Making Sense of the Metaverse: A Cultural and Educational Perspective

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1. Introduction

Many EU strategies have recently been addressing the anticipated technological transitions concerning virtual reality ("An EU Initiative on Web 4.0 and Virtual Worlds: A Head Start in the next Technological Transition" 2023), the industrial relatedness of the virtual worlds, and also citizens' recommendations about the directions of developing them further ("Staff Working Document: Citizens' Panel Report on Virtual Worlds. Citizens' Report from the Citizens' Panel with the 23 Recommendations." 2023). Various industry whitepapers look closely into how digital ethics can manifest in the metaverse (Chi et al. 2023); (Arunov and Scholz 2023) or what shape these spaces will take in the future and how they can provide a space for democracy (Anderson and Rainie 2023). While there are several studies, whitepapers and essays on how digital spaces are possibly transforming different aspects of our daily life (e.g. our identity, see World Economic Forum, 2024), only a few of these whitepapers focus on how various stakeholders consider the role of education and culture in metaverse-like environments in the frame of higher education and the cultural sector.

The term 'metaverse' acquired its initial hype in October 2021 with Mark Zuckerberg's statement about creating Meta and its own social VR space, and the concept of metaverse offered a ground for speculation as well as hope for the XR community for creating new means and use cases of togetherness in virtual spaces. In our view, metaverse functions similar to a paradigm-changing concept or an umbrella term that does not yet mean something well-defined. James Wagner Au, the author of the book 'Making the Metaverse That Matters' (Au, 2023), considers that the definition of metaverse became "comically broad to the point of meaningless" (ibid., 31). According to him the metaverse is

> ***"…a vast, immersive virtual world that's simultaneously accessible by millions of people through highly customizable avatars and powerful experience creation tools that are integrated with the offline world through its virtual economy and external technology."***

While Wagner Au emphasizes the integration of the offline world into the virtual world, another review (Bitterbusch et al. 2022) defines the term as follows:

> ***"…a crossword of "meta" (meaning transcendency) and "universe", describes a (decentralized) three-dimensional online environment that is persistent and immersive, in which users represented by avatars can participate socially and economically with each other in a creative and collaborative manner in virtual spaces decoupled from the real physical world."***

This definition was coined by the authors based on their summary of 364 articles that discuss 'metaverse', 'cyberspace', 'virtual worlds' and other similar terms. According to this working definition, the 'metaverse' can serve more as a platform that isolates the user from the 'real' physical world. This indicates a slight discrepancy between the various

definitions, but they all have in common the digital world aspect, where users can have avatars and they can interact with each other for various purposes. There are a great variety of definitions of the concept that slightly differ from each other, such as Matthew Ball's (2022) well-known definition that emphasises the interoperability aspect of the real-time rendered 3D virtual worlds, but in this whitepaper we aim to provide an overview of how professionals understand the concept.

In this whitepaper, which is the first study of its kind, we summarize the findings based on 41 qualitative in-depth interviews, conducted by the Goethe-Institute in 2023 with Germany-based and international professionals from the field of creative and cultural sector as well as from higher education. The aim of the study is to provide a blueprint of how current technological advancements are perceived and used in the above-mentioned sectors, mapping the concepts and ideas associated with the term 'metaverse' by people in these fields and to find out how they see their practice connecting to it. The study also aimed to figure out the new challenges that metaverse-related technologies can bring to users (e.g. in relation to safety, education design or cultural programmes) and also how they see the role of cultural institutions in creating or contributing to the design of these spaces. We analysed the interviews and aimed to provide several topics that the interviewees touched upon, possibilities for the future and how an individual can navigate these concepts and spaces. This whitepaper addresses the creative industry and cultural professionals, higher education professionals (teachers, programme coordinators, strategists), and policymakers, as well as designers of virtual worlds, in order to provide recommendations for how these metaverse-like environments and virtual worlds can function in their fields and how it can help them to design more tailor-made and future-oriented, but still value-driven programmes and environments for prospective audiences.

We overview the definitions of metaverse, and how they affect the trends in arts, culture, and education. We aim to map various approaches pertaining to how the metaverse and the use of virtual worlds could change educational strategies and how the artistic creation processes can aspire for new forms, and also shed light on the ways these professionals see the role of cultural institutions in shaping virtual world(s). We offer a list of recommendations for the reader concerning how to design virtual worlds and metaverses that are in alignment with international cultural values and that enrich the life of the users.

The list of interviewees can be found in the appendix, and in what follows, we present the opinions they expressed concerning the metaverse in order to create an ongoing dialogue on how to integrate these meaningfully in further cultural and higher education practices.

Topics

Topics	0	1	2	3	4	5	6	7	8	9	10
Accessibility		•	•	•	●	•		•			●
Artistic potential		•						•	•		
Body in the Metaverse			•		•	•	•	●		•	
Design		●	•	•	•	•	●	•	•	•	
Educational potential							●	•	•		●
Legal			•	•	•	•	●	●	•	●	
Mental health in the Metaverse	•	●		•				•			
Perspectives	•	●	•	•	●	•	•	•	•		
Power Relationships		•	●			•	•	●		•	
Recommendations						●	•	•	•	•	●
Sustainability					•		●	•	•		
The role of cultural institutions						●	•	●	•	●	

In the coding process, a thematic weighing system was employed. This involved assigning numerical values to identified themes based on their perceived importance from the interviewees' perspective.

Number of Quotes
- ○ 2
- ○ 4
- ○ 6
- ○ 8
- ○ 10

2. What is the metaverse in our imagination?

Many of the interviewees treat the concept of metaverse as a complex phenomenon that can be approached from many perspectives, including technological perspectives concerning how it can be enabled, taking also into consideration the imagined technological possibilities. In the following section, we divide the participants' answers into two categories: those who discuss the concept from a technological perspective, and those who engage with the concept from a socio-economic perspective.

