Queering E-Therapy: Considerations for the Delivery of Virtual Reality based Mental Health Solutions with LGBTQ2IA+ Communities

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Abstract. Virtual Reality (VR) has emerged as a rapidly advancing technology with substantial attention from scientific disciplines including Psychology and Human-Computer Interaction. It has become an attractive tool that can offer healthcare support. Marginalized groups like lesbian, gay, bisexual, transgender, queer/questioning, two-spirit, intersex, and asexual/aromatic (LGBTQ2IA+) adults are at increased risk of poor mental health outcomes. The design of digital mental health tools, including VR, often overlook queer adults. In this study, we investigate the experience and the potential of digital mental health services for queer adults and mental health practitioners (MHP) that may inform future designs and implementation. We deployed an online survey and collected responses from 12 queer participants and 7 MHP. We found five themes that address general digital mental health for queer adults and MHP: (1) simple delivery, (2) flexible use, (3) seamless interactivity, (4) personalization, and (5) support. In addition, we noted six themes for VR-specific design considerations: (1) low cost (2) research, training, and education, (3) usability, (4) safety and privacy, (5) immersion, and (6) provider control and customization. Our findings highlight a series of actionable design considerations for digital mental health tools, and emphasize the importance of factors such as usability and accessibility when designing digital mental health tools for the queer community.

Keywords: support technology, mental health, LGBTQ+, e-therapy

1 Introduction

Lesbian, gay, bisexual, transgender, queer/questioning, two-spirit, intersex, and asexual/aromantic (LGBTQ2IA+, hereinafter referred to as *queer*) adults are more likely to have negative mental health experiences and may struggle with anxiety, depression, or suicidal thoughts [1–4]. Although queer individuals are as diverse as the general Canadian population with regards to their experiences of mental health and well-being, they face higher risks for some mental health issues because of discrimination and the social determinants of health [5–8]. There are three significant determinants of positive mental health and wellbeing are as outlined by a report from the Centre for Addiction and Mental Health [9] including: social inclusion, freedom

from discrimination and violence, as well as access to economic resources. All three factors LGBTQ2IA+ individuals and communities; Bisexual and trans people are over-represented among low-income Canadians and the average personal incomes of LGBTQ2IA+ income earners are significantly less than those of non-LGBTQ2IA+ people [10, 11].

Queer individuals experience stigma and discrimination across their life spans, and are often targets of hate crimes, sexual and/or physical assault and harassment [7]. In Canada, hate crimes motivated by sexual orientation were deemed the most violent of all hate crimes and more than doubled between 2007 and 2008 [8]. Furthermore, trans people in both Canada and the US have reported high levels of violence, harassment, and discrimination when seeking services such as stable housing, employment, health, or even social services [12]. These are but a few of many factors that may impact the mental health and well-being for queer adults [5].

In line with what has been seen historically, queer individuals face various social, structural, and behavioural barriers to adequate healthcare services [13–15]. Barriers include a lack of adequately trained healthcare professionals on queer health needs, high costs, and systemic discrimination [3, 4].

Human-Computer Interaction (HCI) researchers and healthcare professionals have long been interested in employing digital mental health services to overcome barriers of access and address psychological impacts [16–18]. Digital services have proven to be effective for the delivery of various mental health interventions such as counselling, mindfulness, and therapy [19, 20]. The growing effectiveness of video-conferencing tools (e.g., Zoom, Jane.app, Doxy.me, Microsoft Teams, etc.) for the delivery of mental health services opens the door for other emerging technologies, such as Virtual Reality (VR), to be further explored for practicality [21–23].

While often debated, the definition of VR is an umbrella term for the real-time presentation of a computer-generated environment that users may interact with through multisensory stimulation capable of triggering emotional and physiological responses [24, 25]. These technologies have beneficial applications with decreasing costs of hardware and increased availability of open-access software [24–30]. The primary consideration for applying VR in healthcare, and more specifically within the mental health context (Clinical VR), is due to the level of immersion enabled by the technology and the level of presence experienced by the user [31]. This is vital as highly immersive virtual experiences have proven to improve users' cognitive and affective abilities when participating in a variety of situations, particularly in anxiety reduction through therapy [32]. However, clinical rehabilitation requires further exploration, particularly for the potential VR has when addressing certain challenges faced by queer adults [1, 4, 14, 15, 19, 33–35].

