing at least part of the functions it had within otaku culture. As communities move and

107 Cf. N.N.: “EVO Japan 2023,” accessed April 5, 2023, <https://www.evojapan.gg/>

108 Cf. 2dJazz, “Saddest Shit to Me for People That Come to JP for Modern Fgs (If They Miss the Few Regular Offline Gatherings) Is Seeing Majority of Their Gameplay Exp Boil down to Netplay from a Hotel Room. It Used to Be so Different...,” *Twitter*, April 4, 2023, <https://twitter.com/2dJazz/status/1643097801562423296>

109 Cf. Infil: “Netcode [P1]: Fightin’ Words,” accessed April 5, 2023, <https://words.infil.net/w02-netcode.html>

110 Cf. 2dJazz: “@Speedkicks What i Realized Too, Is You Will Never Be Able to Make Them Understand What They Missed out on. Ignorance Is Bliss, Generational Gap Too Wide Imo. Just Think about Even Trying to Explain This Shit to People in 5 Years. They Will Think You Have Alzheimers,” *Twitter*, April 4, 2023, <https://twitter.com/2dJazz/status/1643151241948856320>

111 Cf. Batchelor, James: “Sega Exits the Arcade Business after 56 Years,” *GamesIndustry.biz*, January 28, 2022, <https://www.gamesindustry.biz/sega-exits-the-arcade-business-after-56-years>

organize into online spaces, an aspect of Akihabara’s culture will only be preserved within fiction. However, it is also opening the opportunity for a new type of organized community. What was left behind in the arcades was the sharing of space—sitting down at the cabinet across from one’s opponent, competing as part of a community within a local space.

Indeed, we can see modern fighting games make direct attempts at creating virtual shared space, with virtual avatars for players to represent them. Where *STREET FIGHTER V*¹¹² (2016) featured a lobby system that was entirely composed of menus, the upcoming *STREET FIGHTER 6*¹¹³ (2023) features a character creator and a 3D environment for its lobbies. In fact, in an interview with *Game Informer*, producer Matsumoto Shuhei explained that this was a deliberate goal:

“Especially with COVID, there’s not many opportunities to go to arcades and socialize with your friends,” Matsumoto says. “So, we felt like, ‘What if we made an online version of an arcade? Are we able to do that within Street Fighter?’ That was a challenge we wanted to take on and recreate because we grew up in the era of going to arcades with our friends, and that’s something we have fond memories of.”¹¹⁴

A Hyperreality Presented as a Time Capsule

Within the *Acquire*’s game series *AKIBA’S TRIP*,¹¹⁵ we can see an adaptation of Akihabara into a digital space that players traverse. The space has been faithfully reproduced within the game down to getting the storefronts right and using real stores that existed there at the time of the games’ releases.

Perhaps appropriately for a space shaped by market forces, a significant aspect of the game is purchasing items from shops. The way the game presents this is through a simple graphical user interface rather than letting you “browse” the shop for different items. The shopping experience is quite interesting in that it shows us which aspects the game focused on adapting. Strolling through a shop’s aisles, looking for a specific item, the different spaces the shops occupy, or what they feel like as you walk through them were not given priority and are left behind in adaptation.

112 *STREET FIGHTER V* (Capcom 2016, O: Capcom).

113 *STREET FIGHTER 6* (Capcom 2023, O: Capcom).

114 Shea, Brian: “Street Fighter 6 Cover Story—The Dawn of a New Era,” *Game Informer*, December 28, 2022, accessed April 5, 2023, <https://www.gameinformer.com/feature/2022/12/28/street-fighter-6-cover-story-the-dawn-of-a-new-era>

115 *AKIBA’S TRIP* (Acquire 2011, O: Acquire).

The merchandise itself is not generic, however, and offers relevance to the shop it's in—A PC part store will sell you a keyboard, and a doujin store will sell you magazines. These items are given unique descriptions, sometimes containing references. However, what AKIBA'S TRIP puts a lot of emphasis on is the recognizability of the stores. The shopping itself may be a generic UI, but the background will usually be a photo of the shop interior, and a mascot character of the shop will be displayed on screen prominently (see Figure 1).

The example of Tsukumo-tan, as seen in the figures, is particularly interesting as she is no longer the mascot of the chain of PC hardware stores. When her retirement was announced in 2020, she stopped appearing in Akihabara—yet she remains visible in AKIBA'S TRIP.¹¹⁶

The fact that AKIBA'S TRIP is more concerned with showing off the mascots and a view of the store rather than the experience of browsing betrays the importance of the mascots (or *yurukyara*) themselves. Mascots are frequently used in Japan,¹¹⁷ and the shops' mascots have become a part of Akihabara's culture. *Tsukumo-tan* herself was quite popular—in the eleven years she was *Tsukumo*'s mascot, she won a poll on the most popular moé character you find within Akihabara every single year.¹¹⁸ Over the years, a lot of merchandise featuring the character has been sold as the goodbye message states¹¹⁹ outright, and at a time, there was a vending machine featuring *Tsukumo-tan* outside one of the stores¹²⁰ (see Figures 2 and 3).

116 N.N.: “「つくもたん」契約終了のお知らせ,” Tsukumo-tan's Retirement, accessed March 29, 2023, <https://tenpo.tsukumo.co.jp/static/info/39-tsukumotan.html>

117 Chang, Eddy YL: “Let the Yuru-Chara Do the Job: Japan's Mascot Character Frenzy and Its Socioeconomic Implications,” *Mirai. Estudios Japoneses* 1 (2017), pp. 237-52, here: pp. 239-240.

118 N.N.: 株式会社インプレス, “「アキバで見かけた萌えキャラコンテスト 2019」結果発表,” AKIBA PC Hotline! Character Contest Results 2019, December 27, 2019, <https://akiba-pc.watch.impress.co.jp/docs/sp/1226770.html>

119 N.N.: “「つくもたん」契約終了のお知らせ,” Tsukumo-tan's Retirement.

120 N.N.: “ツクモDOS/Vパソコン館前に「つくもたんのラッピング自動販売機」が登場,” Tsukumo-tan receives a vending machine, accessed March 29, 2023, <https://blog.goo.ne.jp/omaketeki/e/bd90245c7535d1ba33660bcc47cdeabb>

Figure 1: The interface as the player enters the PC store “Tsukumo” in Akiba’s Trip. It prominently features their mascot character Tsukumo-tan



Figure 2 (left): A photo of a vending machine serving drinks in Akihabara featuring the mascot character Tsukumo-tan in March 2018

Figure 3 (right): A photo of an advert at one of the Tsukumo stores in Akihabara featuring Tsukumo-tan in March 2018



