

AUTHOR COPY

To cite this article: Tawfik, R., & Harley, D. (2025). From the comfort of home: Examining consumer virtual reality use in the home. *Digital Creativity*, 1–20. DOI: 10.1080/14626268.2025.2543452

To link to this article: <https://doi.org/10.1080/14626268.2025.2543452>

From the comfort of home: Examining consumer virtual reality use in the home

Reem Tawfik and Daniel Harley

Stratford School of Interaction Design and Business, University of Waterloo

ABSTRACT

Despite the hype that has driven mass-market consumer virtual reality (VR), research relating to the at-home use of these technologies is underexplored. The contexts, responses, and experiences of people who use VR offer insight into the ways that VR is becoming a domestic technology. Applying methods drawn from digital ethnography, our research asks how participants interpret their use of VR in the home, and how they integrate it into their social, personal, and material contexts. We examine data consisting of interviews, images, and videos from participants ($n = 15$) across 10 countries to begin to chart the complexities of the real-world conditions of VR. Our findings show that as these participants make efforts to creatively integrate VR into their everyday routines, the enjoyment that they describe is entwined with a variety of difficulties, demonstrating that consumer VR offloads a burden of adaptation onto the people who bring these technologies into their homes.

KEYWORDS

Virtual reality, VR, home, Oculus, Meta, metaverse

Introduction

Within a list that includes bath robes, charcuterie boards, and bracelets, Oprah Winfrey's gift guide in late 2021 included Meta's Quest 2 virtual reality (VR) headset (O Magazine 2021). The release and promotion of the Quest 2 followed a larger technological push towards consumer-grade VR development, offering 'room scale' experiences without the need to tether to a separate high-end computer. These untethered platforms would become Meta's standard format for VR: the Quest 2 was later followed by the Quest Pro, the Quest 3, and the Quest 3S. After Oprah's endorsement in 2021, the online VR news site *VRScout* described it as a 'major step forward for VR,' bringing VR 'closer to mainstream adoption' (Melnick 2021, para 4). Yet despite the hype that has been a consistent feature of VR discourse in recent years (Egliston and Carter 2022a; Evans 2018), the contexts, conditions, and experiences of those who bring VR into their homes has received little academic attention.

Examining the ways that VR affects domestic routines and spaces reflects a longer history of research into emerging technologies and their sociotechnical relationships. Across disciplines, domestic technologies have represented (re)enactments and (re)mediations of interrelated social, political, and cultural dynamics (see e.g. Cockburn 1997; Dahlgren et al. 2021; Harvey 2015; Kennedy 2005; Kennedy et al. 2015; Hargreaves, Wilson, and Hauxwell-Baldwin 2018; Silverstone and Hirsch 1992; Spigel 1992). Within these contexts, new media are said to shape (and be shaped by) the existing physical, social, and technological characteristics of the home. For a technology that is envisioned as an ‘embodied’ extension of Meta’s social media empire with multiple use cases from work to entertainment (Newton 2021), developing an understanding of how and why people use VR in the home is important, both to examine the social characteristics of domestic technologies, and to better understand how people navigate and/or respond to the challenges identified by current research. As Saker and Frith (2020) argue, as these systems integrate, recognize, and remediate physical space, there is a need to deliberately examine the physical (or ‘concrete’) reality of VR.

Applying methods from digital ethnography, we present the results of a qualitative study consisting of interviews, images, and videos from VR users ($n = 15$) across ten countries to contribute insights into the social and embodied realities of VR as a domestic technology. After situating our examination of VR in relation to prior work, we describe our approach, which is oriented around research questions that ask how participants interpret their use of VR in the home (RQ1) and how they integrate VR into their social, personal, and/or material contexts (RQ2). Our findings suggest that despite the pleasures that participants described and the creativity they showed in integrating VR into their daily routines, the challenges that they faced reveal that the technology offloads a burden of adaptation onto the people who bring these technologies into their homes. Our work begins to trace the contours of a rich area of study, identifying a need to further document the physical, social, and technological realities of VR, especially as the data capture and sensing capabilities of VR devices continue to expand.

Background

Bringing attention to the ways that VR is entering the home reflects a much longer tradition of theoretical and empirical research into domestic technologies (e.g. Cockburn 1997; Haddon 2011, 2017; Kennedy 2005; Silverstone and Hirsch 1992). New media technologies, for the brief moments that they are seen as new (Gitelman 2008), are often said to engender specific forms of change and adjustment within a home even as they replicate and/or mediate specific aspects of material, cultural, or social arrangements. For example, in Spigel’s (1992) analysis of post-World War II television use in America, the television not only reshaped how living room spaces were used, but also offered new forms of familial access to media that alternately reinforced and contested prevailing patriarchal gender roles. Importantly, the domestication of technology in these cases is characterized as an active, negotiated, and multistage process of ‘mutual adaptation’ (see e.g. Berker et al. 2006; Berker 2011). In its original articulation, the metaphor of the domestication of technology involved four stages: appropriation, objectification, incorporation, and conversion (Silverstone, Hirsch, and Morley 1992). In this view, a new technology might first be appropriated when it is purchased and brought home, then objectified as its affordances are reinterpreted by the user in relation to the physical and spatial characteristics of the home, then incorporated as it is embedded into the moral economy and

daily routines of the home, before finally undergoing conversion when the technology reflects a facet of the user's identity across broader cultures outside the home.

As 'new' digital technologies entered the home, research would continue to show a variety of adaptations, responses, and mediations. For example, in a study on the ways that the advent of personal computers affected media use, Morrison and Krugman (2001) stressed the importance of the social, familial, and domestic contexts of new media technologies. Their work describes a 'clustering' of media in the home, with a dominant technology 'anchoring' other technology in each room, playing a role in defining the functional, social, and affective qualities of that space. The authors describe how the personal computer – the new media of the time – led to new rules and new behaviours for the participants as their media use changed.

Design-related fields would also strive to situate an expanding range of domestic technologies within their social and material realities. In anticipation of the proliferation of smart home technologies, Taylor and Swan (2005) described ways in which 'people continually design, arrange and integrate artifacts' (642) into the 'artful systems' of the home, advocating for design flexibility and to intentionally consider specific social and material arrangements. Such considerations are part of a long history of research that draws attention to the lived, relational, and contradictory facets of domestic technology adoption. As Venkatesh (1996) observed in his description of the 'cyberhousehold' of the mid-1990s: 'Don't assume that what the technology can do in the household is the same as what the household wants to do with the technology' (53). A decade later, Venkatesh (2008) would theorize that new technologies would affect routines and behaviours in the home in three primary ways: by *enabling* new actions, by *mediating* new perspectives or experiences, and by *transforming* the home by reconfiguring what is included within its boundaries. Applied to a recent example, an examination of domestic technologies during the work-from-home mandates of the COVID-19 pandemic might predict uses of video conferencing technologies that *enabled* remote work, *mediating* new forms of socializing, while *transforming* living spaces into multipurpose offices and classrooms.

Alongside this rich history of theoretical considerations, the difficulties in assessing this interplay of social, material, and technological factors within the home would raise significant methodological questions. As Watson, Lupton, and Michael (2021) describe in examining what they call the 'COVID digital assemblage' of homes during the pandemic, assessing the complexities of the sociomaterial, non-digital, and other attributes of digitally-mediated homes requires an approach that is able to 'centre relationality, action and processes *in situ*' (1210). With this goal, the authors draw on theorizations of relational assemblages as well as on Richardson's (2011) emphasis on the social, spatial, and embodied 'choreographies' that people develop with increasingly mobile and pervasive forms of digital technology in their everyday lives. Identifying these types of constituent factors is a focus of digital ethnography more broadly (Pink et al. 2015) and are a key focus of methods that strive to capture the sensory and embodied interplay of technology use alongside other home routines and practices (e.g. Pink and Mackley 2012; Pink et al. 2020).