Our study contributes a unique perspective into the use of current digital mental health tools for the delivery of mental health services and focuses on the needs of queer adults and Mental Health Practitioners (MHP) alike. Furthermore, this study explores their attitudes of VR for the use in clinical mental health care and can inform the future design of digital mental health tools and VR systems for queer adults and MHP. We offer design considerations that can be applied to both mainstream and queer-specific

contexts, which can address concerns of both inequality and inequity of mental health services provided to queer individuals [36–38].

We conducted a qualitative survey with a group of queer adults and MHP to address the following two research questions:

Our objective was to answer the following research questions:

Research Question 1 (RQ1): What is the experience of modern digital mental health tools for queer adults and mental health practitioners?

Research Question 2 (RQ2): What do queer adults and MHP think about the use and implementation of clinical VR as a tool for mental health services?

2 Related Work

Recent HCI research has played a large role in examining the effectiveness and design implications for technologies designed to address the broad spectrum of complex mental health needs [22, 39–42]. These technologies, referred to as *digital mental health services* in this paper, include a vast array of mediums from web and mobile-based applications for mood tracking, to VR simulations to address phobias [19, 39]. We now discuss a myriad of design consideration for the queer community followed by a discussion on the current state of VR as a digital mental health service.

2.1 HCI and VR Considerations for the Queer Community

Prominent user experience discussions for queer communities often focus on the creation of inclusive websites, graphic design, and surveys [43–46]. DeVito et al. [34], however, label Queer HCI as "research in HCI by, for, or substantially shaped by the queer community itself and/or queering methods and theory, regardless of application subdomain" (p. 2).

As a field in design, Queer HCI has largely focused on topics of queer social media usage [47] and has only recently begun to branch into popular topics of identity and trans technology [48, 49]. The use of VR for queer adults, however, has begun to be explored further and has shown to provide positive user experiences, particularly when expressing evolving queer identities [50–53]. Jones et al. [51] explored queer avatars in the video game *Second Life*. They found the in-game feature of finding "virtual bodies" (i.e., representation of one's presence in a digital context) and configuration options lend to heightened agency via gender and sexual expression granting opportunities for interpersonal connection and experiential immersion [51]. Similarly, Pare et al. [50] explored how VR can support the development of critical literacies on gender and sexuality. Their analysis showed that the figured worlds of the participants (i.e., a simulated environment based on particular worldviews and effective thinking) were emergent and dynamically constructed through creative and collaborative efforts and that engagement with others enabled participants to find affirmation on their identities.

HCI researchers have also incorporated VR to support queer individuals in other ways. For instance, Muessig et al. [54] created an artificial intelligence-based VR

system designed to aid queer HIV+ men practise disclosing their status in a variety of scenarios. They found that 81% of participants felt the system was easy to use and found the system effective to practise holding difficult discussions regarding HIV status. This finding highlights the potential of VR as a tool for addressing complex and difficult personal situations for queer adults.

2.2 VR for Digital Mental Health

HCI and psychology literature has explored VR as a tool for digital mental healthcare, notably in the treatment of anxiety disorders. This is largely due to the increased subjective perceptions of safety and control over how the stimuli are presented [25]. While not meant to replace the need for trained therapists, VR offers a tool that can augment the access and effectiveness of techniques such as exposure therapy through subtle and gradual progression protocols [28]. Similarly, patients living with social anxiety may benefit from the opportunity to enhance and train their skills with virtual exposure [54]. A patient can use computer designed environments to experience triggering situations [26].

One particular affordance of VR makes this technology an effective mental healthcare tool for queer adults; this affordance can alleviate some of the psychosocial barriers that discourage queer adults from utilizing mental healthcare services. In VR, the patient and the healthcare provider interact in a multidimensional computer-generated environment in real time and both participants can represent themselves in the form of virtual avatars [55, 56]. This digital representation adds a layer of anonymity (e.g., the patient does not need to reveal their physical appearance and even adopt a pseudonym), encouraging the patient to fear less about the healthcare provider's evaluation and also encouraging the patient to express their thoughts more openly and honestly [56, 57].

Main psychosocial barriers that discourage queer adults from seeking out mental healthcare services are their experience of past discrimination [58] and their fear of being negatively evaluated and stigmatized by others, including healthcare providers [59, 60]. VR's affordance of anonymity and the resulting sense of safety and control can alleviate these unique barriers experienced by queer adults.

VR technology does present barriers to implementation. Not only does cyber-sickness pose a potentially negatively impact to a user's experience [25, 28], acquisition of VR technologies in a clinical setting is often expensive and requires training for therapists to become familiar with the use of these tools [25, 33]. Questions remain as to how users will cope with extended treatments through VR as VR is not being readily implemented for interventions such as "talk therapy," and it remains a relatively unexplored area.