2.1. Technology-related definitions

The feedback provided by professionals such as Thomas Lilge, Judit Klein-Wiele, Elaine Hoter, Alain Bieber, and Mirjam Vosmeer offers an image of the metaverse as a combination or an interconnection of various technologies. While for Nishant Shah metaverse is a graphical, user-friendly virtual reality, a university professor defines it as the "next form of Internet with decentralized offerings." Similarly, Kamya Ramachandran defines it as "an accessible all-in-one virtual space that tries to mimic the real-world experience to a robust extent." According to David Smith, it is an "interoperable 3D environment" while, among many, a university professor emphasizes such characteristics as interconnectivity of media and platforms, avatars, consistency in experience, and multiple interconnected "universes". Mihaela Popescu also mentions that the metaverse is real-time rendered and it is persistent. All the participants mentioned virtual reality and/or augmented reality as a type of access point for interconnectedness, but many (e.g. David Smith) also mentioned that the metaverse is like a "3D-internet".

The previous definitions point at how the interconnectedness of these worlds or sub-metaverses can be seen as a key definition point. Based on the words of a university professor, interconnectivity of media and platforms, avatars, and the consistency in experience can be understood as an existing "multiply interconnected" universe system, to which the most characteristic aspect is the interoperability. This interconnectedness of 3D worlds (David Smith) can also lead to a more out-of-the-box thinking attitude that involves imagining the metaverse as the intersection of the virtual/digital with the real/physical world, a view shared by Marcus Lobbes, Raphael Zender, and Katharina Groß.

Besides these, the participants of the interview study often mentioned related technologies such as blockchain (Eike Langbehn, Christian Fieseler) as an advanced database mechanism that enables transparent information sharing within a network.

What is the Metaverse?

technological
social
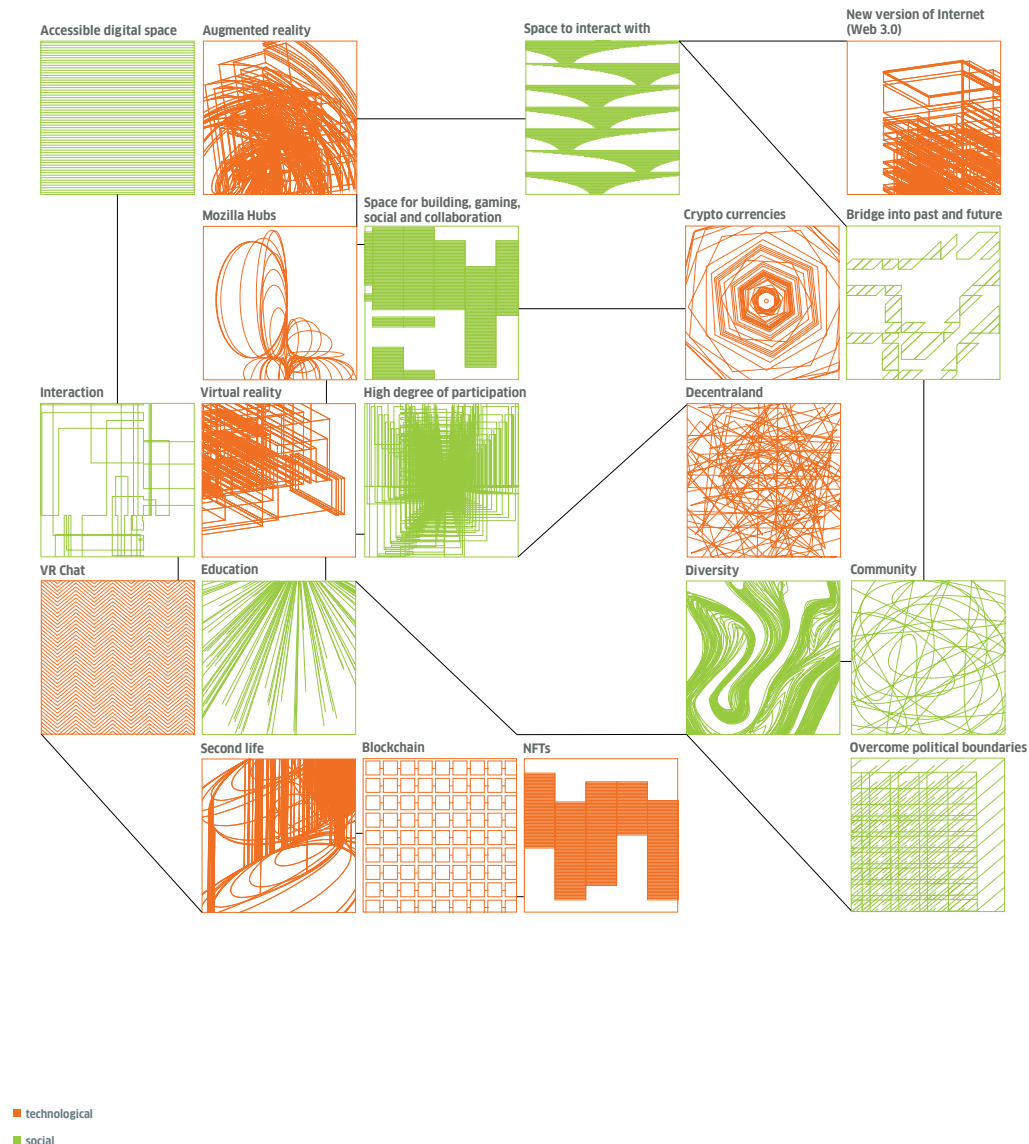
This visualization employed line-based abstract structures and patterns. These patterns were visually linked to the topics, with orange signifying the technological aspects and green representing the social elements. The data visualization depicts how these structures combine to form the complex structure of the metaverse, reflecting the concept that the Metaverse is comprised of numerous intricate systems, similar to networks existing within a larger system.

2.2. Definitions related to societal aspects

AR and VR can function for many as a means of interconnectedness, and the technology also offers a strong sensation of spatiality. However, Murray states that creating immersive interactive experiences, including those in the imagined metaverse, needs more than just better technology (Murray, 2020). It also requires figuring out how people interact with the technology and with each other, so the users know what to expect and how to participate. We are just starting to explore these possibilities, therefore it is important to design these spaces in a way that enables safer and richer social interactions.

