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Katja Kaufmann (University of Innsbruck)
Monika Palmberger (University of Vienna)

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Editorial

Doing Research at Online and Offline Intersections: Bringing Together Digital and Mobile Methodologies

Katja Kaufmann [1,*,†] and Monika Palmberger [2,†]

[1] Department of Geography, University of Innsbruck, Austria
[2] Department of Social and Cultural Anthropology, University of Vienna, Austria

* Corresponding author (katja.kaufmann@uibk.ac.at)

† These authors contributed equally to this work

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Abstract
This thematic issue is an interdisciplinary exchange of methodological, practical, and ethical issues linked to conducting research across online and offline spaces in times of mobile technologies. It includes a wide range of disciplines, geographical locations, methodological approaches, and designs. The seven articles in this thematic issue are organized around three distinctive potential entry points: (a) researching across online and offline spaces with ethnographic, multisited, nonmedia-centric approaches; (b) making use of mobile media for researching across online and offline spaces; (c) researching emerging technologies built across online and offline spaces. All authors make their research processes transparent and share not only the methodical challenges and ethical dilemmas they faced, but also the opportunities that arose and methodological ways forward.

Keywords
digital ethnography; hybrid methods; mixed methods; mobile media; mobile methods; mobile technologies; multimethod; multimodal; online ethnography; qualitative methods

Issue
This editorial is part of the issue "Across Mobile Online and Offline Spaces: Reflections on Methods, Practices, and Ethics" edited by Katja Kaufmann (University of Innsbruck) and Monika Palmberger (University of Vienna).

1. Introduction

Our thematic issue's unwieldy title, "Across Mobile Online and Offline Spaces," refers to the methodological development of two quite separate strands visible in methods handbooks and collections: (a) digital methods that indicate the end of the virtual (Rogers, 2013), and (b) mobile methods as a set of approaches in mobility studies that follow their object of research (Büscher & Urry, 2009) in order to overcome the sedentary character of traditional empirical methods, and, in a more narrow sense, the use of mobile media technologies to study social phenomena (Boase & Humphreys, 2018). The first strand includes a focus on efforts to overcome the conceptual and, later, methodological distinction between virtual space and its physical counterpart. Eventually, "hybrid" concepts and methods postulated the third as something more than the sum of its parts (Leander & McKim, 2003).

These two methodological strands are, however, rarely linked to each other. Throughout attempts to connect them, the process of dealing with, and eventually solving, the ensuing challenges has rarely been documented, leaving the possibility of other researchers learning from it to chance. Certainly, this is partly due to scholarly publications focusing mainly on research results over the research process. We are therefore delighted that *Media and Communication* agreed to

dedicate a full issue to bringing together contributions from a wide array of disciplines and topics, in which authors defer results in favor of giving much-needed space to share the practicalities of doing research, centered on the theme of research across mobile online and offline spaces.

While we are aware that by using the terms "online" and "offline" we perpetuate this dualism, we continue using them to underline that there is no unified approach to researching these spaces just as there is not necessarily a consistent, merging— i.e., hybrid—space. Spaces and perceptions of them do not always align; technologies, especially emerging ones, can be unruly, and researchers need to be adaptive and inventive, as we will show together with our authors in this issue's collection of articles.

2. Across Mobile Online and Offline Spaces

The idea that the online and the offline are not separate entities is nothing particularly new. After a period of research focused on cyberspace versus the "real world," researchers deconstructed the separation between the physical and the digital (Orgard, 2009; Udupa & Budka, 2021). This deconstruction was initially conceptual: As Gajjala (2009) argued, "we cannot really separate our being online from being offline, because online and offline are not discrete entities" (p. 61), and Gajjala demanded a new vocabulary to grasp the simultaneities of being online and offline. In a similar vein, Morley (2017) stated that "if we are to understand the complexities of how the virtually augmented spaces of our lives are now embedded within the material practices and settings of everyday life, the terminology is of some consequence" (p. 115). Accordingly, concepts such as mediaspace (Couldry & McCarthy, 2004), hybrid space (de Souza e Silva, 2006), or cON/FFlating spaces (Bork-Hüffer et al., 2020) were introduced to capture the nature of connected lives and the simultaneities of being online and offline. The interdisciplinary field of digital migration studies has been pioneering in bridging online and offline spaces conceptually (Leurs & Smets, 2018; Palmberger, 2022a). Research in this field has captured digital technologies' potential to create overlapping copresences, physical and virtual, with concepts such as "connected migrants" (Diminescu, 2008) and "smart refugees" (Dekker et al., 2018).

While discussions of the online and offline nexus have thus been vibrant both conceptually and empirically, methodological discussions have been less so (Orgard, 2009). In her book *Hybrid Ethnography*, Przybylski (2021, p. 6) states that "fieldsites that span digital, physical, and digital-physical spaces require more than additive methodology." The methodological shift present in this plea goes beyond moving offline methods to online formats. It entails finding ways to research online and offline phenomena in their complexity using both old and new methods (Tummons, 2020). The latter may include the "digitization" of traditional methods and "natively digital" methods (Marres, 2017, p. 82). Most methods handbook contributions to date, however, focus either on the online or the offline aspect, while their intersection is rarely dealt with: neither in individual approaches nor in a broader disciplinary approach that calls for combined designs.

Given the spread of smartphones and the ongoing advancement of mobile media technologies that connect online and offline environments on the go (Campbell, 2019), the empirical complexity is further increasing steadily—and it only adds to the methodological challenges that researchers face. Consequently, it has also become impossible to maintain "a clear distinction between place (in a purely geographical sense) and mediated experience" (Morley, 2017, p. 113; see also Waldherr et al., 2021). With the rise of mobile media and augmented reality (Liao, 2019), self-tracking devices, the Internet of Things, and other mobile technologies to come (Frith, 2022), online and offline spheres are only becoming further intertwined and in multilayered ways. These mobilities complicate matters and no longer make the entry point for empirical research clear (Bolander & Locher, 2020).

In this thematic issue, we have collected seven articles from a range of disciplines and fields that present different ways of tackling the methodological—as well as ethical and practical—complexity that arises when researching across mobile online and offline spaces (Bolander & Locher, 2020). The texts provide important insights, not only into the relationship between online and offline environments, but also into the movements of participants in and between these environments, and how such movements critically affect the empirical research process. Some of the articles focus on the relationship between online and offline from a nonmedia-centric perspective; other articles start from specific media, while others research emerging mobile technologies that connect the physical and digital. We have grouped these contributions according to their entry points into these three themes: (a) researching across online and offline spaces with ethnographic, multisited, nonmedia-centric approaches; (b) making use of mobile media for researching across online and offline spaces; (c) researching emerging technologies built across online and offline spaces.

All authors make their methods transparent and share limitations, challenges, and ethical dilemmas they faced during the research process, as well as opportunities that arose and methodological ways forward. We highly appreciate the authors' openness and honesty in reporting extensively on their experiences. With this collection of articles, we want to strengthen the case for a more extensive academic exchange in *doing research* at the intersections of mobile online and offline spaces. Such research is likely to increasingly challenge researchers as developments in mobile technologies advance.

2.1. Researching Across Online and Offline Spaces with Ethnographic, Multisited, Nonmedia-centric Approaches

The first two articles are by Suzanna Jovicic and Cathrine Bublatzky, respectively, and they take a digital ethnographic nonmedia-centric approach (Pink et al., 2016). The premise underpinning this digital ethnographic approach is that "the Internet, and the 'digital' are not available to us in any transcendent sense, but are emergent in practice as they are realized through particular combinations of devices, people, and circumstances" (Hine, 2015, p. 29). Both articles clearly show that such an approach—an experiential form of knowledge—demands a situated and unique methodological response (Hine, 2015, p. 31).

Jovicic (2022) vividly demonstrates this in her discussion about field entry in which she describes the smartphone as an "ambivalent friend." Jovicic reflects critically on establishing rapport when participants "slip in and out of online–offline environments" through a discussion of her own research experiences in two youth centers in Vienna. While her research was designed solely offline, the youths' mundane smartphone practices that she encountered lay where the online and offline intersect. These "entanglements of online–offline digital environments and their dynamics" (p. 232) are the focus of her later methodological investigations. Jovicic's article is a much-needed analysis of new challenges ethnographers face with respect to field entry, relationship-building, and negotiations of privacy in everyday digital environments.

Bublatzky (2022) also scrutinizes transforming field sites and field relations across online and offline environments and the challenges but also opportunities this presents. She follows and co-researches with an Iranian artist and activist in exile. Both Bublatzky and the artist faced Covid-19 pandemic restrictions. In her discussion of the notions of "digital exile" and "mobile belonging," Bublatzky offers valuable insights for multimodal ethnographies that build on collaboration and cocreation, and her work "is situated at the intersection of mobile online and offline spaces" (p. 240). Bublatzky provides ample and refreshingly open insights in her research methodology, and she discusses the chances and challenges of incorporating multimodality in digital ethnography. Such an endeavor has the highest chances of succeeding, Bublatzky suggests, when ethnographers adopt a flexible, processual, and collaborative research mindset.

2.2. Making Use of Mobile Media for Researching Across Online and Offline Spaces

The second, third, and fourth articles are by: Larissa Hugentobler; Amanda Alencar and Julia Camargo; and Guanqin He, Koen Leurs, and Yongjian Li. These articles propose approaches in which mobile media apps are used as research tools to study phenomena across online and offline spaces. Recent methodological developments acknowledge the methodological potential of mobile media and smartphones (Boase & Humphreys, 2018). While their application in quantitative research is widely tested and established, making use of such potential in qualitative research is a newly expanding field (Garcia et al., 2016; see e.g., Kaufmann, 2018; Palmberger, 2022b). When mobile media are used in qualitative research, they are usually not just a tool that is applied regardless of context, but a digital space inherently linked to the subjects and their experiences under study, and thus a promising entry point for researchers (Kaufmann, 2020).

In this vein, Hugentobler (2022) suggests using Instagram, a location-based mobile social media network, to engage with visitors of (physical) tourism and memorial sites in an innovative qualitative asynchronous digital interview called the "Instagram interview." Hugentobler takes advantage of Instagram as an inherent part of many visitors' experiences both during and after their visits to the sites, and she aptly employs the platform to interview individuals about "entangled offline and online experiences" (p. 257) with the Dr. Martin Luther King Jr. Memorial in Washington, DC. Because of the app's location-based affordances, Instagram also lends itself well to sampling and recruiting, as Hugentobler explains before reflecting on her role and representation as a researcher in both digital and physical spaces.

Similarly, Alencar and Camargo (2022) propose the use of WhatsApp, a mobile messenger app, to co-research experiences of Venezuelan refugees settling in Brazil. Alencar and Camargo build on the essential role that messengers play in the lives of refugees. They present an intervention study in which they are maintaining a WhatsApp group among participants and researchers proved useful for grasping the refugees' settlement experiences in both digital and physical environments, while also facilitating social exchange among refugees. Alencar and Camargo use the case study to illustrate the strengths and weaknesses of using a WhatsApp group as a "new form[s] of knowledge production that [is] inclusive, sustainable, and meaningful" (p. 270), and they also reflect on their own positionality as negotiated throughout the intervention process.