For VR research specifically, although there is a lack of research into *in situ* and in-the-moment practices and experiences, some of the most direct examinations of the real-world contexts of VR have relied on data gathered from social media. For example, Dao et al. (2021) use YouTube

videos to analyze ‘VR fails,’ i.e. instances in which people collide with others, or fall, or otherwise harm themselves or their property while wearing a headset. Similarly, Harley and MacArthur (2023) examine visual data showing VR play spaces shared on Reddit, which reveals a variety of spatial arrangements and several possible impediments to play. These real-world contexts and barriers to VR adoption can be contrasted with how companies present the idealized set-up for VR in the home. Gilmore and Blair (2024) argue that Meta’s official set-up tutorials demonstrate a domestication of VR that reveals classist and ableist assumptions about how users are expected to play alone within empty, open spaces that have been reconfigured for VR use. The authors supplement their analysis with counterexamples drawn from YouTube, where users are actively ‘developing workarounds and forcing these systems to accommodate their bodies and experiences’ (746).

Other recent research on VR offers additional areas of interest that are likely to impact domestic VR, including examinations of VR content (Leotta and Ross 2018), examinations of problematic discourse (Nakamura 2020), examinations of harmful, abusive, or harassing behaviour in virtual spaces (Blackwell et al. 2019; Freeman et al. 2022), barriers to widespread use, including the need for improved accessibility, affordability, and more equitable design (Gerling and Spiel 2021; Pimentel et al. 2021), and examinations of the political economy of VR as a platform (Egliston and Carter 2022c). Whether openly discussed or not, the domestic context is implicated across these areas of research. For example, Egliston and Carter (2022b) mention the home in their examination of the expanding data gathering and sensing possibilities of mobile VR, writing that the headset is ‘a data intensive digital sensor that is increasingly (and uncritically) taken into our homes’ (3). Such observations have both practical and theoretical implications. As Saker and Frith (2020) argue when conceptualizing what they term ‘coextensive space’, enabling this kind of spatial tracking for headsets like those released by Meta means that physical realities are not only enmeshed in the virtual, but also incorporated into the virtual through features like ‘passthrough’ and the ‘boundary’ system that is intended to keep players within a ‘safe’ play space.

Work by Green et al. (2021) is perhaps most closely related to our own study in that their study of VR experiences is deliberately situated in the home. The authors describe a longitudinal study (10 weeks) centring on 14 households in the UK to examine responses to non-fiction VR experiences. The researchers provided these households with portable VR headsets with curated content, noting that the home offers insight into contemporary VR as it is where ‘traditional media reach their widest and most diverse audiences, and where other media – and other distractions – compete for attention’ (6). While their participants showed enthusiasm, there were concerns related to the headset and its use, and some felt that it was less social than gathering around a television. These results not only offer a reminder that the television continues to hold ‘material and symbolic’ significance in the home (Morley 2000), but also that the social and physical dynamics of VR devices are likely to have an impact on how these technologies are used and understood. Even as the study we present in the following sections offers distinctions from that of Green et al. (e.g. we do not limit our examination to non-fiction content or to first-time users), examples like this offer a reminder of that a primary contribution of such research is in documenting the early moments of new media technologies: articulating the choices, experiences, effort, and difficulties involved in bringing new technologies into the home. We

therefore take up this call to better understand how VR is envisioned as it ‘competes for attention’ within the complex sociotechnical dynamics of the home.

Methodology

As design researchers became increasingly interested in the mundane qualities of domestic spaces to better integrate technology into everyday life (e.g. Bell, Blythe, and Sengers 2005; Crabtree and Rodden 2004; Dourish and Bell 2011), examinations of emerging technologies adapted ethnographic and anthropological lenses to better interpret the social, material, and technological cultures of the home (e.g. Horst and Miller 2012; Pink and Mackley 2012; Pink et al. 2015). The home in these cases is understood to be a site that is dynamic and expressive, producing and reproducing social relationships, and offering insight into broader social realities (Miller 2001). As described in the previous section, technologies in the home are entangled within these connections and relationships. As Horst (2012) describes, the use and interpretation of new media technologies, whether referring to the radio, or television, or access to online participatory cultures, affects the social and material arrangements of the home while also blurring lines between public and private and/or between work and leisure.

Drawing on these perspectives, we rely on digital ethnographic methods (Mitchell et al. 2015; Pink et al. 2016) and studies that focus on the everyday use of domestic technologies (e.g. Pink et al. 2016), to examine VR use in the home. Given the many possible areas of interest within this underexamined space, we narrow our focus by foregrounding the contexts, responses, and experiences of people who use VR in their home. Our research questions are: *RQ1: How do participants interpret and/or describe their use of VR in the home?* and *RQ2: How do participants integrate VR into the social, personal, and/or material contexts of the home?*

Study design

The core elements of the study consisted of a demographic questionnaire using Qualtrics followed by a 60-minute semi-structured interview and demonstration session conducted remotely via Zoom. We chose an online format to ensure that we could recruit as widely as possible, rather than limit recruitment to our geographical region. When applicable, digital ethnography combines more common methods like interviews and observation with methods that put data collection in the hands of the participants. For example, in their study on technology use and energy consumption in the home, Pink and Mackley (2012) describe the ‘collaborative video tour’ interviewing method in which participants share their ‘routines of making, maintaining, experiencing and knowing’ (2) by recording themselves, and/or by giving a verbal walk-through of their experiences. An important goal of this method is to capture details about sensory and embodied characteristics of technology use, including the potentially mundane or everyday aspects of those environments.¹ Part of our study design work was to adapt these methods for an online context, asking participants to show their space using their webcam during the interview: each participant was asked to guide the researcher through how they set up their VR equipment (e.g. what room did they choose and why, were there challenges that they faced?). At the end of the interview, participants were encouraged to take pictures of their VR set-up to send to the researchers as an opportunity to supplement (and more directly participate in) our data collection. This resulted in an additional 26 photographs and 2 videos for our analysis. Taken together, these methods are an attempt to better understand participants’ everyday practices and routines, allowing several opportunities to articulate what might otherwise be tacit aspects of their VR use.

Recruitment strategy, study procedure, and demographics

We recruited fifteen participants in two phases after receiving ethics clearance from our university. Our inclusion criteria required adult participants who own consumer-grade virtual reality equipment, and who were at least occasional users of the technology (i.e. they had used it in the last month). Participants were also required to have access to a stable internet connection to engage in the remote interview, remote observations, and other methods that required video recording over Zoom. We began recruitment within our local context (mailing lists at a North American university), but cognizant of current challenges recruiting diverse participants in VR research (see e.g. challenges described in Blackwell et al. 2019), we also targeted specific online groups dedicated to (or related to) virtual reality on Facebook (e.g. Women in VR, Educators in VR, Women in Immersive Tech). Targeting groups like Women in VR was an attempt to ensure more equal representation and more international representation. Our inclusion criteria specifically did not restrict participation based on the participant's country of residence as an attempt to begin to reflect the global reach of VR technologies. This first phase yielded 8 participants. Although we were successful recruiting international participants, our first round of recruitment failed to yield a balanced sample despite repeated attempts. To balance our sample, we used Prolific for our second round of recruitment, which resulted in an additional 7 participants. Our stopping point for data saturation occurred after the second round, when our initial coding did not produce additional categories or themes for analysis (see data analysis below for coding strategy).

Seven of the fifteen participants identified as men, seven identified as women, one identified as genderqueer/non-binary/transgender. The fifteen participants were recruited from ten countries (USA, Canada, Mexico, UK, Belgium, Portugal, Greece, South Africa, India, and Australia). The devices included two HTC Vive headsets, several Meta headsets (the Quest, Quest 2, and Rift models), and four participants used headsets powered by a smartphone, like Samsung's Gear VR. All but one participant said they own their VR headset, with this participant having access through work but who used it for personal purposes. The most frequent use was daily, while the most infrequent use was once every other month. The average length of ownership was three years, with a range of six months to 12 years (only one participant reported owning and using VR for 12 years; the range of time of ownership for the other participants was six months to six years). Table 1 provides an overview of the participants in the study.

Table 1. Participant demographics and reported frequency of VR use.