2.2.1. Accessible, inclusive, and safe social spaces

Many professionals described their idea of the metaverse by comparing it to the Second Life application in which users can create their own avatar, build up ecosystems, and interact with other users within frameworks and identities that they have predefined. Wagner James Au, the author of several books on virtual environments and metaverse (e.g. 'Making a Metaverse That Matters'), states that metaverse platforms do have networking features built into them, and users become friends with each other because they enjoy other people's company and, as Elaine Hoter emphasizes, to create together and pursue joint activities such as visiting a place, building, gaming, and social collaboration. This kind of collaboration can happen faster in VR compared to the physical world; as Andrea Geipel states: "sometimes [the metaverse] lowers barriers in the mind. Sometimes you open up faster […] on topics that are not necessarily personal, but that you might not have addressed otherwise[.]" Paulina Donoso also mentions that "social interactions in person can be really difficult, but in the metaverse it is really easy" as it can offer anonymity. It is, however, very important for the creators of these spaces to design an "accessible digital social space"– to use a phrase by an information security professional.

Although users can choose to stay anonymous, according to Paulina Donoso it is still important for some to have "potential safe space for women, children, [and] minority groups". Metaverse-like environments present an opportunity for marginalized groups, such as women and the mentally disabled, to represent themselves and their experiences better. Experts such as Myriam Achard emphasize the importance of the integration of people from Africa and Asia, but she mentions that "what works in Europe doesn't work in Africa or Asia […], it needs to be adapted to the region". Fabián Barros also mentions how designers should consider the needs of various groups of users, such as "blind people, young people, old people", though Andrea Geipel also notes that virtual worlds "[…] are leading to a rethinking of the design of inclusive offerings. Instead of designing something and then expanding it to make it as accessible as possible, there is now the opportunity to design in an open and

welcoming way from the outset. Accessibility is then no longer seen as an additional task, but as an invitation to the people I want to reach. And that takes the pressure out of planning and makes it more inclusive", as Andres Leon Geyer points out, users with disabilities may struggle to navigate immersive environments, and the lack of universal access can create a "digital gap" where some users are left behind. According to Raphael Zender, this issue must be addressed to ensure that the metaverse is a "safe space for people with social anxiety" and those with other mental conditions and disabilities. A creative professional also states that "inclusion in the metaverse is critical". This requires the integration of accessibility principles into the core design philosophy, establishing clear guidelines and standards, and involving people with disabilities in the design process to address their needs directly. By creating accessible and safe social spaces, users can feel more encouraged to co-create worlds that are fulfilling their needs and are offering them a cultural value system that can reflect their own.

2.2.2. Interconnectedness–without connectivity?

The metaverse, a digital universe that blurs the lines between physical and virtual realities, presents significant challenges for accessibility. According to David Smith, the shift from two-dimensional to three-dimensional interaction raises significant privacy and accessibility implications: users might not be able to assess quickly what it means to be in a space with a 3D digital environment compared to a 2D screen. Mihaela Popescu warns that the metaverse may exacerbate existing inequalities in access to information and resources, creating a digital divide that excludes those with disabilities and limited connectivity. This means that first of all we have to understand how members of various disadvantaged groups can or cannot cross the line between physical and virtual reality, which brings us to the problem of the hardware that is meant to enable connectivity.
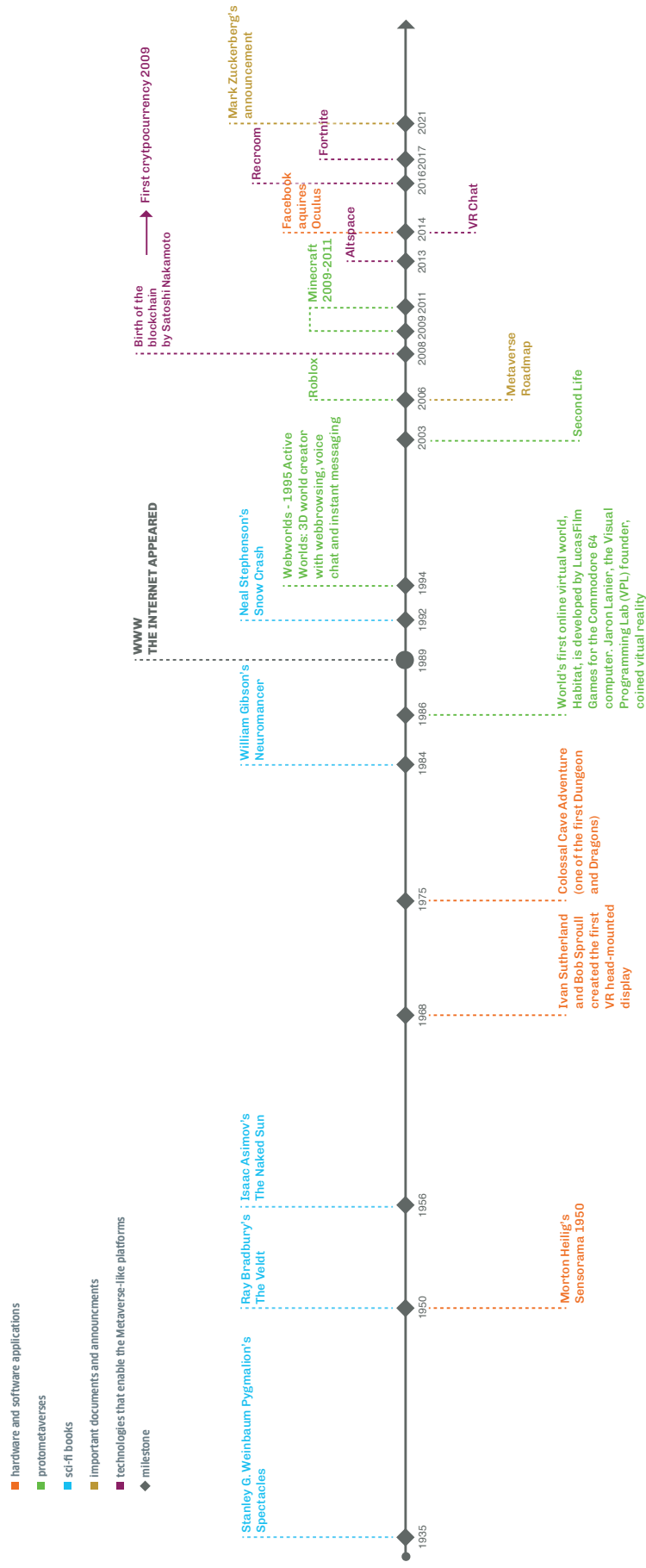
Raphael Zender and a higher education professional point out that one of the primary concerns is the hardware problem, where expensive and cumbersome equipment can be a barrier to entry for many users. Additionally, technological barriers such as the need for high-end devices and bandwidth, as Alain Bieber also mentions, can make it difficult for users with limited resources to participate fully in the metaverse. This point is also highlighted by Judit Klein-Wiele who states that "hardware and software should be more accessible" to ensure that everyone can engage with the digital world without being left behind. Many other participants mention the need for taking into consideration low connectivity (Muhsinah Morris, Fernanda Parente, and Kamya Ramachadran) and low-end devices (Andres Leon Geyer) as crucial for ensuring that the metaverse is inclusive. However, the current state of technology often prioritizes high-end hardware and software, making it difficult for users with limited resources to participate. According to Nishant Shah, "universal access is a utopia" and, as Marcus

