research article

Digitalising qualitative social research? On the potential of digital features to enhance data collection in qualitative research: the example of a virtual reality serious game in a qualitative research project

Daniel Gredig, daniel.gredig@fhnw.ch
Daniele Bigoni, daniele.bigoni@fhnw.ch
Jasmina Bogdanovic, jasmina.bogdanovic@fhnw.ch
Patrick Weber, patrick.weber@fhnw.ch
Safak Korkut, safak.korkut@fhnw.ch
University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

Digital features like virtual reality have hardly been used in the framework of data collection in qualitative social work research. Virtual reality holds specific promise because it allows the immersion of participants in a situation and has the potential to strengthen the ecological validity of data. In this light, we examined the use of a virtual reality serious game in qualitative in-person interviews in the framework of a prevention-oriented HIV social research project. We designed and developed an immersive virtual reality serious game, and integrated it into 24 problem-centred in-person interviews. The integration was feasible, and the virtual reality serious game was well accepted. It prompted participants to elaborate their lived experiences more extensively and in depth. Participants subsequently recalled episodes they had not mentioned before, complemented their narratives and brought up new topics. The atmosphere became less formal, and participants were even more communicative. The use of virtual reality seems to have the potential to open up new perspectives, broaden epistemic possibilities and complement the qualitative methods used to investigate, in particular, verbal and non-verbal communication and interaction processes. From an ethical perspective, the use of virtual reality should be well reflected upon regarding possible after-effects for the participants.

Key words virtual reality • serious game • qualitative research • digitalisation • data collection

Introduction

In quantitative social research, the use of digital features seems to have a firm place within the research process. The use of digital tools for data collection and analysis has become common practice. For example, the use of various programmes supporting the construction, distribution and online administration of questionnaires (such as SurveyMonkey or EFS survey) or facilitating statistical analysis (such as SPSS, STATA, R or SAS) and complex modelling (such as AMOS, Mplus, Lisrel or Lavann) is taken for granted. Going beyond this, digital spaces, known as 'virtual environments', are used in experimental research in psychology and social psychology. Virtual environments allow the creation of a variety of different situations while offering good experimental control with high ecological validity and an exact replication of settings. They provide the option to create situations that cannot safely and feasibly be staged in a laboratory (Pan and Hamilton, 2018). They also make the inclusion of distant participants possible (Fox et al, 2009). Virtual reality (VR) has been used, for instance, for the study of (non-verbal) behaviour, social interaction skills, interpersonal persuasion, social inhibition, social anxiety, prosocial behaviour or prejudice and stereotyping (Fox et al, 2009; Zinchenko et al, 2015). Recently, the first studies have been presented that used machine learning for text analysis in social work. As a paper at the ESWRA conference demonstrated, sentiment analysis based on machine learning was used to analyse the expressions of emotion in social workers' written free-text responses to open-ended questions (Schwartz-Tayri, 2022). This computational procedure blurs the boundaries of quantitative and qualitative analysis as do other emerging methods of computational social science, such as topic modelling, network analysis (Franken, 2023) or computational grounded theory (Nelson, 2020).

In qualitative social research too, digital technologies are now routinely used to support the research process. The devices range from taken-for-granted equipment for registering interviews or group discussions (such as MP4 recorders or video cameras) to programmes supporting the transcription of interview data (such as F4) and programmes supporting data management and interpretation (such as Nvivo, Nudist, MAXQDA, ATLAS.ti). Increasingly, visual methods and digital technology seem to be used to complement the classic semi-structured interview. During the COVID-19 pandemic, the use of video-conferencing software definitely made its way into qualitative research (see, for example, Gray et al, 2020; Boland et al, 2022). In healthcare research, video recording has been used in inquiries on collaboration between interprofessional teams and their patients (Carroll, 2009). In video-reflexive ethnography, video recordings of professional interactions that have become habitual and therefore invisible to the actors serve as material for joint reflection by participating professionals and researchers (Iedema et al, 2013). The go-along interview, a well-established ethnographic research method, was 'digitalised' (that is, converted to digital form) by performing the go-along in an immersive virtual reality (IVR) setting, conducting the semi-structured interviews in virtual space (Vindenes and Wasson, 2021). In criminology, the use of VR was also suggested to replace traditional written vignettes (van Gelder et al, 2014). The use of vignettes is an approach also used in social work research, particularly in investigating professional decision making (see, for example, Williams and Soydan, 2005; Killick and Taylor, 2011; Söderberg et al, 2014; Gautschi, 2021; McCafferty et al, 2021). However, it does not seem as if written

vignettes have ever been replaced by VR. To our knowledge, the use of VR is novel in social work research.

VR refers to a 'digital space in which a user's movements are *tracked* and his or her surroundings *rendered*, or digitally composed and displayed to the senses, in accordance with those movements' (Fox et al, 2009: 95, emphasis in original), which provides a high level of interactivity. In VR, users are not limited to passive observation (as in a two-dimensional environment); rather, they have an active role as their actions have an immediate and observable impact on the reality displayed. The cues of the real-world environment are replaced with digital cues while blocking sensory impressions from physical reality. Users may experience losing themselves in this digital environment, which is referred to as 'immersion': 'a psychological state characterised by perceiving oneself to be enveloped by, included in, and interacting with an environment that provides a continuous stream of stimuli and experiences' (Witmer and Singer, 1998: 227), producing the phenomenon of 'presence', which is the sensation of 'being there' – the feeling 'that one is actually physically present within the portrayed but virtual reality' (Waterworth and Riva, 2014: 3), 'even when one is physically situated in another' (Witmer and Singer, 1998: 225).