Participant	Age (years)	Gender	Country	Frequency of use
P1	25	Male	Belgium	Every other day
P2	37	Male	UK	Daily
P3	42	Male	India	5–6 times a week
P4	48	Female	Canada	Daily
P5	47	Male	US	3–4 times a week
P6	46	Male	Australia	Daily

P7	57	Female	US	Several times a week
P8	42	Male	Greece	3–4 times a week
P9	24	Genderqueer	US	Weekly
P10	25	Female	Portugal	1–2 times a week
P11	31	Female	South Africa	1–2 times a month
P12	22	Male	South Africa	Infrequent
P13	22	Female	Mexico	Infrequent
P14	52	Female	South Africa	Weekly
P15	34	Female	UK	1–2 times a week

Data analysis

Drawing on a constructivist grounded approach in which the researchers are guided by prior knowledge of ‘sensitizing concepts’ (Charmaz and Belgrave 2012), we compiled a preliminary list of expected higher level codes prior to beginning the data analysis. These initial codes were derived from the interview questions and open-ended prompts, and would guide the initial coding of responses. New codes were added after a first pass of the transcripts and video files, leading to the development of a final coding scheme that the authors used when independently assessing the data. Coded transcripts were then compared and discussed to develop categories and themes for further analysis. While watching the video recordings, the researchers also took screenshots of the depictions of space, and we combined these images with any images that the participants sent after the interview sessions. Below, these images are labelled ‘screenshot’ for those that the researchers captured, and ‘curated image’ for those that the participants captured. Although we did not observe significant differences based on demographics in this study (and therefore avoid more targeted demographic analysis below), we do anticipate that areas such as gender, age, geographical region, socioeconomic status, and differences in household types (e.g. single family, multigenerational, etc.) are likely to be crucial areas for future research (see e.g. Helsper 2010).

Results

In this section, we rely on a combination of interview responses, remote video tours, and photographs provided by participants showing the physical spaces in which they use VR. To answer RQ1, we begin by analyzing how participants interpreted and/or expressed their use of VR in the home. To answer RQ2, we look to the ways that participants integrated VR into their social, personal, and material contexts of the home. While there are necessary overlaps in the following subsections, the first foregrounds the multifaceted challenges that participants faced and how those challenges were (or were not) addressed, and the second subsection foregrounds participants’ creative strategies in integrating VR into personalized routines, and how VR is embedded within everyday activities and environments. Throughout, we contend that incorporating VR into the home requires specific adaptations to accommodate the material realities of VR alongside the embodied, personal, and social characteristics of the home.

The pain and pleasure of VR in the home

A VR device that offers ease of use would be one in which any required actions are comprehensible, uncomplicated, and safe for as broad a population as possible. No such device existed for our participants. Instead, our participants described challenges when initially learning to use their device, challenges finding places in the home to use VR, and challenges in maintaining their spatial orientation, or physical safety in VR. Yet many of these challenges were dismissed. For P3, who used VR almost every day, there was a need to ‘get used to it’: ‘When I first got the headset, I would draw a small circle right around where I was standing, then I would go out of the boundary and be able to see my room. So, then I started drawing a larger boundary to the full room basically. And the room has a lot of furniture and a lot of tables, and there are moments where I really hurt my knee, but it happens, and you get used to it.’ P4, who used her headset primarily for exercise, said, ‘You need space and to respect the environment you’re in. I’ve broken but was able to fix my controllers after hitting them on the wall.’ None of these challenges prevented further use. P9, who described navigating similar difficulties said, ‘It’s all preparation.’

In addition to efforts to mitigate the discomfort of the headset, participants showed that preparing for use required ad-hoc efforts to push furniture aside and/or looking for more immediate and opportunistic uses of available space. Although all participants noted various uses for their devices, including gaming, virtual travel, exercise, or social activities with strangers and distant family members, the physical effort in preparing their space affected what kinds of experiences were possible. After the interview, P15 shared images of the two places where she uses VR, showing different views of the living room and her bedroom (Figure 1). Because she wears glasses, she described the ‘uncomfortable feeling of wearing glasses on glasses; it’s like double glasses!’ and the discomfort of the headset, tightening the straps to put all the pressure on her forehead (which would later hurt) to alleviate the pressure elsewhere. This pain caused her to avoid longer play sessions.

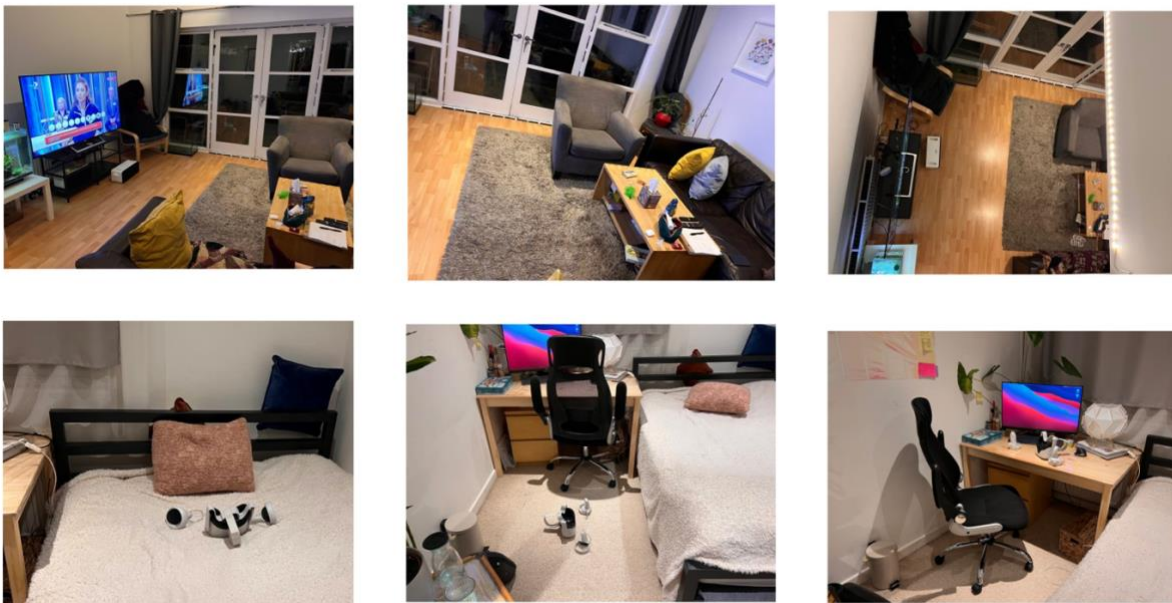


Figure 1. Examples of VR areas for P15 (curated images). Clockwise from top left: 1a) a view of the living room with large windows and patio doors, as well as a coffee table, couch, sofa, and a

television; 1b) an alternate view of the living room; 1c) an overhead view of the living room; arrangement; 1d) a bedroom with a bed, desk, office chair, with VR headset and monitor on the desk; 1e) a VR headset and controllers are on the ground behind the desk chair and next to the bed; and 1f) a VR headset and controllers are resting on top of the bed with a pillow at the head of the bed.

For movement-based games, P15 would use the living room. The images in Figure 1 show changes to the space to accommodate these games, like a sofa and coffee table pushed towards the couch to make more space in front of the television (Figure 1a, b, c). However, from the images it is also clear that these changes would impact how this kind of shared, multipurpose space might be used – playing VR blocks the view of the TV, and the position of the coffee table makes the couch less accessible. This meant that P15 had to rearrange the furniture after each use, which she described as a lot of work. Moreover, creating this space in the living room did not protect her from injury. She described a moment playing an exercise game in VR as her headset fogged with perspiration: ‘I love playing it, but it’s this really big space [in VR, and] I forget myself when I’m playing it. Once I hit the television (...) it was, like, dangerous. So, I decided not to play it.’ The images show additional risks beyond those she described in the interview: beside the television is an aquarium, and glass patio doors frame one side of the room. Ultimately, to avoid the possible danger of movement-based games within this space, she would choose to play stationary games in her bedroom. Her photographs of the bedroom show the headset placed in the three places she uses the headset: sitting at her desk (Figure 1d), sitting on the ground behind her office chair between the bed and the wall (Figure 1e), and lying down on the bed (Figure 1f). Beyond the fact that a headset is deliberately placed in these images, there is nothing else to suggest that this is a ‘VR space.’ Instead, each of the areas in the relatively small space of the bedroom is chosen as a contrast to the larger space of the living room, offering different forms of embodied engagement with the technology.