Lobbes mentions, the biggest constraint is accessibility and probably not everyone will participate in these spaces (even if this would be their main entertainment and socializing possibility). A university professor, besides emphasizing the accessibility of the software, also mentions that the metaverse should be open source. By providing accessible and customizable software tools, educational institutions could offer courses that educate students with basic media literacy skills for virtual worlds. This entry-level education is crucial for students to navigate and critically evaluate the growing landscape of metaverses.

2.3. Metaverse(-like) environments or 'virtual worlds'?

For many professionals (such as Marcus Lobbes, Raphel Zender, Katharina Groß), the metaverse exists in the middle ground between the virtual world and the real world. While the metaverse is often envisioned as a fully immersive digital realm, it can also be seen as a bridge between the physical and virtual realms. Andrea Geipel, Mirjam Vosmeer, Elaine Hoter as well as others mentioned in the interviews that the concept of the metaverse is connected to the Second Life video game in which players can simulate life situations. A creator duo describes the metaverse as a fluid concept that can be understood as "a virtual world where things can be done that cannot be done in the real world". Mihaela Popescu defines virtual worlds as a network of interconnected digital spaces, while a researcher suggests using the term 'virtual worlds' rather than 'metaverse' to describe these environments. This highlights the plurality of virtual worlds that may make up the metaverse or metaverse-like spaces, rather than a single unified digital realm. The metaverse, then, can be seen as an evolving ecosystem of virtual worlds that blend elements of the physical and digital realms that present possibilities that are not found in the real world. However, the exact nature and boundaries of the metaverse remain fluid and open to interpretation by different professionals and stakeholders, who also have a variety of views regarding the strategies for the governance of these platforms.

Timeline

Legend:
- hardware and software applications
- protometaverses
- sci-fi books
- important documents and announcements
- technologies that enable the Metaverse-like platforms
- milestone

Timeline entries:

- 1935 — Stanley G. Weinbaum Pygmalion's Spectacles
- 1950 — Ray Bradbury's The Veldt; Morton Heilig's Sensorama 1950
- 1956 — Isaac Asimov's The Naked Sun
- 1968 — Ivan Sutherland and Bob Sproull created the first VR head-mounted display
- 1975 — Colossal Cave Adventure (one of the first Dungeon and Dragons)
- 1984 — William Gibson's Neuromancer; World's first online virtual world, Habitat, is developed by LucasFilm Games for the Commodore 64 computer. Jaron Lanier, the Visual Programming Lab (VPL) founder, coined virtual reality
- 1989 — WWW THE INTERNET APPEARED
- 1992 — Neal Stephenson's Snow Crash
- 1994 — Webworlds - 1995 Active Worlds: 3D world creator with webbrowsing, voice chat and instant messaging
- 2003 — Second Life
- 2006 — Metaverse Roadmap; Roblox
- 2008 — Birth of the blockchain by Satoshi Nakamoto
- 2009 — First cryptocurrency 2009
- 2009–2011 — Minecraft
- 2011 —
- 2013 — Altspace
- 2014 — VR Chat; Facebook aquires Oculus
- 2016 — Recroom
- 2017 — Fortnite
- 2021 — Mark Zuckerberg's announcement

This timeline shows how the concept of virtual worlds/metaverse(s) emerged in literature and how various technological advancements made it more possible to experience or imagine it.

3. Effects on education and art

3.1. Education

The interviews reveal that the concept of metaverse holds transformative potential for education, offering unprecedented opportunities, while there are still fundamental questions related to identifying the stakeholders, offering an adequate environment, and involving them in the most advantageous way. According to Rolf Kruse, the metaverse can be seen as a space for education and communication activities, and, as a higher education professional sees it, it has the potential to diversify education.

Isabel Hoffmann notes that one of the key potentials of the metaverse is interdisciplinarity, allowing students to integrate knowledge from multiple disciplines in a cohesive and immersive learning environment, while Raphael Zender is convinced that providing learnings with an environment that has the capacity to produce authentic simulations that mirror real-world scenarios and presenting them with practical experience in a controlled, virtual setting is key for knowledge transfer.

> *"I don't believe in just people watching lectures and learning. I believe that learning is done by talking to people, and collaborating, reflecting and talking through things"*

says Elaine Hoter, referring to the fact that learning through interaction and active engagement is significantly enhanced in the metaverse. Students can interact with 3D models, conduct virtual experiments, and participate in collaborative projects with peers from around the globe, deepening their understanding of complex concepts. To maximize this potential, it is crucial to effectively engage both students and teachers with the technology, which leads Judit Klein-Wiele to the question "how can we motivate students to get involved at all or, above all, in university teaching how can we get lecturers to want to engage with [this technology]?" This could possibly be achieved through comprehensive training programmes, support systems, and by showcasing the tangible benefits of immersive learning experiences. Andrea Geipel emphasizes the importance of anchors in virtual spaces, particularly for newcomers navigating the vastness of the metaverse. These anchors should be rooted in reality so experiencers can compare digital reality to the physical one, providing a sense of orientation and familiarity by bridging the gap between the two realities, therefore making education in these platforms more seamless. With the help of these anchors, the experiencers could also acquire more knowledge, especially if the environment enables the users to gain more literacy about the working mechanisms of metaverse(s), as a creative professional also emphasizes. Mihaela Popescu suggests that VR, AR and 360-degree videos are particularly effective tools for teaching in the 'metaverse'; they

offer unique perspectives and interactive experiences that traditional methods cannot match.