Experimental research has revealed that virtual environments are perceived as real, so that physical and behavioural reactions are evoked in the participants (see, for example, Slater et al, 2006). There is growing evidence that people who are confronted with events and situations in VR are inclined to behave and react as if they were real (Sanchez-Vives and Slater, 2005).

Rather than asking participants to imagine themselves in a described situation – as, for example, vignette studies do – VR allows participants to actually immerse themselves in that situation (Blascovich et al, 2002). The feeling of being present in the virtual environment can presumably lead to more authentic and valid responses (van Gelder et al, 2014), and has the potential to strengthen the ecological validity of data. In accordance with this, studies have shown that VR can offer advantages over written scenarios and written vignettes (Van Gelder et al, 2019). Based on current research, it can be assumed that IVR simulations (with 'embodied conversational agents') combine the respective advantages of computer-based and face-to-face interviews. Studies have shown that respondents in interviews using computer-based methods are more willing to respond to sensitive topics openly, as the situation is more anonymous and they are less exposed to the danger of being judged (negatively) by a counterpart (Locke et al, 1992; Richman et al, 1999; Lind et al, 2013). Research has also shown that respondents detect human-like qualities in agents, even when they know their counterpart is a computer (Holtgraves et al, 2007; Von der Pütten et al, 2010; Gratch et al, 2014). From this, it is deduced that avatars (that is, agents who communicate in a realistic verbal and non-verbal way) combine the advantages of the two approaches: relief and relationship building (Pickard et al, 2016: 24).

Considering these effects and the fact that head-mounted displays that allow full immersion and presence to unfold have become affordable and are easily transported and positioned, VR also holds promise specifically for social work research. VR seems to have the potential to push the exploration of 'social action' (Weber, 1913 [1988]) – in terms of subjectively meaningful (verbal and non-verbal) interpersonal interaction[1] – in various social contexts (as well as in the context of professional social work) beyond its current boundaries.

Thus, we think that including VR in qualitative social work research, for example, in in-person interviews, should be a subject of discussion. Given the benefits, such as immersion and the higher ecological validity of responses, as well as anonymity, a greater willingness to talk about sensitive issues and the lower effects of social desirability, the use of VR could be promising.

It is our view that a discussion about the potential of VR for social work research is timely and important. At the same time, we suggest that the discussion about the capacity, feasibility and weaknesses of VR, as well as related ethical challenges, should be based not only on theoretical reflection and conceptual work but also on concrete experience with the use of VR in specific research projects. In this article, we take a first step in this direction. Specifically, we offer the example of a current qualitative HIV-related social research project using a virtual reality serious game (VR-SG) for data generation and share our experience of the use of this digital feature in face-to-face interviews.

First, we outline the aims and rationale of the project in order to provide the specific context in which the use of a VR-SG was embedded. Then, we describe the design and development process of the VR-SG, report on the game's application in a series of qualitative in-person interviews and report our observations on the effects of the VR-SG on the interview data. Lastly, we address issues of research ethics and conclude with reflections on the potential that might arise from the use of IVR features in qualitative social work research and a possible 'digitalisation' of qualitative social work research.

Specific context

In prevention-oriented HIV social research, it is a major challenge to address the dyadic and bidirectional interactive nature of sexual encounters in which the topic of protection against HIV or other sexual transmitted infections (STIs) is situated. Summarising an extensive body of research, it is evident that HIV protection behaviour is determined by a complex set of variables on the micro, meso and macro levels but always comes to bear in concrete actions,[2] ranging from the implementation of effective strategies, that is, the use of (male or female) condoms (Crosby and Bounse, 2012) or taking pre-exposure prophylaxis (PrEP) (Riddell et al, 2018), to applying risk-reduction strategies (Gredig et al, 2014) or abstention from protection strategies. All personal HIV protection strategies require the acceptance or collaboration of the sexual partner(s), and therefore need to be negotiated. Our current project, which serves here as an example to demonstrate the use of a VR-SG, explores how HIV-negative men having sex with men (MSM) negotiate their HIV and STI-related protection with non-steady partners. Thus, it is central to capture in as much depth as possible the verbal and non-verbal interactions between potential and actual partners from initial contact until intercourse.

As interactions during sexual encounters are not accessible, during recent decades, research has relied basically on retrospective self-reports to capture protection behaviours in various contexts and diverse groups. The researchers accepted the well-known flaws of this approach, while waiting for an alternative. Recent desiderates called for the use of digital technologies to overcome the known weaknesses of retrospective self-reports (Peasant et al, 2015). Encouraged by the promise of VR, as mentioned earlier, we chose to extend in-person (problem-centred) interviews (Witzel, 2000) with a VR-SG, with the aim of immersing participants in situations similar to those they might have encountered in their lives.