As P15’s experience suggests, negotiating the material realities of VR also extends to the hardware. This was also the case for P11, who would try various positions to mitigate physical discomfort, alternately using the headset in a reclined seated position, or lying down in her bed. P13 also described lying down to watch VR videos, but had to take off her glasses to wear the headset which would exacerbate her feelings of motion sickness. The headset was described by our participants as heavy, bulky, and/or uncomfortable when used for extended periods of time. P9, aged 24 and living in the US with their partner, said, ‘This is not a case of one size fits all, there are a lot of adjustments that need to be done.’ With the Meta Quest 2, for example, the manufacturer appears aware of this possible discomfort, and sells replacement padding, replacement head straps, an external battery, prescription lenses, etc. (Meta 2025b). However, despite these challenges, each participant enjoyed their devices and wanted to share their experiences with others. P14, aged 52 and living in South Africa, said she was eager to participate in the experience of using novel technologies despite occasional discomfort, saying, ‘We don’t want to be left behind in technology.’ Yet the technology would continue to move quickly: the Gear VR smartphone-based headset that she shared with her brother had been discontinued by the manufacturer in 2020.

Participants also described discomfort due to social interactions within online VR applications, noting a need for avoidance strategies that have been learned from other online spaces: ‘I’m also

somebody that's been online for a long time. I've dealt with a lot of gaming and idiots and I'm good at just ignoring it and not responding to it and blocking them' (P4). P3 said that while he hadn't personally experienced harassment or discrimination, it was 'very common,' describing the inevitability of trolls and their abusive language or behaviour: 'You cannot do anything about those people – you report to the admin or shut yourself in a bubble [a virtual barrier that prevents other avatars from entering your space].' In one instance that echoes what Gray (2014) calls 'linguistic profiling' (i.e. sexist and/or racist targeting after hearing a player speak), P4 said, 'I'm super lucky I have a low voice so I can go in with a female avatar and as soon as I open my mouth, they think I'm a male. So, therefore, I don't get any of that treatment, but I've heard a lot of my female friends that say yes; as soon as I open my mouth, they start.'

Despite some awareness of these virtual and physical challenges among all our participants, the perceived social benefits of the experience remained a consistent theme. The ability to physically interact with others differentiated the medium from other forms of remote sociality. P5, living in the US and using VR three to four times a week, said, 'Yes, so it was neat. We've played miniature golf together, despite the hundreds of miles between us. You know, you can talk on the phone but it's nice to do something together.' For P6, living in Australia and using VR daily said, 'Doing experiences you can't do in any other medium is really valuable.' P4 called herself an 'introvert,' but said that she became increasingly involved in exercise games and social experiences in VR: 'A bunch of us haven't even met in person, so when we meet up, if a couple of weeks have passed, we catch up on what we've been up to because we're all busy doing adult things.' For P4, it also gave her more control over how and when she exercised, especially during the pandemic lockdowns: '[I]f I don't have to go outside to exercise and I can just play 10 minutes of *Beat Saber* on my break, then great.'

P1, enthusiastic about VR and its possibilities, effectively summarized the prevailing sentiment: 'I would say it's difficult at first, so the learning curve is quite steep. You get sick quite often, especially the first time. But try to hang on. That's okay, it's worth it. I think the technology is worth it.' For P1, any current challenge with the headset, including possible invasions of privacy by Meta ('Facebook will know everything you do in the virtual') was interpreted as an inevitable, if not entirely acceptable, cost of use. For these participants, despite needing to adapt and adjust to the possible obstacles of use, VR was 'worth it': worth looking for solutions to the possible pain and discomfort, or worth the hassle of moving furniture and creating space for virtual worlds.

Creative adaptations and negotiations of space

In this subsection, we turn to the ways that participants integrated VR into the social, personal, and/or material contexts of their homes, with VR used in living rooms, basements, bedrooms, and home offices. In video tours and shared images, participants would point at objects in the room describing what they would move out of the way (e.g. an ottoman, a rug), or show what changes they had made to the space. In many instances, the obstacles described in the previous subsection also led to creative adaptations within a given space. P5 showed how he had added soft play-mats in the family room which functioned to provide a tactile reminder of the play area (Figure 2a). P4 and P6 showed similar creative additions, using yoga mats as their play area, with P4 also including a fan as a sensory reminder of her physical location in the room (Figure 2c). In a video tour, P6 showed how he would use his pneumatic standing desk, raising it to hide

away his desk chair to make more space, and lowering it to use for gaming, which revealed a poster for the film adaptation of *Ready Player One* (Figure 2b). While this poster is the only overt visual indication of anything related to VR in the images of Figure 2, each of the images also depicts direct actions that participants took towards making their space more conducive to VR.

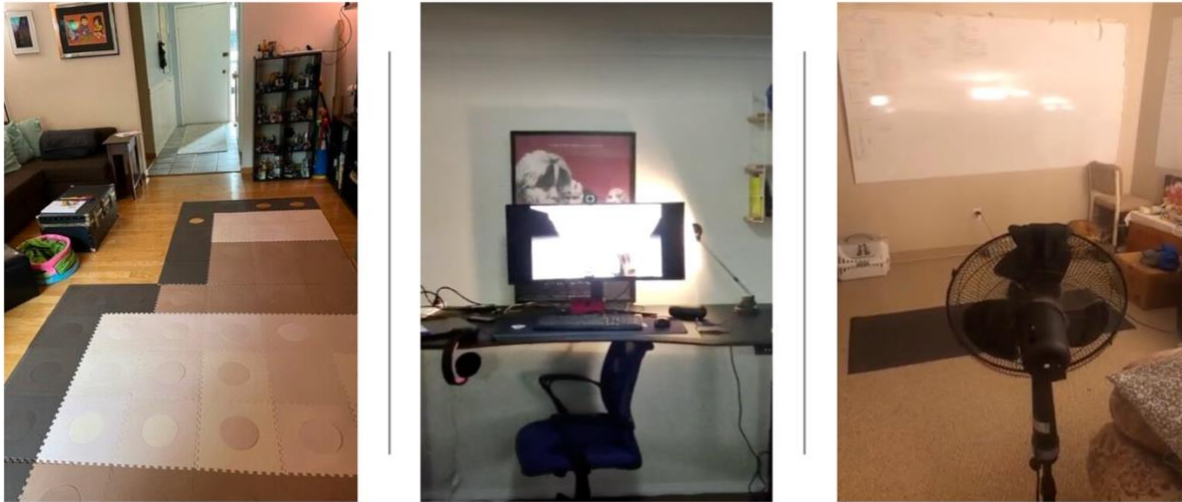


Figure 2. Examples of creative adaptations (curated images). From left to right: 2a) soft foam mats in P5's living room to help show the play area; 2b) P6 places his desk chair under his standing desk in his home office 2c) A fan points at a yoga mat in P4's home office.

When the largest or most convenient room for VR was a shared space, participants also described the need to negotiate their use of that space and/or factor in considerations for others using the space. For P1, who used VR every other day, the living room was only available for VR when his parents were away, otherwise the expectation was that they would use that space to watch TV. Room scale experiences required moving the furniture after they left, and putting it back by the time they returned. P2 used VR daily and avoided shared spaces and used his bedroom instead, which meant that he only used VR for seated experiences. P11 only used her headset once or twice a month, and said that it was awkward to use her headset in shared areas of the home (unless she was alone), not only because of space considerations, but also because the headset closed her off from others who might be in that space. For instance, when others might be using the shared space, P11 said: 'It is weird because then everybody is like, you're watching something without us.' All participants who shared living spaces with family or roommates described maneuvering around other household members' use of those spaces. P9, who used VR weekly, described using the living room when their partner was away, while also having conversations with their partner about how they would 'split up the space' to incorporate VR into shared rooms. Having a bean bag in the shared space was a conscious choice in this case, so that it could be easily moved out of the way (Figure 3a).