However, knowledge of teaching in VR is in its infancy and Popescu elaborates that this nascent stage presents a unique opportunity for educators to experiment and innovate. It is a good moment to begin defining what teaching in the metaverse could mean, shaping its development before it becomes commercialized and potentially restricted by market forces. By participating in this early phase, educators can ensure that the metaverse becomes a powerful and equitable tool for learning, rather than just another commercial product.

3.2. Art

3.2.1. Avatars and creativity

"[There is] an insane interest in creating avatars that are more artistic, that are more influenced by their own storytelling, where it seems much more interesting to try things out and constantly transform your avatar and make it crazier." This statement by a creative professional highlights a growing trend in the metaverse where users are deeply engaged in crafting unique and highly personalized digital identities linked to individual stories. This "insane interest" reflects the current enthusiasm and creativity people invest in their avatars, treating them as artistic expressions and narrative vessels. Rather than sticking to static or conventional representations, users are exploring imaginative and often unconventional designs, continuously evolving their avatars to reflect their personal stories and artistic visions. This dynamic approach to avatar creation emphasizes experimentation and transformation, encouraging users to push the boundaries of their creativity and explore new identities and aesthetics within the virtual world. Essentially, a creative professional is pointing out that the metaverse offers a unique space for self-expression where the process of designing and reinventing avatars becomes an engaging and ever-changing art form.

3.2.2. Worldbuilding practices for new artistic endeavors

Valentino Catricalá mentions the aspect of worldbuilding, where artists use technology to create interactive, immersive, and dynamic environments, often with a level of detail and interactivity that is difficult to achieve with traditional media. Digital tools allow for the creation of worlds that users can explore and interact with in real-time, offering a more engaging and multifaceted experience. This highlights the potential of technology to expand the boundaries of artistic expression and worldbuilding, providing new ways to imagine, create, and experience alternate realities.

A higher education professional describes what the virtual world offers as a unique opportunity for experimentation and innovation, and points at an additional aspect:

"It's a great thing in the virtual world that I can also destroy things." In the virtual world, there are fewer real-world consequences to actions, allowing individuals to freely explore, create, and, importantly, destroy their creations without permanent loss or harm. This freedom encourages bold experimentation and the continuous evolution of ideas. A higher education professional points out that in reality, the more effort and resources one invests in a project, the more hesitant one becomes to risk it, which can stifle creativity and innovation. However, in the virtual world, this investment does not carry the same weight of permanence or risk, enabling a cycle of continuous destruction and recreation that fosters innovative thinking and creative development. Essentially, the virtual world provides a safe space to take risks, fail, and try again, which is crucial for artistic and intellectual growth.

3.2.3. The fourth dimension

A higher education professional highlights metaverse's potential to transcend temporal boundaries, "you can jump into the past, look at things that no longer exist". Metaverse will enable users to explore past realities and experiences from an embodied-spatial perspective. This presents a transformative potential of the metaverse in terms of historical exploration and preservation. A higher education professional is referring to the capability of the metaverse to recreate past environments, events, and artifacts in a detailed and immersive virtual space. This allows users to experience and interact with historical moments and places that are no longer physically accessible or have been lost to time. Similarly, virtual worlds are like playgrounds for both creators and users in terms of anticipating future scenarios. They allow us to imagine what the future might hold and experiment with all sorts of possibilities that wouldn't be possible in the real world. These virtual worlds can also enable users to understand the effect of the actions of our contemporary society and can offer the possibility to rethink the status quo. This way, metaverse(s) can offer us such temporal experiences that have the potential to transcend two-dimensional limitations, fostering a heightened sense of presence and facilitating a more profound engagement with speculative future scenarios.

3.2.4. Extended field of arts

Valentino Catricalá suggests that artists must collaborate with experts from various fields such as technology, engineering, and research. This integration allows for the merging of creative and technical skills, leading to innovative outcomes that would not be possible within the confines of a single discipline. By entering the innovation sector and engaging with companies, research labs, and technical professionals, artists can push the boundaries of their work, exploring new mediums and methods that enhance their creative expression. This collaboration has the potential to be a fertile base for groundbreaking projects that combine aesthetic creativity with cutting-edge technological advancements, demonstrating the powerful synergies that arise when art encounters other fields of expertise.

In summary, the feedback from the interviewed professionals provides an image of the metaverse as offering exciting possibilities for artistic expression and creativity. This dynamic approach emphasizes the metaverse as a space for self-expression, where designing and reinventing avatars becomes an engaging and ever-changing art form. It provides a unique opportunity for bold experimentation, as there are fewer real-world consequences to actions. This freedom encourages the continuous evolution of ideas, allowing artists to freely explore, create, and destroy their creations without permanent loss or harm and this way it offers them deeper knowledge of how virtual worlds function. The metaverse also has the potential to transcend temporal boundaries, enabling users to experience and interact with historical moments and places that are no longer physically accessible. To fully harness the potential of the metaverse, artists must collaborate with experts from various fields to push the boundaries of their work.

4. Bridging the metaverse-gap. The role of cultural institutions

The participants of the qualitative study expressed diverse perspectives on the role of cultural institutions in creating metaverse-like environments. One of the main challenges identified is the lack of a shared vision, as noted by an information security professional, which could be overcome by initiating various collaboration processes. The participants, such as Thomas Lilge, also discussed the importance of aligning the metaverse with European values, and a cultural professional expressed the need for cultural institutions to make their criticism audible; and according to Isabel Hoffmann, these institutions should also share their knowledge about creating transparency.

4.1. Collaboration

According to Andrea Geipel: "We can no longer afford to remain isolated. We need to open up, develop together, and find ways to invite both startups and larger companies to collaborate." There is a need for cooperation between cultural institutions, as also stated by an XR researcher: "…as a cultural institution, we can also work here, and instead of working against each other, we can work together and influence and inspire individuals". David Smith acknowledges the reality that "we do need to rely on private industry and you know, the profit-driven companies, who can help kind of advance this and accelerate our development". Similarly, Kim Baumann Larsen emphasizes the need for cooperation between big tech companies. Paulina Donoso urges a cross-country collaboration and Eike Langbehn mentions that collaborating in the creation of an open metaverse could enable "democratic governments to continue to somehow retain control over the world". There is a need for a mixture of governmental, corporate, and public moderation to regulate the metaverse, as stated by Christian Fieseler and Jeremy Nelson. An information security professional suggests the need for an "open-source, publicly-owned infrastructure" that could be developed based on a solid collaboration.