Despite these limitations, VR is becoming accessible to the general population due to it being increasingly affordable and accommodating for individuals with various abilities (including those with temporary or chronic disabilities) through virtual deployment [26, 28]. The current research and design efforts are geared towards non-queer individuals. It is important to investigate the potential of VR as a mental healthcare tool for queer adults with the ultimate goal of creating inclusive design and

implementation guidelines that incorporate the needs of as many user populations as possible.

3 Study Methodology

We distributed two online Qualtrics surveys to queer participants and MHP to address our two RQs. We created two surveys; one for queer participants, and another for MHP. We obtained approval from the Carleton University Research Ethics Board.

3.1 Data Collection & Analysis

The survey collected both qualitative and quantitative information, included 38 questions for MHP and 32 questions for queer participants, and explored demographic information, mental healthcare experiences, and perceptions of VR. We piloted both surveys to ensure clarity and functionality. We collected survey responses during a one-week period between March 23 to March 30, 2021.

MHP and queer participants responded to long form survey questions including questions such as the following: (1) Describe the aspects about the services/tools that worked well, or could use improvement; (2) Describe the most significant barriers to providing/receiving mental health services/tools; (3) Describe the necessary criteria when choosing/providing a mental health service or tool; (4) Describe and expand on whether or not you are interested in using VR technologies for providing/receiving mental health service; and (5) Describe the necessary features and resources required for VR-based technology to provide effective mental health services.

We analyzed participant responses using a collaborative, inductive approach to thematic analysis through Microsoft Excel and Miro. We downloaded the survey responses from Qualtrics and separated the responses into respective qualitative and quantitative spreadsheets. One researcher further broke down qualitative responses into meaningful segments prior to coding while another created a pivot table of quantitative responses for quick processing. We systematically and iteratively coded the collected qualitative survey data using primarily emotion and value coding techniques [35, 61, 62]. Due to the length of the surveys, all researchers were able to participate in the coding process by establishing meaning units to ascribe both condensed meanings and the initial code frame prior to working as a team towards refining codes and establishing a codebook that highlighted the final major themes using Miro digital whiteboarding.

3.2 Participants & Recruitment

We recruited participants (N=22) through online special interest groups (e.g., Queer Design Club and Psychology Today Canada), social media, word of mouth, and snowballing techniques. We recruited queer participants who were 18 years of age or older, comfortable with the English language and self-identified as queer. We also recruited MHP who were 18 years of age or older, comfortable with the English language and actively practising and registered with a Canadian regulatory body. We

did not require either participant groups to have experience using digital mental health services or VR but deemed it beneficial. We assigned unique pseudonyms to both groups (MHP as PM#, queer participants as PL#).

For the MHP survey, we had a total of 7 participants. All participants were from the province of Ontario and most of them had over 3 years of working experience and held positions as Clinical Psychologists or Psychotherapists (see **Error! Reference source not found.** for a full summary of demographic information related to MHP).

Table 1. Mental Health Professional Participant Demographics

Participant	Age Range (Years)	Gender	Sexual Orientation	Race	Clientele
PM02	26-35	Woman/ womxn	Straight/ Heterosexual	White/Caucasian	Adolescents, Adults, Students, Young adults
PM03	26-35	Woman/ womxn	Straight/ Heterosexual	Middle Eastern	Adolescents, Children, Families
PM04	26-35	Woman/ womxn	Straight/ Heterosexual	White/Caucasian	Adolescents, Adults, Students, Young adults
PM05	26-35	Woman/ womxn	Straight/ Heterosexual	White/Caucasian	Adolescents, Adults, Children, Families, Students, Young adults
PM06	36-45	Woman/ womxn	Straight/ Heterosexual	White/Caucasian	Adolescents, Adults, Children, Families, LGBTQ+ community, Students, Young adults
PM07	36-45	Woman/ womxn	Straight/ Heterosexual	White/Caucasian	Adolescents, Adults, Students, Young adults
PM08	36-45	Woman/ womxn	Straight/ Heterosexual	White/Caucasian	Adolescents, Adults, Children, Seniors, Students, Young adults

For the queer participants' survey, we had a total of 12 responses. Participants were from Canada (n=8) and the United States (n=4), mostly White or Caucasian, and between 18 and 35 years of age. Only one participant identified as transgender. See **Error! Reference source not found.** for a full summary of demographic information related to queer participants.