Figure 3. Examples of shared and modified spaces. Clockwise from top left, 3a) P9's shared space, including a large television at the front of the room with storage underneath, the VR headset and controllers on the floor showing the play area (curated); 3b) P10's living room, with couch, TV, coffee table, etc. (curated); 3c) P11's living room with couches, TV, coffee table, etc. (curated); 3d) P12's dining room, repurposed as a VR area (screenshot).

Visually, some of these shared spaces only showed subtle changes. Figure 3b and c show similar spaces in terms of their overall arrangement; the coffee table does not appear moved in one image (3b) though it does in another (3c). The changes (or lack of changes) to these spaces clarify their dominant use: the current arrangement of the space, with furniture oriented around a television shows which technology has priority. By contrast, Figure 3d shows a headset on the floor in what appears to be an empty room. During his video tour, P12, aged 22 and living in South Africa, described how he had changed the dining room into a home office and VR space by removing everything from that room except for a computer desk. He replaced the lighting so that it would be brighter, added a thick floor mat (not pictured) to stand on while in VR instead of the hardwood floor, and tried but abandoned solutions to tether the cables connected from his computer to his headset.

Eight of the 15 participants had headsets and related paraphernalia at hand, showing how VR devices are deliberately and visibly inserted into everyday spaces and routines. P7, aged 57 and living in the US, said that VR was part of her 'accidental fitness journey' and shared a wall of medals (Figure 4a) earned through virtual fitness challenges (many not related to VR use). P1, aged 25 and living in Belgium, shared an image of a bookshelf where he keeps his headsets (Figure 4b). Headsets no longer in use are on display, representative of his dedication to VR over the years. P5, aged 47 and living in the US, shared an image of the wall of objects where he hangs his headsets along with assorted keepsakes like display swords and his kids' drawings (Figure 4c). Because each of these images is taken by the participants, they also provide a view of how these participants view the integration of VR into their home: P7's image shows VR as an extension of other fitness efforts and successes; P1's image shows VR as primarily an

extension of other technologies, with the image also showing smart watches, a projector, a game controller, etc.; and P5's image shows VR as yet another of the myriad personal objects that are always available for use. While P1's arrangement of headsets on a bookshelf (Figure 4b) might be interpreted as akin to earlier analyses of the appreciation of the design and material aesthetics of gaming devices (e.g. Simon 2007), a VR headset in and amidst the everyday clutter of the home was more common for our participants: a domestic technology not necessarily set apart from other everyday objects.

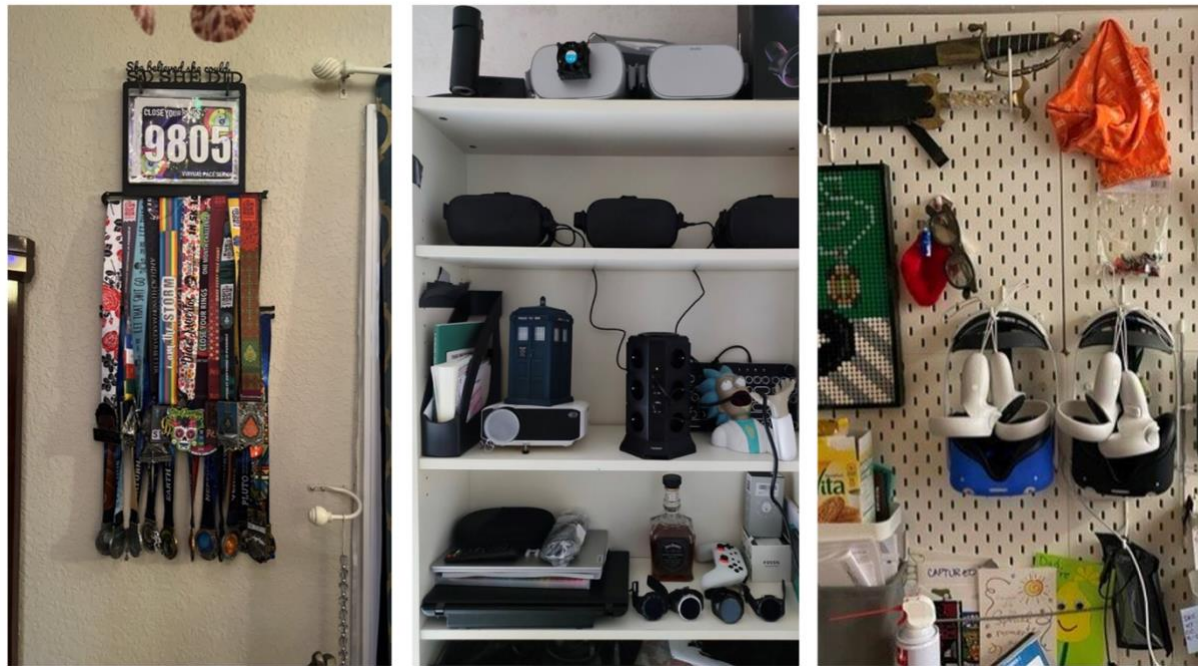


Figure 4. Examples of the ways that VR devices and related paraphernalia are displayed (curated images). From left to right: 4a) P7's assorted virtual fitness medals; 4b) P1's assorted headsets, with other shelves including figurines, collectibles, and other personal items; 4c) P5's home office storage, with headset and controllers hanging on the wall alongside a miscellany of personal objects.

Although personal spaces (rather than shared rooms) were more likely to show how participants made deliberate changes to a given space, for many of the participants, the location of the headsets within the rooms offered another indication of how VR was becoming an everyday technology. P5's second VR location was primarily for seated VR experiences, with the headset within easy reach from his home office desk with charging ports nearby for when the headset was not in use. P4, living in Canada and working from home, described how she set everything up to have the headset within easy reach for breaks during work. For P15, the headset was stored in the Meta Quest travelling case (purchased separately) in her bedroom, the room where she used the headset most (Figure 5a). P11 kept the headset on her desk in her bedroom between her laptop and bookshelf (Figure 5b). Similarly, P2 always kept his Quest 2 on his desk, within easy reach (Figure 5c). P7 kept her decorated Quest 2 on a table by the door, with the controllers in a glass bowl with other objects (Figure 5d). The front of the headset (blurred here) shows her name. Again, the images show more than can be gleaned from the interviews, providing a stark visual contrast to the imagined homes with pristine minimalist environments of Meta's set-up

tutorials (see Gilmore and Blair 2024). Here, instead, VR is yet another technological object within the broader material culture of the home. In the screenshot from P11's interview (Figure 5b) for example, the black headset is almost invisible among the other technologies on the desk, with the charging wires flowing in every direction seeming almost symbolic of broader technological connection. Throughout, these examples suggest that rather than an occasional technology that is stowed away for intermittent use, in these spaces, the headset is also a technology that is always available, and always at hand.

