

Considering Psychotherapy in the Metaverse

Lucie Kruse^{1,*}, Catharina Rudschies², Sebastian Rings¹, and Frank Steinicke¹

¹Human-Computer Interaction, Universität Hamburg, Hamburg, Germany

²Department of Informatics, Universität Hamburg, Hamburg, Germany

Correspondence*:

Lucie Kruse

lucie.kruse@uni-hamburg.de

ABSTRACT

Virtual environments provide many possibilities for immersive psychotherapy, e.g., exposure therapy, practicing difficult situations before encountering them in reality, or through relaxation exercises (1). However, in many cases, these are single applications that can be experienced in the clinical context, with a physically co-located psychotherapist, who is constantly available on-site during the therapy. While remote therapy potentially provides several benefits and advantages, such as availability and transferability, it also leaves room for ethical and technical considerations, justifying the question: Can - and should - virtual therapy also be available online through the metaverse? In this paper, we provide a first glance at three important design considerations of integrating psychotherapy into the metaverse: uncertainties in emergency situations, transmission of non-verbal factors, and privacy and data protection requirements.

Keywords: metaverse, virtual reality, psychotherapy, digital health, emotion recognition, ethics in IT

1 INTRODUCTION

The concept of the metaverse is getting more tangible with each advancement in XR and networking technologies, providing a social, immersive environment where users can meet, enjoy entertainment and perform business operations. This also opens opportunities for providing immersive psychotherapy online, combining a variety of effective digital therapy offers, such as diagnostics, cognitive behavioral therapy, or online support groups, in one application, potentially with human support available. This could mean that instead of visiting a health expert in person, they could meet online in VR, represented by their respective avatars, in a chosen virtual environment. The meeting characteristics, as well as the representation of the users could be customized to the patient's needs and in the best case, this could improve the therapy outcome. Additionally, through the international connections in the metaverse, it would be possible to find a health expert at any time. In this paper, we identify current technical and ethical limitations from interviews with health experts and patients, and underline these statements with literature to point out design considerations for future metaverse applications in the psychotherapeutical domain.

2 INTERVIEWS AND FINDINGS

For a project on hybrid psychotherapy, we interviewed sixteen medical experts (M_x) and ten (former) patients and relatives (P_x). From these extensive interviews, this paper only considers certain aspects that can be transferred to applications in the metaverse. The relevant interview questions deal with the

importance of personal contact between a patient and a medical expert, possible use cases for digital interventions, and prerequisites for (digital) diagnostics and therapy. All interviews were audio-recorded and transcribed. Consequently, they were evaluated with respect to our research question, identifying design considerations. Three larger themes emerged, which will be presented in the following parts.

2.1 Negative Impacts of Remote Therapy

With all the positive aspects of the metaverse, such as independence of the user's location and a certain doctor's availability, virtual therapy could also pose risks in emergency situations. For example, one medical expert mentioned that during online therapy sessions, if there is an emergency, it can be difficult to directly reach the patient (M_{15}). Similarly, a patient mentioned that being alone when an online session ends would leave them without support when dealing with the aftermath of the session (P_7). This implies that if patients are in an acute crisis during or after using the metaverse for psychotherapy, they could possibly not receive the same, immediate help they would get if they were in a clinical setting. In contrast, when virtual therapy is offered 24/7 through the metaverse it may also contradict common practice in conventional (face-to-face) psychotherapy. Therapists usually aim to prevent patients from becoming dependent on them; rather, they work to improve patients' self-esteem and agency (2). Hence, while the possibility for constant access to psychotherapy may sound beneficial on paper, excessive dependency on a (virtual) psychotherapist may even be counterproductive for the therapy's success and increase social isolation. Some studies also indicate that the metaverse has the potential for addiction (3).