4 Findings

4.1 Descriptive Information on Mental Health Services

4.1.1. Barriers of Digital Mental Health Services. Four queer participants did not use mental health services. Two participants indicated not requiring these services, while two participants highlighted a lack of locally available resources and felt uncomfortable with seeking out said services. The most significant barriers to accessing mental health

services and tools for queer participants were high cost (n=9), limited availability (n=7), and lack of queer-friendly resources (n=7). Four queer participants stressed the importance of making digital mental interventions readily available and accessible to clients.

Four MHP indicated a lack of queer-friendly resources as a potential barrier to accessing mental health services, while three indicated limited availability, stigma from friends and family, and lack of culturally sensitive/representative resources as prominent barriers. They identified the need for accessibility and availability of services for their clients. Equity of these services, due to cost and wait times, were the most common barriers associated with accessibility (n=6). These participants identified the cost of mental health services and tools, and the need for additional funding support for both clients and therapists as a major barrier.

Table 2. Queer Participant Demographics

Participant	Age Range (Years)	Gender	Sexual Orientation	Race	Digital Mental Health Services/Tools
PL01	18-25	Woman/ womxn	Queer	Hispanic/ Latinx	Yes (virtual counselling, meditation app)
PL02	18-25	Man	Gay/ Homosexual	White/ Caucasian	Yes (meditation app)
PL03	26-35	Man	Gay/ Homosexual	White/ Caucasian	Yes (virtual therapy, meditation app)
PL04	18-25	Woman/ womxn	Lesbian	White/ Caucasian	Yes (virtual counselling, meditation app)
PL05	18-25	Woman/ womxn	Bisexual, Pansexual, Queer	White/ Caucasian	Yes (meditation app)
PL06	26-35	Man	Gay/ Homosexual	Multiracial or Biracial	No
PL07	18-25	Woman/ womxn	Bisexual, Queer	Asian	No
PL08	26-35	Man	Gay/ Homosexual	White/ Caucasian	Yes (virtual counselling, virtual therapy)
PL09	18-15	Man	Gay/ Homosexual	White/ Caucasian	No
PL10	18-25	Woman/ womxn	Bisexual	White/ Caucasian	Yes (meditation app)
PL11	26-35	Man	Gay/ Homosexual	White/ Caucasian	Yes (virtual counselling, meditation app)

PL12	18-25	Genderfluid, Woman/ womxn	Lesbian	White/ Caucasian	No

4.1.2. Use of Digital Mental Health Tools. Most queer participants with experience using digital mental health services indicated having done so either from a recommendation (friends or family [*n*=6]; an MHP [*n*=1]) or due to a required shift to online services because of the COVID-19 pandemic (*n*=3). Queer participants showed no steady trend in how frequently they use devices (daily (*n*=2), weekly (*n*=1), biweekly (*n*=1), "when I need it" (*n*=1)) in relation to factors such as the services they use. We found, however, that most queer participants with previous experience (*n*=6) access their respective services and tools via their mobile device (smartphones) as opposed to a desktop computer or laptop (*n*=3).

The majority of MHP had provided mental health services digitally (*n*=6), while one had not due to confidentiality concerns. All MHP who had used digital services indicated that the ongoing pandemic required the shift online or the use of the digital platforms were recommended by a client or fellow MHP (*n*=1). The digital services and tools used to provide mental health services included mental-health questionnaires (via q-global, MHS online assessment centre, etc.), video-conferencing platforms (Jane.app, Zoom, Microsoft Teams, Doxy.me, Virtual Care, etc.), and telerehabilitation. These services were used daily (*n*=4), or weekly (*n*=2) with clients.

Seven queer participants had experience with VR technologies with all but one having used it for entertainment purposes such as digital gaming. Only one MHP had experience using VR to provide mental health services. This participant used VR for exposures therapy to simulate experiences such as phobias.

4.2 Experiences With Digital Mental Health Services

We found five considerations for the delivery of a digital mental health services (**Fig. 1**).

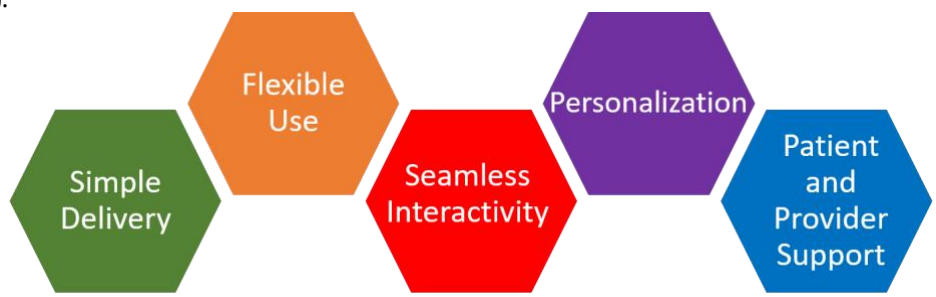

Fig. 1. An overview of five considerations in response to RQ1.

