

UX issues in the Metaverse *Focusing on inclusivity when designing user-experience for the Metaverse world*

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The metaverse has the potential to transform social interaction and learning, but user experience difficulties may limit its influence. Inclusivity is essential when building UX for the metaverse. As the metaverse grows in popularity, it is critical to guarantee that all users can fully engage and feel included. This necessitates planning for accessibility, offering avatar modification choices, and establishing clear communication routes. This article gives an overview of current research on metaverse UX challenges, with a focus on inclusion. The article covers the significance of building virtual reality settings with inclusion in mind and specific advice for UX designers based on current research. The research paper emphasizes the significance of customization possibilities. Such as allowing users to personalize their avatars which have been found in studies to increase their sense of belonging and engagement in virtual reality environments. UX designers should concentrate on developing creation tools that are simple to use and accessible to all users. It emphasizes the significance of clear communication pathways in the metaverse. Some users, particularly those new to the technology, may find virtual reality surroundings overwhelming and disorienting. To guarantee that all users can fully engage and feel included in the virtual world, UX designers should prioritize the creation of clear and accessible communication channels. in addition to the significance of planning for accessibility. While building virtual reality settings, UX designers should address the needs of people with disabilities, such as vision and hearing impairments. This necessitates the development of accessible design elements such as colour contrast, text-to-speech, and closed captioning. Lastly, the article points out the potential of virtual reality settings for increasing empathy and understanding across cultural barriers. UX designers should focus on building immersive experiences that create empathy and understanding, which may help bridge cultural barriers and promote inclusion in the metaverse. Furthermore, developing UX for the metaverse with diversity in mind is crucial for increasing engagement, belonging, and a sense of social community. Offering personalization choices, clear user journey paths, and immersive experiences that build empathy and understanding may help guarantee that all users feel included in the virtual environment.

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1. INTRODUCTION

The concept of a metaverse has long attracted technologists and futurists. Real-time user interaction with other users and digital objects is possible in a metaverse. Virtual reality (VR) and augmented reality (AR) technological developments are paving the way for a fully immersive metaverse. Companies like Facebook,

Microsoft, and Google are investing billions of dollars in the building of the metaverse because they view it as the next stage in the growth of the internet and a chance to establish innovative business models and income streams. The metaverse may have advantages, but there are also big problems that need to be solved, especially in the field of user research which falls under

the umbrella of UX. The metaverse's success will depend on its capacity to offer consumers a compelling, interesting, and inclusive experience. We will look at some of the inclusivity-related UX problems that the metaverse has in this paper. A crucial aspect of metaverse UX design is inclusivity. People from all over the world may communicate with one another through the metaverse, creating previously unreachable opportunities for social interaction and education. Yet, doing so requires that the metaverse be designed with variety in mind. Making virtual reality environments accessible to users of diverse backgrounds, skills, and preferences is a key component in designing inclusive virtual reality environments. It requires creating digital environments that promote empathy, understanding, and a feeling of community. Recent studies has identified a number of UX difficulties in the metaverse, notably in the area of inclusion. Some users, for example, may find the virtual world overwhelming and bewildering, especially if they are new to the technology. Others may feel isolated if they are unable to modify their avatars or engage with other users efficiently. There are also accessibility difficulties, with individuals with impairments possibly finding it difficult to navigate virtual settings. We will look at these and other UX concerns in the metaverse in this article, with a special emphasis on inclusion. We will examine current studies on user experience concerns in the metaverse and highlight some best practices for UX designers to ensure that virtual settings are accessible, engaging, and inclusive for all users. Finally, we think that by solving these UX difficulties, we will be able to fully realize the metaverse's promise as a platform for social engagement, learning, and cooperation.

2. THE CHOSEN PAPERS FOR THE SURVEY PAPER

After doing scoping review regarding the issues that face metaverse in terms of user experience and narrowing it down to a specific issue, those four articles that i found are key to this paper. "The actualization of meta affordances: Conceptualizing affordance actualization in the metaverse games" "Designing the metaverse: A study on inclusion, diversity, equity, accessibility and safety for digital immersive environments" "Exploring the application scenarios and issues facing Metaverse technology in education" "Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy". More papers have been included and talked about in the paper, though they are not the main four papers nonetheless, they will be referenced in the appendix.