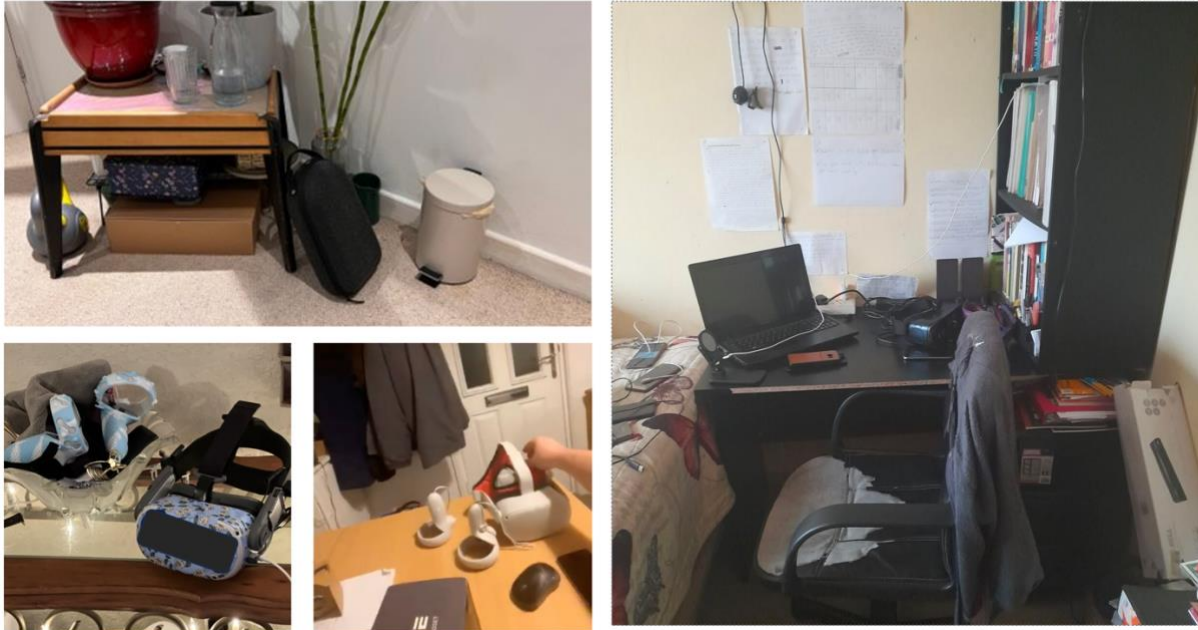


Figure 5. Examples of VR devices within easy reach. Clockwise from top left: 5a) P15 stores her VR headset on the floor inside its travelling case in her bedroom (curated); 5b) P11 keeps her headset on top of her desk with other electronics and personal items, with a bookshelf and desk chair nearby (curated); 5c) P2 keeps his headset on his desk in his office (screenshot); 5d) P7 keeps her headset on a countertop with the controllers in a glass bowl with other at-hand items (curated).

Discussion: VR as a domestic technology

We organized the results of our study into two overarching themes, each demonstrating social and material realities of bringing VR into the home. The first subsection describes how despite the challenges of setting up and using their headsets, our participants were often proud of their devices and saw value in continuing to use VR. The second subsection describes how our participants applied various strategies when integrating VR into their home, including rearrangements within the space, developing interpersonal expectations, and keeping their devices available and ready to use. Some of these actions and behaviours are reflected in previous work, whether in accounts of people hurting themselves in VR by banging into something real (Dao et al. 2021), or the various material arrangements of VR spaces (Harley and MacArthur 2023), or the feeling of some household members that activities in VR felt less social than watching television together (Green et al. 2021). However, our findings also extend these considerations by showing how participants interpret these experiences and how they develop creative strategies in response: what they do after hurting themselves in VR, or after initial

attempts to set up their space, or after negotiating the social dynamics of VR with others in the household.

One explanation of our participants' creative adaptations – including soft mats to stand on, storage space that doubles as a charging station, or a fan to help with spatial orientation – is that some participants were able to find acceptable ways to integrate VR into the personal and idiosyncratic arrangements of their home. In this explanation, we might classify aspects of participant behaviour and actions as following the key stages of the domestication of technology (e.g. Silverstone, Hirsch, and Morley 1992). For example, we might suggest that after the VR technologies were *appropriated*, they were ascribed particular use cases (e.g. as a tool for exercise vs a tool for entertainment). VR was then *objectified* by the specific owner's needs and contexts of use (e.g. by a participant proudly having their headsets on display, or by a participant choosing to only use the technology in their bedroom rather than their living room), before being *incorporated* into existing and/or changing routines (e.g. as evidenced by how at-hand the technology was for some participants). Finally, the VR devices underwent *conversion*, where the technology shifted from something new to something that is also evocative of the users' identity and participation in culture outside the home (e.g. one participant's engagement in a growing exercise community, or another's efforts not to be 'left behind' a fast-paced technological culture).

Yet the expectations, experiences, and adaptations to a technology that consumers have relatively little power to change also reflects the broader 'unevenness and friction of a complex, diverse and contrary world of lived relations' (Silverstone 2003, 97). When Gilmore and Blair (2024) briefly draw on De Certeau (1984) to describe the creativity that people in YouTube videos showed in their adaptations to VR, it was with the understanding that any use of VR is also enmeshed in relative degrees of power, privilege, and access. Drawing on Watson, Lupton, and Michael (2021), extending these considerations with some of the *in-situ* and relational dimensions of the home show that our participants faced (and often accepted) implied ultimatums as VR put new demands on their environments and relationships. For example, navigating a lack of space or navigating the social dynamics within a shared space, some participants would avoid movement-based experiences and choose stationary experiences in private rooms. Some participants noted an awareness of, and strategies to avoid, online harassment and discrimination (see also: Blackwell et al. 2019; Freeman et al. 2022). One participant recognized that their headset was not a 'one size fits all' device, while another chose to risk nausea by using the headset without their glasses. One participant was eager to continue using an older headset that was discontinued by the manufacturer, while another recognized and dismissed concerns relating to privacy and the manufacturer's data collection strategies. In short, the challenges that participants identified were not always possible to overcome, and their creative problem solving (as well as the limitations and dismissals across those efforts) can be read as responses to a technology that could not be used without some form of compromise.

Acknowledging these hurdles and concessions does not diminish the fact that our participants predominantly saw VR as a promising technology that could be deliberately and creatively brought into their homes. In the interviews, many of our participants dismissed the difficulties of using their devices as necessary annoyances for ongoing use. They were required to become experts on how and where to use VR and were required to discover and implement their own

best practices. These difficulties were rarely described as a burden; instead, participants would show how they would tolerate, justify, and/or avoid negative experiences while also interpreting these challenges as a fact of use. Even though the VR headsets used by our participants each offer different technological capabilities, with some headsets more advanced than others, none of our participants described a seamless technological experience. The possible burdens and/or dangers of these imperfect spatial computing devices was seen as an acceptable risk, requiring participants to adapt and adjust the technology to their body and their environment. This could also be understood as a reflection of the language of Meta's Health and Safety guidelines (Meta 2025a), which emphasize the precautions a user should take in the face of potential risks. In this formulation, it is not the corporation that must adapt to the user and their environment, but the user that must adapt to the corporation's specifications.

Putting these findings into conversation with other areas of VR scholarship raises additional questions. For example, based on the challenges our participants faced simply using and wearing the headsets, we might ask how these adaptations and home contexts can extend research into the accessibility concerns outlined in previous research (e.g. Gerling and Spiel 2021; Gilmore and Blair 2024; Pimentel et al. 2021). Similarly, the need for flexible, adaptive design for technology in the home is a known issue in research on ubiquitous computing, and research into the real-world contexts of VR could extend these considerations. For example, two decades ago, Taylor and Swan (2005) recommended that novel smart home technologies respect and value the heterogeneity and changing qualities of domestic spaces. Situating VR within the personal, social, material, and heterogeneous realities of the home raises questions about initial and ongoing barriers to access, and the specific challenges that people face when a burden of adaptation is placed on their shoulders.

At the same time, any call for increased attention to the heterogeneity of VR spaces and users alongside critical VR scholarship also raises concerns about how that heterogeneity might be captured and interpreted by the corporations that manufacture VR devices. A techno-solutionist response to a device that is incapable of adequately recognizing differences in homes and bodies might propose to improve the tracking and sensing capabilities of that device. Alongside the data gathering and sensing capabilities of current VR devices (Egliston and Carter 2022b; Saker and Frith 2020), any 'improvements' to these spatial devices would add to the existing forms of data capture across a range of other 'smart' technologies in the home owned by a handful of corporations (Rose, Lashua, and Pang 2023; Sadowski 2019; White and Gilmore 2022).

Importantly, these forms of data capture also rely on users' active efforts to integrate the technology into their everyday routines. When Zuboff (2019) illustrated this kind of 'extraction imperative' (in which new technologies represent the collection of new forms of 'raw' data), she referred to Weiser's (1999) vision of ubiquitous computing technologies that 'weave themselves into the fabric of everyday life' (3). Although Weiser explicitly excluded VR from his vision of ubiquitous computing,² and although his phrasing emphasizes the agentic force of the technology, our participants' experiences consistently offered the reminder that there is a need for greater attention to the ways that people must also actively contribute their own labour and creativity to 'weave' VR into their home.