Azuma points out that “independently and without relation to an original narrative, consumers in the 1990s consumed only such fragmentary illustrations or settings; and this different type of consumption appeared when the individual consumer empathy toward these fragments strengthened. The otaku themselves called this new consumer behavior ‘chara-moé’—the feeling of moé toward characters and their alluring characteristics.”¹²¹ The mascot characters are (at least at the surface level) removed from direct narrative backdrops and constitute an instance of “fragmentary illustrations.” We can see here that mascot characters are thus not removed from the culture and otaku media themselves; they merge and reflect them. A fantastic example of this act of self-reflection can be seen within DI GI CHARAT.¹²² The Akihabara store *Gamers* created a mascot character called DI GI CHARAT, which Galbraith describes as an “assemblage of elements of character design that fans like” (e.g., she is wearing a maid outfit and has cat ears and a tail).¹²³ DI GI CHARAT became a successful anime and manga franchise in the late 90s and early 2000s¹²⁴ and most recently received a new anime series that aired in late 2022.¹²⁵

The popularity of these mascot characters shows us that there is never a clear dividing line between the works sold at these stores and the stores themselves. Just as Akihabara has become part of what people think of regarding the otaku subculture, so have the characters meant to advertise the stores become the direct focus of attention and stories. *Tsukumo-tan*’s representation within AKIBA’S TRIP thus remains a time capsule for an Akihabara that once was, preserving it as one may have remembered it—Akihabara within AKIBA’S TRIP is a fantasy, an imagined space that may at first glance link to space lost in time but is in fact more than that.

Indeed, in an interview on *Siliconera*, Associate Producer of AKIBA’S TRIP said when asked for the reason they chose to set the game in Akihabara:

“It’s as much like a contemporary ‘fantasy’ world as places come, so we felt it was a natural choice. Also, Akihabara is a living, breathing entity that is constantly changing with the rise

121 H. Azuma: *Otaku: Japan’s Database Animals*, p. 36.

122 DI GI CHARAT (Japan 1999, D: Hiroaki Sakurai).

123 P. Galbraith: *The Moé Manifesto*, pp. 174-175.

124 *Ibid.*

125 CF. Loo, Egan: “Reiwa No Di Gi Charat Mini Anime’s 2nd Teaser Unveils October 7 Premiere,” *Anime News Network*, March 28, 2023, <https://www.animenewsnetwork.com/news/2022-09-10/reiwa-no-di-gi-charat-mini-anime-2nd-teaser-unveils-october-7-p-remiere/>.189551

and fall of trends and counterculture, so we felt that to capture one specific moment in Akihabara's 'life' in the form of a game is also a valuable and interesting thing to do for the sake of entertainment."¹²⁶

If Akihabara is a space of fantasy, then it is specifically a space in which otaku fantasy turns into reality. The memories and associations captured within are not lost but saved and reimagined within depictions of the space in media. Saitō spoke of simultaneous multi-layered understandings of fictionality.¹²⁷ Can we not then say that what otaku see when they walk through the city is distinctly multi-layered? My contention is that when otaku visit Akihabara, they are not only seeing the city itself. Simultaneously—the same way they are able to both fully buy into a character on screen while also recognizing their voice actor immediately—they are seeing a space beyond its physicality. They are seeing an Akihabara beyond the real.

This, then, is why AKIBA'S TRIP's depiction of Akihabara works. In its disjointed form, in its accuracy to specific characteristics that are not of as much geographic importance as they are of symbolic significance, it simulates the hyperreal Akihabara. It is neither a simulation of the real Akihabara nor a simulacrum. It is a second-order simulation—a simulation of a simulacrum. It brings the player to the space of fantasy, not the place of reality.

Akihabara—A Link Between Worlds

AISP@CE,¹²⁸ a massively multiplayer social space that ran from 2008 until 2011, shows us a different adaptation of Akihabara. In this case, it is a type of proto-metaverse, though one developing out of the otaku sensibilities of its era. It is an expression of a desire to coexist digitally formulated through the ideas of Akihabara. Akihabara here becomes the gateway to a space for otaku to gather and live out desires and interact with digital characters—just as its real-world counterpart did.

Outside the player's own digital home, which they could customize with furniture and items, the game was split into multiple separate "islands." The game

126 Siliconera Staff, "This Interview With Acquire Gives Us A Tour Of Akiba's Trip," *Siliconera* (blog), February 25, 2011, <https://www.siliconera.com/this-interview-with-acquire-gives-us-a-tour-of-akibas-trip/>

127 T. Saitō: *Beautiful Fighting Girl*, pp. 24-25.

128 AISP@CE (Ai Space Production Committee 2008, O: Headlock).

was built in collaboration with three eroge developers, and each of the three islands corresponded to the franchises that built the foundation of the game—CLANNAD, SHUFFLE!, and DA CAPO.¹²⁹ Finally, a central “Akihabara Island” connected all of them.¹³⁰ It served as a hub as well as a social space and was modeled after the district in Tokyo.¹³¹ We can see here a distinctly literal positioning of Akihabara as a bridge between different media franchises. (see Figure 4 for a screenshot of AISP@CE’s representation of Akihabara) Ōtsuka spoke in his work on narrative consumption about a state in which “we are no longer capable of distinguishing whether a given commodity is ‘real’ or ‘counterfeit.’”¹³²

Indeed, we can see here a situation where the world of these dating games is being represented within another world, a social space in which the characters and spaces are completely removed from their original context. In fact, not only are these worlds removed from their context, but they are also direct objects of fandom. AISP@CE is not an extension of their universes directly. Rather, it is a digitalization of the fandom into a ludic space. Events granted players digital posters and merchandise.¹³³ I argue that this is an act of fictionalizing, as Saitō termed it. AISP@CE is a place for us to digitally engage with fictional characters in new contexts. It provides a terminal for interactivity with fictional characters whom players have already developed *moé* for and lets players quite literally ‘live’ with them.

AISP@CE is thus a space wherein players can both experience dress-up and living together with their favorite characters but specifically within the context of them being *characters*. Here, Saitō Tamaki’s observation of the otaku’s ability to effortlessly navigate multiple layers of fictionality is pulled into focus. The player may visit the locations from within these games and speak to a character from one

129 CLANNAD (Key 2004, O: Jun Maeda.); SHUFFLE! (Omegavision 2004, O: Navel); D.C. II ~DA CAPO II~ (Circus 2006, O: Circus).

130 Serizawa, Kamone: “Memories of aisp@ce,” September 19, 2021, YouTube video, 05:22, <https://www.youtube.com/watch?v=4SB3OF-sSGE>

131 Okada, Yuka: “「CLANNADは人生」を3Dで実現 ギャルゲーキャラと暮らす仮想空間、ドワンゴなど開発. (“Clanad is life”—A virtual space wherein galge characters turn real),” *ITmedia NEWS*, accessed April 12, 2023, <https://www.itmedia.co.jp/news/articles/0804/08/news104.html>

132 E. Ōtsuka and M. Steinberg: “World and Variation,” p. 110.

133 YURIKA, “Ai Sp@ce Joins the Rain Bandwagon,” *かわいいじゃなきやダメなの!* (blog), June 2, 2009, <https://breadmasterlee.com/2009/06/02/ai-spce-joins-the-rain-bandwagon/>

of the games while wearing a shirt featuring another dating game.¹³⁴ Akihabara is presented here as the interlinking piece for the worlds. It serves as the main social hub for otaku, quite literally a digital Akihabara. I argue that AISP@CE is not a direct form of advertising for any of the three games. Rather, *CLANNAD*, *SHUFFLE!*, and *DA CAPO* form the backdrop for a digital space for otaku culture.

