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Mental health services in the metaverse: potential and concerns

Sophie Gloeckler, Nikola Biller-Andorno

Institute of Biomedical Ethics and History of Medicine, University of Zürich

Introduction

The Metaverse, a concept describing the convergence of the physical and digital worlds, may have a role to play in addressing mental disorders, which can be broadly characterised by problematic ways the brain forms its representations of the inner and outer worlds [1]. The following piece offers reflection on the potential application of extended reality technology in advancing mental health services and highlights the need for greater protection given ethical concerns. Appropriate care means providing care that is evidence-based, draws on clinical expertise, is patient-centred, uses resource wisely, and is equitable [2]. How the Metaverse might factor into the provision of appropriate mental health care remains an open question.

The Metaverse and innovation in mental health services

Between 1990 and 2019, the number of people diagnosed with mental disorders increased from 80.8 to 125.3 million [3]. Advancing mental health care means improving access to needed services and improving the efficacy of those services. Digital technology, from mental health apps to telepsychiatry, is playing a role meeting these aims. With the next generation of high-speed internet and the rapid progression of artificial intelligence, tangible interfaces, the Internet of Things, and biosensors, the convergence of the physical and digital world becomes increasingly possible. Some have projected that within the next decade there will be a global transition from flat media to immersive media as the primary means of accessing digital content [4]. Such innovations may have profound implications for addressing mental disorders, given their potential to reshape people's schemas of themselves and the world.

The concept of the Metaverse refers to a burgeoning reality where users experience being inside the internet via extended reality technologies. In the Metaverse, what occurs in the digital world more tangibly impacts experiences in the physical world, and activity in the physical world can be translated to the digital world. Realistic, first-person experiences that cause strong physiological reactions can be produced with stereoscopic viewing, lifelike three-dimensional graphics, and head tracking [5]. Experiences that are highly personalised and able to mimic those of the real world can be generated [6]. Hyper-connected, intelligent technology interweaves the physical, digital, and biological worlds [7].

Evidence is growing that these technologies can play a role diagnosing and treating mental health conditions such as specific phobias, posttraumatic stress disorder, attention deficit disorders, eating disorders, autism, sexual dysfunction, schizophrenic hallucinations, substance misuse, panic disorders, pain, and borderline personality disorder among others, potentially on a large scale and reaching those who are hard to access [6, 8]. The Metaverse has a unique capacity for aiding exposure therapy (e.g. habituating someone with arachnophobia to spiders using holograms in augmented reality settings); enhancing social learning (e.g. creating opportunities for children with autism to practise social interactions in virtual worlds); addressing dysmorphia (e.g. correcting interpretation bias in those with anorexia nervosa using avatars that represent the user's body); and creating positive affective experiences (e.g. distracting people with anxiety using virtual reality during medical procedures) among others. There can be a high degree of personalisation according to need.

These capacities draw on multi-user interfaces and intimate knowledge of the user. Preferences and emotional states can be predicted by tracking gaze, facial expressions, voice pitch, and vital parameters such as heart rate, respiratory rate, or blood pressure [4]. This information, sometimes in conjunction with artificial intelligence, can be directed towards specific therapeutic aims. An important premise of mental health services in the Metaverse is that the created-worlds can reach back to help change people. While this has implications for behavioural improvement in the realm of psychotherapy, it also has implications for other arenas of control and influence.

The need for protection and attention to ethical concerns

The Metaverse has origins that are largely profit-based. Investors, decision-makers, and corporations have been drawn to the social and economic prospects of the Metaverse. By 2025, 30% of global economic activity could be mediated by digital platforms and the global healthcare market for immersive technology is poised to reach $5.1 billion [7, 9]. There is a need to consider the protection of users. It is unclear who is responsible for the control and regulation of the Metaverse, a decentralised, virtual space

Nikola Biller-Andorno
Institute of Biomedical Ethics and History of Medicine
University of Zürich
Winterthurerstrasse 30
CH-8006 Zürich
biller-andorno[at]ibme.uzh.ch

with no geographical classification. High bidders and powerful technology companies are likely to dominate. Innovations with clinical implications may be used outside the purview and protection of traditional clinical settings.

With nebulous regulatory guidelines and highly intimate interventions, caring for those with mental health needs in the Metaverse raises pressing ethical issues. A few of these are outlined below:

– *Concerns about lack of privacy* range from the problem of data sharing to data breaches. Misuse of sensitive data includes information being used outside its intended and agreed-upon purpose, for instance in marketing or government surveillance. Hacking and violations such as identity theft are also concerns [10, 11].

– *Concerns about threats to autonomy and mental integrity* centre on the potential coercion and manipulation of users. These technologies provide significant insight into users' minds; can reach fine-grained, contextually relevant conclusions; and, thus, may potentially nudge behaviour in ways that undermine users' independent, intentional acts [12].

– *Concerns about lack of transparency* relate primarily to users' ability to understand and consent to the underlying aims and design of the technologies with which they interact. For example, AI-generated, simulated people have been shown to engage so authentically that users cannot recognise them as AI-driven avatars with agendas [4]. Deception, even with the aim of doing good, and inscrutability, given the opacity of certain technology, raise questions.

– *Concerns about the amplification of bias* are tied to fear that the Metaverse may accelerate discriminatory practices. Bias may be embedded in the data used to train AI models, and structural inequalities may be reflected in healthcare datasets, creating risk for discriminatory outcomes on a large scale [10].

– *Concerns about triggering or aggravating mental illness* stem from the role that social media and digital technology have likely already played in worsening mental health. Potential problems include addiction to digital technology, social isolation, and the unknown impact on developing brains. Moreover, as the reach of immersive technology becomes more intimate, what is intrusive or distressing may be experienced all the more acutely and profoundly so [9].

The role of the Metaverse in the provision of appropriate mental health care

Appropriate care means providing care that is evidence-based, draws on clinical expertise, is patient-centered, uses resources wisely, and is equitable [1]. Users will need to be empowered to seek out high-quality offerings, differentiating between services that have been validated and those that have not. Clinical expertise should inform the development of offerings. Additionally, the identity of user-as-patient, not only user-as-consumer, should hold weight to ensure that design and services are patient-centred rather than primarily driven by motives of data, power, or profit.

There is still an open question about what function the Metaverse may have in the provision of appropriate mental health services. The Metaverse invites developments in the digitisation of mental health services to flourish. In an age when mental disorders are a leading cause of disability worldwide, and between 30% to 80% of those suffering do not seek treatment, virtual services may be valuable [8]. The Metaverse may provide solutions to the issue of access, offering greater anonymity and overcoming geographical barriers. Those who are housebound, remote, disabled, isolated, or concerned about stigma may find care more easily in the Metaverse [8, 13, 14]. A single clinician may be able to amplify his or her reach through the use of avatars [4]. Artificial intelligence and wearable devices may offer lower-cost options for more independent assessment and monitoring of conditions [14]. The Metaverse may herald a transformation from information-based to experience-based mental health education, potentially improving efficacy, while immersive gamification may help promote healthy behaviour [13, 15]. However, attention should be given to questions of equity. To clarify the potential role of Metaverse based mental health services in the provision of appropriate care, the concerns outlined above need to be addressed. Given the pace of technological development, the sooner that in-depth, interdisciplinary, and inclusive discussions happen, the better.

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