Methodologically, the similarities as well as the differences across our participants' responses, images, and videos also raise questions for future work. Our results showed the rich possibilities of study design that includes opportunities for participants to share videos and photographs after the initial interview. Offering participants more control over when and how they demonstrate the 'sensory aesthetic' and 'atmosphere' of their home provides insight into how the 'mundane' and everyday aspects of technology are understood across a variety of contexts (Pink and Mackley 2012). While our attempt to broaden recruitment across several countries may result in glimpses of intersecting cultures of domestic VR use (rather than a single specific culture described in traditional ethnographic work), future work can do more to examine and differentiate between the range of demographic and domestic characteristics across the many contexts of use for a technology that is increasingly made global.

Within these global contexts, future studies of these spaces might focus more closely on participants' conceptualizations of the home, or might broaden the focus beyond a single member of the household to others living in the home, or examine how domestic contexts play a role in participants' sociality online. Our study suggests that the inclusion of videos and photographs alongside interviews can help to untangle where, how, and why the possible similarities and differences arise across instances of domestic VR. Even in spaces that share common features (e.g. couches oriented around a TV), not only are there varied interpretations of how and when a given space might be used for VR, but the diverse and changing sociotechnical choreographies (Richardson 2011) of these spaces also provides contextual insight into where and why people choose to use VR. While we could only include a selection of the images we received in this study, the images our participants shared were a valuable supplement to the interview and video tour, offering both a snapshot of how these households incorporated VR, as well as evidence of how VR shaped how spaces were seen by the participants. Throughout, images that showed subtle changes offered insight into different views of those spaces: what might appear to be a 'typical' living room organized around a television, was now (imperceptibly) also a VR room. In some cases, they would imagine how they might change the room with more space, or in new homes, but they consistently saw opportunities for VR across a variety of available spaces. Each choice for where and how to use VR showed, again and again, the social and material realities of virtual worlds.

Conclusion

This study shows that VR in the home is messy, physical, embodied, and social, with the richness of at-home contexts revealing multiple forms of adaptation, creativity, modification, and negotiation. Our intentional inclusion of the everyday aspects of use shows interrelated factors like pride in the technology, personal rearrangements of space, as well as a straddling of physical and virtual forms of sociality. A focus on the embodied, material, and social contexts of use are a reminder that these experiences are never purely virtual. The VR areas our participants shared showed the ways they negotiated the physical and material requirements of using their VR device(s), and how they integrate VR into everyday routines and experiences. Bringing this technology into the home requires creative adaptations that go beyond those that are apparently anticipated by the manufacturer. Our participants would choose specific spaces in the home, moving furniture before and after use, and/or applying specific modifications – soft mats, carpets, fans, tucked away chairs – to help ground virtual reality in the physical and to negotiate household dynamics in the moment. These strategies were not a complete removal of potential

hazards but rather an attempt to adapt the technology to the physical and social realities of their homes. In this sense, the technology is a clear disruption to the home: to use movement-based VR, for example, requires alterations to current social and material arrangements.

Our participants show that incorporating VR into the home impacts and reflects household dynamics, including (among other possibilities) waiting for others to leave the home to briefly appropriate the family room as a VR space, or choosing specific rooms and/or VR applications based on who else was present. As with other domestic technologies that reflect ongoing negotiations and mediations of social and cultural processes, an examination of VR in the home at this stage of its technological development also reveals how intricately related that process is to participants' choices and environments, with participants actively identifying use cases and navigating specific challenges as they strive to find ways to integrate the technology into their routines and spaces. Images and videos shared by our participants begin to show the diversity and uniqueness of spaces and how they are modified for VR use (whether subtly or more explicitly). In each case, the perceived value of VR comes with several hidden costs beyond the purchase price, confirming that concerns about the availability and accessibility of these devices are well-founded. Ultimately, the burden and responsibility of use appears to fall on the shoulders of those consumers who are willing to navigate the many challenges of using this technology.

Notes

1. As just one example, Pink and Mackley (2012) describe eliciting participants' routines involved in maintaining the home's sensory qualities, which helped to reveal how the type of flooring (e.g., carpeted, tiled) affected participants' energy consumption practices.
2. Weiser's (1999) used VR as a contrast to his vision for ubiquitous computing, writing: 'Virtual reality focuses an enormous apparatus on simulating the world rather than on invisibly enhancing the world that already exists' (p. 3). Yet the sensing capabilities of modern VR devices alongside the 'invisible' computational (and social) networks that these devices are connected to suggest that any VR device produced by Big Tech corporations is directly related to the production of ubiquitous computational networks.

Acknowledgements

We would like to thank Garret Tracey for his assistance in the initial phases of this research, and the participants for their engagement with the study. This research was funded, in part, by the Social Sciences and Humanities Research Council of Canada.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by Social Sciences and Humanities Research Council of Canada.

Data availability statement

The participants of this study did not give written consent for their data to be shared for uses other than this study, so data sharing is not available.

Ethical approval

University of Waterloo Research Ethics Board approvals: #43337, #44146

References

- Bell, G., M. Blythe, and P. Sengers. 2005. "Making by Making Strange: Defamiliarization and the Design of Domestic Technologies." *ACM Transactions on Computer-Human Interaction (TOCHI)* 12 (2): 149–173.
- Berker, T. 2011. "Domesticating Spaces: Sociotechnical Studies and the Built Environment." *Space and Culture* 14 (3): 259–268.
- Berker, T., M. Hartmann, Y. Punie, and K. Ward, eds. 2006. *Domestication of Media and Technology*. New York: Open University Press.
- Blackwell, L., N. Ellison, N. Elliott-Deflo, and R. Schwartz. 2019. "Harassment in Social Virtual Reality: Challenges for Platform Governance." *Proceedings of the ACM on Human-Computer Interaction* 3 (CSCW): 1–25.
- Charmaz, K., and L. Belgrave. 2012. "Qualitative Interviewing and Grounded Theory Analysis." *The SAGE handbook of interview research: The complexity of the craft*, pp.347–365.
- Cockburn, C. 1997. *Women's Studies International Forum* 20 (3): 361–371.
- Crabtree, A., and T. Rodden. 2004. "Domestic Routines and Design for the Home." *Computer Supported Cooperative Work* 13 (2): 191–220.
- Dahlgren, K., S. Pink, Y. Strengers, L. Nicholls, and J. Sadowski. 2021. "Personalization and the Smart Home: Questioning Techno-Hedonist Imaginaries." *Convergence* 27 (5): 1155–1169.
- Dao, E., A. Muresan, K. Hornbæk, and J. Knibbe. 2021. "Bad Breakdowns, Useful Seams, and Face Slapping: Analysis of VR Fails on YouTube." In proceedings of the 2021 CHI conference on human factors in computing systems, 1–14.
- De Certeau, M. 1984. *The Practice of Everyday Life*. Berkley: University of California Press.
- Dourish, P., and G. Bell. 2011. *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing*. Boston: MIT Press.
- Egliston, B., and M. Carter. 2022a. "The Interface of the Future': Mixed Reality, Intimate Data and Imagined Temporalities." *Big Data & Society* 9 (1).
- Egliston, B., and M. Carter. 2022b. "The Material Politics of Mobile Virtual Reality: Oculus, Data, and the Technics of Sensemaking." *Convergence* 28 (2): 595–610.
- Egliston, B., and M. Carter. 2022c. "Oculus Imaginaries: The Promises and Perils of Facebook's Virtual Reality." *New Media & Society* 24 (1): 70–89.
- Evans, L. 2018. *The re-emergence of Virtual Reality*. New York: Routledge.
- Freeman, G., S. Zamanifard, D. Maloney, and D. Acena. 2022. "Disturbing the Peace: Experiencing and Mitigating Emerging Harassment in Social Virtual Reality." *Proceedings of the ACM on Human-Computer Interaction* 6 (CSCW1): 1–30.
- Gerling, K., and K. Spiel. 2021. "A Critical Examination of Virtual Reality Technology in the Context of the Minority Body." In proceedings of the 2021 CHI conference on human factors in computing systems, 1–14.
- Gilmore, J. N., and B. W. Blair. 2024. "Make Room for VR: Constructing Domestic Space and Accessibility in Virtual Reality Headset Tutorials." *Television & New Media*.
- Gitelman, L. 2008. *Always Already New: Media, History, and the Data of Culture*. Cambridge: MIT Press.