Requirement 1: Simple Delivery. Queer participants highlighted a need for these systems to operate simply and consistently (*n*=5). A "low-pressure environment" (PL08) was vital to creating positive experiences that aligned with goals of clinical care.

However, it remains crucial that this did not impact the tool's ability to address the user's needs.

For MHP, the most significant barrier for using digital tools for the delivery of mental health services was a lack of familiarity (*n*=4). To address this, they indicated the delivery of care worked well when the product was visually appealing (*n*=1), easy to navigate and user-friendly (thus requiring minimal need for technological skills, *n*=4), simple to troubleshoot (*n*=2) and integrate smoothly with other tools (*n*=3). PM04 highlighted simplicity, requiring few steps to avoid frustrating experiences. A virtual platform may be as "simple as copying and pasting the zoom link into their web browser" (PM03). They further explained that "it is tricky for clients to navigate, who are not as tech savvy … you are then faced with navigating frustration on top of your client's goals for the session." PM03 also expressed the importance of considering that MHP are "working with individual's impacted by potentially poor mental health, [so] asking them to navigate systems that are multi-stepped needs to be factored in advance by the clinician."

Requirement 2: Flexible Use. Four MHP described flexible delivery as the integration of services and tools with current technology (i.e., smartphones, computers, tablets), and providing flexible service that can address geographic, transportation, physical and mental barriers. Furthermore, they desire a digital service that could be a multi-use tool. PM02 and PM04 gave examples where the integration of "scheduling appointments," "encompasses everything that is required," and a system that allows for "forms/scales/questionnaires to be completed."

Requirement 3: Seamless Interactivity. MHP mentioned poor internet connection (*n*=4) and changes in service providers (*n*=3) as common issues. This caused connection delays, and internet unreliability such as freezing, delays in connection, losing access to video stream, and dropped calls. PM05 captured the impact of technology issues on client comfort in the following statement: "Sometimes the call drops or the device battery dies, seemingly always in the most critical point of the session." Furthermore, privacy (*n*=4) was another concern for MHP.

Requirement 4: Personalization. Queer participants emphasized the importance to have personalized experiences that were highly customizable and client-focused (*n*=5). PL01 provided an example in a comparison of their experiences with two leading meditation apps: "Headspace has become a bit generic in all their meditations, but Balance is a great customized experience for meditation." Similarly, ensuring a sense of agency and control, particularly for when and how users navigate a system, was vital to the queer experience. Certain MHP noted that digital services and tools may provide the opportunity to interact in a sensory flexible environment or opportunity for increased privacy or anonymity. PM05, for instance, described that "for some clients…participating over the phone or through zoom with cameras off, opens the door for them." For PL04, functionality that enabled users to see their progress over time was particularly beneficial when measuring the efficacy of digital mental health solutions.

Requirement 5: Patient and Provider Support. Adequate support networks are a vital aspect for queer adults when they select digital mental health services and tools. Four queer participants discussed the reputability of the service and the provider to provide

adequate care that research has verified. Four queer participants shared that the ethos of the clinicians must also align with their own personal beliefs, such as feminism (PL10) and secularism (PL03). For PL02 and PL11, it was important that clinicians are educated on queer topics and implement services using gender-neutral language. PL12 summarized conversations about the ethos of mental health providers when discussing the importance of empathy versus sympathy: "There is a fine line between providers being educated on LGBTQ+ topics and… being condescending towards us. I don't want to be babied because of my gender and sexuality, just be respectful and try to empathize." MHP identified support for the client through access to the necessary tools, and understanding the stigma associated with mental healthcare. PM06 exemplified this process as providing adequate "compassion, empathy, open-mindedness, [and] collaboration with [the] client." PM05 highlighted client support to be dependent on the client's commitment to therapy, including their readiness and willingness to participate and engage in various interventions. MHP identified community support through mental health training for teachers, and other community members as a necessity to support the client. They also discussed reduced wait times and cost as areas of support.

4.3 Impressions and Considerations for the use of VR as a Tool for Digital Mental Health Services

We found six considerations for VR as a tool for digital mental health services (**Fig. 2**).