4.2. Challenges and limitations

It is important to note that some of the participants voiced their scepticism about the existence of the metaverse or its level of development: Mihaela Popescu states that the "Metaverse is not yet fully social", and a cultural professional mentions that she sees "Metaverse as currently not yet a construct". Similarly, Isabel Hoffmann considers that the idea of metaverse is simply a marketing tool; Muhsinah Morris is of the opinion that it is a cliché term not understood correctly by people; and Andres Leon Geyer thinks that 'Metaverse is a hype' as there is no concrete metaverse platform yet.

One of the challenges that cultural institutions could help to overcome, according to a cultural professional, is the possible lack of artistic freedom in these spaces. Besides the lack of freedom, the lack of content is also emphasized: Pierre-Stuart Rostain states that for the metaverse to be truly successful, it needs to offer a vast variety of experiences. However, achieving this requires linking these platforms with major tech platforms. Ideally, users should be able to have access to seamless transitions and "should be able to hop in and hop out from Horizons worlds to the Goethe-Institut's platform".

Despite the potential for cultural institutions to play a role in creating and providing knowledge, as mentioned by Isabel Hoffmann, there are concerns about the infrastructure. Judit Klein-Wiele identifies the issue of lack of funding that restrains cultural institutions from taking immediate measures in creating metaverse(s). Jeremy Nelson concludes that "the biggest challenge is not that we couldn't build it. It's maintaining it, enhancing it, and supporting it over time. And what's the effort to do that versus the return?" Mihaela Popescu also emphasizes the need for "some kind of economy" that would maintain the metaverse, but she also wonders who will be the audiences visiting these spaces and sustaining the economy. An information security professional also identifies the lack of an inter-institutional consensus for funding strategies.

The interview participants also highlighted the potential for cultural and educational institutions to take advantage of their experience, as mentioned by Raphael Zender. According to Zender, institutions "have to create worlds that are easy to use" and these worlds shouldn't necessarily be hosted on the servers of corporations, meaning that they "should actually have social VR worlds that you can host yourself [...] and that should also be open source". However the lack of expertise, as noted by Marcus Lobbes, should also be taken into consideration. Ultimately, the participants expressed a desire for a metaverse that is not controlled by a single entity; a creative professional duo stated "...we don't want a metaverse that is controlled".

Cultural institutions play a crucial role in educating the public about media literacy and providing opportunities for artistic freedom in the metaverse. One of the main challenges identified by the participants is the lack of a shared vision among cultural institutions. However, by initiating various collaboration processes, they can overcome this obstacle and work together to influence and inspire individuals. Collaboration is key, as cultural institutions need to open up, develop together, and invite both startups and larger companies to work alongside them. The importance of ensuring that the metaverse remains a space for artistic expression and diverse experiences. Cultural institutions can also share their knowledge about creating transparency and maintaining a balance between governmental, corporate, and public moderation to regulate the metaverse.

5. Embodiment

As 3D spaces can offer a strong sense of presence, which is to an important extent provided by the sense of embodiment made possible by a 3D-rendered avatar, the question of embodiment was also often touched upon by the participants. The interviews reveal diverse perspectives on the role of embodiment and the senses in the metaverse. Some participants, such as Nishant Shah, express concerns about the potential for the metaverse to decouple subjects from their physical bodies. However, others highlight the potential for the metaverse to enhance embodied experiences. Thomas Lilge suggests that physical co-presence via the metaverse can "simulate much more than in a Zoom call, in terms of spatiality, specialty, a feeling of closeness and distance, [and] spatial impression". Katharina Groß emphasizes the co-evolution of humans and technology, stating that "humans and technology, [are in] a co-evolution, [...]. So technology is actually embodied knowledge". She also mentions how the human sensory apparatus, the way we perceive the environment, is influenced by new structures that we are embedded in.

The participants also discuss the role of the senses in the metaverse. Elaine Hoter notes that "we can be whoever we want to be, you know, you don't have to show your outside appearance, [it] doesn't reflect who you are anymore," suggesting a disconnection between appearance and identity. However, Katharina Groß cautions that the metaverse "will by no means replace real contact, because we simply don't have a [sense of] smell [in virtual environments], and micro-movements are also difficult to recognise." Regarding the embodied experience in the metaverse, Andrea Geipel suggests that "the moment you're in there with the avatars, the hierarchies disappear, which is of course great... And at the same time it [is] totally chaotic." In contrast, Fernanda Parente sees the metaverse as a way to "extend our existence into this digital realm" in a more "intuitive and fluid way" compared to screen-based interactions. It is also important to mention that not all professionals think that the metaverse will be used in an interactive manner: Pierre-Stuart Rostain mentions that he "doesn't think everybody will use the metaverse in an interactive manner as the interaction will not appear as naturally engaging for the senses, although human centric haptic technology is rapidly progressing and will eventually bridge the existing gap for multiple types of sensory virtual interactions". These diverse perspectives highlight the complex and evolving nature of embodiment and the senses in the metaverse, with both opportunities and challenges for creating truly immersive and engaging experiences.

The interviews reveal diverse perspectives on embodiment and the senses in the metaverse, with both opportunities and challenges for immersive experiences. As 3D spaces can offer presence through embodied avatars, participants discuss the potential for enhanced interactions, suggesting the metaverse can simulate much more than a video call. However, some express concerns about decoupling from the physical body and doubt the metaverse will be universally used interactively, emphasizing the co-evolution of humans and technology.

6. Reality-based vs. imaginary worlds

"If I can be anything, why would I be human?"

provokingly asks an XR researcher. Like her, many creatives and educators are thinking a lot about this question in the context of possible design trajectories for the metaverse. It is this alternative virtual world that offers an opportunity to seemingly transcend into a mint parallel universe, be it an imaginary universe or a copy of the real one. According to this XR researcher, a reason for this form of escapism might be greater creative competition in seeking for alternative worlds. A creative duo expresses the striving for creative expression thus: "Why would I want to go through this whole process of building a newer world that is similar to the one that I'm currently in? So, I feel like it should totally be imaginative."