The aim of the VR–SG was to evoke memories and stimulate accounts of partner interactions, thereby supporting qualitative data generation and enriching the interview data. To make this explicit, the VR–SG was used neither to capture participants' (bodily or emotional–affective) reactions (for example, by measuring electrodermal activity) and to track eye gaze (both technically feasible), nor as a test of the interviewees' actions in the game or the veracity of their narratives before the game. Instead, the game was used to evoke memories of courses of action and negotiations in the past, and to stimulate episodic accounts of partner interaction. It was intended to complement and strengthen the dynamics or mechanisms that are known to unfold in personal interviews (Schütze, 1976), and to produce narratives of self-experience containing feelings, cognitions, self-explanations or self-theories embedded in the storyline. The VR–SG should support the communicative process in which qualitative interviewing generates a database for an analysis that allows the reconstruction of situated courses of action, the resulting history of action and ex post evaluations (Rosenthal and Loch, 2002).

To our knowledge, there are no VR games available that are suitable for our purpose. Therefore, we first had to design and develop a suitable VR–SG.

Design and development process

Given our aim, we decided that the game would involve participants in scenarios reflecting situations with which they were familiar. To obtain insight into specific situations and how MSM proceed in negotiations about their HIV and STI protection, we recruited five men by reaching out on two dating platforms designed for men-to-men dating (Romeo and Grindr). We then conducted semi-structured in-person interviews (that is, problem-centred interviews [see Witzel, 2000; Witzel and Reiter, 2021]) on how they negotiate HIV and STI protection. Further, we conducted expert interviews (Bogner et al, 2002; Helfferich, 2014) with five sexual health advisors that we had recruited from sexual health clinics specialised in MSM and AIDS service organisations in order to elicit their case-based knowledge on how MSM negotiate HIV prevention. Based on the participants' informed consent, interviews were registered and transcribed verbatim. We analysed the data resulting from both sources using qualitative content analysis (Kuckartz, 2018) and identified exemplary courses of negotiation.

Drawing on these insights, we decided that the VR–SG would combine two negotiation scenarios: initially, the VR–SG should immerse participants in a chat on a dating platform; subsequently, depending on its outcome, participants should find themselves on a date in the virtual partner's (VP's) apartment. We developed complex stories using Petri nets for possible interactions. First, based on our empirical data, we crafted an online dating chat story leading to nine different plots based on the outcomes of the chat messages with a potential VP. Some could lead to the termination of the chat, others to an appointment for sex at the VP's home and a (provisional) agreement on protection against HIV. Then, based on the data again, we designed nine continuing story plots using Petri nets for all possible interactions with the VP during the date. In the game, the conversation unfolded from the point reached in the chat and, again, allowed for different developments and outcomes of the negotiations. The participants had to choose the most suitable answer from two to six options. We designed ten Petri nets in total for all possible interactions with the VP, leading to nine different plots with 34 authentic dialogues. The plots in the chat and during the date were arranged in such a way that, in some instances, the

VP challenged the participant to abandon his personal protection strategy. Figure 1 illustrates such a petri net.

The dialogues were scripted by an actor. As in real life, the text-based conversations in the chat were held in German. During the virtual date, the actor spoke Swiss German. The content was checked by the research team for adequately familiar wording and 'insider' jargon.

For the chat, the participants found themselves (using IVR) sitting quietly on a couch in an apartment holding a smartphone in the avatar's hand (in reality, the hand of the camera man with a camera fixed on his head). The participant was approached by the VP (a programmed agent) with a message. Messages faded in and the participant could choose from a variety of reply options faded into his field of vision by using the Oculus Touch controller input.

If participants agreed to a date, they briefly saw only a black screen, after which, they found themselves in front of the VP's door. The VP, played by an actor, opened the door and the story unfolded (see Figure 2). The VP asked a question, and the participant had to choose the most suitable answer from a list of faded-in options. Based on the response, the game revealed the next scene until the participant faced one of a set of possible endings.

In order to create as authentic an environment as possible, we produced the sequences of the VR–SG playing at the VP's home – a furnished apartment, which we rented for this purpose on a platform that specialises in short-term rentals. To render a lifelike experience, we filmed using a 360-degree camera mimicking the participants' point of view in conversation with the VP. The actor talked through the sequences with the team (directors) and rehearsed them (see Figure 3).

As we were aware of the possible side effects of full immersion in VR, such as motion sickness/cybersickness and headaches (Davis et al, 2015), information overload, intensification, and problems with re-entry when taking off the head-mounted displays (Behr et al, 2005), we were sensitive to the well-being of participants and took the following precautions: (1) the game's duration was limited to a few minutes to keep participants' exposure to full immersion short; (2) the entry phase of the game showed neither movement nor action to allow participants to look around and get accustomed to the IVR; (3) the scenes were realised without the camera moving to prevent motion sickness; and (4) the participant had only one (virtual) counterpart for the duration of the game, and no other action took place. The production of the video material was completed in two days. Each sequence from the nine storylines was recorded several times. The most suitable material was then selected and loaded onto a custom-built game engine in Unity[3] and assembled into a game in VR. For the display, we choose Oculus Quest 2, which is a consumer-ready, standalone head-mounted display allowing full immersion. Due to the limited performance of the native video player on Oculus Quest 2, to play the video on a specific timestamp upon request, we chose to stream the videos from an external source via an active high-speed Internet connection. We observed that this solution has been the most productive and best-performing method for the user experience and usability.