Last, He et al. (2022) present the case of using the video-blogging app Douyin to study self-representations of Chinese stay-at-home mothers and their daily lives across online and offline spaces. The authors use their vivid case study to reflect on how a mobile media platform's affordances and the resulting divide between different user groups can hinder qualitative research. They also describe how they circumvented obstacles, before discussing the possibilities and limitations of using user-generated short videos (vlogs) as research data. In the second part of their article, the authors skillfully develop the concept of motherhood 3.0 based on the "distinctively situated performance of motherhood" (p. 285) they found on Douyin.

2.3. Researching Emerging Technologies Built Across Online and Offline Spaces

The last two articles in this collection are by Moritz Schweiger and Jeffrey Wimmer, and by Chelsea Paige Butkowski, Ngai Keung Chan, and Lee Humphreys. These articles are dedicated to emerging mobile digital technologies built to connect digital and physical environments (Liao, 2019). Their analysis covers the challenges that come with it: As these technologies are "not yet stabilized, both technologically and discursively" (Butkowski et al., 2022, p. 304), the researchers find themselves in the position of coproducing the environments they study, even more than usual.

In this way, Schweiger and Wimmer (2022) report on a field study in the German city of Augsburg in which they dealt with the complex issue of how augmented reality (AR) changes city dwellers' perception of space. The authors faced various limitations linked to established methods when attempting to capture augmented space, and so they developed an innovative mixed methods design that combined questionnaires with an experimental field study and think-aloud protocols. Later, Schweiger and Wimmer discuss the "methodological challenges and opportunities of augmented reality field studies" (p. 290) and provide "best practices" for working with augmented reality as an emerging technology.

Finally, Butkowski et al. (2022) present the case study of a community-based Internet of Things network project that aims to apply Low Power Wide Area Networks (LPWAN). In the article, they reflect on how to navigate researching a technology in the making. Butkowski et al. discuss the methodological opportunities and pitfalls of their multimethod approach based on semistructured interviews, participant observation, and community-based project work. They identify key obstacles in studying the social construction of networked technologies that bridge online and offline environments, concluding that "these challenges also serve as generative methodological opportunities" (p. 303) for studying technological advances.

3. Conclusions

Together, the seven articles in this issue showcase a broad range of ways of tackling the methodological, practical, and ethical challenges that researchers face when studying current and emerging phenomena across mobile online and offline environments. With this collection, we hope to inspire and facilitate discussion and advance methods-focused scholarship and a cross-disciplinary exchange on mobile digital technologies and their embeddedness in everyday practices across mobile online and offline spaces.

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Conflict of Interests

The authors declare no conflict of interest.

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About the Authors

Katja Kaufmann (PhD) is postdoctoral researcher at the Department of Geography, University of Innsbruck. In the past academic year, she also served as interim professor of Human Geography at the University of Innsbruck. Katja holds a PhD in communication science and her research interests include mobile media, digital and forced migration, digital geographies, mobile methods and method development, and research ethics. Katja's work is published in leading journals in the fields, such as *Mobile Media & Communication*, *Information, Communication & Society*, and *The International Journal of Qualitative Methods*.

Monika Palmberger holds a PhD in social and cultural anthropology (University of Oxford, 2011). She is senior research fellow at the Department of Social and Cultural Anthropology at the University of Vienna and associate research fellow at the Department of Social and Cultural Anthropology at the University of Leuven. She is principal investigator of the research project REFUGEeICT—Multi-local Care and the Use of Information and Communication Technologies Among Refugees (2018–2022, funded by the Austrian Science Fund). She is author/editor of three books and numerous articles in peer-reviewed journals (including *Journal of Ethnic and Migration Studies*, *Citizenship Studies, Focaal*, *Space and Polity*, *Identities*, and *International Journal of Comparative Sociology*).

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Article

The Affective Triad: Smartphone in the Ethnographic Encounter

Suzana Jovicic

Department of Social and Cultural Anthropology, University of Vienna, Austria; suzana.jovicic@univie.ac.at

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Abstract
"Hanging out" and establishing "rapport" is an essential part of the ethnographic encounter in anthropology. But what happens when the smartphone, seemingly a distraction from the relationship in the making, creates a wall between the anthropologist and the interlocutor? While smartphones have been widely explored as a media technology used by the interlocutors, or as research tools, their affective grip on the researchers themselves has received less attention to date. Based on ethnographic fieldwork conducted with visitors of two youth centers in Vienna, Austria, in 2019, I argue that the moment when the smartphone becomes part of the affective triad, alongside the researcher and the interlocutor, also presents a window on the entanglement of digital technologies with everyday life. Moreover, affective ripples emerging from such irritations also expose underlying assumptions about how ethnographic encounters should ideally proceed and what constitutes rapport and "good" ethnographic relationships, seemingly a prerequisite for successful ethnographies. Hence, affective entanglements and irritations that arise in this context are not disturbances to be discarded or smoothed over in the ethnographic narratives. While the smartphone appears to impair the ethnographic encounter at first, its designed porosity allows the researcher to develop a particular sensitivity to issues of rapport, consent, and privacy, and to negotiate the space of potentiality of ambiguous, door-like situations, thus becoming a methodological blessing rather than a curse.

Keywords
affects; anthropology; digital ethnography; ethnography; privacy; rapport; small talk; smartphone; youths

Issue
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1. Introduction

"As soon as they start using their smartphones, our work becomes really difficult," was the reaction of one staff member and a common sentiment I encountered during my ethnographic fieldwork at a youth center in Vienna in 2019. After introducing myself and explaining my interest in the usage of digital media technologies among youths, staff members typically shared their concerns that their relationships with youths were disturbed by smartphones. The staff member quoted above continued: "Our work has changed, it's different now than it was 10/15 years ago. It is harder to reach them and connect with them." The youth centers, often located near council housing, provided young visitors with access to free recreational spaces where they could play analog and digital games, hang out, or do homework. The staff managed the space, initiated activities such as excursions, political quizzes, cooking, and sports competitions, but above all sought to build long-term relationships of trust with the visitors. They actively sought contact with the youths, engaged them in casual conversation, and exchanged notes during the subsequent debriefing. Aside from their explicit pedagogical agenda and counseling efforts, their overall goal of building rapport and trust resembled my own role as an ethnographer. Therefore, their frustration with the smartphone as a disruption of the connection we all sought seemed a cause for alarm. Was the object I sought to understand as it entered social relations also the same object that might sabotage my own ethnographic relationships?

The popular imagination still seems caught up in images of fragmented attention and disrupted sociality, especially in relation to young people turning

"smombies'' in the face of the irresistible distraction of digital games and socializing. The widespread persistence with which young people, in particular, are subjected to moral panic related to digital media technologies is curious, given that scholars from anthropology, media and communication studies, and related disciplines have long provided ample empirical evidence across the world that such technologies do not corrode sociality by default (e.g., boyd, 2014; Horst & Miller, 2006; Ito et al., 2005; Miller & Slater, 2003), but can also help scale it (Miller et al., 2016) or extend it, resulting in "augmented flesh-meets" (Ito & Okabe, 2005, p. 257) that are permeated by the co-presence of absent friends and (dis)localized communities and networks across transnational flows (e.g., Greene, 2020; Hromadžić & Palmberger, 2018; Madianou & Miller, 2012). The disjuncture between the theoretical framing of smartphone-like technologies and the youth workers' construction of the smartphone as an enemy was also reflected in my initial experience in the field, imbued with pragmatic concerns about being unable to establish contact with youths immersed in their smartphones. This irritation was particularly curious because although I experienced a smartphone-free period until my early 20s, smartphones are a welcome part of my own everyday experience. Here, I explore affective disturbances that are rarely woven into the sophisticated theoretical framing of smartphone use but are nonetheless an essential part of the messy fieldwork experience. I argue that the entry of an object of awkwardness—a smartphone—into the field on the one hand helps to expand our conceptualization of online-offline spaces, but on the other also sheds new light on the blind spots of the "old" issues of legitimate data collection, rapport, and privacy.

2. Smartphones and Ethnography

To date, much research has been conducted on how research participants in different global and local settings use, adapt, and appropriate digital media technologies such as mobiles phones and smartphones (e.g., Hjorth & Arnold, 2013; Ito et al., 2005; Miller et al., 2021; Slater & Kwami, 2005). Less attention has been given to methodological considerations of smartphone use by ethnographers/researchers themselves, although research has provided growing insights into innovative ways of using the smartphone as a valuable tool, with all its beneficial and problematic sides, for relationship building, data collection, and teaching (Favero & Theunissen, 2018; Kaufmann, 2018; Verstappen, 2021). Few scholars, however, have scrutinized how the emergence of digital technologies in ethnographic encounters affects emerging relationships and the affective labor of ethnographers engaging with spatially and temporally dispersed interlocutors who slip in and out of online-offline environments (Bengtsson, 2014; Mainsah & Prøitz, 2019; van Doorn, 2013). This neglect of affective entanglements in research is symptomatic of historical and sometimes gendered research practices in which emotions have been viewed as disturbances that contaminate scientific data (Davies & Spencer, 2010; Stodulka et al., 2019). However, as some scholars have argued, emotions and various intimacies in the field introduce the essential dynamics to research as they move, motivate, or discourage engagement in the field and must thus be taken seriously (Ahmed, 2013; Fraser & Puwar, 2008; Lutz, 1988; Stodulka et al., 2019).

Especially when research is steeped in technologies designed to create intimacy in everyday interactions (Pink et al., 2017), examining the affective ripples surrounding researchers themselves seems helpful in understanding how intimacy is created across and along screens. As media and communication scholar Bengtsson (2014, p. 863) argues, researchers are rarely discussed as embodied subjects embedded in an offline social and cultural environment, gendered power dynamics, and daily caring responsibilities when conducting ethnographic research online. While Bengtsson explores the difficulties she encountered when doing online ethnography while embedded in family life and affective work at home, in this article I explore how, conversely, my offline presence, as my primary methodological vantage point, became linked to smartphones and online space precisely through affective and embodied entanglements. In particular, I ask what the emergence of such an attention-grabbing object within the ethnographic relationship means for the latter's formation. How does this affect "connection" or "rapport," the idealized state of alignment that seems to be one of the major prerequisites for successful ethnographic fieldwork? What questions of consent and ethics does it raise (Palmberger & Budka, 2020)? Before addressing the notions of rapport and privacy, and framing smartphones as part of the affective triads alongside the ethnographer and the interlocutor, I will briefly outline my methodological approach.

3. Smartphones and the Youth Centers

The two youth centers I visited weekly over 11 months in 2019 were inherently social, buzzing leisure spaces, chosen to explore young people's everyday digital practices through participant observations, documented in subsequently coded fieldnotes according to constructivist grounded theory (Charmaz, 2014). This research follows previous interdisciplinary work on youths' situated use of digital media technologies (e.g., Archambault, 2017; boyd, 2014; Ito et al., 2009; Miller et al., 2016). Following the "non-digital-centric" (Pink et al., 2016, p. 9) approach to ethnographic study of digital phenomena, I adopted a holistic perspective and embedded youths' practices on and around the smartphone into a larger social, cultural, and political context. Here, "hanging out" online and offline soon turned political, as extended scrolling on the smartphone appeared embedded in the chronic boredom and unemployment of youths struggling to

find work and apprenticeships, as the themes of poverty and inequality soon emerged prominently in the ethnographic conversations about issues that many of my interlocutors faced daily (Jovicic, 2020a; Jovicic et al., 2019).