Whether in the context of one-to-one copies or imaginary worlds, the topic for reconnection to the physical world is essential and should be considered while designing digital environments. Grounding in the physical world is paramount while designing and engaging in metaverses to ensure a seamless, relatable, and ethically sound digital experience. This anchoring helps to bridge the gap between virtual and physical realities, providing users with familiar reference points that enhance navigation and interaction. It mitigates the risk of disorientation and detachment, fostering a sense of continuity and coherence between the two realms. Andrea Geipel advocates for an anchor, especially for users who are new to the technology.

Judit Klein-Wiele mentions that "I wouldn't say [the virtual world is a] copy [of the real world], because we don't have to leave the real world completely, so it should be a good addition." This suggests that the metaverse should not be seen as a replacement for the physical, real world, but rather as an addition or complement to it. The real world cannot be entirely left behind, and the effects and impacts of the virtual world on us and the planet will always be real. The metaverse should be designed and developed in a way that enhances and augments our experiences, rather than completely replacing physical reality. It should be a "good addition" that coexists with the real world, rather than a copy or substitute for it. This perspective highlights the need to strike a balance between the virtual and physical realms, ensuring that the metaverse is integrated in a way that complements and enriches our lives, without completely divorcing us from the tangible realities of the world we inhabit. Offering anchors can help virtual interactions to enrich rather than replace real-world engagement, and this way help create a meaningful use for these worlds, which can be further nurtured by cultural institutions.

7. The present and the future of the metaverse

The metaverse is rapidly transitioning into a tangible reality, or so it seems, at least. As we are facing the new popularity of this digital frontier, a convergence of voices from diverse backgrounds offers insights into the future trajectories and potentialities of this emergent landscape. From an anthropocentric perspective, the metaverse, like technologies in general, prioritizes human needs and interests, often over those of the environment or other species. There are those who have a strong confidence in technology as a tool for solving problems, and they argue that technological innovations, such as those that the concept of metaverse promises, can address issues ranging from health and environmental challenges to social and economic inequalities. This perspective is closely linked with the idea of technological solutionism, a term coined by Evgeny Morozov (2013) who sees continuous technological advancement as a key driver of human development that leads to improved living standards, increased efficiency, and solutions to complex problems. However, there are concerns about the social and ethical implications of unchecked technological advancements, such as privacy issues, data protection, the digital divide, and the potential for technology to be used in ways that harm rather than help society, especially by Big Tech.

Metaverses can be seen as platforms in their infancy; David Smith points out that these technologies are

> **"very immature right now and it's gonna take some proof points and some use cases and some successes"**

Indeed, the metaverse in its current form is a patchwork of platforms, each grappling with its own set of challenges. There is a necessity for iterative development, robust experimentation, and the establishment of clear value propositions to drive widespread adoption.

Discussing the security aspects of the metaverse, an information security professional sheds light on the inherent complexities of existing platforms, suggesting that they are ill-equipped to navigate the nuances of a rapidly evolving digital landscape. The metaverse demands novel approaches to identity authentication, that transcend conventional machine-to-machine interactions.

In terms of sustainability, a media artist's vision of Web 3.0 introduces the concept of reshaping the Internet to prioritize sustainable experiences. In the metaverse, sustainability extends beyond environmental concerns to encompass social and economic dimensions. As we reimagine digital interactions, there exists a unique opportunity to foster communities, economies, and environments that are equitable, inclusive, and environmentally conscious.

Views on the future

Professional background:

■ creative
■ education
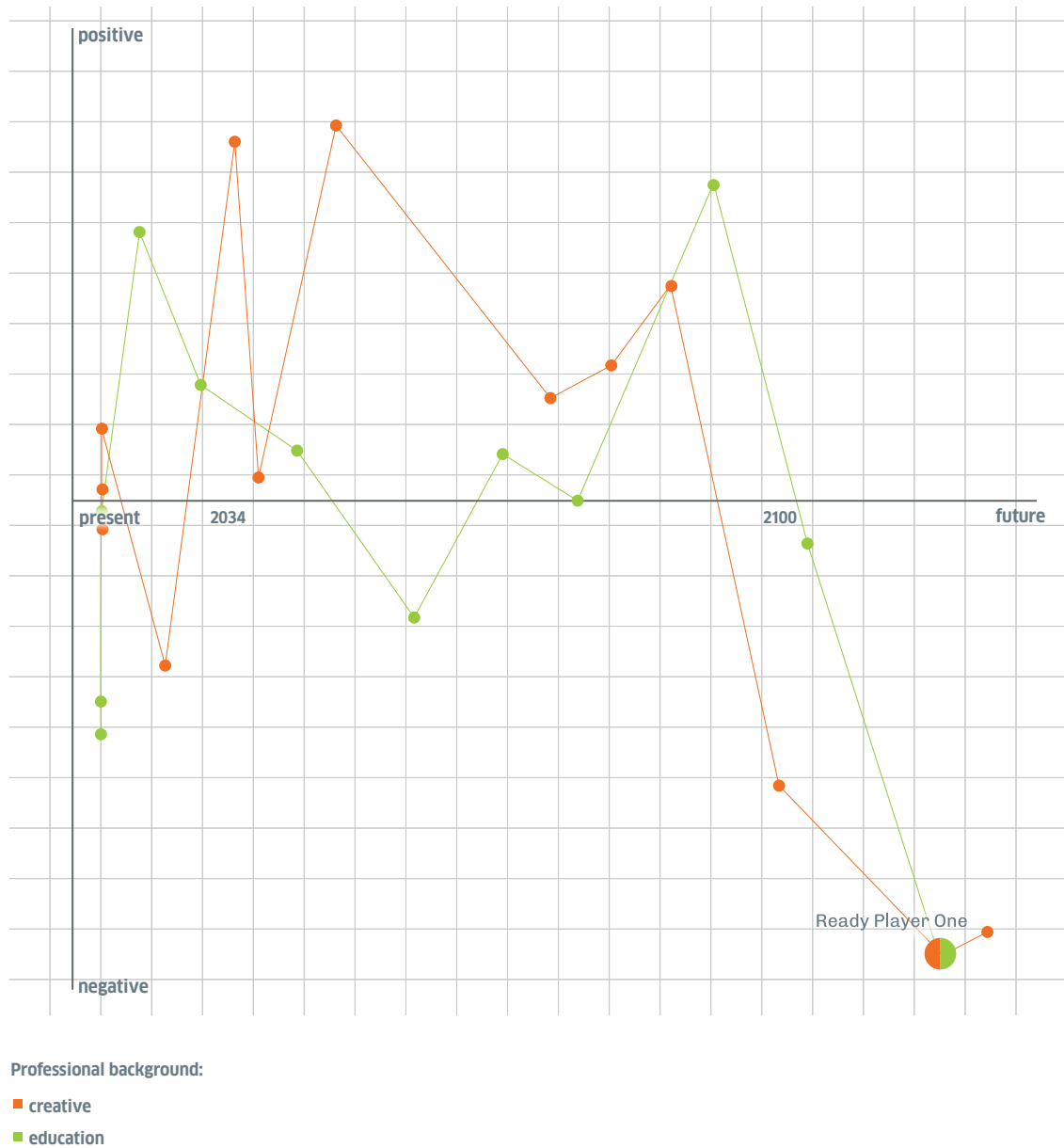
This visualization reveals a range of possible and speculative futures imagined by various interviewees with creative and educational backgrounds. Their hopes, wishes, concerns, and fears, expressed throughout the interviews, were used to gauge their positive or negative feelings about certain futures of the metaverse. Ready Player One" has been repeatedly referenced as an example of a distant, dystopian future. Temporal indicators (e.g., "soon," "now," "in ten to fifteen years," etc.) helped estimate the timeframe in which these scenarios might unfold. This visualization interprets quantitative data distilled from 41 interviews.