3. THE ACTUALIZATION OF META AFFORDANCES: CONCEPTUALIZING AFFORDANCE ACTUALIZATION IN THE METAVERSE GAMES

The notion of affordance actualization for metaverse games (MG) is discussed in connection to users' internalized and embodied experiences in this article. It highlights the significance of knowing MG affordances and how they impact user experience. The article also explores the metaverse's affordance duality, in which users build the metaverse based on their actualized affordance, while the metaverse moulds and constrains user behaviours. The article employs a combination of empirical methodologies to discover key affordances, hypothesize affordance actualization, and define affordance duality in the metaverse. The study posits that affordance actualization aids in theorizing the metaverse's duality of affordance and has practical consequences for academics and practitioners operating in the setting of the

extended environment. The authors draw on the theory of affordance, which refers to the relationship between the properties of an object or environment and the actions that it enables or affords for users. The authors conceptualize affordance actualization for MG in relation to the affordances of internalized and embodied experiences by users. "Affordance actualization helps to theorize the duality of affordance in the metaverse that users shape their metaverse based on their actualized affordance, and at the same time, the metaverse becomes a part of the structure shaping and constraining user actions." The results highlight the duality of MG, in which the metaverse is changed by users' affordances and perceptions while also shaping the XG environment. According to the study's findings, determining how extended reality influences interactions with users adds to prescriptive knowledge in the form of theoretical considerations and practical consequences for academics and practitioners working in the setting of the extended environment.

4. DESIGNING THE METAVERSE: A STUDY ON INCLUSION, DIVERSITY, EQUITY, ACCESSIBILITY AND SAFETY FOR DIGITAL IMMERSIVE ENVIRONMENTS

As the metaverse grows in prominence and accessibility, it is critical to ensure that it is inclusive and accessible to all users, regardless of their skills, backgrounds, or identities. This involves creating user experiences that are straightforward, easy to navigate and take into account a variety of requirements and preferences. It also entails cultivating a diverse and inclusive metaverse community in which users feel welcomed and represented. This is kind of what this article by doctor Matteo Zallio and P. John Clarkson talked about. This recent article in the Journal of Systems and Software emphasizes the significance of equality, diversity, and accessibility in the construction of the metaverse. No matter one's physical limitations, ethnicity, gender, or financial status, the metaverse has the potential to become an inclusive and accessible virtual environment, according to the research. The promise of the metaverse to offer a more inclusive and accessible virtual environment cannot be emphasized, according to the paper. It recommends that while developing an inclusive and accessible metaverse, designers should give the requirements of users with impairments top priority. The article stresses the value of diversity and representation in the metaverse in a similar spirit. One designer points out how important it is for designers to make sure that the virtual world accurately represents a wide variety of cultures, identities, and viewpoints. The designer added, "Designers must take efforts to guarantee that the virtual world is a reflection of the actual world. Diversity and representation are key factors in developing the metaverse."

A. Figure from the article

Figure 1 shows an example figure.

5. EXPLORING THE APPLICATION SCENARIOS AND ISSUES FACING METAVERSE TECHNOLOGY IN EDUCATION

"This study aims to explore how the Metaverse platform could be applied to the field of online education, the benefits it brings, and the challenges posed by the application of Metaverse to online education." This quote from the first line opens up many questions, especially regarding education and the metaverse. But how could that relate to inclusivity? I will elaborate more on this systematically reviewed paper. "Virtual reality has the

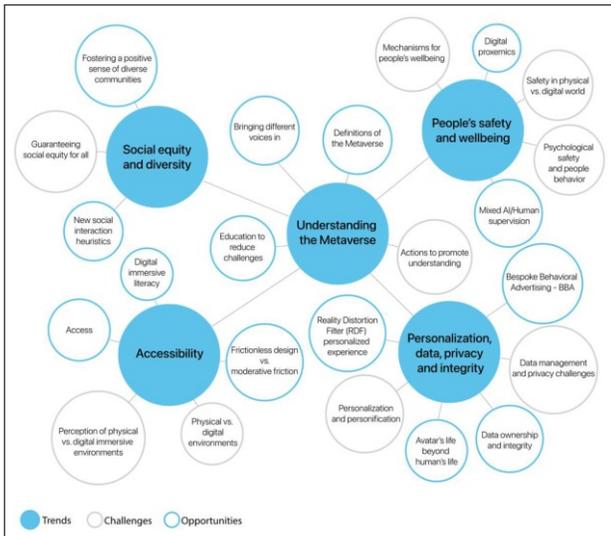


Fig. 1. The trends-opportunities-challenges in the metaverse interconnections map, based on experts' feedback.