2.2 Non-Verbal Factors

One of the doctors said that the correct diagnosis of a patient, which is crucial to choose the right form of therapy, not only depends on what they verbally say but also on non-verbal factors such as gait patterns, facial expressions, focus and attention (M_{13}). A patient also mentioned difficulties in the communication with their psychotherapists when they met via video call, e.g. because the medical experts had limited perception of the patient's facial expressions or gestures, which can lead to misunderstandings and fatigue (P_1). In the context of the metaverse, these issues are also relevant. While current VR headsets provide facial tracking, classification of emotions and transferring emotions to a virtual avatar still remain areas of research (4). For example, facial expressions with a Meta Quest Pro¹ are estimated using infrared images of the user's face and then mapped to generic facial expressions of virtual avatars. In this process, it is possible to lose accuracy or personal expression characteristics, deteriorating the emotion fidelity. Similarly, body tracking in standalone consumer headsets is often only performed by tracking the head and hands of users and interpolating between these positions. This can in turn lead to missing important information, such as distress, which can consequently result in a worse diagnosis or therapy experience. To counteract this gap of knowledge, it is possible to integrate biosensors, e.g. to measure the participant's skin conductance or heart rate. This would provide information about physiological stressors and potentially help patients' and medical experts' mutual understanding. However, research has shown that the assumption that emotions can be inferred from facial movements alone currently lacks scientific evidence and is "at best incomplete and at worst entirely lack[s] validity" (5), p. 48. Further research is thus needed on how to improve non-verbal communication in the metaverse.

¹ <https://www.meta.com/de/quest/quest-pro/>

2.3 Privacy and Data Protection

In our interviews, most participants raised privacy concerns, especially in regard to personal data and sensitive information being collected and analysed. Interviewees required that data is securely stored and not shared with third parties (P_3). Particularly data revealed in conversations and collected through body tracking (6) or biosensors poses a high risk for the user's privacy. The amount and nature of the data also poses legal challenges. Current legislation only protects "personal data", meaning information through which a person is identifiable. However, some data collected via VR applications like aggregated or irreversibly anonymised data are not considered "personal data" and therefore lack legal protection, despite the potential to infer highly sensitive information from them (7). For example, the inference of sensible attributes such as gender, age, and even income is possible with relatively high accuracy from seemingly innocuous information (8). Given that mostly large companies control the infrastructure, software and state-of-the-art hardware necessary for the metaverse, concerns can also be raised about the control private companies have over the practices surrounding design and data processing.

3 IMPLICATIONS AND FUTURE WORK

This paper only presents a short glance into the psychotherapeutical requirements. Further research is still needed to study the effects of facial and body tracking, but improving the realism of avatar representation could foster a better understanding between users. Further, it has to be clarified what safety measures need to be in place for emergency situations. Finally, it is crucial to ensure privacy and data safety. Especially for medically sensitive data such as diagnoses, medical history of a patient or emotional states, the patient has to remain in control of their data which cannot be revealed to third parties. Future research in this direction should be considered to assess the benefits and risks of psychotherapeutic care in the metaverse.

Funding: Funded by the BMBF within the scope of the HIVAM project, Grant Number: 16SV8878 and under the Excellence Strategy of the Federal Government and the Länder.

REFERENCES

1. Cieřlik B, Mazurek J, Rutkowski S, Kiper P, Turolla A, Szczepańska-Gieracha J. Virtual reality in psychiatric disorders: A systematic review of reviews. *Complementary Therapies in Medicine* **52** (2020) 102480. doi:<https://doi.org/10.1016/j.ctim.2020.102480>.
2. Clemens NA. Dependency on the psychotherapist. *Journal of Psychiatric Practice*® **16** (2010) 50–53.
3. Bojic L. Metaverse through the prism of power and addiction: what will happen when the virtual world becomes more attractive than reality? *European Journal of Futures Research* **10** (2022) 1–24.
4. Khare SK, Blanes-Vidal V, Nadimi ES, Acharya UR. Emotion recognition and artificial intelligence: A systematic review (2014–2023) and research recommendations. *Information Fusion* **102** (2024) 102019. doi:<https://doi.org/10.1016/j.inffus.2023.102019>.
5. Barrett LF, Adolphs R, Marsella S, Martinez AM, Pollak SD. Emotional expressions reconsidered: Challenges to inferring emotion from human facial movements. *Psychological science in the public interest* **20** (2019) 1–68.
6. Bailenson J. Protecting nonverbal data tracked in virtual reality. *JAMA pediatrics* **172** (2018) 905–906.
7. Wachter S, Mittelstadt B. A right to reasonable inferences: re-thinking data protection law in the age of big data and ai. *Colum. Bus. L. Rev.* (2019) 494.
8. Nair V, Garrido GM, Song D. Exploring the unprecedented privacy risks of the metaverse. *arXiv preprint arXiv:2207.13176* (2022).