We pre-released the VR–SG on the Oculus Rift and tested and improved the flow of the game in a series of test rounds. We then conducted a usability experiment with five MSM. We checked whether the instructions for participants were comprehensible and complete. We checked the game regarding the connectivity

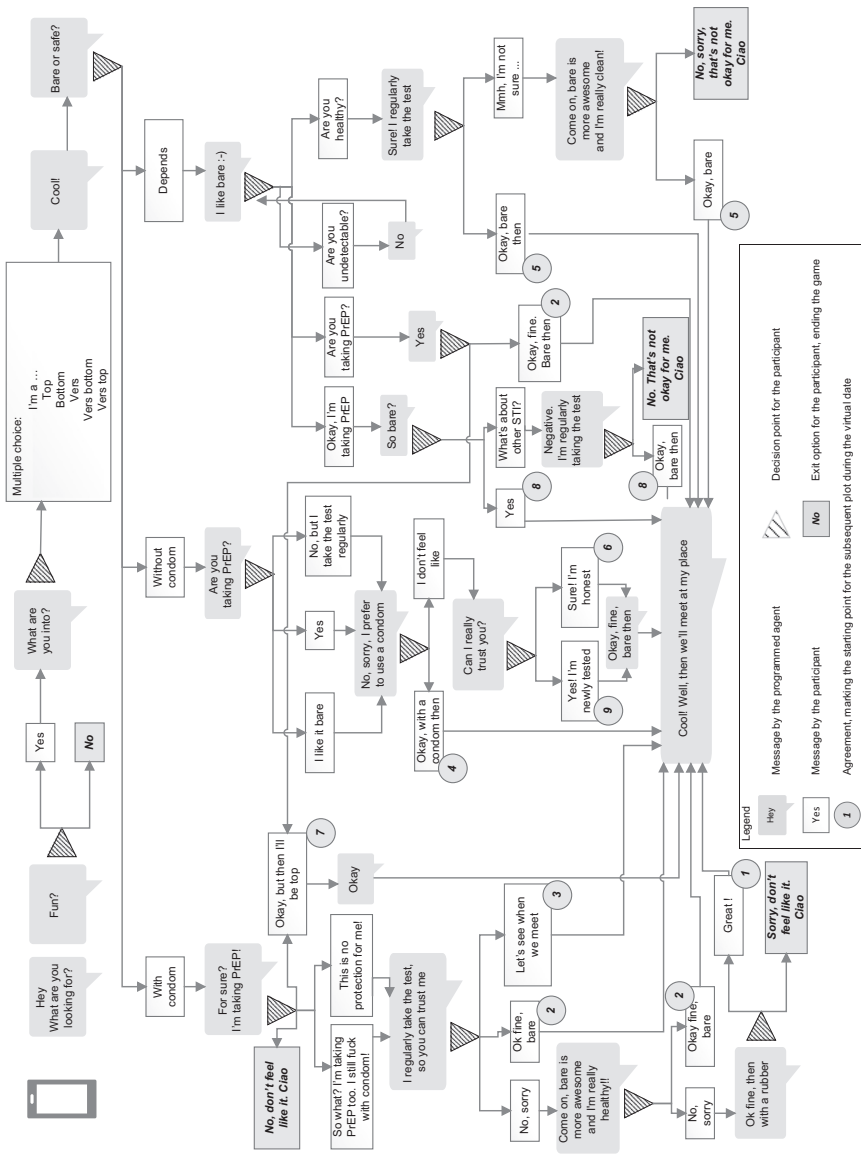**Figure 1: Example of a Petri net structuring the VR-SG, 'The chat'**

Figure 2: Snapshots from the VR-SG interaction (the actual gameplay)

Chat

Date

Note: Based on the chosen answer, the next scene in the conversation is revealed.

and technical reliability of the display in an interview situation, the flow of the game, the realism of the story, the match with the culture and experiences of MSM, and the participants' well-being. We made adjustments accordingly and finalised the VR–SG for the research project. Lastly, we implemented a default workflow that mirrors the participants' view in VR on the interviewer's smartphone, using

Figure 3: A 360-degree snapshot from the VR-SG (not the actual gameplay)

Note: The image highlights all possible viewpoints (for the actual gameplay view, please see Figure 2).

the Oculus App to monitor the participants' moves through the game during the interview session.

The development of the game was an interdisciplinary team effort. The principal investigator and a research fellow, both trained social workers, were responsible for the content of the game. An expert in VR was responsible for conceptualising and directing the videos, devising the technical aspects, and developing the game. Further, we relied on the skills of a professional theatre actor to write the final script and act in the scenes. A specialist in camera operation and set design assisted the production on site, and a software engineer supported the finalisation of the game. The revision of the gameplay and the usability experiment were in the hands of three research fellows, two of whom were trained in social work and one in psychology.