Figure 4: Screenshot of Akihabara within AISP@CE. Note the presence of Gamers with their mascot character DI GI CHARAT, visible on the sign



Image Source: https://image.itmedia.co.jp/1/im/news/articles/0804/08/1_yuo_aispec_10.jpg

Akihabara in the Metaverse

Akihabara is changing. While doujinshi are as popular as ever, the popular doujin shop *Tora no Ana* closed every single one of their five Akihabara branch stores in the last few years.¹³⁵ Arcade experiences are lost and replicated within virtual

134 YURIKA, “Aisp@ce Celebrates Comptique’s 25th Anniversary,” *かわいいじゃなきやダメなの!* (blog), December 8, 2008, <https://breadmasterlee.com/2008/12/08/ai-spce-celebrates-comptiques-25th-anniversary/>

135 The shop served as the basis for *Denki-gai no Honya-san*, a manga (with a subsequent anime adaptation) about working at a doujin store; Cf. Baseel, Casey: “Akihabara Landmark Toranoana Is Permanently Closing, Chain Downsizes to Just One Branch in Japan,” *SoraNews24 -Japan News-* (blog), July 6, 2022, <https://soranews24.com/>

worlds. Vtubers serve a similar function to maid cafés, only served to a worldwide audience, digitally.

Akihabara, as a hyperreal space, is very unlikely to die out. It has been manifested as a part of otaku culture and its history and thus will likely continue finding representation in this form. Just as AISP@CE made Akihabara the hub for otaku media, any future versions of a virtual space will likely draw from the collective understanding of Akihabara as the place of belonging for otaku when designing something aimed at them. It is therein where we can expect preservationist efforts to develop, as AKIBA'S TRIP already has, with mascots such as *Tsukumo-tan*, which remain in-game, including re-releases despite her deletion from the real Akihabara.

Then what does such a future look like? Otaku have unusually high compatibility with accepting fictional contexts, as we established in *Of Otaku and Moé*. The technological shifts before us ask us to accept new forms of interaction and living. In his talk *Character, Culture, Platform: Locating Emotional Technology in Contemporary Japan*, Patrick Galbraith describes the act of willingly accepting fiction for truth to be able to live within two-dimensional fictional contexts as “self-hacking.”¹³⁶ Indeed, perhaps an exceptional ability to “self-hack” is one of the attributes of otaku. As cases of generative AI capturing users’ hearts spread,¹³⁷ the many cases of otaku looking to marry fictional characters come to mind.¹³⁸

Another precursor to a realization of a Metaverse can be seen in the app *VR CHAT*, wherein otaku are engaging in a form of romantic relationship with each other, termed “sugar.” These relationships are not bound by the limits of their real-world identities, including gender.¹³⁹ Bredikhina, too, identifies it as an act of

2022/07/06/akihabara-landmark-toranoana-is-permanently-closing-chain-downsizes-to-just-one-branch-in-japan/

136 Cf. Galbraith, Patrick W.: “Character, Culture, Platform: Locating Emotional Technology in Contemporary Japan|Desired Identities.” *Musée du quai Branly—Jacques Chirac*, June 28, 2020. YouTube video, 20:46, here 12:00-14:00, https://www.youtube.com/watch?v=_rOv5WHDgDw

137 Thompson, Ben: “Apple and AI, Lobotomized Lovers, XR Companions,” *Stratechery*, March 21, 2023, <https://stratechery.com/2023/apple-and-ai-lobotomized-lovers-xr-companions/>

138 P. Galbraith: *Character, Culture, Platform*, here. 15:00-19:00.

139 Bredikhina, Liudmila: “Virtual ‘Sweet Relationships’ in Japan: Navigating Affection through Technology. Communal Practices, Behaviors, and Latent Socio-Cultural Meaning,” *Comunifé* 22 (2022), pp. 53-62, here pp. 57-58.

“hacking” the self in which one is “breaking down the binary and creating fractional identities that are not afraid of kinship with and as fictional beings enabled by machines (PC) and communication technologies.”¹⁴⁰ As Freyermuth concludes, the future of media and design lies within digitalization and requires artificial intelligence to come to fruition—taking the form of a symbiosis of human and machine, borrowing the concept of J. C. R. Licklider, a cyborg.¹⁴¹

Then why Akihabara? Why there? And why is it fading now? “As if the contents of an otaku’s bedroom have spilled out into an entire neighborhood of Tokyo”—this was the description Morikawa offered of Akihabara. An important aspect to mention is that Akihabara grew in an environment where social digitization was beginning but hadn’t matured yet. In Japan, the way the Internet took hold in everyday life was different from many other countries. Whereas within Europe and America, the Personal Computer brought the Internet into the everyday, Japan developed a focus on internet-connected phones (*keitai*).¹⁴²

Indeed, it appears that the use of these webphones emphasized the communicative aspects while de-emphasizing the communal:

“Webphones are most often used to exchange short, quick messages with those who are physically nearby. They are less often used to access the Internet, and they are rarely used to gather information about social issues or to participate in online communities. It appears that webphones are useful to maintain strong ties with people who are socially or physically close.”¹⁴³

140 Ibid., p. 61.

141 Cf. Licklider, J. C. R.: “Man-Computer Symbiosis,” *IRE Transactions on Human Factors in Electronics* HFE-1, no. 1 (March 1960), pp. 4-11, <https://doi.org/10.1109/THFE2.1960.4503259>; Cf. Freyermuth, Gundolf S.: “Design, Spiel, Metaversum: Zukünfte in der digitalen Kultur,” in: Thilo Schwer/Melanie Kurz (eds), *Design für Spiel Spaß Spannung—Gestaltung von Artefakten zum spielerischen Handeln* vol. 6, Stuttgart: avedition, 2023, pp. 86-103, here pp. 100-102.

142 Cf. Matsuda, Mia: “Discourses of Keitai in Japan,” in: Itō, Mizuko/Okabe, Daisuke/Matsuda, Misa (eds.): *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, Cambridge, MA: MIT Press 2005, pp. 19-40, here pp. 28-35.

143 Miyata, Kakuko et al.: “The Mobileizing Japanese: Connecting to the Internet by PC and Webphone in Yamanashi,” in: Itō, Mizuko/Okabe, Daisuke/Matsuda, Misa (eds.): *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, Cambridge, MA: MIT Press, 2005, pp. 143-164, here p. 160.

Years before the launch of the smartphone, connection to the web was not tied to a static location, and we can theorize that this focus of the digital element on locality and the unique slowing of the digitalization of communities helped foster a communal *physical* space for subculture. Indeed, we can connect this to the question of what Akihabara was anticipating in the first place. Morikawa described Akihabara as a space that mimics cyberspace created by computers.¹⁴⁴

We can argue that many of these factors come together to create what Akihabara ultimately is—a digital community as we know it now, manifested as a space within Tokyo. It happened with Otaku of all communities because they had both the market force and a unique understanding of fictionality. They were able to bring about a space that is itself a proto-metaverse.