potential to create powerful, immersive experiences that can simulate situations that are difficult or impossible to reproduce in the real world" reads one of the article's major quotations. The authors contend that students may more easily comprehend and sympathize with persons whose lives and viewpoints vary from their own because of VR's immersive nature. The article also mentions how VR may be used to replicate many scenarios, including those involving diversity and social justice. According to the authors, this may be especially helpful when trying to teach empathy to students who may not have had firsthand contact with a specific subject or community. The article also emphasizes how critical it is to create inclusive and compelling VR experiences. It is crucial that VR experiences are created in a way that is sensitive to the diversity and inclusion of all learners, according to one remark from the article. Designing VR experiences entails taking into account elements like gender, colour, and physical ability. The promise of virtual reality as a tool for fostering empathy and understanding of other experiences and viewpoints. The authors do point out that more study is required to completely comprehend VR's efficacy in this situation and to guarantee its ethical and responsible use. Because the metaverse has the ability to alter how we learn and educate ourselves, education is important when discussing the metaverse and inclusion. Following by highlighting how more immersive, interactive learning experiences that can accommodate various learning styles and demands would help the metaverse revolutionize education. Those who would not have been able to seek education owing to different obstacles including physical limitations, geographic location, and the socioeconomic position may now be able to do so thanks to the metaverse. Educators may create a more equal learning environment by building the metaverse with accessibility in mind. "The metaverse could provide a more democratic platform for education by extending access to information and knowledge to people from all over the world, irrespective of their social and economic status." as the article puts it. As a result, education is essential to ensuring that the metaverse is a welcoming and inclusive place for everyone.

6. THE LACK OF SOCIAL CUES IN THE METAVERSE

The virtual world of the metaverse is not real. and personally, I highly doubt it will ever replace real-life interactions. One of the many reasons I believe this is the case is the lack of social cues. When compared to face-to-face encounters in the metaverse. Nonverbal signs and social indicators can be difficult to comprehend in virtual settings, resulting in miscommunications and misunderstandings. To guarantee that users can engage in meaningful social interactions, UX designers must examine how to design for and express social cues successfully in the metaverse. This might include creating new types of social cues or altering current ones to work better in a virtual context. Even with customizable avatars, and interactions, it is still a "fake" world. This segues to how UX designers should take that into consideration to increase learning effectiveness.

7. METAVERSE BEYOND THE HYPE: MULTIDISCIPLINARY PERSPECTIVES ON EMERGING CHALLENGES, OPPORTUNITIES, AND AGENDA FOR RESEARCH, PRACTICE AND POLICY

The article of Systems and Software article "Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy" explores the need of designing the metaverse with inclusion in mind. The authors underline that the metaverse's potential to establish a just and accessible virtual environment cannot be emphasized. They suggest that while designing an inclusive and accessible metaverse, designers should consider the requirements of users with impairments. The necessity of designing with accessibility in mind and making the virtual world as accessible as feasible is the major point in the paper. The piece also elaborates on the necessity of diversity and representation in the metaverse. The need of designers to ensure that the metaverse includes a varied range of cultures, identities, and opinions. They say that designers must make efforts to ensure that the virtual environment accurately reflects reality. Ultimately, the significance of inclusivity in metaverse design, with an emphasis on accessibility, diversity, equity, and inclusion. The necessity for creating the metaverse with diversity and accessibility in mind, particularly for people with impairments. It underlines that the metaverse has the potential to become a more inclusive and accessible virtual environment for all people, regardless of their physical ability, colour, gender, or financial background. As quoted in the text "We should focus on how the metaverse can be used to strengthen human aspects that can only be seen as commendable such as inclusion, happiness, empowerment, or creativity. The metaverse has the potential of improving the access and experience of several services in sectors such as education, healthcare, and culture. It is also one potential solution that enables remote working in a better and more immersive context, making it possible to work from anywhere, but still be present at the office or in meetings. This means that employees can work at any location they want without sacrificing time with family and friends."