Use of the VR-SG

In the main study, we implemented a maximum-variation sampling strategy (Patton, 2002). From May 2021 until June 2022, we approached MSM through various communication channels. This included addressing them on the two most frequented dating platforms in our country (PlanetRomeo and Grindr). We gathered a sample of 24 MSM who declared that they were HIV-negative. This sample was characterised by a great degree of heterogeneity in terms of demographic characteristics (age, education, employment, economic sector, income, place of residence and migration background), sexual orientation (gay, bisexual), sexual practices, experience with substance use during sex ('chemsex') and experience of sex in saunas. We informed potential participants verbally and in writing about the study, and asked for their informed consent. The information made clear that we would ask them to play a VR-SG. For data generation, we conducted semi-structured in-person interviews (again, problem-centred interviews [see Witzel, 2000; Witzel and Reiter, 2021]), in which we integrated the VR-SG. In the first phase, we opened the interviews with a narrative interview phase, explored the topic further based on semi-structured

guidelines and asked ad hoc questions. The second phase consisted of the VR–SG. We opened this sequence with the invitation to participate in the game. We informed participants that the game would be on negotiations and, depending on their choices, would include two scenarios: a chat and an in-person date. We explained that they could stop playing at any time without any consequences if they did not feel comfortable. Then, we instructed them on the use of the device. The game took approximately seven minutes to play.

In the subsequent third phase, we encouraged the participants to share their reflections on their interaction in the game and elaborate on converging or diverging experiences in their own lives. Depending on the participants' elaboration, we prompted them using such questions as, 'Have you ever experienced a situation like this?', and in cases where the participants were reminded of a similar situation, a question could be: 'How did you navigate the situation then?'

As we let the participants choose the location, we conducted the interviews at the participants' homes, in hired meeting rooms or at the university. The interviews were recorded and transcribed verbatim. Data were analysed using open and axial coding (Strauss and Corbin, 1996; Oktay, 2012; Strübing 2021).

We identified a range of 17 negotiation strategies used by MSM to motivate their non-steady partners to pursue their HIV protection strategy and (partly overlapping) eight strategies to assure their protection from other STIs. These strategies can be grouped into three categories: subject–centred strategies (such as making explicit demands); strategies leveraging sexual arousal (such as seduction); and strategies centred on risk communication (such as calming the partner). Further, we identified actions taken by MSM to end negotiations that did not fit with their aims and to break off interactions.

Our experience

We included the VR–SG in 24 in-person interviews. In what follows, we report on what we experienced in this series of interviews. We organise them around three aspects: (1) feasibility; (2) effect on data generation; and (3) issues and limitations.

Feasibility

In the recruitment process, some participants contacted us at their own initiative. They had learned about the project via flyers, advertisements and the project's website. Through all these channels, we conveyed the information that the interview included a VR–SG. For these men, the game was apparently not an obstacle to coming forward for an interview. The men who responded to our message on the dating platforms were also willing to participate in the game. The enthusiasm of the respondents for this element of the interview may have varied. However, the game was never mentioned to us as a reason for refusal.

The VR–SG was successfully integrated into the interview guidelines. We initiated the interview with open questions, prompting free narratives, and elicited further details and episodes using open questions. We thereby provided room for the participants to present their thoughts freely, make associations and recount their memories. The interview followed their narratives and made it possible for them to develop their subjective 'relevance structure' (Schütze, 1976). The game came next

and was introduced when the interviewer perceived that the main topics had been exhausted. The game in itself was not a test but, instead, an additional focus, with the aim to boost further elaboration of the topic (negotiations) and lead to new eliciting open questions, again giving room for elaboration according to their relevance structure. Therefore, the game did not violate the principles of qualitative methodology (for example, research as a communication process, the process character of research and subject, openness, and flexibility) (Lamnek and Krell, 2016).

During the interview, none of the participants showed reluctance or inhibitions regarding engaging with the VR–SG. No comprehension questions arose, either before or during the game, and participants were able to handle the control stick without problems.

The participants got involved in the game and accepted a date with the VP (actor) even if he might not necessarily or explicitly match their personal preferences in men. They were still willing to play the game and were open and cooperative. We interpret this willingness to cooperate as a result of the rapport built between them and the interviewers during the recruitment process and the first interview phase.

The use of the VR–SG needed specific preparation before the interview beyond the usual procedure. The Oculus Rift had to be turned on and connected to the Internet, and the VR–SG made ready for its start during the interview. When the interview took place at the participant's home, the preparation had to be done quickly and potentially while being observed by the participants. This could increase the stress levels of the interviewers. Therefore, preparatory training in general and monitoring before the specific interview were important.

We learned that the game took approximately seven minutes. This was compatible with an overall interview duration ranging from 44 minutes to 94 minutes.

After playing the game, we asked the participants how they felt. We received no report of motion sickness/cybersickness, and we did not record other negative effects or problems with re-entry.

Effects on data generation

The game functioned like a focus or a vignette introduced during the interview. Although it was a digital (that is, technical) element, the VR–SG did not seem to undermine the basis for a qualitative interview: communication was maintained; the positive, trusting relationship that had developed up to that point was continued; and the openness of the participants was not diminished. Rather, the opposite was the case: after the game, some participants seemed even more open to sharing their experience.

In line with our expectations, the VR–SG prompted some participants to elaborate their lived experiences more extensively and in depth. They recalled episodes that they had not mentioned before the game and *complemented* their narratives from before. Nestor[4] may serve as an example. Commenting on the interaction in the VR–SG, he gave insight into how it comes about that relationships evolve and men he met as casual partners become regular non-steady partners (he called them 'fuckbuddies'). This led him to elaborate about trust, which is important to him in this context. He explained that trust may evolve and can sometimes lead to him giving oral sex without a condom. He stated that he would never have condomless oral sex with a man on a one-time encounter. In contrast with regular partners, he does not have

a relationship of trust with casual partners, whom he considers to function as 'sex objects' (Nestor, 266)[5].