In explaining his concept of media consumption, Ōtsuka said, “With the accumulation of these small narratives, a ‘grand narrative’ reminiscent of a mythological epic appeared.”¹⁴⁵ Akihabara’s history mirrors this idea—the creation of the otaku capital did not form top-down but bottom-up as a result of smaller, individual actors synchronizing. Azuma and Manovich both describe a media landscape defined not by narratives but by databases.¹⁴⁶ Indeed, otaku culture is a culture of databases—doujin works provide endless reinterpretations and reconfigurations of previous narratives, and characters are built up through *moé* traits.¹⁴⁷ Narratives themselves reinterpret video games’ concepts overtly, as exemplified within the new genre of *isekai* fiction.¹⁴⁸ Akihabara’s adaptations within media reflect this idea as well. Within AISP@CE, we are shown a vision of Akihabara as a digital space that reconfigures the contexts of fiction into one where we can coexist with it. With its maid and costume cafés, one can see that attempts at coexistence with fiction are already present within Akihabara.¹⁴⁹ At the same time, we see the virtual world spill back into Akihabara the same way: Held for the first time in June 2023, the *Virtual Market 2023: Real in Akiba* represents a real-life component to a previously entirely virtual event centered around Metaverse concepts, with many of its activities crossing the boundaries between real and virtual.¹⁵⁰ As anticipated in AISP@CE, Akihabara serves as the bridge between real and virtual.

144 Cf. K. Morikawa: *Otaku and the City: The Rebirth of Akihabara*, p. 152.

145 E. Ōtsuka and M. Steinberg: “World and Variation,” p. 106.

146 See *Akihabara—The Otaku Capital*.

147 See *Akihabara as a Space for Sharing in Community Creation*.

148 Cf. G. Tagliamonte and Y. Yang: “Isekai,” pp. 347-359.

149 See *Akihabara as a Space for Interpersonal Relationships*.

150 Cf. Hickey: “40,000 Visitors Recorded! More Than 8,000 Real Products Sold! Report on ‘Virtual Market 2023 Real in Akiba’,” *Virtual Market* (blog), August 28, 2023,

Thus, in a world that is moving rapidly towards digitalization and virtualization, a space like Akihabara constitutes a transitional period. Cities and stores are replaced by websites. Community spaces are brought into the digital and become global. People channeling 2D characters to bring living and breathing moé into our reality within maid cafes are granted entirely new outlets through technology (Vtubers, AI, VRCHAT).

The cityscape of Akihabara anticipated telepresence technology which allows living in spaces centered around community and personal interests. Those spaces are turning out to be digital. A place described as a fantasy within reality¹⁵¹ thus anticipated a reality that is a fantasy. To the otaku, the degree of its reality was never a concern after all.

GLOSSARY

Otaku—The Japanese word for “geek” but with a significant amount of additional connotations. Otaku of all types exist, though generally, they have a certain degree of obsession with fictional characters. A longer exploration of the term is presented in *Of Otaku and Moé*.

Moé—The term generally describes the feeling of attraction toward fictional characters. While the exact etymology is not clear, it is written as 萌え (moé—budding) and is not necessarily sexual in nature. Otaku use the term to describe their emotional reaction evoked by characters. It is also not necessarily holistic as a descriptor: a character’s action or pose can evoke moé. A longer explanation of the term is presented in *Of Otaku and Moé*. For further reading, Patrick Galbraith’s book *The Moé Manifesto* is entirely dedicated to exploring the concept.

Doujinshi—Derivative works, usually manga, created by doujin (hobbyist) artists. Doujinshi refers specifically to magazines/manga, and many are explicit in nature. Doujinshi are usually made for and sold at specific events (often at a loss), such as Comiket.

<https://virtual-market.prowly.com/258265-40000-visitors-recorded-more-than-8000-real-products-sold-report-on-virtual-market-2023-real-in-akiba>

151 Cf. Siliconera Staff: “This Interview With Acquire Gives Us A Tour Of Akiba’s Trip,” Siliconera (blog), February 25, 2011, <https://www.siliconera.com/this-interview-with-acquire-gives-us-a-tour-of-akibas-trip/>

Comiket—Short for Comic Market. The biggest doujin event is held bi-annually at the Tokyo Big Sight exhibition space. Comiket 97 (shortened to C97) in 2019 attracted 750,000 visitors across four days before the COVID-19 pandemic. Not only doujinshi but also other doujin works such as games or music are sold.

Otome Road—A specific street within East Ikebukuro with stores mostly catering to female otaku, often specifically carrying BL (Boys Love) fiction.

Galge—Short for girl game. A dating game, often eroge, but not always. Most galge feature multiple heroines (usually five) that the player can romance by making the right choices. These games are usually presented in visual novel format with a text box at the bottom of the screen.

Eroge—Short of erotic game. Not all eroge are galge, but many of them are. Most of them are visual novels, but some feature gameplay. Despite their pornographic content, they are often not focused on it, and frequently, only a fraction of their content is explicit in nature. Again, outliers exist. Eroge that specifically focus on the pornographic aspects are often referred to as *nukige*. Due to multiple historical reasons, eroge are almost entirely PC games, and in the 2000s, “PC games” were almost synonymous with eroge in Japan. Many games received console versions that cut out the explicit content (referred to in Japan as “consumer versions”).

Tora no Ana—A chain of doujinshi stores across Japan. They have closed a majority of their physical locations since the COVID-19 pandemic and now operate almost exclusively online.

Akihabara Gamers—A store that sells games and other otaku culture-related products. The Akihabara store is their main store, though they have a number of branches—even multiple within Akihabara.

DI GI CHARAT—The mascot character of Gamers. She wears a maid uniform and has large cat ears, a cat tail, and giant bells. The character was very popular and spawned multiple anime and manga adaptations.

LITERATURE

@2dJazz: “Saddest Shit to Me for People That Come to JP for Modern Fgs (If They Miss the Few Regular Offline Gatherings) Is Seeing Majority of Their Gameplay Exp Boil down to Netplay from a Hotel Room. It Used to Be so Different” *Twitter*, April 4, 2023, <https://twitter.com/2dJazz/status/1643097801562423296>