The metaverse offers the opportunity to transcend the physical world and create imaginary parallel universes, driven by the desire for creative expression and escapism from the real world. Many designers and educators are facing the question of whether to replicate reality or design entirely new, fantastical worlds in the metaverse. As it is suggested that the metaverse's ability to allow people to "be anything" may lead to a preference for imaginary worlds over physical human existence, we should encourage imaginative, novel worlds rather than copies of the current reality, as the creative process of building an entirely new world is more compelling, but this new world should be anchored into the physical world and allow for a convenient transition.

8. Recommendations for creative and educational uses of the metaverse

The creative and artistic perspectives in metaverse-like environments are discussed by several participants: a creative professional's insights underscore the intersection of artistry and technology within the metaverse. Avatars, once mere digital representations, are evolving into dynamic canvases for artistic expression. This fusion of art and technology not only enriches the user experience but also serves as a catalyst for innovation across sectors. Such a capability not merely fosters nostalgia but also invites opportunities for historical education, cultural preservation, and creative reinterpretation. A higher education professional's perspective on creative destruction further emphasizes the dynamic nature of the metaverse, where users are empowered to deconstruct and reconstruct their digital environments with boundless creativity. An XR researcher's reflections on creative competition prompt us to reconsider the allure of the metaverse in an era of environmental and existential challenges. In a world where identity is fluid and possibilities are limitless, the quest for creative expression becomes both a driving force and a philosophical inquiry.

Cultural actors and higher education institutions started to experiment and to explore metaverse-technologies, but as they are guided more by cultural values and rather than profit-making, they prioritize accessibility and inclusivity from the start. Metaverse-like environments present a new pathway to reach new audiences and engage existing ones in novel ways in a way that can instigate new dialogues. This multiplicity of audiences can be a challenging aim for designers, as they cannot design for all users.

One of the priorities of cultural institutions should be to consider how to offer a more inclusive experience for people with disabilities, such as screen reader compatibility, audio descriptions, and haptic feedback, and how to ensure that the UX design is accessible, which will be an important factor for creating a welcoming virtual world experience.

Additionally, cultural institutions should strive to foster a meaningful, embodied pedagogical approach: they should offer bold experiences that make us rethink how experiential education (Breunig, 2005) and critical pedagogy's principles (Darder et al., 2024) can be designed and communicated in spaces that do not imitate real-world characteristics. Cultural institutions can offer sustainable, equitable virtual worlds that can serve as playgrounds for education professionals as well as critical thinkers and creators to explore the possibilities of virtual immersive environments. Institutions should leverage this potential to build inclusive, modular, and environmentally-conscious virtual worlds that prioritize social sustainability.

Inclusive design accommodates users of all abilities, backgrounds, and socioeconomic statuses, providing options for low-bandwidth connectivity, assistive technology compatibility, and customizable interfaces. Diverse stakeholders should be involved to address potential barriers to inclusion and to ensure ethical governance. Ethical governance requires clear standards established through a collaborative process incorporating input from civil society, experts, and end-users. Robust data privacy and security measures, according to David Smith, new standards for biometric data collection, must mitigate risks. Transparency issues surrounding algorithmic decision-making should address bias and discrimination.

Cultivating critical thinking and media literacy skills within metaverse-based educational curricula empowers students to navigate the virtual environment with discernment. As Isabel Hoffmann also states, "teaching criticality" is crucial. Promoting conscious consumption encourages users to think critically about the information and interactions they engage with. Safeguarding users' well-being is of paramount importance. As emphasized by a researcher, "inclusion and the bullying problem" must be addressed. Comprehensive anti-bullying and moderation policies should ensure that the metaverse is a safe and supportive space, especially for vulnerable populations. Mental health resources and support systems should address the potential psychological impacts of prolonged immersion. The metaverse must uphold democratic principles, such as freedom of expression and artistic freedom, rather than being dominated by commercial interests or authoritarian control. Open-source, community-driven metaverse platforms prioritizing user agency and decentralized governance can foster these democratic ideals. By incorporating these guidelines, cultural and educational institutions and policymakers can create more equitable, inclusive, and user-centric metaverse-like environments.

These suggestions may involve rethinking traditional hierarchies, empowering users to co-create content, and finding ways for virtual interactions to enrich rather than replace real-world engagement. By proactively shaping the virtual worlds to align with their values, cultural institutions can help ensure that this emerging digital realm lives up to its promise as a space for learning, creativity, and connection.

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Professionals who consented to be named by the early July 2024 editorial closing are identified in the whitepaper, while others remain anonymous but are categorized by their field of expertise.

PUBLISHING DETAILS