Some participants brought up *new topics* and addressed *episodes not mentioned* before. One example is Fabian. When commenting on his interaction in the game, he tried to explain why he had discontinued the chat conversation with the agent who did not quickly conform to his wish to use condoms. He explained that he finds it disrespectful when his counterpart persists in trying to persuade him. He went on to say that he concluded from this that the sex on a date would not be good either if the communication was not already good. Thus, new topics, such as the role of communication, the expression of respect and his conception of 'good sex', came up in the interview (Fabian, 194–200).

The game also prompted a narrative about an experience he had had in a sauna several years previously. He remembered that an anonymous partner had suddenly and without warning penetrated him without a condom, which was something that he could not have imagined until then (Fabian, 114). The reflection on the game provided the opportunity to go into detail for the first time about an experience in which he could not use his usual negotiation strategies. Until then, he had presented himself as a consistently competent, successful negotiator.

The transition to the game was accompanied by a change of rhythm. The interviewer gave the instructions for the game and the participants changed chairs and put on the Oculus Quest 2. After the game, they put down the device and returned to their former seat and original position for the interview. This transition, where there was no conversation between interviewer and interviewee, seemed to bring a change to the room, for example, we observed that the atmosphere became less formal after the VR–SG: Pio yawned and stretched while taking off the head-mounted display. In the continued interview, he answered in a more relaxed way than before the game. After the VR–SG, he seemed to be even more communicative than he was before it (Pio, 322). The relaxing effect may have been an important factor facilitating the increased openness we reported earlier.

Issues and limitations

We found that the advantages of the VR–SG did not emerge among MSM who were not familiar with the scenario in the VR–SG. Our game covered only one specific scenario: dating online and meeting at the VP's home. This did not correspond to the experience of all participants. MSM who mainly seek contact in saunas, did not see their reality represented.[6] The experienced mismatch underlines how important it was for our project to: (1) involve the MSM in a story that, at least in terms of the setting, corresponded to their experience; and (2) take on the effort of conducting eliciting interviews before the development of the game.

As mentioned earlier, the plots were arranged in such a way that, in some instances, the VP challenged the participant to abandon his personal protection strategy. It may be that such negotiations resulted in predominantly salient experiences being recalled and reported after the VR–SG (Anderson, 1983). However, since we were primarily able to elicit accounts of routine situations and smooth negotiations during the interviews, it seemed expedient to trigger memories of challenging negotiation situations.

We also experienced some technical issues. Using Oculus Quest 2 required a fast and stable wireless Internet connection. While this was guaranteed for interviews conducted at the university, connectivity could be a problem on other sites. On three occasions, the VR–SG did not work. This is not a problem inherent in VR. The video files needed to be streamed online due to the limited performance of the native video player on Oculus Quest 2. The use of a more powerful head-mounted display or a better-performing native video player update would have allowed the implementation of the VR-SG independently of an Internet connection.

The VR–SG strengthened participants' emotional and social involvement. This became evident, for example, when participants commented that the VP had come uncomfortably close during the game.

The relatively small number of interviews including the VR–SG (24 in total) limits our experience.[7] We think, an inquiry into the effects of a VR-SG in a qualitative in–person interview would be worth a study in itself.

Summary of experience from the present project

The use of a VR-SG proved feasible. It integrated well with qualitative in–person interviews and was well accepted. It was productive, as it enriched data and provided more in–depth insights into participants' interactions and underlying dynamics. When designing the game, it proved worthwhile to explore the lifeworld of the targeted participants in order to design scenarios corresponding to their experience. A wider selection of scenarios could cover a wider range of participants. Lastly, the production of a VR-SG is time-consuming. Nevertheless, the effort involved was rewarded by the results. However, it would have been worth investing in a developed solution without the dependence on Internet connectivity.

Ethical considerations

The general principles of ethics – beneficence and non-maleficence; fidelity and responsibility; integrity; justice; and respect for people's rights and dignity (see, for example, APA, 2017) – also apply to research using IVR. However, the option of immersing the participants and creating a presence make it necessary to carefully adapt these ethical principles to the possible effects of IVR. It is suggested that the use of IVR does not require a specific code of ethics but, rather, an adaptation of the existing codes (Behr et al, 2005; Hammersley, 2016). Researchers have to consider that just as real experiences have after-effects, virtual experiences may cause after-effects too (Slater et al, 2020: 5). The following points should be explored further.

After appropriate participants have been recruited, they should be instructed and prepared for what they will experience during IVR exposure in terms of both the content presented and observed effects, such as motion sickness (see, for example, Stanney et al, 2003), information overload and possible difficulties re-entering the real world (Behr et al, 2005; Slater et al, 2020). Participants should be enabled to make a well-informed decision as to whether they are ready to participate and if they can handle the cognitive processing, emotional coping and technical aspects of the content presented (Behr et al, 2005; Slater et al, 2020). Participants should also be informed that they always have the possibility to drop out of the game and be told how to withdraw (Pan and Hamilton, 2018). It is important that the participants know that

they, as users, are in control. In the VR–SG presented here, participants always had the option to exit the game by clicking on a corresponding answer, and we did not observe any difficulties in the transition from VR to the real world.