8. WHAT HAVE COMPANIES BEEN DOING TO DESIGN WITH INCLUSIVITY

Meta, formerly known as Facebook, has publicly stated its dedication to diversity, equity, and inclusion (DEI). They listed many steps they are doing to increase diversity and inclusion inside their firm and their products in their 2020 DEI report. In 2021,

they also released a white paper on the problem of diversity and inclusion in virtual and augmented reality, which are crucial technologies for the metaverse. The necessity of designing for diversity and inclusion in virtual settings is talked about in the white paper, which states that “inclusive design should be a core principle for anybody building virtual and augmented reality experiences.” The document also includes specific criteria for designing inclusive virtual and augmented reality experiences, such as accessibility, cultural awareness, and representation. (REF1) It’s worth mentioning that Meta, like any huge corporation, has experienced criticism and controversy for how it handles delicate issues like privacy, disinformation, and content control. Nonetheless, it appears that they are addressing these concerns and improving their approach to DEI, especially through the development of their metaverse technology.(REF2)

A. Paragraph Citation

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2. Zhisheng Chen (2022) Exploring the application scenarios and issues facing Metaverse technology in education, *Interactive Learning Environments*, DOI: 10.1080/10494820.2022.2133148

9. THE IMPORTANCE OF CREATING INCLUSIVE METAVERSE POLICIES THAT PROHIBIT DISCRIMINATION AND PROMOTE EQUITY AND FAIRNESS FOR ALL USERS

As previously stated earlier, the metaverse is rife with advantages. the virtual environment that serves as a platform for social interaction, education, entertainment, and business. To ensure that such advantages are available to all users and that they feel included in the design, inclusiveness should be a fundamental factor when creating the user experience (UX) for the metaverse. Who will enforce the "rules" of metaverse design? It is critical for an inclusive metaverse to have regulations that ban discrimination and promote justice and fairness. These regulations must be followed to guarantee that all users are treated fairly and have equal access to opportunities. It is critical to understand that the metaverse is a virtual place with real-world repercussions. Discrimination in the metaverse can harm users’ mental health and well-being, as well as promote inequity and exclusion. As a result, it is critical to act and implement rules that encourage inclusion and ban prejudice. Creating inclusive metaverse regulations can also benefit the community as a whole. The metaverse can generate a sense of belonging and connectivity among its users by encouraging justice and fairness. This can result in more meaningful social engagement as well as a deeper feeling of community. Furthermore, enacting regulations that promote diversity and inclusion might attract a more varied user population, leading to increased innovation and creativity in the metaverse. It is critical to include varied ideas and voices in the decision-making process when developing inclusive metaverse policy. This can include feedback from users with impairments, representatives of underrepresented populations, and diversity and inclusion professionals. By including these individuals, policies that promote inclusion and ban discrimination may be developed that are more broad and successful. It is critical that these policies are properly disclosed to all users. This may be accomplished through a variety of methods, including user agree-

ments, tutorials, and community rules. Moreover, enforcement procedures must be put in place to guarantee that the policies are implemented. This can include reporting methods for users to report instances of discrimination or exclusion, as well as punishments for policy violations. It is vital to develop inclusive metaverse policies that prohibit discrimination and encourage justice and fairness in order to construct an inclusive and varied metaverse. These measures can improve users’ well-being and build a feeling of community and connection. The metaverse may become a more inclusive and inviting platform for all users by integrating varied viewpoints in decision-making and articulating policies clearly. According to an Anti-Defamation League (ADL) survey, individuals in online settings are increasingly vulnerable to hate speech and abuse. I also highlighted a Pew Research Center research, which found that online harassment is a widespread problem that affects people of all backgrounds but disproportionately impacts women, racial and ethnic minorities, and members of the LGBTQ+ community. (Online hate and harassment: The American experience 2021 2021). The importance of promoting diversity and representation in the metaverse, which discovered that diversity and representation are significant variables in game production and may lead to improved engagement, creativity, and innovation. I also noted successful programmes to encourage diversity and inclusion in the gaming business, such as Google’s Black Game Developers Fund. (IGDA report tackles the essentials of inclusive game design and development 2021)