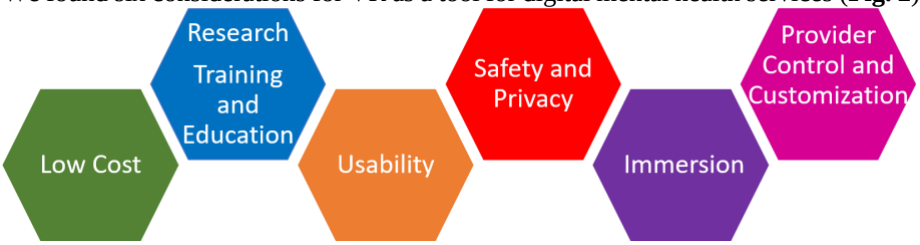

Fig. 2. An overview of six considerations in response to RQ2.

Requirement 1: Low Cost. Queer participants highlighted cost (n=8) and availability of technology (n=7) as significant barriers to the use of VR. Despite these barriers, ten queer participants indicated that they would be interested in using VR as a specialized mental health service. One of the two that indicated otherwise shared the disinterest as not wanting to spend money on a large head mounted display. Similarly, one MHP who had previous experience using VR identified cost of implementation as a major barrier when using VR. MHP identified further funding resources to support VR. All MHP expressed that VR must be cost-effective (n=2).

Requirement 2: Research, Training and Education. Queer participants highlighted lack of familiarity (n=8) as significant barriers to the use of VR; six shared that they perceive VR technologies as niche. PL01 exemplified this perceived niche as relating solely to gaming or entertainment experiences: "It's not really common… It always feels like some experimental gamer experience." Three other queer participants echoed

this perception as they felt VR applications for mental health as unimaginable before completing the study. MHP identified a need for evidence-based training and treatment for both digital services (*n*=5) with PM03 expressing that the successful VR implementation requires more research, as it "needs time for it to be considered evidence-based."

Requirement 3: Usability. Five queer participants shared that aesthetics, relating particularly to calming audio and visuals, are key components of ensuring VR interventions remain engaging and realistic. As such, two queer participants shared that graphical issues such as drops in frame rates negatively impact immersion. Certain MHP felt difficulties associated with using VR for mental healthcare exist. PM03 shared that there may exist a "complexity in learning and implementing it," which may contribute to a disinterest in the use for mental health services. For successful VR implementation, MHP desired limited steps, efficiency, and simplicity of the tools.

Requirement 4: Safety and Privacy. When discussing VR implementations, two queer participants expressed concerns regarding the safety of such systems. PL07 shared worries of undue mental influence, while PL06 was uneasy regarding risks of motion sickness. Three queer participants also signified concerns for the data privacy. PL12 mentioned that data privacy was in fact a greater concern with digital mental health solutions, not just potential VR implementations.

Requirement 5: Immersion. Five queer participants highlighted the immersive benefits of VR-based digital mental health solutions. Two suggested that a VR-based solution would afford extremely realistic and engaging opportunities that current mobile application-based services and tools lack. In the PL09's case, the major disadvantage of contemporary digital mental health solutions is that they are widely screen-based and lack the social connection that physical services offer. Four queer participants signified that VR would provide a unique opportunity to circumvent the impersonal nature of modern digital solutions by potentially allowing clients to interact with an avatar version of their therapist.

Requirement 6: Provider Control and Customization. Four queer participants addressed a concern of user control. PL11 shared that it would be useful to not only allow users to see their therapist but also allow them to control the avatar's location to ease any potential discomfort that comes with talking to a professional head-on. MHP echoed this idea as they identified that VR technology must be able to customize the use to a specific experience and needs of the client (*n*=3). They highlighted flexible scenarios as a requirement for the use of VR in exposure therapy. PM02 explained that "a lot of different situations [are required] to address particular phobias." Both MHP and queer participants alike felt providing control to the mental health professionals to help guide the patient through the experience offered a greater sense safety and control, with PM02 classifying it as a particular boon for exposure therapy.

5 DISCUSSION

Clinical VR presents itself as a viable approach with the potential to address mental health needs that disproportionately affect the queer community. As such, we explored

the current state of digital mental health tools, particularly with VR systems, and how it addresses the needs of queer adults and MHP. Using the data collected from 12 queer participants and 7 MHP, we observed key design considerations from each participant group's unique experiences to address our two research questions.

Our study highlights the varied design needs and considerations that both queer adults and MHP have for digital mental health services (see **Fig. 1** and **Fig. 2**). These considerations can specifically address unique psychosocial stressors faced by queer adults, which prevent them from seeking mental healthcare services. We now offer the interpretation, and discuss the implications of our findings.