- @2dJazz: “@Speedkicks What i Realized Too, Is You Will Never Be Able to Make Them Understand What They Missed out on. Ignorance Is Bliss, Generational Gap Too Wide Imo. Just Think about Even Trying to Explain This Shit to People in 5 Years. They Will Think You Have Alzheimers,” *Twitter*, April 4, 2023, <https://twitter.com/2dJazz/status/1643151241948856320>
- Ashcraft, Brian: “Arcades In Japan Keep Closing, Which Sucks,” *Kotaku*, November 24, 2021, <https://kotaku.com/arcades-in-japan-keep-closing-which-sucks-1848115616>
- Azuma, Hiroki: *Otaku: Japan’s Database Animals*, trans. Jonathan E. Abel/Shion Kono, Minneapolis, MN: University of Minnesota Press 2009.
- Baffelli, Erica/Yamaki, Keiko: “Maids in Akihabara: Fantasy, Consumption and Role-Playing in Tokyo,” *Journal of International Economic Studies* 32, pp. 117-137.
- Baseel, Casey: “Akihabara Landmark Toranoana Is Permanently Closing, Chain Downsizes to Just One Branch in Japan,” *SoraNews24 -Japan News-* (blog), July 6, 2022, <https://soranews24.com/2022/07/06/akihabara-landmark-toranoana-is-permanently-closing-chain-downsizes-to-just-one-branch-in-japan>
- Batchelor, James: “Sega Exits the Arcade Business after 56 Years,” *GamesIndustry.biz*, January 28, 2022, <https://www.gamesindustry.biz/sega-exits-the-arcade-business-after-56-years>
- Baudrillard, Jean: *Simulacra and Simulation*, Ann Arbor, MI: University of Michigan Press 1994.
- Benjamin, Walter: “The Work of Art in the Age of Mechanical Reproduction,” Arendt, Hannah (ed.): *Illuminations*, trans. Harry Zohn, New York, NY: Schocken Books 1969.
- Bredikhina, Liudmila: “Virtual Theatrics and the Ideal VTuber Bishōjo,” *REPLAYING JAPAN* 3, March 1 (2021): pp. 21-32.
- Bredikhina, Liudmila: “Virtual ‘Sweet Relationships’ in Japan: Navigating Affection through Technology. Communal Practices, Behaviors, and Latent Socio-Cultural Meaning,” *Comunifè* 22 (2022): pp. 53-62.
- Chang, Eddy YL: “Let the Yuru-Chara Do the Job: Japan’s Mascot Character Frenzy and Its Socioeconomic Implications,” *Mirai. Estudios Japoneses* 1, (2017): pp. 237-252.
- Cloba.U.: *Magic of Stella*. Tokyo: Houbunsha 2012.
- Eco, Umberto: *Travels in Hyper Reality: Essays*. Trans. William Weaver. New York, NY: Harcourt Brace Jovanovich 1986.
- Fiadotau, Mikhail: “Indie and Dōjin Games: A Multilayered Cross-Cultural Comparison,” *Gamevironments*, January 1, 2019, <https://www.academia.edu/40095159/>

- Foucault, Michel: "Of Other Spaces," Trans. Jay Miskowiec. *Diacritics* 16, no. 1 (1986): pp. 22-27, <https://doi.org/10.2307/464648>
- Freyermuth, Gundolf S.: "Design, Spiel, Metaversum: Zukünfte in der digitalen Kultur," in: Thilo Schwer/Melanie Kurz (eds), *Design für Spiel Spaß Spannung—Gestaltung von Artefakten zum spielerischen Handeln* vol. 6, Stuttgart: avedition, 2023, pp. 86-103.
- Freyermuth, Gundolf S.: "Vegas, Disney, and the Metaverse: On the Material Anticipation of Virtual Worlds and Virtual Play in the Second Half of the 20th Century," in: Beil, Benjamin et al. (eds.): *Playful Materialities: The Stuff That Games Are Made Of*, Bielefeld: transcript Verlag 2022, pp. 17-97, here 21-24, <https://www.transcript-open.de/doi/10.14361/9783839462003-002>
- Galbraith, Patrick W.: "Character, Culture, Platform: Locating Emotional Technology in Contemporary Japan|Desired Identities." *Musée du quai Branly—Jacques Chirac*. June 28, 2020. YouTube video, 20:46, https://www.youtube.com/watch?v=_rOv5WHDgDw
- Galbraith, Patrick W.: "Maid Cafés: The Affect of Fictional Characters in Akihabara, Japan," *Asian Anthropology* 12, no. 2 (December 2013): pp. 104-125, <https://doi.org/10.1080/1683478X.2013.854882>
- Galbraith, Patrick W.: "Maid in Japan: An Ethnographic Account of Alternative Intimacy," *Intersections: Gender and Sexuality in Asia and the Pacific* 25, no. 2 (2011), <http://intersections.anu.edu.au/issue25/galbraith.htm>
- Galbraith, Patrick W.: *Otaku and the Struggle for Imagination in Japan*. Durham, NC: Duke University Press 2019.
- Galbraith, Patrick W.: *The Moé Manifesto: An Insider's Look at the Worlds of Manga, Anime, and Gaming*. Tuttle Publishing 2014.
- Garner, Katelin: *The Digital Otaku: Anime, Participatory Culture, and Desire*, Long Beach, CA: California State University 2019.
- Hayakawa, Kiyo: *Meido Kissa de Aimashō*. Tokyo: Āruzu Shuppan 2008.
- He, Tianxiang: "What Can We Learn from Japanese Anime Industries? The Differences Between Domestic and Overseas Copyright Protection Strategies Towards Fan Activities," *The American Journal of Comparative Law* 62, December 1 (2014): 1009-42, <https://doi.org/10.5131/AJCL.2014.0029>
- Hikky: "40,000 Visitors Recorded! More Than 8,000 Real Products Sold! Report on "Virtual Market 2023 Real in Akiba'," *Virtual Market* (blog), August 28, 2023, <https://virtual-market.prowly.com/258265-40000-visitors-recorded-more-than-8000-real-products-sold-report-on-virtual-market-2023-real-in-akiba>
- Huizinga, Johan: *Homo Ludens: A Study of the Play-Element in Culture*, trans. Gillin, John L., London: Routledge & Kegan Paul, 1949.

- Infil. "Netcode: Fightin' Words." Accessed April 5, 2023, <https://words.infil.net/w02-netcode.html>
- Japan National Tourism Organization: "Akihabara | Travel Japan (Japan National Tourism Organization)," *Travel Japan*, accessed March 21, 2023, <https://www.japan.travel/en/spot/2178/>
- Juric, Alana: "Maid Café Secrets Spilled by a Former Maid," *Tokyo Weekender* (blog), July 23, 2021, https://www.tokyoweekender.com/art_and_culture/entertainment-art_and_culture/maid-cafe-secrets-spilled-former-maid/
- Lewis, Leo: "Game on: Why Japan's Arcades Are Still Winning," *Financial Times*, February 9, 2017, <https://www.ft.com/japanarcades>
- Licklider, J. C. R.: "Man-Computer Symbiosis," *IRE Transactions on Human Factors in Electronics* HFE-1, no. 1 (March 1960): pp. 4-11, <https://doi.org/10.1109/THFE2.1960.4503259>
- Loo, Egan: "Reiwa No Di Gi Charat Mini Anime's 2nd Teaser Unveils October 7 Premiere," *Anime News Network*, March 28, 2023, <https://www.animenewsnetwork.com/news/2022-09-10/reiwa-no-di-gi-charat-mini-anime-2nd-teaser-unveils-october-7-premiere/.189551>
- Manovich, Lev: "Database as a Symbolic Form," 1998, <http://manovich.net/index.php/projects/database-as-a-symbolic-form>
- Maruto, Fumiaki: *Saekano: How to Raise a Boring Girlfriend*. 10 vols. Tokyo: Fujimi Fantasia Bunko 2012.
- Matsuda, Mia: "Discourses of *Keitai* in Japan," in: Itō, Mizuko/Okabe, Daisuke/Matsuda, Misa (eds.): *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, Cambridge, MA: MIT Press 2005, pp. 19-40.
- Mehra, Salil K.: "Copyright and Comics in Japan: Does Law Explain Why All the Cartoons My Kid Watches Are Japanese Imports?," November 25, 2002, Rochester, NY: SSRN Scholarly Paper, <https://doi.org/10.2139/ssrn.347620>
- Mizu, Asato: *Denkigai no Honya-san*. 15 vols. Tokyo: Media Factory 2011.
- Miyata, Kakuko et al.: "The Mobile-izing Japanese: Connecting to the Internet by PC and Webphone in Yamanashi," In: Itō, Mizuko, Okabe, Daisuke/Matsuda, Misa (eds.): *Personal, Portable, Pedestrian: Mobile Phones in Japanese Life*, Cambridge, MA: MIT Press 2005, pp. 143-164
- Morikawa, Kaichiro: *Learning from Akihabara: The Birth of a Personapolis, Schriften Der Bauhaus-Universität Weimar*, August 14, 2008, <https://doi.org/10.25643/bauhaus-universitaet.1316>
- Morikawa, Kaichiro: "Otaku and the City: The Rebirth of Akihabara," in: Itō, Mizuko/ Okabe, Daisuke/Izumi Tsuji (eds.): *Fandom Unbound: Otaku Culture in a Connected World*, New Haven, CT: Yale University Press 2012.