In general, as a stepwise adaptation to IVR (Adhanom et al, 2022) (which is possible in specific experimental research environments) is not feasible, it is recommended that self-movement through virtual realities takes place at low speed, as the speed at which objects move through a scene is related to the occurrence of motion sickness. This also applies to unexpected and surprising movement manoeuvres, and to unforeseen events, such as visual frights that participants do not expect and were not informed about (Behr et al, 2005). Something similar could be observed with Jan, a participant who was surprised that the game was "suddenly" finished (Jan, postscript).

However, as in traditional social research, there are research topics and questions that potentially carry an inherent risk of exposing participants to negative experiences or content that cannot be fully purged of problematic aspects (Behr et al, 2005). As described earlier, we designed our content carefully, based on findings from exploratory interviews. Nevertheless, we could not prevent Aaron, a rather sexually inexperienced 21-year-old who chose to exit the VR–SG during the chat, from feeling overwhelmed by the VP's attempts at negotiation (Aaron, postscript).

Immersive VR–SG can trigger positive and negative physical, emotional and cognitive after-effects, and lead to a form of loss of control. As mentioned earlier, the intensity of the possible experiences that virtual environments can evoke suggests that the nature and explicitness of the content that study participants are confronted with should be carefully considered in the design. In terms of the nature of the content, if possible, all representations that could evoke 'negative' emotions, such as fear, disgust or anger, should be avoided (Behr et al, 2005). Further, in IVR, it is possible to depict situations that could cause psychological harm (Behr et al, 2005). In this respect, regarding social work research, it seems to us to be imperative that researchers consider the risk of experiences of revictimisation.

When designing our VR–SG, we took precautions to avoid revictimisation. The response options were designed in such a way that participants could agree or disagree with the VP's proposals and arguments at any time. Their agency was thus preserved, and insisting on their opinion and acting according to their needs was possible throughout. In the case of hardened dissent, the game ended and the players did not experience victimisation. They always encountered the VP directly in the form of an anonymous interlocutor in the chat or as a human agent portrayed by the actor. As mentioned earlier, two participants were reminded of a past experience of unwanted condomless penetration (Fabian, 218–21; Otis, 126–38). Another participant remembered a sexual encounter where the partner did not want to stick to the previously agreed practices and how he got out of the situation, which he experienced as an assault (Gregor).

Regarding the risk of revictimisation, when designing and implementing the IVR, it could be worthwhile to consciously pay attention to how participants are confronted with the events in the game. The participants do not need to be involved in a direct interaction with the agent. They could also be given a position as a bystander or an observer with a bird's-eye view, both of which are less confrontational.

Madary and Metzinger (2016) highlight the importance of selecting subjects for VR experiments with special care. At the same time, they point to the fact that methods for pre-screening for individuals with high-risk factors and a set of exclusion criteria must be developed incrementally. Beyond this, we think that there should be a discussion

about whether there are research topics where the use of VR should, in principle, be avoided as a precaution against revictimisation. For example, consideration could be given to refraining from using IVR in studies on experiences of violence (including domestic violence or intimate partner violence).

Further reflection is needed, as there are still many unanswered ethical questions in research using IVR (Maloney et al, 2021), not least because of the lack of information on the short- and long-term physiological impacts of VR (Madary and Metzinger, 2016). However, even if there is a specific code of ethics for research using IVR one day, it will not be a substitute for ethical reasoning by the researchers. In this situation of uncertainty, to guide their action when designing IVR research content on negative, even revictimising, experiences, the researchers could ask the question: 'How will a user respond to unforeseen trouble?' (Kenwright, 2018: 23).

Concluding reflections on the potential of VR for qualitative social work research

In the project that served as a testing ground, we integrated virtual features into data generation in a qualitative research process. It takes just a further step in a direction that could provocatively be called the 'digitalisation of qualitative research'. The use of IVR in our study is certainly only a first, even tentative, step towards the use of virtual features in data generation in qualitative research. A farther-reaching, more sophisticated use of IVR in data generation may be possible; the use of IVR has become feasible because head-mounted displays have become affordable (Cipresso et al, 2018). Our initial experience shows that this technology can be integrated into qualitative research without undermining the basic assumptions of this methodological paradigm and that it is accepted by participants. Drawing on our experience and abstaining from fantasies, we generally attribute to IVR the potential to enrich data generation in qualitative research and, specifically, in social work research.

IVR can create participants' immersion and the effects of presence for the purpose of data generation, promises to prompt more genuine responses and richer and more valid data, and thus ultimately promises to further understanding in areas that are otherwise difficult to access, for example, because the effects of social desirability are in play or the thoughts, emotions and actions that it is about are burdened with shame or in conflict with social norms or legal regulations – all of which are to be found in social work research. From our perspective today, the use of IVR seems to have the potential to open new perspectives, enlarge the epistemic possibilities and complement the extant range of acknowledged qualitative methods used to investigate verbal and non-verbal *communication* and *interaction* processes, both on an interpersonal and a group level, including *group dynamics*, perceptions, definitions of situations, attributed meaning, intentions, factors influencing decision making and, finally, action. It could provide insight into dynamics, mechanisms, processes and experiences, in particular, in complex, dilemmatic, stressful or overwhelming situations, as well as experiences of discrimination, intimate interactions or behaviour that conflicts with social norms and that may be burdened by shame. It also holds promise for the investigation of interactions in the field of professional action, such as professional communication, interaction, decision making and both intra- and inter-professional teamwork.