5.1 Considerations for Improved Experiences with Digital Mental Health Tools

MHP converted to offering mental health services digitally due to the COVID-19 pandemic, however, both groups benefitted from accessing mental health services digitally. This was grounded in the reduced need for geographic proximity to mental health services, as well as the improved access to sensory flexible experiences. Although digital mental health tools may have improved access to services, financial costs proved to be the most prominent barrier to access. Lack of funding allocations introduce an increased cost to service and equity of services for MHP and queer clients alike. This supports the notion for greater government subsidies and funding resources and make digital mental health services and tools readily available and accessible to queer clients [1, 63].

The usability of the digital mental health tools implicated the overall experience of digital mental health services for both queer participants and MHP. It is vital for designers to create services that limit the steps required by clinicians and patients using these tools to provide a flexible delivery of care.

Furthermore, these systems often lack a level of customization, thereby not providing opportunities for MHP and clients to customize the experience to a specific context. This is a notable oversight when working with queer clients whose queer experiences fall short in the proper education of queer needs. Queer participants highlighted a need for customization, bringing attention to the importance for digital services that have a personalized element that is client-focused and offering a sense of agency and control when using the system. MHP can personalize inclusive language based on queer adults' preference (e.g., how a queer adult would like their gender identity to be addressed while receiving a mental healthcare service intervention). Personalization can build trust with queer clients, whom have expressed mistrust towards healthcare systems [64].

This design consideration also aligns with the specific demand for tools and services that address their unique queer ethos and personal beliefs. To address both client and clinician needs, the design of digital mental health tools requires collaboration between medical and IT experts and end users by their feedback and comments to provide effective content and increase the likelihood of successful implementation [33].

We also found modern digital mental solutions to be largely impersonal. The screen-based nature of mental health applications lends itself to the common misconception

that these services are simply products meant for consumption than mental healthcare enabled by the unique properties that technology can offer [65]. Modern digital solutions present the inability to properly perceive client comfort. While thought of as a barrier for MHP, it also makes it difficult for queer people to be able to experience an enhanced sense of self-awareness and trust. Due to the unavailability of substantial technological training, MHP have a limited understanding on how to personalize therapeutic use based on the context and client's specific needs and abilities. Dissemination of knowledge in this area would be beneficial for queer adults so that MHP can customize interventions for varying sexual orientations and gender experiences.

Privacy and confidentiality were highlighted concerns for queer participants and MHP concerning digital mental health tools. Queer participants requested agency control, while MHP requested safeguards to protect themselves and the client. In considering 'apps' (mobile applications) that clients may use, threats to data privacy are increasing, with clients reporting privacy concerns and may inhibit and discourage their use of possible health-related apps [66–68]. This is important, as when clients use these apps various data points are frequently shared with the developers. Information such as an individual's username, password, contact information, age, gender and phone number are often monitored by app companies, and this information is even sometimes sold to third parties [69].

MHP's who encourage the use of these tools with their clients should acknowledge these limits of confidentiality and encourage their clients to use these apps with caution and limit their personal disclosure if possible. However, it is important to consider how the experience using these apps may change (i.e. customizability of app experience). In the event that a client loses their device, utilizing tools that can remotely wipe data wipe may be helpful [70, 71].

5.2 Considerations for Clinical VR as a Tool for Digital Mental Health

From our results, it is apparent that there needs to be an evidence-based training and research for a VR to become a credible mental health service tool. This will make the technology more approachable and reduce perceived niche of this technology, as expressed by our queer participants. When it comes to MHP, training and education have various overlapping elements with MHP's comfort using VR technology and their respective need to have support through collaboration with industry experts, co-workers and ultimately their clients. The adoption of VR across mental healthcare is seemingly limited, and insufficient training that encompasses technological onboarding results in a worsened comfort level using this technology. Professional education on evidence-based research must ensure MHP are educated on queer issues, mental health needs, and available resources before creating or administering VR e-therapy simulations for queer adults [33, 72].

Beyond technology, we found that the success of the service is dependent on many factors. First, the success somewhat depends on the support of clinicians and the client's willingness to participate and improve (PM05). VR mental healthcare tools that appropriately address previously mentioned design considerations, including a system

that provides personalization and that ensures privacy and consideration, can alleviate queer adults' fear of being negatively evaluated and stigmatization, which in turn can encourage them to actively participate during interventions, Also, providing MHP with the necessary support, may in-turn support their clients. This notion demonstrates a foundational need to support MHP through collaboration and providing the necessary resources prior to implementing a novel technology such as VR.