Rather than pre-selecting a particular set of practices, platforms, or communities, I decided to frame the physical field as a site of dynamic sociality, permeated by smartphones and the online spaces they afforded. These places were simultaneously located in physical sensory environments that offered playful corners, warm shelter in winter, or air-conditioning in summer—and the extended, trans-local, multimodal leisure spaces enabled by screens. As researchers of digital phenomena have noted, such an intersection of online and offline spaces of sociality poses a methodological challenge. While some have called for blurring the boundaries between online and offline (Coleman, 2010), others have argued that the online and offline realms can be seen as co-constitutive rather than intellectual artefacts to be blurred (Bareither, 2017; Boellstorff, 2012) and that the blurring of online and offline would dilute the political architecture of often highly commercialized online spaces (Nardi, 2015, p. 19)—an argument I would extend by noting that the blurring of boundaries can be an explicit goal of digital designers who create immersive experiences. However, while such approaches are insightful, they do not always explicitly place *the embodied* researcher in the online/offline continuum. This is where the notion of "digital environments" (Frömming et al., 2017) seems appropriate, as it encompasses the virtual and physical realms, where people, devices, and online spaces are all part of the same complex, rather than blurry, "digital environment." From such a perspective, the researcher becomes a "dweller" (Ingold, 2000) within the same environment, while the distinction between ethnography and "digital ethnography" fades into the background, except for the "digital" phenomenon at the center of the research inquiry.

However, dwelling in the same environment does not mean that access can or should be granted to all spaces, be it among a group of friends engrossed in a private conversation in the youth center or private online messages. Considering that most of my interlocutors were minors, I saw consent as an ongoing dynamic process (Sveningsson Elm, 2008) and only engaged with youths' online profiles when they explicitly granted access in real-time rather than following them online. Ethical reasons aside, my interest was primarily in the embodied in-between moments when their fingers touched the screen, somewhere between intention and content. While the content of online practices or the intricacies of specific online platforms or communities have been studied frequently in scholarship over the last two decades, embodied, seemingly trivial, and "in-between" (Hjorth & Richardson, 2014; Ito & Okabe, 2005; Juul, 2010; Kinder-Kurlanda & Willson, 2016; Kuittinen et al., 2007) "small scale practices" (Møller & Robards, 2019), such as scrolling and swiping, are still ethnographically underresearched. Hence, I primarily focused on the moments in which online and offline intersect, as the thumb scrolls through the Instagram feed while passing the time, and not necessarily because the person is interested in its content—i.e., mundane practices reminiscent of what Ehn and Löfgren (2010) have called "non-events," barely perceptible, yet imbued with complex meanings and social choreographies. Within the "digital environment" in its entirety, conversations went in and out of the smartphone, as some spontaneously shared online content as part of our conversations, or when I asked if they wanted to share what they were doing at a particular moment. I did not conduct walkthroughs, as I was mainly interested in "naturally" occurring, "embedded, embodied and everyday" (Hine, 2015) instances of digital/online interactions, rather than the log of past activities or totality of digital networks or practices.

These ongoing on-the-spot negotiations about entering and leaving a private online/offline space took place not in the context of spectacular events, such as the signing of a consent form or the final establishment of trust after a transformative event that fostered intimacy and connectedness, but in the unspectacular "non-events,'' in the barely perceptible disruptions and affective ripples crossing online/offline boundaries. To further develop this argument, I will take a step back and first explore the underlying ideas behind rapport, before examining the role of smartphones in the process of rapport development.

4. The Holy Grail of Rapport

For more than a century, the concept of rapport has been an obligatory presence in methodological textbooks advising novice ethnographers on interactional rules for establishing rapport (Rampton, 2021). However, although rapport has become an indispensable part of the ethnographic vocabulary, it still remains undertheorized, somewhat vague, and embedded in an air of mysticism, much like "*en rapport*" as "in communication" was used to describe mesmeric states in 19th-century spiritualism (Goebel, 2021). The term, which stems from the French word *rapporter*—to carry something back—describes how a relationship is formed between two people who come into contact. According to the Collins Dictionary, "If two people or groups have a rapport, they have a good relationship in which they are able to understand each other's ideas or feelings very well" (Rapport, n.d.-a); while the Cambridge Dictionary describes rapport as "a good understanding of someone and an ability to communicate well with them" (Rapport, n.d.-b). This promise is no less attractive to ethnographers who strive to understand "emic," often unfamiliar and distant perspectives. Failure to make such a connection seems to indicate failure on both a personal and professional level, leaving students under institutional time constraints at an impasse despite methodological formulas (Rampton, 2021).

Recently, scholars such as the authors of the edited volume *Reimagining Rapport* (Goebel, 2021) have argued that the concept of rapport—which Malinowski (1922/2020) regarded as a desirable side-effect of "being there" and building long-term relationships with interlocutors—reproduces problematic assumptions about fieldwork in general. As a "warm and fuzzy" feeling, it remains a positively connoted affective state that is rarely challenged and only seemingly emerges after a series of significant transformative events that establish a solid bond with individuals and entire communities. Only then does the immersion in the field appear to be complete, and rapport serves to legitimize the researcher's data and claim "understanding, authenticity and authority" (Goebel, 2021, p. 404) after the doors opened for in-depth data collection. The problem with this common narrative is that it freezes the community or individuals in a fixed bond that denies the "co-evalences" (Fabian, 2014) of the interlocutors, a bond that, once it has emerged due to certain preconditions, is hardly mentioned afterwards, and often remains removed from the context in which rapport is situational and performative (Goebel, 2021, p. 31). Goebel, like the other contributors, offers solutions stemming from linguistic anthropology. Rather than constructing a perfect narrative of overcoming the challenges of fieldwork after initial conflicts and frustrations, the authors advocate a closer examination of the discursive means and dynamics involved in the production of rapport (Goebel, 2021). While attention to discursive devices has its limitations outside of linguistic expertise, the emphasis on critical readings of rapport, how it is constantly (re)negotiated by all parties rather than produced by a researcher, how it is carried out and, equally important, how it fails and is disrupted is a valuable lens to better understand how rapport emerges in digitalized circumstances.

The fuzzy vagueness of rapport, beyond the binary of established or unestablished, is complicated enough without the presence of smartphones creeping into the emerging relationships—relationships that rely on the bidirectional loop of "rapporter" when the third actor, a smartphone, is included in the equation of attunement, and the interlocutor's gaze turns away from the researcher. As Springwood and King (2001, p. 410) noted, Marcus' (1999) substitution of rapport for collaboration was a result of the increasing problematization of rapport, but this approach reaches its limits as soon as we ask "how to collaborate with a significant practice or sociocultural landscape" or, to extend this question, how to collaborate with a smartphone, especially when "sticky screens" turn the gaze inward (Richardson, 2010) and face-to-face interaction seems displaced.

5. Smartphone as a Disturbance

I usually entered the youth center in the afternoons, when the mostly male youths, aged 12 to 21, gradually arrived after younger visitors left. The colorful space was dominated by eclectic sofas and posters on topics such as homophobia, brochures on local activities, or youth artwork. Afternoon visitors usually listened to rap music that alternated between local slang or Turkish songs, varying in style and volume depending on who happened to be passing by the youth center's old computer with the YouTube webpage open. Sometimes the "bar" area, where snacks and non-alcoholic beverages were sold or where donated food was prepared, appeared enveloped in the steam of Turkish chai tea, while a group of youths nearby threw their arms dramatically in the air and danced to a popular song. Staff members were scattered around the room, occasionally joined by ever-changing interns. My emergence on the scene was unremarkable, as I was identified as just another "unpaid intern" or, when the youths learned of my interest in digital media technologies, turned into "the internet woman," as one visitor introduced me after forgetting my name. Unlike the regular staff, whom some visitors had known for most of their lives, the interns were a fleeting presence. It was usually the established staff that the young people turned to for help with apprenticeships, job applications, private family matters, as well as police and court appointments, while the mostly younger interns served as companions at table tennis or Mario Kart. At 30 years old, I was perceived as lingering somewhere in the middle: old enough to understand the struggles with the job center, and digitally capable enough to participate in the Mario Kart races on the Wii console, although usually coming in last. Having immigrated to Germany from Bosnia and Herzegovina as a teenager, I was also "foreign" enough to relate to the concerns of the youths, most of whom had some sort of migration or asylum-seeking experience. Although research with young people frequently involves a "wariness of adult authority" (Campos-Holland et al., 2016, p. 226), I was occasionally able to tap into the established role of youth workers, who emphasized a non-hierarchical approach to their work and were usually seen as trusted confidants on issues not normally discussed with other adults. Moreover, I also benefited from the numerous opportunities to playfully "be there."

However, the space was not always buzzing with sociality and play. Sometimes, for reasons even the most experienced staff could not foresee, few visitors showed up; no one played songs on YouTube, and scattered individuals could be seen leaning on the sofas, engrossed in their smartphones. On such occasions, time passed slowly, as I fought the urge to fight my own boredom and discomfort of staring into space by reaching for my smartphone. Initially, I wondered if I should interrupt those who seemed to be busy chatting online. Dismissing it as rude, I patiently waited for a moment when the person looked up and seemed disengaged enough, before disturbing the intimate relationship between the person and the smartphone. At times, this imaginary wall that began to manifest in my perception was reinforced when a group of all-male friends who spoke only Turkish

to each other were passionately playing a then-popular PubG mobile game and not paying much attention to the silent observer/researcher nearby, wondering what the "participant" aspect of "participant observation" actually meant. It seemed as if the pre-existing barriers of age, gender, my inability to play such games, or language were further cemented by the protective wall that the smartphone erected around the interlocutors. In this context, the smartphone acted like a black box that was not only impenetrable itself, but also exuded an air of warmth and intimacy towards the user, while remaining cold to the researcher.

In these situations, there was a dual pressure to build rapport. On the one hand, I tried to mimic the staff's efforts to constantly engage the visitors in conversation and activities. Although such expectations were not imposed on me, our collective failure to engage the youths and keep them from leaving out of boredom was discussed in the debriefing as something that needed to be changed. Second, the ethnographic mantra of constantly establishing relationships was ever-present in my mind, as I tried to make contact and engage in small talk, wondering how relationships are established and how the researcher's agenda affects their nature. While manuals of anthropological and ethnographic methods abound with advice on interviewing, small talk, a quintessential aspect of ethnographic fieldwork, is still rarely treated explicitly as a methodological concern, despite the fleeting theoretical discussions of "phatic community" and the importance of casual greetings, gossip, and passing conversations for social cohesion (Driessen & Jansen, 2013; Goebel, 2021).

While trying to deliberately establish rapport, I wondered about the comments of the youth center staff and my own impression of the smartphone as a competitor. Observing from a distance how potential conversation partners were technically present but focused all their attention on the smartphone eventually triggered a vague sense of jealousy toward the smartphone, which was effortlessly receiving the attention I was striving for. Jealousy, typically discussed in anthropology, if at all, in the context of romantic relationships, was described by Descartes (1988, p. 257) as a "warmth that disposes the soul to undertake things that it hopes (or expects) it can attain because it sees other attaining them." In the ethnographic encounter, feeling jealous of the smartphone indicated a fragile rapport. For if the smartphone siphoned off this warmth, what was left for the ethnographer, seemingly excluded from this dyadic relationship?