- Morikawa, Kaichiro: “おたく Otaku/Geek.” Trans. Dennis Washburn. *Review of Japanese Culture and Society* 25, no. 1 (2013): pp. 56-66, <https://doi.org/10.1353/roj.2013.0002>
- Morrissy, Kim: “Playboard: World’s Biggest Superchat Earner Is Virtual YouTuber Kiryu Coco.” *Anime News Network*, April 5, 2023, <https://www.anime-newsnetwork.com/interest/2020-08-22/playboard-world-biggest-superchat-earner-is-virtual-youtuber-kiryu-coco/.163103>
- N.N.: Web. “Comiket 97 After Report,” コミックマーケット公式 accessed March 22, 2023, <https://www.comiket.co.jp/info-a/C97/C97AfterReport.html>
- N.N.: “EVO Japan 2023,” accessed April 5, 2023, <https://www.evojapan.gg/>
- N.N.: “ツクモDOS/Vパソコン館前に「つくもたんのラッピング自動販売機」が登場。(Tsukumo-tan receives a vending machine.),” *Omaketeki*, Accessed March 29, 2023, <https://blog.goo.ne.jp/omaketeki/e/bd90245c7535d1-ba33660bcc47cdeabb>
- N.N.: “「つくもたん」契約終了のお知らせ。(Tsukumo-tan’s Retirement),” *Tsukumo Official Website*, Accessed March 29, 2023, <https://tenpo.tsukumo.co.jp/static/info/39-tsukumotan.html>
- N.N.: “「アキバで見かけた萌えキャラコンテスト 2019」結果発表,” AKI-BA PC Hotline! Character Contest Results 2019, 株式会社インプレス, December 27, 2019, <https://akiba-pc.watch.impress.co.jp/docs/sp/1226770.html>
- Nobuoka, Jakob: “User Innovation and Creative Consumption in Japanese Culture Industries: The Case of Akihabara, Tokyo,” *Geografiska Annaler: Series B, Human Geography* 92, no. 3 (September 2010): pp. 205-218, <https://doi.org/10.1111/j.1468-0467.2010.00348.x>
- Noppe, Nelle: *The Cultural Economy of Fanwork in Japan: Dōjinshi Exchange as a Hybrid Economy of Open Source Cultural Goods*. PhD Thesis, University of Leuven 2014, <https://lirias.kuleuven.be/retrieve/280506>.
- Novitskaya, Alexandra: “Otaku Sexualities in Japan,” in: *The Global Encyclopedia of Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) History*, pp. 1179-1181. Farmington Hills, MI: Gale 2019.
- Okada, Yuka: “「CLANNADは人生」を3Dで実現 ギャルゲーキャラと暮らす仮想空間、ドワンゴなど開発。(“Clanad is life”—A virtual space wherein galge characters turn real),” *ITmedia NEWS*. Accessed April 12, 2023, <https://www.itmedia.co.jp/news/articles/0804/08/news104.html>
- Oshikiri, Rensuke: *Hi Score Girl*. 10 vols. Tokyo: Square Enix 2010.
- Ōtsuka, Eiji/Steinberg, Marc: “World and Variation: The Reproduction and Consumption of Narrative,” *Mechademia* 5, no. 1 (2010): pp. 99-116. MN: University of Minnesota Press 2011.

- Saitō, Tamaki: *Beautiful Fighting Girl*. Trans. Keith Vincent/Dawn Lawson. Minneapolis, MN: University of Minnesota Press 2011.
- Serizawa, Kamone: “Memories of aisp@ce,” Q&A, 2021, <https://www.youtube.com/watch?v=4SB3OF-sSGE>
- Sharp, Luke: “The Heterogeneity of Maid Cafés: Exploring Object-Oriented Fandom in Japan,” *Transformative Works and Cultures* 16 (June 15, 2014), <https://doi.org/10.3983/twc.2014.0505>
- Shea, Brian: “Street Fighter 6 Cover Story—The Dawn of a New Era,” *Game Informer*, December 28, 2022, accessed April 5, 2023, <https://www.gameinformer.com/feature/2022/12/28/street-fighter-6-cover-story-the-dawn-of-a-new-era>
- Siliconera Staff: “This Interview With Acquire Gives Us A Tour Of Akiba’s Trip,” *Siliconera* (blog), February 25, 2011, <https://www.siliconera.com/this-interview-with-acquire-gives-us-a-tour-of-akibas-trip/>
- Stephenson, Neal: *Snow Crash*, New York, NY: Bantam Books 1992.
- Suan, Stevie: “Performing Virtual YouTubers: Acting Across Borders in the Platform Society,” in: Roth, Martin/Yoshida, Hiroshi/Picard, Martin (eds.), *Japan’s Contemporary Media Culture between Local and Global: Content, Practice and Theory*, Berlin: CrossAsia-eBooks, 2021, pp. 187-222, <https://books.ub.uni-heidelberg.de/index.php/xa/catalog/book/971/c12884>
- Tagliamonte, Giovanni/Yaochong Yang: “Isekai: Tracing Interactive Control in Non-Interactive Media,” in: Beil, Benjamin et al. (eds.): *Paratextualizing Games: Investigations on the Paraphernalia and Peripheries of Play*, Bielefeld: transcript, 2021, pp. 341-372.
- Takahashi, Yōichi: *Captain Tsubasa*, Tokyo: Shueisha, 1981.
- Thompson, Ben: “Apple and AI, Lobotomized Lovers, XR Companions,” *Stratechery*, March 21, 2023, <https://stratechery.com/2023/apple-and-ai-lobotomized-lovers-xr-companions/>
- Wired Staff: “Akihabara Lifestyle Weekend,” *Wired*, September 18, 2006, accessed March 22, 2023, <https://www.wired.com/2006/09/akihabara-lifes/>
- YABAI Writers: “Doujinshi and the Deal with Self-Publishing,” *YABAI—The Modern, Vibrant Face of Japan*, June 14, 2017, <http://yabai.com/p/2197>
- YURIKA: “Ai Sp@ce Joins the Rain Bandwagon,” *かわいいいじやなきやダメなの!* (blog), June 2, 2009, <https://breadmasterlee.com/2009/06/02/ai-spce-joins-the-rain-bandwagon/>
- YURIKA: “Aisp@ce Celebrates Comptique’s 25th Anniversary,” *かわいいいじやなきやダメなの!* (blog), December 8, 2008, <https://breadmasterlee.com/2008/12/08/ai-spce-celebrates-comptiques-25th-anniversary/>