Second, the success of the service needs to consider accessibility needs in the domains of cost and stigmatization. The cost of administering virtual services and procuring necessary VR technology appear to be of great significance to both MHP and queer participants. Despite a recent decrease in price [30], their cost is still comparably higher than video-conferencing tools and make VR an expensive alternative for MHP. Similarly, some queer participants did not appear interested in spending money purchasing the required VR equipment when market applications are available to download for substantially less. The current perception of VR technologies being niche and only intended for certain audiences, such as video game players, makes this even more evident. MHP and alike can consider adopting cost-effective and publicly known alternatives that are commercially available such as Google Cardboard, Samsung Gear VR, and Merge VR Goggles. To this end, VR gathering tools such as Hubs by Mozilla or ALtspace VR may also be viable alternatives to the standard HMD interaction with VR that can be costly. Hubs by Mozilla and AltspaceVR are designed for almost every headset and browser, and are open-source projects, that are built on principles of flexibility, privacy and scalability and present a unique opportunity for further investigation as a Clinical VR tool.

Third, the success of the service depends on the usability and immersion. Usability principles are currently at a crossroads with the technical limitation of VR. For some, the size of VR systems limits their use in certain clinical settings. For others, mobile VR platforms can only provide so much immersion with a pocket-size computer. Computer specifications and the resolution of available VR devices can be limiting for some private clinics. Providing immersive experience is especially important for queer adults. The experience of immersion and the resulting emotional and cognitive engagement [73] and enjoyment [74] can motivate queer adults to continuously utilize mental healthcare services and change their negative attitude towards healthcare providers.

Fourth, a successfully VR-based service should craft individualized experiences that can easily be controlled and adjusted mid-use [75]. With this in mind, customizable digital mental health solutions will ensure an individual's therapy program is the most comfortable for them with gradual progression based on their needs, level of growth, and commitment to the program. For example, VR in exposure therapy requires the use of flexible scenarios. With proper VR implementation providing MHP control to help guide patients through experiences, both parties obtain a greater sense of safety and control.

6 Limitations and Future Work

We identified several limitations of our study. First, barring unpredicted technical issues with the software, participants may have felt inclined to progress through a survey as quickly as possible which results in less rich data when compared to other qualitative methodologies such as interviews [76]. While we did provide opportunities to provide open-ended text answers, long-text answers are often a deterrent to study participants in research surveys [77]. Second, many participants had limited experience using VR, while having prominent experiences with digital tools due to the COVID-19 pandemic. In certain cases, this contributed to an emphasis of insights from digital services and tools in general and less on specific VR potential. However, these insights are important contributions to consider in the development of VR tools to promote the usability and accessibility of these tools. Third, our survey results provide a very limited but generalized perspective of VR use and the factors influencing their adoption at a broader health system level. Repeat evaluations in different countries and practise settings over time will enable comparisons to understand more clearly the dynamics of VR adoption in these differing contexts. Likewise, repeat evaluations should also consider reaching out to a greater number of participants with a wider variety of demographic makeup, particularly in the case of MHP.

While we acknowledge these limitations, we similarly discuss several noteworthy future works. Primarily, future work should consider incorporating additional research methods in tandem with a survey, such as qualitative interviews. This would provide MHP and queer participants to expand on the themes identified and potentially introduce new ideas.

Future studies should consider conducting controlled studies to evaluate the feasibility regarding customizable, scenario-based VR mental health therapy. They may consider assessing the usability of VR tools in the teletherapy setting for client and clinician use. Evaluating user experience will provide further justification for use of VR in teletherapy settings and help support the lack of evidence-based research for MHP to provide appropriate services for queer clients.

Finally, to follow human-centred design principles [78], an evaluation of the themes found from the survey responses would be an effective follow-up study to this paper. Researchers would accurately inform and verify future design with the appropriate stakeholders by having both MHP and queer individuals critique our findings. A useful method of conducting such would make use of experience or journey map to highlight design scenarios for both queer adults and MHP's. Participants would be able to use the contextual nature of a journey map to evaluate the validity of our conclusions. Furthermore, future work could complete a Wizard of OZ or similar method to pilot VR within the context of a clinical counselling.

7 Conclusion

Throughout our study, we simultaneously investigated the experiences and opinion of queer individuals and mental health professionals with digital mental health services

and the potential for VR technology as a medium for digital mental health. We distributed two surveys and collected insight from both groups; these insights demonstrate the potential VR-based digital mental health solutions for addressing the unique needs of the queer community when designed with considerations such as safety, customizability, and immersion. We highlight the importance of user-centred design principles and the importance of creating tools that balance being technologically innovative while understanding complex and unique user needs. We then presented a series of design considerations for digital mental health and VR-based mental health tools that leverage our user-informed findings.

8 Acknowledgments

We would like to thank all of our participants for their time, expertise, and insights.

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