"Exclusion," write Herriman and Winarnita (2021, p. 118), "is not only a reason to be unpopular, but also an indication of our possible failure as anthropologists." The pair, who conducted research in Indonesia, report instances in which fieldwork relationships were disrupted by exclusions from important rituals and social activities. However, as they also note, participation in daily life inevitably leads to poor relationships at times (Herriman & Winarnita, 2021, p. 134), which is not uncommon for anthropologists who tend to strive for warm relationships conducive to fieldwork (see, e.g., Beatty, 2005; Briggs, 1970). Nevertheless, as the authors highlight, even hostile rapport can lead to crucial insights (Herriman & Winarnita, 2021, p. 134). In this case, the disruption caused by the smartphone exposed the ways in which I had created a mystical atmosphere of privacy and impenetrability around the smartphone. Initially, I understood it as an intimate and private object that required me to look away rather than pry into its inner secrets. These imaginations, based more on my implicit assumptions rather than on conversations with interlocutors, then reinforced the self-doubt I was experiencing while trying to relate in an unfamiliar environment, further clouding my view. By creating an affective, dynamic web of warmth and distance, smartphones caused disruption; but they also drew my attention to the blind spots that led me to misinterpret the activities of those seemingly engrossed in smartphones as absent from the potentiality of sociality.

6. Smartphone as an Ambivalent Friend

As the authors of the volume *Reimagining Rapport* (Goebel, 2021) write, it would be easy to construct a narrative arc from the awkward beginnings, through difficulties of fieldwork, to the transformative moments of eventually established rapport. However, although the "internet woman" became a familiar sight, the ethnographic relationships were also subject to the ebb and flow of interaction in the various rhythms of the youth center—either when nothing was happening, or when meaningful conversation could take place between two table tennis sessions, or while I was being playfully yelled at by my self-proclaimed coach in Mario Kart, 17-year-old Arnel. Some visitors came regularly, some I saw only once. Sometimes I sat for hours among friends engrossed in Turkish conversations, sometimes the language switched to German as soon as I approached the same group. Some, like Arnel, a charismatic visitor who was popular with peers and staff alike and notorious for immediately engaging with new interns, approached me when he first saw me, announcing: "You're lucky I'm here today." Probably unaware of the significance of such luck for ethnographers, he immediately proceeded to tell his life story. He continued to share bits of his biography and everyday life on every occasion, without a long process of overcoming rapport issues and without much concern with my research agenda. Intimacy appeared in passing moments and disappeared in others, while smartphones, with their ability to open up intimate spaces and temporary "magic circles" (Huizinga, 1938) and close them again, enabled the play of a mobile game for hours, scrolling through Instagram for a few seconds, or engaging with absent friends within one's "telecocoon'' (Habuchi, 2005), thus creating opportunities for "scalable sociality" (Miller et al., 2016).

The importance of these shifting rhythms of attention, communication, and intimacy was most evident in the in-between moments and "non-events," where smartphones creep in through their deliberate design aimed at bridging the dead time while waiting, commuting, or being bored (Hjorth & Richardson, 2014; Ito et al., 2005; Willson & Kinder-Kurlanda, 2021). Occasional scrolls, free of content or specific intent, were sprinkled over casual conversations in the flesh, simultaneously filling "small communication voids" and "gaps in the day where one is not making interpersonal contact with others," as Ito and Okabe (2005, p. 263) phrased it in relation to early mobile phone use in Japan. There were no clear boundaries between online and offline spaces, between hanging out with or without a smartphone. Instead, multilateral sociality unfolded with peers present and absent, and with me as the researcher, all the while maintaining peripheral awareness (Ito & Okabe, 2005; Richardson, 2010). For example, David, a 16-year-old apprentice gardener once showed me the FIFA mobile game he was playing with his absent friend, while also talking to his friends across the room who were playing the FIFA video game on the PlayStation. He drew a digital card with a FIFA player and then waited for his friend to react while participating in several parallel streams of communication. On another occasion, when a group of friends were playing an analog poker game, 16-year-old Hassan was the first to lose and had to grudgingly move to the periphery of the game's magic circle. Having lost the attention of the other players, who ignored the interference of other people and vibrating devices, he opened a mobile poker game on his smartphone and joined a magic circle with the machine while talking to me, aware of his friends and their absent attention, ready to rejoin them as soon as they restarted the game.

The presence of smartphones in the ethnographic encounter also created the possibility of weaving images, audio, and video into flowing conversations, while expanding space and time. Sina, whose family left Afghanistan to seek asylum in Austria, showed me her WhatsApp groups after I asked her about her smartphone and told me about the friends she had made in a Turkish refugee camp who were now living in different places around the world. The instant messages shared with me revealed a wealth of biographic links and hopes for the future. The smartphone housed an endless trove of both intimate and superficial, but no less important, content—for example, when Arnel explained the dramas of his new relationship by showing me his girlfriend's messages, but also the funny memes he had collected in a photo gallery, just because he was bored and felt like having a laugh. For the most part, I did not actively seek out the invitation into the smartphones and online worlds they afforded. Instead, the smartphone became an inevitable part of the multimodal conversations regularly transcending online and offline. Without the need for spectacular events, the shared everyday "non-events" (Ehn & Löfgren, 2010) involving the smartphone had created realms of intimacy, drawing me into a temporary affective triad that could be created and dissolved at any time.

Moreover, the sometimes-slow rhythm of stalled conversation and play, or the occasional boredom, were essential to experientially understand what later became crucial research insights. While conversations often revolved around unemployment, discrimination, and a general lack of apprenticeships or employment, the chronic experience of boredom and waiting became emotionally palpable in those very moments of slow hanging out, when effortless scrolling through Instagram feeds did not simply fill a short-lived dead time of lapsed conversation but became symbolic of an effortful state of disorientation and stagnation in the endless feed of rejections and failures. Sometimes, reaching for the smartphone did not signify a deliberate interruption of sociality or even temporary boredom, but was part of "making do" (Greene, 2020), of making the waiting and boredom bearable. While adjusting to the larger dynamics of exclusion from socio-economic participation, window shopping on Instagram meant almost but not quite participating in the commercial flows. Here, the seemingly inefficient boredom of fieldwork, which also plagued Malinowski (1922/2020), or the temporary walls caused by the smartphone were not necessarily a threat to relationships but an unavoidable part of my interlocutors' lives. Submitting to these rhythms meant gaining understanding through them. Over time, the initial irritation of halted conversations and boredom became political, as hanging out turned into doing nothing, and thus into a symptom of "social suffering" (van den Berg & O'Neill, 2017). The "sweet nothings" of occasional, casual, intimacy-enhancing exchanges among peers, as Ito (2005, p. 14) phrased it, could at times turn into bitter nothings, as some peers were busy at work, while others were stuck in a cycle of unemployment, waiting for their friends to finish work.

Such fluctuating rhythms of rapport, playful magical circles or instant intimacies were part of the ethnographic experience even before the emergence of smartphones. Nevertheless, the affective ripples surrounding the smartphone drew my attention to the ethnographic non-events that made me question the foundations of relationship building. With their vibrant and pulsating presence, smartphones lend themselves to the ethnographic encounter as a solidified projection surface, much like they serve as a popular scapegoat for various ills of modernity. The inherent ambivalence of rapport and the affective turbulence of fieldwork may easily be projected onto a manifest artefact. Perhaps the discomfort I initially felt towards smartphones' disruptions of sociality was linked to my understanding of dwelling in digital environments as something particularly proactive in the sense of actively seeking rapport to prove ethnographic legitimacy once a "good" connection was established. Rather than waiting for the trust and rapport to turn solid, trusting the shifting rhythms of youth centers

and smartphone-created spaces alike was key to understanding the politics of those rhythms.

As my own preconceptions of smartphones as private objects inaccessible to the gaze of strangers began to crumble, my perception of the role of the smartphone also shifted—again, not necessarily because of increasingly accumulated rapport credit, although some relationships obviously evolved over time. When Sara started coming in with a printed picture behind the transparent smartphone case on the back of her smartphone, I noticed that the pictures changed every week. The picture on the back thus became an outward-facing news bulletin that I used as a conversation starter. Following our conversations, she shared audiovisual clips from her life, whether pictures of her family or her TikTok videos. As Greene (2020, p. 740) noted in her research in Greek refugee camps, images shared in the fieldwork were "not only re-presentations of participants' photographs but also documentations of intimate research encounters." Rather than being discrete and private objects creating distance, smartphones could also expand the possibility of conversation, of "phatic community" and intimacy through mundane acts.

Most of my interlocutors did not pull out their smartphones indiscriminately at moments when social interaction would be disrupted but appeared sensitive to the implicit rules of social conventions and explained that they were annoyed when someone was on their phone when inappropriate, while some described this sensitivity as a matter of "respect" or "upbringing." At the same time, temporary disruption of sociality could be triggered by someone pulling out their phone and eliciting a wave of smartphones that populated the tables and occupied hands; and conviviality was restored when someone was scolded for answering their phone during a game. The seemingly rude disregard of these rules could also be relativized. Arnel, for example, eagerly anticipated meeting a girl who was to be introduced to him by family friends. However, during dinner with their parents, she kept looking at her phone instead of engaging with Arnel, which dashed his romantic hopes. However, Arnel showed understanding and explained that he later found out that she was having a bad day due to a family incident before dinner and was clinging to her smartphone for comfort.

7. Privacy and Negotiation of "Doorstep Moments"

Such examples of performing social absence and withdrawal through the deliberate act of engaging with the smartphone when physical distance is not possible are reminiscent of research by Hirschauer (2005), who examined how discomfort with physical proximity in elevators is managed through subtle signals of absence. Similarly, Tacchi (2012) has argued that listening to the radio, and later smartphone radio, may actually represent a withdrawal into silence and away from sociality. In his overview of the rare but extant anthropological exploration of privacy within various sociocultural contexts, van der Geest (2018) argued that the urge to signal withdrawal and privacy, no matter how temporary or variously expressed, seems universal, even if it means creating complicated rules for appropriate behavior that form imaginary walls, be it in crowded prisons or Indonesian longhouses. Research in digital anthropology, as van der Geest (2018) also noted, has shown how digital technologies create islands of privacy away from the prying eyes of a surveilling family and peer networks (Costa, 2016; Horst & Miller, 2006), a point also made by my interlocutors. In this context, privacy and protection of data against the predatory players within the tech industry weighed less heavily than circumnavigating family surveillance.

Moreover, as psychologist Gerry Schwartz (1968, p. 743) argued, privacy "has always been a luxury." Several visitors to the youth center came from crowded households and shared both rooms and digital devices with other family members. For young men, mostly with immigrant backgrounds, hanging out in the yards of housing developments or in shopping malls was sanctioned while they often lacked the means for commercial leisure activities. For some, the youth centers and online spaces were the only sites of free movement and privacy. After all, "home" is not always a safe, secure, and welcoming concept that offers definite privacy and protection (van der Geest, 2018) as the Covid-19 pandemic has shown when domestic abuse cases skyrocketed globally (Piquero et al., 2021). Temporary negotiations of withdrawal, even in the hypersocial context of youth centers, were thus unsurprising, and I as a researcher had to learn to distinguish these signals of withdrawal from the convenience of fiddling with one's smartphone because one feels excluded or disengaged. On such occasions, smartphones served as an invisibility cloak, as for Arnel's love interest, who signaled her absence from the table despite his advances.