FILMOGRAPHY

AKIBA MAID WAR. (Japan 2022, D: Sōichi Masui).
DI GI CHARAT (Japan 1999, D: Hiroaki Sakurai).
LUCKY STAR (Japan 2007, D: Yutaka Yamamoto, Yasuhiro Takemoto).
NEON GENESIS EVANGELION (Japan 1995, D: Hideaki Anno).
NIPPON NO GENBA: AKIHABARA TOSHINOSE NO MONOGATARI (Japan 2005, D: Satoshi Kobayashi, Kohei Nagashima).
THE MELANCHOLY OF HARUHI SUZUMIYA (Japan 2006, D: Tatsuya Ishihara).

GAMOGRAPHY

AISP@CE (Ai Space Production Committee 2008, O: Headlock)
AKIBA'S TRIP (Acquire 2011, O: Acquire)
AKIBA'S TRIP 2 (Acquire 2013, O: Acquire)
AKIBA'S TRIP: HELLBOUND & DEBRIEFED (Marvelous USA 2021, O: Acquire)
AKIBA'S TRIP: UNDEAD & UNDRESSED. (Marvelous USA 2014, O: Acquire)
AKIBA'S TRIP: UNDEAD & UNDRESSED: DIRECTOR'S CUT (Marvelous USA 2023, O: Acquire)
AKIBA'S TRIP FOR GREE (Acquire 2012, O: Acquire)
AKIBA'S TRIP FESTA (Acquire, DMM Games 2016, O: DMM Games)
CLANNAD (Key 2004, O: Jun Maeda)
D.C. II ~DA CAPO II~ (Circus 2006, O: Circus)
HIGURASHI NO NAKU KORO NI. (07th Expansion 2002, O: 07th Expansion)
ONGEKI (Sega 2018, O: Sega Interactive)
SHUFFLE! (Omegavision 2004, O: Navel)
SOUND VOLTEX (Konami 2012, O: Konami)
STEINS;GATE (5pb. 2009, O: Nitroplus)
STREET FIGHTER V (Capcom 2016, O: Capcom)
STREET FIGHTER 6 (Capcom 2023, O: Capcom)
TSUKIHIME (Type Moon 2000, O: Type Moon)
WELCOME TO PIA CARROT!! (Cocktail Soft 1996, O: Cocktail Soft)

Contributors

Bamba, Icare, freelance game and narrative designer working in France. Currently a Ph.D. student in philosophy and design at the University of Paris 8 under the co-supervision of Pr. Dr. Pierre Cassou Noguès and Prof. Dr. Gundolf S. Freyermuth. His research interest focuses on phenomenology, critical theory, and their potential contribution to the understanding of contemporary culture and its technological issues. It informs his creative work, leading to a reflection on virtuality and its impact on both subjectivities and bodies. Email: icare.bamba@gmail.com

Beil, Benjamin, Professor for Media Studies & Digital Culture at the Department of Media Culture & Theatre at the University of Cologne. Selected publications: *Im Spielrausch* (co-ed., Glückstadt: vwh 2017); *Game Studies* (co-ed., Wiesbaden: Springer VS 2018); *Playing Utopia. Futures in Digital Games* (co-ed., Bielefeld: transcript 2019). *Paratextualizing Games: Investigations on the Paraphernalia and Peripheries of Play* (co-ed., Bielefeld: transcript 2021). *Playful Materialities. The Stuff That Games Are Made Of* (co-ed., Bielefeld: transcript 2022). Website: <https://mekuwi.phil-fak.uni-koeln.de/benjamin-beil>

Bieseke, Tobias, is a research assistant at the Dortmund University of Applied Sciences and Arts in the storyLab kiU at the Dortmunder U (Center for Art and Creativity) and researches the potential of extended perceptions and narration for contemporary art. He experiments within the framework of artistic research and wanders on the threshold between artistic application and scientific investigation of new media. He also works occasionally in the independent creative industry for theaters, universities, and businesses. Since 2018, he has been working on his doctorate at the Academy of Media Arts (KHM) in the field of experimental computer science, under the supervision of Georg Trogemann, on the topic of ‘Extended Realities—Technically extended visual perception and its effects on individual spaces of action in contemporary art.’ In 2023, he was able to make the success of

his research visible for the first time, where he and Thomas Krupa won the German theater award “Der Faust” in the category Genrespringer for ‘The Wall 360°.’

Fizek, Sonia, Professor of Media and Game Studies at the Cologne Game Lab of TH Koeln—University of Technology, Arts and Sciences, visiting professor at the University of Lower Silesia in Wroclaw, and co-editor-in-chief of the international *Journal of Gaming and Virtual Worlds*. Selected Publications: *Playing at a Distance. Borderlands of Video Game Aesthetic* (Cambridge, MA: MIT Press 2022); *Material Infrastructures of Play. How the Games Industry Reimagines Itself in the Face of Climate Crisis*. In *Ecogames*, eds. Raessens, Joost / Werning, Stefan / Op de Becke, Laura. Amsterdam: Amsterdam University Press (2024), *Through the Ludic Glass: Making Sense of Games as Algorithmic Spectacles* (*Game Studies* 22.2 2022); *Automation of Play. Theorizing Self-Playing Games and Post-Human Ludic Agents* (*Journal of Gaming and Virtual Worlds* 10.3, Bristol: Intellect 2018), *Automated State of Play. Rethinking Anthropocentric Rules of the Game. Digital Culture and Society* (*Digital Culture and Society*, Bielefeld: transcript 2018). Websites: <https://colognegamelab.de/about/faculty-staff/professors/prof-dr-sonia-fizek> and <https://mitpress.mit.edu/books/playing-distance>