- Gray, K. L. 2014. *Race, Gender, and Deviance in Xbox Live: Theoretical Perspectives from the Virtual Margins*. New York: Routledge.
- Green, D. P., M. Rose, C. Bevan, H. Farmer, K. Cater, and D. S. Fraser. 2021. "You Wouldn't get That from Watching TV!": Exploring Audience Responses to Virtual Reality non-fiction in the Home." *Convergence* 27 (3): 805–829.
- Haddon, L. 2011. "Domestication Analysis, Objects of Study, and the Centrality of Technologies in Everyday Life." *Canadian Journal of Communication* 36 (2): 311–323.
- Haddon, L. 2017. "Domestication and the Media." *The International Encyclopedia of Media Effects* 1:409–417.
- Hargreaves, T., C. Wilson, and R. Hauxwell-Baldwin. 2018. "Learning to Live in a Smart Home." *Building Research & Information* 46 (1): 127–139.
- Harley, D., and C. MacArthur. 2023. "Sharing Play Spaces: Design Lessons from Reddit Posts Showing Virtual Reality in the Home." In *Proceedings of the 2023 ACM Designing Interactive Systems Conference* : 509–522.
- Harvey, A. 2015. *Gender, Age, and Digital Games in the Domestic Context*. New York: Routledge.
- Helsper, E. J. 2010. "Gendered Internet use across Generations and Life Stages." *Communication Research* 37 (3): 352–374.
- Horst, H. A. 2012. "New Media Technologies in Everyday Life." In *Digital Anthropology*, edited by Heather Horst and Daniel Miller, 61–79. New York: Routledge.
- Horst, H. A., and D. Miller, eds. 2012. *Digital Anthropology*. New York: Routledge.
- Kennedy, H. 2005. "Subjective Intersections in the Face of the Machine: Gender, Race, Class and PCs in the Home." *European Journal of Women's Studies* 12 (4): 471–487.
- Kennedy, J., B. Nansen, M. Arnold, R. Wilken, and M. Gibbs. 2015. "Digital Housekeepers and Domestic Expertise in the Networked Home." *Convergence* 21 (4): 408–422.
- Leotta, A., and M. Ross. 2018. "Touring the 'World Picture': Virtual Reality and the Tourist Gaze." *Studies in Documentary Film* 12 (2): 150–162.
- Melnick, K. 2021. "The Oculus Quest 2 Is One of Oprah's favorite things 2021." VR Scout. <https://vrscout.com/news/the-oculus-quest-2-is-one-of-oprahs-favorite-things-2021/#>.
- Meta. 2025a. "Meta Quest Safety Centre." <https://www.meta.com/ca/quest/safety-center/>.
- Meta. 2025b. "Meta Quest Accessories." <https://www.meta.com/ca/quest/accessories/>.
- Miller, D. 2001. *Home Possessions: Material Culture behind Closed Doors*. Oxford: Berg.
- Mitchell, V., K. L. Mackley, S. Pink, C. Escobar-Tello, G. T. Wilson, and T. Bhamra. 2015. "Situating Digital Interventions: Mixed Methods for HCI Research in the Home." *Interacting with Computers* 27 (1): 3–12.
- Morley, D. 2000. *Home Territories: Media, Mobility and Identity*. London: Routledge.
- Morrison, M., and D. M. Krugman. 2001. "A Look At Mass and Computer Mediated Technologies: Understanding the Roles of Television and Computers in the Home." *Journal of Broadcasting & Electronic Media* 45 (1): 135–161.
- Nakamura, L. 2020. "Feeling Good about Feeling bad: Virtuous Virtual Reality and the Automation of Racial Empathy." *Journal of Visual Culture* 19 (1): 47–64.
- Newton, C. 2021. "Mark in the Metaverse: Facebook's CEO on Why the Social Network Is Becoming 'A Metaverse Company.'" *The Verge*. <https://www.theverge.com/22588022/mark-zuckerberg-facebook-ceo-metaverse-interview>.

- O Magazine. 2021. "Oprah's Favorite things 2021: The Full List." O Magazine. https://www.oprah.com/gift/oprahs-favorite-things-2021-quest-2?editors_pick_id=80835.
- Pimentel, D., M. Foxman, D. Z. Davis, and D. M. Markowitz. 2021. "Virtually Real, but Not Quite There: Social and Economic Barriers to Meeting Virtual Reality's True Potential for Mental Health." *Frontiers in Virtual Reality* 2.
- Pink, S., E. Ardèvol, and D. Lanzeni, eds. 2016. *Digital Materialities: Design and Anthropology*. London: Bloomsbury Publishing.
- Pink, S., H. Horst, T. Lewis, L. Hjorth, and J. Postill, eds. 2015. *Digital Ethnography: Principles and Practice*. London: Sage Publications.
- Pink, S., and K. L. Mackley. 2012. "Video and a Sense of the Invisible: Approaching Domestic Energy Consumption through the Sensory Home." *Sociological Research Online* 17 (1): 3.
- Pink, S., K. L. Mackley, R. Morosanu, V. Mitchell, and T. Bhamra. 2020. *Making Homes: Ethnography and Design*. London: Routledge.
- Pink, S., J. Sinanan, L. Hjorth, and H. Horst. 2016. "Tactile Digital Ethnography: Researching Mobile Media through the Hand." *Mobile Media & Communication* 4 (2): 237–251.
- Richardson, I. 2011. "The Hybrid Ontology of Mobile Gaming." *Convergence* 17 (4): 419–430.
- Rose, J., B. Lashua, and B. Pang. 2023. "Leisure as Surveillance, and the Surveillance of Leisure." *Leisure Sciences* 45 (5): 391–399.
- Sadowski, J. 2019. "When Data Is Capital: Datafication, Accumulation, and Extraction." *Big Data & Society* 6 (1).
- Saker, M., and J. Frith. 2020. "Coextensive Space: Virtual Reality and the Developing Relationship between the Body, the Digital and Physical Space." *Media, Culture & Society* 42 (7-8): 1427–1442.
- Silverstone, R. 2003. *Television and Everyday Life*. New York: Routledge.
- Silverstone, R., and E. Hirsch, eds. 1992. *Consuming Technologies: Media and Information in Domestic Spaces*. London: Routledge.
- Silverstone, R., E. Hirsch, and D. Morley. 1992. "Information and Communication Technologies and the Moral Economy of the Household." In *Consuming Technologies: Media and Information in Domestic Spaces*, edited by Roger Silverstone and Eric Hirsch. London: Routledge.
- Simon, B. 2007. "Geek Chic: Machine Aesthetics, Digital Gaming, and the Cultural Politics of the Case mod." *Games and Culture* 2 (3): 175–193.
- Spigel, L. 1992. *Make Room for TV: Television and the Family Ideal in Postwar America*. Chicago: University of Chicago Press.
- Taylor, A. S., and L. Swan. 2005. "Artful Systems in the Home." In proceedings of the SIGCHI conference on human factors in computing systems, 641–650.
- Venkatesh, A. 1996. "Computers and Other Interactive Technologies for the Home." *Communications of the ACM* 39 (12): 47–54.
- Venkatesh, A. 2008. "Digital Home Technologies and Transformation of Households." *Information Systems Frontiers* 10:391–395.
- Watson, A., D. Lupton, and M. Michael. 2021. "The COVID Digital Home Assemblage: Transforming the Home into a Work Space during the Crisis." *Convergence* 27 (5): 1207–1221.
- Weiser, M. 1999. "Some Computer Science Issues in Ubiquitous Computing." *ACM SIGMOBILE Mobile Computing and Communications Review* 3 (3): 12.

White, C., and J. N. Gilmore. 2022. "Imagining the Thoughtful Home: Google Nest and Logics of Domestic Recording." *Critical Studies in Media Communication* : 1–14.

Zuboff, S. 2019. *New Labor Forum* 28 (1): 10–29.