It was not necessarily only the quality of the rapport, but also my increasing understanding of the affective and effective features of smartphones, as well as my own biases and sensitivities that made a difference when interpreting unfamiliar contexts. These ongoing interpretations of the potential for sociality were critical not only to establishing temporary relationships but also to negotiating my interlocutors' privacy and consent to allow me insights into their smartphones—both aspects of a "good" connection borne of mutual respect. When it is intimately connected to the relationship, consent is not a one-time legal agreement that is signed and never revisited. However, taking refuge behind one's own discomfort when unsure whether we, as researchers, should interrupt another person's affective dyad, would also be a missed opportunity to engage simply because one views the smartphone as a private and non-permeable object. For novice ethnographers, feelings of discomfort and self-doubt are common aspects of fieldwork, but also, like small talk, rarely discussed (Koning & Ooi,

2013). However, taking affects such as jealousy and discomfort seriously helps us to approach these ambivalent moments of rapport with sensitivity, without violating the dynamic boundaries of relational privacy. Such trespassing does not necessarily have to be conscious but can be hidden behind the implicit notion that it is always desirable to be vulnerable and share private matters, while good connection/rapport serves to convince our interlocutors that they should do so (Rampton, 2021)—a notion that is particularly problematic towards minors.

Smartphones are "leaking" (Ingold, 2010) and porous, not discrete, impenetrable objects. Yet their porosity reflects the fragility of ethnographic or, for that matter, of all emergent relations that are not established in binary terms. The liminal space of potentiality in which these negotiations take place can be compared to the potentiality of doors (Jovicic, 2020b). Depending on the context, doors and comparable signifiers of sociality and privacy can be interpreted in a myriad of ways (Schwartz, 1968; Vogler & Jørgensen, 2004). Doors can both signify an invitation and transform into a temporary wall, symbolizing a separation that "denies the possibility of the encounter and withdrawal of social exchange" (Schwartz, 1968, p. 749). Lemos Dekker (2019) speaks of such "doorstep moments" in her research on dementia in nursing homes in the Netherlands, where she found herself lingering at the doorstep, neither here nor there, while patients were dying, relying on her ethnographic sensibility to understand the desires of patients and their family to stay away or enter. Rather than mystifying rapport through simplistic narrative arcs, understanding that ethnographic fieldwork is filled with such back-and-forth "doorstep" moments can help normalize discomfort and create respectful ethnographic relationships that are constantly in flux rather than fixed once established.

8. Conclusion

In the ethnographic methodological literature, smartphones have so far mainly appeared as valuable methodological tools and fieldwork companions. However, their unique characteristics also make them a valuable subject of methodological inquiry regarding the affective entanglements of fieldwork relationships and what these entanglements tell us about ourselves, the interlocutors, and the obscure assumptions about ideal fieldwork. As I have argued, smartphones are a unique reflective surface, a solidified convergence of different constructs in a particular space and time, where moral panic meets everyday discomfort and porous design that can be simultaneously conducive and disruptive to sociality, both within the ethnographic encounter and between interlocutors. As affective, intimate, and "wearable" devices with multiple capabilities of "archiving and sharing affective material," smartphones are "uniquely embodied" (Greene, 2020, p. 733), and, as such, are a shifting subject of fluctuating rhythms of everyday life and relationships, a symbol of proximity and distance, intimacy and exclusion. In the everyday lives of my interlocutors, smartphones were seamlessly embedded in everyday negotiations of sociality and disengagement, varying time regimes, and in a broader dynamic of sometimes precarious participation in social, commercial environments and labor markets.

In other social and cultural contexts, or with other researchers, the time regimes and specific social choreographies surrounding smartphones may vary, yet the designed in-betweenness and doorway-like nature of smartphones inevitably has the potential to unearth affective ripples and thus bring the strange and the awkward into the familiar—a particularly relevant concern within ethnographies in contexts similar to our own.

Within the ethnographic encounter, smartphones affect ethnographic interactions not only in the sense of discomfort of being excluded or even as drivers of interaction and sociality but through continuous negotiations of the meaning of smartphones in the unspectacular, often invisible "non-events" (Ehn & Löfgren, 2010) of everyday life. These negotiations do not take place in spectacular events after solid rapport and trust have been established but in long hours of togetherness, boredom, scrolling, and swiping, instant and fragmented intimacy, or within the strategies of invisibility and withdrawal. Based on this continuous ebb and flow of ethnographic connections, I have argued that the interruptions and impermanence that smartphones introduce into a vague process of relationship-building offer an opportunity to rethink entrenched notions of ethnographic encounters and, in particular, of rapport and privacy, both of which are deeply intertwined in digital environments. Negotiating "doorstep moments" caused by smartphone interference sheds new light on the old process of relationship-building with interlocutors with whom we need to carefully negotiate access and privacy in an ongoing process, rather than as a one-off event after rapport is finally established. Moreover, attention to affective currents such as discomfort and relational disturbance in ethnographic research situates the embodied knowledge of the researcher (Stodulka et al., 2019). These considerations should be extended to the study of and with smartphones, which are part of an affective triad as uniquely embodied devices.

Finally, this affective thread can help us better understand the entanglements of online-offline digital environments and their dynamics, rather than simply blurring the boundaries, which would also blur the situatedness of a researcher as a situated being. As Bengtsson (2014) noted, even when conducting ethnography entirely online, one is not disembodied. But the opposite is also true—When doing ethnography offline, the vibrating devices are an inevitable part of the intimacies that develop in the field, whether through the shared images as a memento of a fieldwork relationship or through the alternation of distance and proximity, of cold and warmth. Awareness of their impact is another

important reminder of the complexity of digital environments, where inanimate objects and absent others also become part of the fieldwork experience. Ultimately, this is the appeal of ethnography—the ability to instrumentalize sensitivities to irritations and disturbances to better understand the complexity of the (digitalized) world around us.

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Conflict of Interests

The author declares no conflict of interests.

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About the Author

Suzana Jovicic is a postdoc and lecturer at the University of Vienna, Austria. She is working at the intersection of psychological and digital anthropology and is a co-founder of the Digital Ethnography Initiative (DEI) and a board member of the European Network for Psychological Anthropology (ENPA).

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Article

Mobile Belonging in Digital Exile: Methodological Reflection on Doing Ethnography on (Social) Media Practices

Cathrine Bublatzky

Heidelberg Centre for Transcultural Studies, Heidelberg University, Germany; bublatzky@hcts.uni-heidelberg.de

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Abstract
Life in exile presents hardship and brings with it multiple personal and socio-political challenges and grievances. Being forced into separation from family and home society often stimulates the desire to maintain belonging and contact with families and communities. "Co-presence" and "being there" require a lot of personal effort and commitment. Communication and mediation strategies have a special significance as everyday practices in social and digital media technologies. "Mobile belonging" and staying connected across various online and offline spaces and in various social and political environments and communities can be a constant requirement in digital exile. After an introduction to relevant literature about the complexity of media communication, belonging, and migration, the article examines mobile media technologies and the central role they play in everyday exile. Following a discussion about the notion of "digital exile" and "mobile belonging," the second part of the article will focus on a specific case study of an Iranian artist and activist living in exile in Germany. It will show how (social) media promotes activism and performance in both online and offline public spaces as practices of "mobile belonging here and there" during the Covid-19 pandemic. Thirdly, the article will turn to a methodological reflection about doing ethnographic research on digital exile and practices of mobile belonging. With a systematic description of applied methods, early developments in multi-modal ethnography will be outlined that illustrate how collaboration and co-creation promise innovative directions for doing ethnography on digital exile in the different-yet-shared times of the pandemic crisis.

Keywords
activism; collaboration; communication; digital exile; ethnography; media; mobile belonging; multimodality

Issue
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1. Introduction

Exile poses an "unhealable rift forced between a human being and a native place, between the self and its true home," as Edward Said wrote in *Reflections on Exile and Other Essays* (Said, 2000, p. 310). Not losing contact with those left behind can make the traumata and grievance of exile somewhat more bearable. Communication is crucial to maintaining a sense of belonging among family, friends, and one's home country. Such efforts require certain strategies, or, more precisely, communication practices, whether in terms of representation and information politics, mobile messaging, community building, networking and placemaking strategies, or embodied and mediated activism or conflicts. In all these different cross-bordering spheres of mobilities and transnational communication activities, migrants make use of different media technologies (Smets et al., 2019). An accomplished range of scholars addresses the deep intertwining of forms of migration (including refugee, diaspora, and exile) and media. Much of this social qualitative research has, on one hand, a particular focus on new or polymedia and their role and functionality in transnational families, as well as the sense of connectedness and constraints they impart on intimate levels such as emotion, caring, or ageing (Baldassar, 2015, 2016; Baldassar & Wilding, 2020; Madianou & Miller, 2012; Palmberger, 2017; Pfeifer,

2019). Making distance bearable, de-demonising everyday separation, and being co-present and "emotionally 'there' for each other" (Baldassar, 2016, p. 145) illustrates how having access to information and communication technologies—and the technical skills necessary to handle them—are very important for the "ability to be co-present across distance" and to sustain "transnational family relations" (Baldassar, 2016, p. 145). On the other hand, there is a growing field of researchers who investigate global connectedness and transnationalism with a focus on dispersed and mobile diasporic communities. An expanding field of "digital diaspora" studies (e.g., Alonso & Oiarzabal, 2010; Andersson, 2019; Brinkerhoff, 2009; Candidatu et al., 2019; Everett, 2009; Karim, 2006; Ponzanesi, 2020, 2021; Retis & Tsagarousianou, 2019) has critically engaged with diasporic media; "mediated interactions, on flows of ideas, information, resources"; and for getting beyond an "occasionally excessive emphasis on the notion of a homeland left behind, lost and/or lamented" (Retis & Tsagarousianou, 2019, p. 4). In this sense, studying the "connected migrant" (Diminescu, 2008) from a critical digital diaspora studies perspective hereby emphasises that contemporary human mobility is "shaped by and constitutive of an unevenly interconnected world" (Candidatu et al., 2019, p. 33). Digitality is furthermore "not disconnected from 'reality,' " rather an inherent "continuity between online and offline worlds" poses "different accents and problems to understanding their complementarity" (Candidatu et al., 2019, p. 40).

In this regard, it seems necessary to acknowledge certain interrelationships and power structures when studying media's role in migratory or diasporic contexts. As specific stakeholders living and working in the diaspora, media professionals deserve special attention here for their usage of different media in the diasporic situation. One can hereby ask for a relational approach to "both presenting and representing migration" in "migrant narratives" (Leurs et al., 2020, p. 4) because certain practices and forms of documentation and representation (including genres, styles, aesthetics) are deeply embedded within "larger frameworks of power and governmentality" (Leurs et al., 2020, p. 4). The politics and poetics of engaging with trauma, displacement, loss, or identity struggles in diasporic and migratory landscapes have found their entrance into different conceptual notions of "accented cinema" (Naficy, 2001, p. 4), migratory aesthetics (Bennett, 2005; Durrant & Lord, 2007; Moslund et al., 2015), performing exile (Meerzon, 2012), or documenting the migrant image (Demos, 2013). It is within this broader range of digital diaspora studies, in which I situate this article and my five years of related ethnographic research on the photographic practices in the art and activism of Iranian artists and photographers in German exile and migration contexts (see also Bublatzky, 2015, 2018, 2019a) arguing that such practices are "situated in the everyday" (Pink, 2012) of Iranian exile.