Freyermuth, Gundolf S., Professor of Media and Game Studies and founding co-director at the Cologne Game Lab of TH Koeln—University of Technology, Arts and Sciences, as well as Professor of Comparative Media Studies at the ifs International Film School of Cologne. His projects have been funded by the Volkswagen Foundation, the Film- und Medienstiftung NRW, The Federal Government of Germany and its Commission for Culture and Media, the European Regional Development Fund, the RheinEnergie Foundation, and others. Selected Publications: *Games | Game Design | Game Studies. An Introduction* (Bielefeld: transcript 2015); *Playing Utopia. Futures in Digital Games* (co-ed., Bielefeld: transcript 2019); *Paratextualizing Games: Investigations on the Paraphernalia and Peripheries of Play* (co-ed., Bielefeld: transcript 2021); *Playful Materialities. The Stuff That Games Are Made Of* (co-ed., Bielefeld: transcript 2022). Websites: www.freyermuth.com and <https://colognegamelab.de/about/faculty-staff/professors/prof-dr-gundolf-s-freyermuth/>

Fuchte, Alina, studied art history and cultural and social anthropology in Münster and Amsterdam (B.A.) and cultural analysis and cultural mediation in Dortmund (M.A.). Afterwards, she completed a traineeship in the department of cultural education at the Kunstpalast Düsseldorf. In April 2020, she took over the project management for nextmuseum.io, a cross-institutional platform for swarmcuration

and co-creation. Since April 2023 she is deputy head of education at Kunstpalast and NRW-Forum and she curated an exhibition on the theme of sneakers, which was on display at the NRW-Forum from February to May 2024.

Hamm, Isabelle, is a research assistant at the Department of Media Culture and Theatre at the University of Cologne. Her research interests include museology, (digital) art mediation and digital art. As co-project manager, she conceptualized and realized the apps “Kunstfreunde im Wallraf” for the Wallraf-Richartz-Museum and “Warhol & Friends” for the Museum Ludwig in Cologne. Her current research focuses on virtual exhibitions and their intersections with games and the Metaverse. She is also preparing her doctoral project titled “Art Presentations in Digital Space: On the Medial Transformation of Virtual Exhibitions.”

Kinne, Christina XaosPrincess, Art School Diploma in “Feature Film and Television Feature” at *HFF University for Television and Film Munich*, Master of Arts in “Digital Narratives” at *ifs International Film School Cologne*. Guest lecturer for VR at the *ifs* and the *University of Applied Sciences Fresenius*. After working as a filmmaker focusing on innovative technologies, Christina XaosPrincess Kinne has found a new creative home in virtual reality, where she creates content and hosts multiuser gatherings. Until January 2022, she served as CMO and Events Manager for the social VR platform TIVOLI CLOUD VR. She currently supervises the public release of her thesis project, QUANTUM BAR, for which she has brought a GPT-3-driven chatbot to life in social VR. Recent Publication: “The Evolution of Emotional Chatbots,” in: *Chatbots Life*, (2021). Websites: <https://xaosprincess.net/> and <https://quantumbar.ai/>

Lamerichs, Nicolle, is a senior lecturer and team lead at Creative Business, HU University of Applied Sciences, Utrecht. She is the program coordinator of the MSc Sustainable Business Transition. Lamerichs holds a PhD in media studies from Maastricht University (2014). She has published peer-reviewed articles and chapters on fandom, media culture, cosplay, and game practices. In her book *Productive Fandom* (2018), she explores intermediality, affect, costuming, and creativity in fan cultures.

Murray, Janet H., Distinguished Professor of Digital Media in the School of Literature, Media, and Communication at Georgia Institute of Technology in Atlanta, Georgia, USA. From 1971 to 1999, she taught humanities and led advanced interactive design projects in the Center for Educational Computing Initiatives at the

Massachusetts Institute of Technology (MIT). A pioneer in the fields of interaction design, digital humanities, and game studies, she specializes in interactive narrative and experimental television. Her projects have been funded by NSF, NEH, Intel Corporation, Apple, IBM, and others. She is an Emerita Trustee of the American Film Institute and Emerita Board Member of the Peabody Awards. Selected publications: *Hamlet on the Holodeck: The Future of Narrative in Cyberspace* (New York: Free Press, 1997; Cambridge, Mass.: MIT Press 1998, updated edition 2017); *Inventing the Medium: Principles of Interaction Design as a Cultural Practice* (Cambridge, Mass: MIT Press, 2011). Website: <https://iac.gatech.edu/people/person/janet-murray>

Ossa, Vanessa, is a postdoctoral research associate and project coordinator at the Cologne Game Lab of TH Koeln–University of Technology, Arts and Sciences. In 2019, she finished her doctoral thesis, *Sleeping Threats: The Sleeper Agent in Post-9/11 Media* (published 2023, Palgrave Macmillan) at the Collective Research Center “Threatened Order—Societies under Stress” in Tübingen. She is also on the editorial board of the open-access journal *Fandom|Cultures|Research* and co-editor of the edited collections *Threat Communication and the US Order After 9/11: Medial Reflections* (2020), and *Comics and Agency* (2022), as well as the special issue “Fandom and Comics” (2020) of the journal *Participations*. Her current research interests include participatory culture, comic book fandom, and fictional characters in (digital) fan communities.

Schell, Jesse, is the founder and CEO of Schell Games. Since starting Schell Games in 2002, Jesse has grown it into the largest full-service educational and entertainment game development company in the United States. Under his leadership, Schell Games has produced an amazing array of innovative and award-winning educational and entertainment experiences, including the I EXPECT YOU TO DIE franchise, HAPPY ATOMS, UNTIL YOU FALL, and some of the most popular interactive theme park attractions in the world. He is the author of the critically acclaimed book *The Art of Game Design: A Book of Lenses* and also serves as Distinguished Professor of the Practice of Entertainment Technology at Carnegie Mellon University. He has worked on a wide variety of innovative game and simulation projects for both entertainment and education, but he is also known for his predictions about the future of gaming technology. Before starting Schell Games, Jesse was the Creative Director of the Disney Imagineering Virtual Reality Studio, where he worked and played for seven years as a designer, programmer, and manager on numerous projects for Disney theme parks DisneyQuest. He is a previous chair of the International Game Developers Association.

Schmeink, Lars, works as a researcher in futures studies for the German Aerospace Center (DLR) and has been researching science fiction for more than a decade. He has inaugurated the Association for Research in the Fantastic (GfF) in 2010, and has been appointed Visiting Professor at the Institute for Cultural and Media Management of the HfMT Hamburg, at the University of Cincinnati, and at the University of Leeds. His key publications include *Biopunk Dystopias* (2016), *Cyberpunk and Visual Culture* (2018), *The Routledge Companion to Cyberpunk Culture* (2020), *Fifty Key Figures in Cyberpunk Culture* (2022), and *New Perspectives on Contemporary German Science Fiction* (2022).

Tagliamonte, Giovanni, is a Game Designer with a Master's Degree from the Cologne Game Lab of TH Koeln–University of Technology, Arts and Sciences. His research interests lie in exploring the ways culture and history shape media and the spaces we live in. Currently, he is working on a Mystery Adventure game slated for release in 2024. Publication: "Isekai: Tracing Interactive Control in Non-Interactive Media," in: *Paratextualizing Games: Investigations of the Paraphernalia and Peripheries of Play* (Bielefeld: transcript 2021). Email: g.tagliam@gmail.com; Website: <https://taglia.co/>