At this early stage of development, we see the field of application of IVR in qualitative research primarily in interview research. We suggest considering the use of

IVR when designing studies that traditionally rely on focused interviews (Merton and Kendall, 1946; Reiter and Witzel, 2021). IVR could serve as a valuable complement or substitute for such foci as documents, pictures or videos. Another primary use of IVR is most likely to be vignette studies. IVR allows the researcher to place participants in many different, complex, lifelike situations that can be easily controlled by the researcher. It simulates presence and can replace written vignettes (van Gelder et al, 2014). In ethnographic approaches, VR can be used for go-along interviews (Vindenes and Wasson, 2021), as mentioned earlier, and given the advantage that it can simulate interactions, it can also complement institutional ethnography (Nadai, 2022).

Thus, according to our concept of the subject matter of social work research (Gredig et al, 2012), we can imagine the use of IVR in research exploring both social problems and the complexities that service users navigate, contributing to an expanding 'knowledge of understanding' (Gredig and Marsh, 2010), as well as in the investigation of professional action. It is not our intention to present VR as a one-size-fits-all data-generation method. As with any methodology, the use of VR has to be justified in terms of epistemology and ethics. Given the effects of immersion and presence, the use of VR should be well reflected upon regarding possible harm to the participant. Interviews may be reason enough to trigger a flashback, for example. The potential for negative effects might be higher when VR is used. Therefore, the use of VR is not recommended when there is a possibility that it could trigger negative, traumatising experiences from the participants' past, such as victimisation. Thus, researchers using such digital features as VR should always consider the specificities of this technology in their ethical reflexion.

Certainly, a further 'digitalisation' of qualitative research should be accompanied by systematic methodological *and* ethical reflection, both in general and within social work research. Beyond this, we would like to see a rise in systematic research on the use of digital features in qualitative research and the effects of digital practices in this research methodology.

We are not concerned with assigning a leading role to social work research in 'digitalising' or 'virtualising' qualitative research. However, it could be considered desirable for social work researchers to keep pace with technological developments and the integration of digital, that is, virtual features into qualitative research. Researchers today are used to making informed choices from a range of analogue methodologies with respect to a specific research subject and question. In the same way, in future, researchers should also become used to considering the epistemological potential of the inclusion of virtual features on a case-by-case basis. In the education and training of social workers, digital offerings, ranging from digital communication and virtual collaboration platforms to sophisticated VR training applications, have made inroads – not least accelerated by the COVID-19 pandemic (Huttar and BrintzenhofeSzoc, 2020; Jefferies et al, 2022; Lanzieri et al, 2021; Roberson and Baker, 2021). In direct practice, digital media are increasingly being used and conceptually framed. The potential of social work interventions based on VR applications has been spelt out (Trahan et al, 2019) and made available, especially for interventions on mental health and substance abuse issues (see, for example, Bordnick et al, 2012; Meyerbroker and Morina, 2021; Schroeder et al, 2022). In the same way, VR could be used in social work research and, specifically, also in qualitative research in social work.

It is our view that qualitative research in social work should use these digital features if they promise an advanced understanding of social complexities and how people try, and can be supported, to maintain or regain a self-determined life conduct in these conditions.

They should also be used if they provide additional opportunities to understand the interactions between professionals and service users, as well as factors influencing professional decision making, and if they provide deeper insights into 'mechanisms' (Westhorp, 2018) that are effective in social work interventions. In summary, when employed judiciously, VR applications could be considered to offer a way to strengthen the knowledge base of social work, and the potential of VR should be leveraged.

Notes

[1] As Ekström (1992: 107) put it, social actions 'arise out of the complex interaction of internally related mental dispositions, meanings, intentions, social contexts and structures', or, in other words, form perception, comprehension, definition of a situation, related meaning (sense) and intentions.

[2] A complex theoretical framework developed drawing on robust empirical studies is the AIDS risk reduction model (Catania et al, 1990). Among the empirically well-bolstered theoretical models are the theory of planned behaviour (Ajzen, 1985; Armitage and Conner, 2001) and the information–motivation–behaviour skills model (Fisher and Fisher, 2002). The concept of structural prevention focuses on the impact of macro-level factors on individual decisions and behaviour (see Rao Gupta et al, 2008).

[3] Unity is an industry-standard real-time 3D development platform for professionals to create interactive experiences and games.

[4] Names are pseudonyms.

[5] References to interview data include interviewee's pseudonym and the number of the section in the verbatim transcipt in Atlas.ti.

[6] The original plan was to produce a second scenario that would have been set in a different context, specifically a sauna, where MSM meet for sex on the premises. However, given the effort needed to produce more scenarios and the limited funds available, we decided against designing another storyline, accessing the difficult-to-procure location and producing more scenes on site in a group in the middle of the COVID-19 pandemic (in November 2021).

[7] This is due to the fact that we explored the use of the VR-SG in the framework of a research project with its own purpose and a corresponding design defining the number of interviews.

Ethics
On formal request BASEC nr Req-2019-00648, the competent ethics commission, Ethikkommission Nordwest- und Zentralschweiz, declared on 15 August 2019 that, according to Swiss law, the research project on which this article is based did not require further formal ethical approval.

Conflict of interest

The authors declare that there is no conflict of interest.

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