In this article, I foreground what I suggest calling a "digital exile" (instead of digital diaspora) and practices of "mobile belonging" in the face of mobile technologies and their use in on- and offline spaces. In doing so, I want to show in Section 2 that professionals like artists and activists (or activist-artists) living and working in a situation of forced displacement can be representative agents for digital citizenship and political and poetic migration narratives when doing ethnography on mobile media technologies and communication in the field of exilic cultures. Exile is an ongoing state of crisis, with "critical states as pervasive contexts" (Vigh, 2008, p. 8). This is particularly the case when governmental repression and political threats in one's home country restrict mobility and the possibility of return, in contrast to diasporic situations. In these situations, information and social media communication practices in online (digital) and offline (physical) spaces tend to take on a particularly strong socio-political dimension. When "caring for others" and "belonging to" not only include friendship and family members but also situate individuals or groups in exile amidst larger and multi-layered transnational power and governmental frameworks, studying activist–artists' on- and offline experiences with mobile media technologies allows for a "new conceptual and methodological understanding of the phenomenon in its online–offline intersectional co-constituency" (Candidatu et al., 2019, p. 40).

To illustrate its implication for those living in exile, I will provide some empirical insights into a case study and collaboration with the artist and activist Parastou Forouhar. Forouhar, who had been forced into German exile by the assassination of her parents in Iran, has organized an annual Memorial Day in her parents' house in Teheran ever since her involuntary departure. Due to the constraints and global travel restrictions imposed by the Covid-19 pandemic in 2020, she had to interrupt her annual travels to Iran. Ultimately, with the help of others in and outside of Iran, she used a set of different multimedia strategies to cope with these unexpected restrictions and to maintain the Memorial Day in a kind of multimodal, on- and offline format without being physically present. With this particular example and with the discussion of a multimodality of mobile belonging, I wish to show that intersecting online and offline spaces are more than the sum of their separate parts and that "mobile belonging" and the possibilities of coexisting digital and embodied selves in on- and offline spaces in exile have far-reaching implications for those who live under such conditions.

The everyday of "mobile belonging" also has powerful implications for empirical researchers in such fields. Ethnographers, for example, have to carefully consider their methodologies and research designs and how they position themselves and behave as practitioners and researchers in a shared "hypermedia" world (Dicks et al., 2005; Goggin & Hjorth, 2014; Postill & Pink, 2012). In Section 3 of the article, I want to turn towards doing

research on the intersection of the on- and offline spaces and the significant methodological challenges inherent therein. With multimodality (Collins et al., 2017; Dicks et al., 2006, 2011; Hurdley & Dicks, 2011; Pink, 2011) in doing ethnography on mobile belonging and at the intersection of online and offline contexts, I will discuss an innovative approach, that, as I suggest, means researching different meaning-making modes as produced in the different (social and digital) media in people's everyday lives (Dicks et al., 2006, p. 82). Studying the impact of the different modes and the changes they exert on the social everyday implies researching the "use of personal wearable Internet technologies (e.g., smartphones, tablets, and smartwatches) and the increasing connectivity of more and more devices and objects" (Kaufmann & Peil, 2020, p. 230).

This multimodality and the affordances in communicating, producing, and circulating news and information and the social everyday of the "connected migrant" (Diminescu, 2008) or "connected exiled" has consequences for researchers and their methods and research design, triggering ethical concerns. When ethnographers are similarly connected and confronted with "intimate" on- and offline mobile media encounters in their research field, "mobiles increasingly become a pivotal and unavoidable reality in everyday social practices" (Goggin & Hjorth, 2014, p. 2) for the researcher and in the ability to build and maintain social relations with their interlocutors. In response, and in the light of a planned multimodal project that has been developed in partnership and collaboration (Kress, 2011) together with the artist, I will explain applied methods and the challenges and potentials of incorporating multimodality in digital ethnography (Flewitt, 2011).

2. Mobile Belonging in Digital Exile

2.1. Mobile Belonging

Exile, as lived and experienced by Parastou Forouhar and many others, means living in an in-between state where one belongs neither here nor there (P. Forouhar, personal communication, May 24, 2017). Exile is intensively shaped by "a transit, a back and forth, be in and go out, go here and there—to be a nomad and yet be in exile everywhere" (Naficy, 1999, p. 4). Being in transit or "a figure of an in-between space" (Diminescu, 2008, p. 569) acknowledges migrants in particular under the "mobilities paradigm" including their social, geographical, and transnational movements and agencies (Adey et al., 2017; Barber & Lem, 2018; Sheller & Urry, 2006; Urry, 2007, 2010). When living in exile, however, this mobility also includes serious forms of immobility (Cresswell, 2010) because travelling back and forth can be very difficult, if not even dangerous. For example, even when living and working in Iran is unthinkable due to ongoing political persecution and repression, journeys between the host and the home country might still be possible. However, such journeys never happen in complete freedom and always with the uncertainty of experiencing political despotism upon entering or leaving Iran.

Identifying the "connected migrant" and "mobile networks of belonging" (Diminescu, 2008, p. 573) foregrounds mobile belonging in the social life of exiles as "deeply rooted in mobile technologies" and as "more liberated from geographical constraints" (Diminescu, 2008, p. 573). Here Witteborn's (2019, p. 180) approach to the "phenomenology of potentiality" turns out to be particularly useful when she argues that "digital technology is one of the drivers of this potentiality" in transforming "experiences of loss into experiences of participation, self-presentation, and social alliances."

This situation is very familiar to Parastou Forouhar. She is the daughter of Dariush and Parvaneh Forouhar, opposition politicians and activists in Iran, who were victims of political assassinations in their Tehran home on 21 November 1998. Parastou Forouhar, who has lived in Germany since the early 1990s, belongs to the so-called *Burnt Generation*. This term refers especially to Iranians born between the early 1960s and the early 1980s who have spent most of their lives in an environment of war and religious dogmatism in Iran. Many of them fled the repressive regime as a result of the horrific events of the 1979 revolution, Iran's declaration as an Islamic theocracy, and its aftermaths. Settling all over the world, particularly in the US, France, Germany, and England, they form extremely diverse global Iranian diasporic and exile communities. In terms of national ethnicity and belonging, gender, generation, and different localities, one has to carefully consider when to talk about diasporic communities that "tend to be defined as national or ethnic" and when and how nationality and ethnicity interlink with gender, class, and digital grouping (Witteborn, 2019, p. 179). This also counts for exile groups, since exile also cannot be thought of as "a generalised condition of alienation and difference" but much more in the way that "all displaced people do not experience exile equally or uniformly" (Naficy, 1999, p. 4).

For Parastou Forouhar, exile means an in-between existence, being neither here nor there: "not here" (in Germany) where she experiences being perceived as the "other," the "foreigner," or the Iranian; and "not there" (in Iran) because she has been cast as a problematic and uncomfortable person for the Iranian government in the aftermath of her parents' murder and her subsequent struggle against injustice and human rights violations. When it is no longer possible to return to one's homeland, the "belonging neither here nor there" becomes a fundamental circumstance of everyday life in exile. Social and online media technologies thereby play an important role in encountering and even (partly at least) overcoming the grievance of forced displacement in one's private and professional everyday life.

With the approach of "mobile belonging," I do not merely focus on physical mobility. Instead, and in response to digital ethnography (Markham, 2020;

Underberg & Zorn, 2013), collaborative digital ethnography (Palmberger & Budka, 2020), and even hybrid ethnography (Przybylski, 2020), I consider the different uses of mobile media technologies for "mobile belonging" significant in those hybrid contexts where field sites "span digital, physical and digital-physical spaces" (Przybylski, 2020, p. 5). Moreover, because living in (digital) exile powerfully illustrates the ambiguity of "uneven connectedness" to one's home society in everyday life, it challenges in similar ways the social everyday that people experience along a relationality of the "co-presence'' of "being here and there" and across different on- and offline platforms and spaces (Candidatu et al., 2019, p. 40).

2.2. Mobile Technologies

With the rise of digital and social media in the 21st century, when "thanks to the globalization of travel, media, and capital, exile appears to have become a postmodern condition," sites of placement and displacement can be understood as increasingly mediated (Naficy, 1999, p. 4). These sites and their different temporal dimensions have "unique sociotechnical qualities" and "media ensembles" of different mobile devices (Postill, 2020, p. 321), which should always be considered in relation to the time and its technological possibilities. In recent times, they do include the smartphone with different messenger providers, computers and online communication, and chat formats (Postill, 2020, p. 321), whereas at the end of the 20th century, when the world wide web was not yet affordable for everyone, communication took place mainly by telephone or fax. In politics of representation, communication, and mediation, mobile belonging proves to be a central act in an exile-media paradigm that reflects an ambivalent condition of fragmentation in a situation of globally dispersed Iranian political exile and diasporic communities (Naficy, 1993, 1999). So, it is particularly relevant to understand the "technical affordances of today's networked devices" as they "enhance a sense of immediacy by making it possible for people almost everywhere to participate in conflicts [and civic action] remotely as they unfold" (Postill, 2020, pp. 320–321).

Here, overlapping and intersecting media ensembles become "a unique set of mobile (and other) technologies that are brought to bear on a specific collective action, for example, occupying a square, preventing an eviction, or holding a general assembly" (Monterde & Postill, 2014, pp. 429–430). Also, the distinctive mediations of conflict (Postill, 2020, p. 321) as well as the mediation of citizenship, solidarity, or resistance are particularly notable. Social (and other) media practices in online and offline spaces and other forms of media communication that cross transregional and transcultural borders provide the basis for mobile belonging in the everyday life and work of an artist and activist. In other words, mobile belonging is constituted through mobile media technologies on multiple platforms and with different devices and practices. Potential uses include posting photos, poems, or manifestos; sharing obituaries of political prisoners and updates on the lives of people in danger; and liking human rights initiatives or sharing artistic and activist works. Such activities function in conjunction and intersection with media communication work in different physical and digital-physical spaces. In its quantitative, qualitative, and multi-situational dimensions, mobile belonging in digital exile is thus of great social and political relevance for any kind of civic community work.

Parastou Forouhar is an extremely committed person. In addition to conventional media and her own artwork, Forouhar exercises a hyper-presence in social media that testifies to the intensity (e.g., in terms of time management) and intimacy (e.g., in terms of personal and emotional content, commitment, and empathy) of multi-situated mobile belonging as a (digital) citizen (Isin & Nielsen, 2008; Isin & Ruppert, 2020; Mossberger et al., 2007). This sense of "being-in-the-world" is neither merely a physical appearance and embodiment, "nor is the digital another realm outside material culture" (Kaur, 2019, p. 304). Forouhar, who is active in various activist networks, is often invited for interviews in the public media related to new human rights violations or protests in the Islamic Republic of Iran and is additionally an internationally recognized artist and art teacher at an art academy in Germany. She has never stopped fighting against the repressive regime of the Iranian state and is keeping alive the memory of the political assassination of her parents and others in the late 1990s (and afterwards).

2.3. Mobile Belonging in Online and Offline Spaces During the Covid19 Lockdown

Parastou Forouhar developed multimedia strategies to cope with the unexpected changes that accompanied the Covid-19 pandemic and the global travel restrictions in 2020. This included posting memorial letters on her website such as "The Political Murders of Autumn 98 In Iran Are Now 22 Years Old" (Forouhar, 2020) and (re-)posting video interviews or artistic works on her Facebook timeline. This allowed her to cope with the difficult situation of not being able to travel to Iran to organise an annual Memorial Day for her parents. Using alternative media strategies, she developed practices of "digital citizenship" (Isin & Ruppert, 2020).