10. SUMMARY AND CONCLUSION

The metaverse, a virtual world that permits real-time interaction with digital items and other users, has piqued the interest of big tech giants such as Facebook, Microsoft, and Google, who see it as the next stage of internet development. But, for the metaverse to be successful, it must provide a compelling and inclusive user experience. Inclusivity is an important component of metaverse UX design since it allows individuals from all backgrounds to connect and interact with one another. UX challenges exist, particularly in the area of inclusiveness, such as overwhelming virtual worlds, isolation, and accessibility issues for persons with disabilities. This research paper looked at these difficulties and offered UX designers suggestions for best practices for creating accessible, engaging, and inclusive virtual environments for all users. By overcoming these UX challenges, the metaverse will be able to achieve its promise as a platform for social involvement, learning, and collaboration. The notion of affordance actualization in metaverse games (MG) was also discussed in this article, emphasizing the necessity of knowing how MG affordances affect user experience. The paper investigated the metaverse’s affordance duality, in which users construct the metaverse based on their actualized affordances, while the metaverse influences and constrains user behaviour. To find essential affordances and define affordance duality in the metaverse, the authors use a variety of empirical approaches. According to the study, affordance actualization contributes to conceptualizing the duality of affordance in the metaverse and has practical implications for academics and practitioners working in the extended environment. Together with creating an inclusive and varied metaverse, the paper proposed that designers consider user privacy and security. to underline the need of ensuring that user’s personal information is safeguarded and that they have a choice over how their data is utilized as the metaverse becomes increasingly interwoven into daily life by placing rules

and regulations from upper power. The set of design rules that combine equality, diversity, and accessibility principles, as well as user privacy and security. These criteria include designing for a number of input modalities, giving numerous ways to traverse the virtual world, and making material accessible to users of varying abilities. The significance of creating a metaverse that is accessible, inclusive, varied, and values user privacy and security. By doing so, designers may contribute to the creation of a virtual environment that is inviting and reflective of all users, so contributing to a more equal and just society.

When it comes to the use of the metaverse in education, inclusion is a vital factor. Virtual reality has the ability to give immersive experiences that will allow students to better comprehend and sympathize with people from different backgrounds and experiences. In order for these experiences to be effective, they must be designed with diversity and inclusion in mind. While building VR experiences, issues such as gender, colour, and physical ability must be considered. Additionally, by providing a platform for people of various backgrounds and socioeconomic positions to access knowledge and information, the metaverse has the potential to democratize education. This might be especially advantageous for people who experience educational hurdles owing to physical restrictions or geographic remoteness. As a result, education is critical in ensuring that the metaverse is a welcoming and inclusive environment for all, and educators should prioritize building immersive, interactive learning experiences that can accommodate a variety of learning styles and requirements.

Apart from accessibility, the value of diversity and representation in the metaverse. Was argued that designers must go to great lengths to guarantee that the virtual world truly reflects reality by providing a diverse range of cultures, identities, and viewpoints. As a result, the metaverse has the potential to become a more inclusive and accessible virtual world for all people, regardless of physical ability, race, gender, or socioeconomic status.

As the metaverse expands, it is vital to maintain an inclusive and welcoming atmosphere devoid of bigotry and prejudice for all users. The creation of laws and regulations that encourage diversity and inclusion will aid in the creation of a more diverse and creative community, resulting in increased involvement and creativity. It is also critical to ensure that these policies are clearly communicated to users and that enforcement measures are in place to ensure that they are followed. To ensure that the metaverse is a safe and inclusive environment for everyone, occurrences of discrimination or exclusion must be reported, and policy violators must be punished. In conclusion, As the next stage of internet evolution, the metaverse has enormous potential, providing users with a virtual world for social interaction, learning, and collaboration. To be effective, the metaverse must provide an inclusive and accessible user experience that addresses challenges such as overwhelming virtual environments, isolation, and accessibility for those with impairments. Inclusivity, diversity, equity, and user privacy and security are all important aspects of metaverse UX design that must be taken into account. Correspondingly, the metaverse may dramatically improve education and knowledge democratization if immersive, interactive learning experiences are designed with diversity and inclusion in mind. It is impossible to stress the necessity of developing a metaverse that is accessible, varied, equal, and respects user privacy and security. As a result, it is critical to keep the metaverse open and inviting, free of discrimination and prejudice, in order to nurture a varied and innovative com-

munity. Therefore, by solving these UX difficulties and fostering inclusion, the metaverse may realize its full potential as a platform for social participation, learning, and cooperation, as well as contributing to a more fair and just society.

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Meet Hummam Houara, a talented UX designer with a unique blend of technical expertise and creative flair. With a degree in Computation Arts, Hummam has delivered standout results for clients across different inter-disciplines like 7Square and Science Reach. He excels in designing user-centred digital experiences that drive business success. Hummam regularly participates in hackathons and competitions, winning first place in the Canadian Robotics Competition's robot design category. His approach is characterized by empathy for users and a commitment to creating aesthetically pleasing and intuitive solutions. Hummam is eager to continue creating innovative digital experiences that drive success for organizations.