Under normal circumstances, Parastou Forouhar would be busy planning her travel to Iran, as she has always done, to start the preparation for the Memorial Day. It takes place at her parents' home which is a significant site of remembrance, commemoration, and resistance for herself and for her parents' political supporters. The preparations and the ceremony usually include certain activities and rituals in the city of Tehran and in the house, as well as in the online and public media. She begins by announcing her trip with a public letter on

her website and in various online media and then gives speeches and interviews, e.g., for BBC Persia and various local and international newspapers. Forouhar publishes an obituary with a Memorial Day invitation in local newspapers. In Tehran, everything is prepared for the guests and the ceremony takes place in the courtyard and in the house itself and includes rituals with chants, flowers, and candles at the places in the house where her parents' bodies were found. These on-site and online activities are a strong gesture against forgetting and to maintain resistance. Parastou Forouhar does everything she can to maintain the event and has developed different publicity strategies over the years. But this year, she told me, she decided against travelling to Iran, because of the pandemic. It was a difficult decision and, as she explained to me, "I have to find an attitude to the whole situation" (P. Forouhar, personal communication, November 11, 2020), by which she meant the ambivalent situation of responsibility and solidarity, on the one hand, with regard to the pandemics and its risks, and on the other hand with regard to maintaining remembrance and resistance.

There was of course a certain tragic irony in this situation, as Parastou Forouhar has been organising this anniversary for 21 years. The day and the house are very important to remember the political victims of the Islamic regime, as a gesture of protest and resistance and to maintain them against state control and surveillance. This year it was not Iranian control forces, but the Covid-19 pandemic that prevented her physical presence. However, when we talked about this personal dilemma on how to deal with this "blank space" (P. Forouhar, personal communication, November 11, 2020, translation by the author), it was already clear to her that a digital event would not be an option, as she claimed it would undermine everything that has been done so far.

One of many interesting examples of how Parastou Forouhar has created new intersections between different online and offline memory spaces and between different places and actors in exile and elsewhere, and as I will discuss later as a multimodal form, is the publication of a YouTube link to the play *One Case, Two Murders*. This play was directed by the Iranian theatre director Niloofar Beyzaie and her exile theatre group *Daritsche* and premiered in Germany in 2009. It tells the story of the political murder of Parvaneh and Dariush Forouhar. The group's main goal is to raise awareness of the oppression and resistance, especially of women, in countries ruled by political Islam. The play, which also draws on other media such as photographs or documentaries, has been and will be performed on various occasions in Germany. In November 2020, Parastou Forouhar posted the link to its YouTube video (Beyzaie, 2020) twice on Facebook and once on Instagram and received a great deal of likes and comments both times (although there were significantly more reactions on Instagram).

This example demonstrates how Parastou Forouhar succeeded in creating a strong lasting public presence through various digital media and online and offline sites with this and other uploads that included public letters with political and solidarity statements alongside art. In other words, she managed to communicate her "rights of the political subject emerging across…borders and orders" (Isin & Ruppert, 2020, p. xiii). She enacted (with the support of others) a transversal and digital citizenship by "making rights claims [that] traverse multiple political borders and legal orders that involve 'universal' human rights law, international law, transnational arrangements, and multiple state and non-state actors" (Isin & Ruppert, 2020, p. xiii). With her digital activities (and the re-postings by others) of commemoration and remembrance that took place on social media channels and networks during the anniversary event, she certainly reached a wider and different audience, as the number of "like clicks" and the creation of online hashtags and peace signs slogans saying "hope to see you in that house" and "hope for #political_murders_ justice" showed. Together with the, albeit comparatively few, on-site actions at her parents' house in Tehran, mobile affordances and multiple media ecologies opened up new spaces of remembrance and solidarity, whereas the collective online and offline actions created a dynamic processuality (Monterde & Postill, 2014, p. 429) of "mobile belongings."

3. Doing Ethnography on Digital Exile: A Reflection on Multimodality

Doing ethnography on digital exile is situated at the intersection of mobile online and offline spaces and the studying of social and political positionalities in everyday life. The multiplicity of modes, on one hand, and, in distinction to media, on the other hand (Dicks et al., 2006, p. 82), indicate the multi-layeredness of the meaning-making environment in which belonging, connectedness, co-presence, and caring are created by the connected migrants. In this section, I turn to a reflection on methods, practices, and ethics as well as the challenges and potentials inherent in bringing multimodality to the ethnography, and more precisely, to my collaboration and partnership with Parastou Forouhar. My reflections join a multitude of studies on doing ethnography of the Internet and the everyday (Beneito-Montagut, 2011; Costa & Condie, 2019; Hine, 2015; Horst & Miller, 2012; Pink et al., 2016; Postill & Pink, 2012) when it considers multimodality as an approach in doing ethnography to face the intersection between on- and offline spaces in everyday life and when "there is no difference between online and offline interpersonal communication" (Beneito-Montagut, 2011, p. 717).

3.1. Multimodal Modes of Meaning Production in On- and Offline Media

Initially, the ethnographic research engaged Iranian photographers and artists living in the European diaspora

to study the production of knowledge, identities, and memory in photography. In this regard, I was interested in understanding how far and in which way photography represents and is shaped by diasporic aesthetics (Bublatzky, 2020). I accessed the project by studying photography (documentary and artistic) in its international production, dissemination, and reception. I explored photography's communicative and mediating value, and how it creates forms of global connectedness and transnationalism with a focus on dispersed and mobile diasporic communities. Moreover, I examined how professional photography mediates transnational migration experiences, as well as notions of mobility, interaction, identification, and belonging (Alonso & Oiarzabal, 2010; Andersson, 2019; Brinkerhoff, 2009; Candidatu et al., 2019; Everett, 2009; Karim, 2006; Ponzanesi, 2020, 2021; Retis & Tsagarousianou, 2019) within broader media ensembles. As part of my interest in critical representation politics and memory production, I came to know several photographers and artists, living in Germany, the UK, and France, including Parastou Forouhar. I was immediately compelled not only by her experience of migration and forced displacement but also by how these experiences converged with her artistic and activist practices, particularly her employment of a multitude of visual and digital media practices at the intersection of on- and offline spaces.

With the art installation *Documentation* (1999–present; Bublatzky, 2019b, 2021), for example, the artist performs a fractured narrative about the memory of her parents, murdered in Iran, and her own resistance to political injustice. Within this installation, she arranges numerous documents including protest letters, correspondence, reports, and newspaper articles around a xerox machine at its centre. These documents, drawn from her protest and activism and from a variety of media from different situations and places, represent a strong testimony to the brutal and politically motivated murder. Considering that "the recreation of personal records, family histories and communal identities ultimately becomes an attempt to reclaim and reconstruct their shattered lives and to honour the memory of those who perished" (Halilovich, 2016, p. 83), this work represents an important insight to the multiple politics and poetics of migrant narratives (Leurs et al., 2020).

Forouhar's efforts and commitment to maintaining political and activist engagement in post-revolutionary Iran—which is evident in her artwork, physical mobility, and activities across an array of social and digital media—illustrate a central dimension of mobile belonging in exile. In fact, and as over 10,000 people followers on social media demonstrate, she plays an integral role in exile communities and political networks both within and outside Iran. She is hyper-present on social media in all of these activities, whether on YouTube, Facebook, Twitter, or Instagram. Forouhar communicates via different messenger services, depending on her networks and the availability of the messenger services in different local contexts and countries, and must also contend with regular internet censorship of social media and different communication platforms by the Iranian government. She runs several websites, one for her own art, exhibition, and writing activities and one where she publishes letters and documents from the period of her parents' political work that she found in her parents' house, as well as a podcast site (Forouhar, 2021–present) where she reads from her book *Bekhan be nam e Iran, Dariush va Parvane Foroohar* (*Read in the Name of Iran, Dariush and Parvaneh Forouhar*; Forouhar, 2012) in Persian.

Parastou Forouhar's mode of "mobile belonging" has significantly helped to shape my research and research design according to multimodal research "across multiple platforms and collaborative sites, including film, photography, dialogue, social media, kinesis, and practice" (Collins et al., 2017, p. 142). Researching her work led me to acknowledge "the centrality of media production to the everyday life" of both myself as an anthropologist and my interlocutors (Collins et al., 2017, p. 142). This requires recognising the important role of collaboration with interlocutors who are key experts (see e.g., paraethnography) and the fact that research will lead to different outcomes and in different media formats, which, taken together, is highly beneficial.

3.2. On Methods

From the beginning of my project in 2017, I had to build my research around fragmented field sites. One reason for the multi-sitedness (Marcus, 1995) was that "the field" consisted of multiple locations (instead of one or two clearly defined places), individuals (instead of a community or neighbourhood), and various digital (on- and offline) networks and activities spread all over the world. A field site, then, that is best defined, if at all, by its dynamics, mobilities and instabilities, and collaborations "in time." And while my ethnographic project was originally characterised by being "not on location," "not present in time," or sometimes "not present at the same time," research on photographic or artistic practices in situ has yet not taken place. Instead, and this is also related to how I was able to access the field at all, my research focus was first on sites of professional and social interaction and visibilities (e. g. museums and galleries, symposia, or printed media). This also included the main body of qualitative interview methods with migrant photographers and other experts, from places such as galleries, museums, or other institutional settings like photo festivals (e.g., Photo London). My primary interest was to gain insights into the cultural politics of representation: How, when, why, and by whom were specific photographic works produced, displayed, circulated, and perceived? How much of the migrant experiences (during migration, displacement, and back in their home country) was a topic in photography? How does photography in the arts or documentary provide alternative narratives in contrast to mass media and the political

presentation of Iranian society? I began this project at a moment when photography by Iranian migrants was receiving significant international attention, due in part to the tense situation of political and international relations with Iran, as well as the aftermath of the 9/11 attacks in the US and the war against Islamic terrorism. Consequently, much research also went into (digital) archival work to obtain an overview of the international visibility of Iranian photographers and existing networks (who knows whom). This was accompanied by collecting data through participant observation during exhibition openings, guided tours, or public talks by respective photographers. The research took place in the UK (London), France (Paris), and Germany (e.g., in Berlin), and also included a first short-term research trip to Iran (Tehran). The Covid-19 pandemic began thereafter and communication and travel became increasingly difficult and insecure.

At this time, I was already in regular contact with Parastou Forouhar. We had met for several interviews (online via Skype), and I attended her exhibitions and public talks. In the early summer of 2017, for example, she sent me a large number of photographs of an unfinished art project she was working on during an artist residency in Switzerland and that I was able to see at a later date. These kinds of encounters allowed me to gain deeper access to her practice and motivations. Artists and photographers are by nature highly mobile, they are obviously always very much immersed in their different projects, residencies, contracts, etc. One could say that professionals in this field "never stand still."

Conducting ethnographic research required acknowledging, among other things, that digital and mobile media technologies gained a fundamental role in the everyday life of such people (e.g., in the era of digital photography, for work meetings, or social networking activities). Accordingly, I began to not only include other forms of media practice, while remaining inclusive of visual anthropology but to also engage "in public anthropology and collaborative anthropology through a field of differentially linked media platforms" (Collins et al., 2017, p. 142).

The circumstances surrounding organising the Memorial Day for Parastou Forouhar's parents in various on- and offline spaces were exemplarily and significant for my research. The ethnographic research turned more and more towards the multi-situational and multimedia intersections where the artist (and her networks) became active. With the help of my research assistant, we had begun to trace specific postings on various media platforms that the artist made at the same time or to investigate public human rights discussions with, for example, the federal president of the Federal Republic of Germany and other Iranian activists in Berlin. These methods of "tracing" included a fundamental shift in the research and included "going beyond interviewing activists about what they do" and "bringing together relevant online materials and either following or actively participating in blogs, social media platforms, online news sites (both professional and amateur), and face-to-face events" (Postill & Pink, 2012, p. 126). In my eyes, "the research on the 'intensities' of social media activity and sociality that span online and offline and [that] also have repercussions in other web and face-to-face contexts" (Postill & Pink, 2012, p. 126) illustrate the first steps towards a multimodal research design.

3.3. Multimodal Research Design

With the Covid-19 pandemic playing *yoyo* with the world, "social distancing" affected professional and personal lives at challenging and powerful intersections of different online and offline spaces in the online digital world. Conversations and meetings had intensified since the lockdown in Germany in 2020. They often revolved around similar experiences and obstacles during the pandemic, as well as short exchanges about work and personal life. In the summer of 2020, and during the lockdown, for example, Parastou Forouhar spent some time in Switzerland to create a version of her *Written Room* in a public space in Chur. I knew about this project in January 2020 from a conversation and after the artist and I had been invited to give a lecture together at the Technical University of Darmstadt. In our conversation about the upcoming project, we talked about the very special situation of doing *Written Room* in a public space on the ground and with very different materials and colours, new conditions for this project, which the artist was very much looking forward to.

The frequency of brief phone conversations or voice messages intensified around this time, which strengthened our relationship and created the basis for a creative and collaborative exchange that lasted beyond the lockdown and continues today. This shift in media ecologies, as well as multiple modes of encountering and exchange, allowed me to raise questions about the role of partnership and multimodality in the research. Referring to the work of Kress (2011) and his engagement with "multimodality and social semiotics" (Kress, 2011, p. 242), I began to reflect more intensively on ethics and constraints, meaning-making, and collaborative knowledge production in my project.

Forouhar and I began to work more intensively together and to think about future co-operations like lectures and publications, networking, and artist-ethnographic research projects. We used different modes of mobile communication platforms and devices to work together. As our collaboration deepened, the nature and intersection of online and offline spaces where the artist and I met, exchanged, and collaborated became more complex. The "affordances of different modes offer particular constraints and possibilities for meaning making, and therefore offer different potentials for learning" (Flewitt, 2011, p. 295), data, and knowledge production.

The intensifying processuality of the collaboration, which continues to this day, entered a new phase in

spring of 2021 when Parastou Forouhar proposed to write an article together on feminist art in the diaspora and in relation to her work. Feminism and art are a new topic in my research, and writing this article together with Forouhar, including different working phases and organisational steps, guided me to a new theoretical terrain and new processes of knowledge production that will likely lead to further outcomes (Collins et al., 2017, p. 142).

With Kress (2011, p. 242) I dealt with questions "around *meaning*; meaning-*making*; about the *agency* of *meaning-makers* and the constant (re-)constitution of *identity* in sign- and meaning-making" (italics in the original). This new situation of partnership not only led to an intensification of the relationship with the artist but to even more new collaborative projects, for example, on historical photography and the artist's private archive of press and political photographs of her father, Dariush Forouhar. This marked a significant turning point in my research, which transformed my understanding of knowledge production, making meaning, and the different agencies of the artist and myself. The project is just starting; there are several meetings planned, and there will even be a prestigious fellowship at a German research centre available for me to work more intensively on the data and project. All this bears ethical and "(social) constraints" that I find myself facing "in making meaning; around social semiosis and knowledge; how 'knowledge' is produced and shaped and constituted distinctly in different modes; and by whom" (Kress, 2011, p. 242), but where I also see the affordances of multimodality at the intersection between different practices, experiences, meanings, and expectations that are negotiated across these different modes and spaces, and which turn out to be a reciprocal, yet unfinished process.

As "multimodality as such…names a field of work, a domain for enquiry, a description of the space, and the resources which enter into meaning, in some way or another" (Kress, 2011, p. 242), "multimodal anthropology asks that we take these outcomes and processes seriously as meaningful interventions that nudge anthropology into more collaborative, innovative, and reflexive directions" (Collins et al., 2017, p. 142). To further explore these developments in their relevance to the ethnographic process and multimodal ethnography (Collins et al., 2017; Pink, 2011), I began to approach the multiplicity of practices and sites in different terms—for example, the importance of different sites where a person takes social action that are closely related to each other, such as sites of exile and activism, sites of (artistic, teaching, or administrative) work, or sites of research. All these sites are constituted by different sensorial and social experiences of place and belonging as well as by different possibilities in using, dwelling in, and moving through them as online and offline mobile spaces. In its methodological dimension, this recognises at its core the central importance and diversity that media use and production acquire in each of our everyday lives. As it reflects on such changes in the media ecologies (Collins et al., 2017, p. 142), I recognise three key developments among the approaches in multimodal anthropology: "(1) the (relative) democratization and integration of media production; (2) the shift toward engagement and collaboration in anthropological research; and (3) the dynamic roles of anthropologists vis-à-vis both the profession and the communities in which they work" (Collins et al., 2017, p. 142). "The new experience of a hyperconnected reality within which it is no longer sensible to ask whether one may be online or offline" (Floridi, 2014, p. 1) and the "onlife" entanglements (Kaur, 2019) with both the multiple modalities of "exile" and "mobile belonging" emphasising the role of mediation and media in contemporary social and everyday practices of Parastou Forouhar. And through our agencies as collaboration partners (Nolas & Varvantakis, 2018), I recognize a certain momentum in the overall research with Parastou Forouhar, as well as in its goals and their development.

4. Conclusions

Exile is a constant context of crisis and action, it often means a daily life marked by efforts to belong politically and culturally, to remember and resist. By considering co-presence and connectedness as a fundamental challenge, particularly during the global Covid-19 pandemic and social distancing, I concentrated in this article on "mobile belonging" in the digital exile. Considering digital exile as a sum of different on- and offline spaces, where mobile practices including cross-bordering daily media communication, activism, and the use of mobile media technologies such as the smartphone, social media platforms, or computer work span and trigger social and geographical distances, I identified multimodality in artist-activist work as exemplarily for conducting and developing a multimodal ethnography.

With the case study of the Iranian artist and activist Parastou Forouhar and the annual day of remembrance for her murdered parents in Iran, this article has illustrated that living in exile bears a complex (media) lifeworld including belonging to different groups and communities: as an internationally renowned and interconnected artist, as a political activist, and as a daughter of politicians murdered in Iran. The affordances of multiple communication and information technologies have been discussed as being central to the emergence of "mobile belonging" and the agency of digital citizenship in exile and, as has been shown, may even be reinforced by global crises such as the Covid-19 pandemic.

Drawing from the research on and the collaboration with Parastou Forouhar and her different media and communication practices of memory and activism, the article elaborated on the necessity of developing a multimodal research design (Collins et al., 2017) to meet complex and powerful intersections of different online and offline spaces in the exile and everyday research. In response

to this complexity and the artist–ethnographer collaboration that formed during this period, this article has argued for the necessity of a multimodal ethnographic design, outlining several of its possibilities. Such an approach to ethnography would enable and acknowledge encounters and practices in multi-situated onlife entanglements in exile and its studies while remaining flexible, processual, and collaborative as envisaged by multimodal anthropology.

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About the Author

Cathrine Bublatzky is a visual and media anthropologist who has worked at the Heidelberg Centre for Transcultural Studies at Heidelberg University (2009–2022). From 2022–2023, she will be a fellow at the Käte Hamburger Research Centre "Dis:Connectivity in Processes of Globalisation" at the LMU Munich. In her research and teaching, she focuses on visual cultures, art and photography, museums and exhibition studies, and migration and memory. She has a regional interest in South Asia, the Middle East, and Europe.

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Article

The Instagram Interview: Talking to People About Travel Experiences Across Online and Offline Spaces

Larissa Hugentobler

Department of Communication and Media Research, University of Zurich, Switzerland; l.hugentobler@ikmz.uzh.ch

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Abstract
Studying visitors' experiences with cultural sites has been complicated by the availability of internet-connected mobile devices. Simply observing visitors on site is no longer sufficient since they can interact with a site offline and online: before, during, and after their visit. Furthermore, cultural sites are as much sites of cultural heritage as they are sites of tourism. To study such complex experiences, new approaches to the study of human interactions with cultural sites must be developed; these methods must account for the fact that the offline and online realms can no longer be considered separate. In this article, I introduce the method of the Instagram interview as applied in an Instagram ethnography, contextualized by my project on visitor experiences of a Dr. Martin Luther King, Jr. Memorial in Washington, DC, where I interviewed visitors after their visit. The Instagram interview helps study a dispersed population that engages, through Instagram posts, with one physical location and its narratives, allowing conclusions about visitor experiences of the site and the role of Instagram in this context. When constructing the Instagram interview in a manner that corresponds to platform conventions, it produces personal, in-depth narratives about the interviewee's experiences. Conceptualizing the experience of a memorial as expanding beyond the space and time of the site visit, the Instagram interview is suitable for holistically studying visitors' complex experiences: before, during, and after their visits, as it recognizes that offline and online interactions with the site are part of the same experience.

Keywords
cultural sites; digital ethnography; heritage tourism; Instagram; social media

Issue
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1. Introduction

Solemn faces carved in marble, stoically looking down from their pedestals, visitors zipping past on scooters, looking at their mobile phone screens, snapping a selfie every now and then: Memorials in Washington, DC have become more than the physical representation of public memory, a "socio-political construct" through which groups define and distinguish themselves from others by communicating specific versions of the past (Neiger et al., 2011, p. 4). They have become tourist destinations, and concomitantly, individuals' visits to these sites have become more complex. Visitors are no longer (purely) taking a pilgrimage to the nation's "monumental core" (Savage, 2009) to witness the embodiment of the nation's identity; they are also visiting must-see sites, taking tourist photographs, and judging their visits' success as much by the memorials' expressiveness, as by their personal experiences (cf. Sturken, 2007). This development is accelerated by the prevalence of mobile phones and the importance of social media to tourists. While it is obvious that individuals at these sites are using their mobile phones—aside from seeing them take pictures—it remains unclear how they use their internet-connected devices to augment their visits. I, therefore, wanted to know how visitors experience such sites, including how they use their devices to engage with the memorials and the narratives they tell.

Museum scholars have long acknowledged that the offline and online realms intersect at cultural sites (e.g., Weilenmann et al., 2013). This intersection of spaces is particularly palpable at memorial sites when visitors, having traveled far to see them, can be observed looking at their mobile phones while in the presence of a unique artifact. As Couldry and McCarthy (2004) describe with their concept of mediaspace, "digital media and everyday life form part of the same spatial realities" (Pink, 2021, p. 55). Spaces overlap here in that visitors can inhabit the online realm while standing at the physical site. However, the spaces also expand: Visits to DC memorials are impacted by individuals' (online) media use and destinations for tourism are in part chosen by what individuals have seen before (e.g., Muslimah & Keumala, 2018). Furthermore, visits do not necessarily end upon leaving the location, as engagement can continue, particularly through social media. The space of the memorial experience is therefore not restricted to the physical site. In this article, I propose the Instagram interview as an adaptive method that can help researchers answer questions regarding user's complex experiences of cultural sites, both on-site and online, during and after a visit.

2. Literature Review

To study visitor engagement at cultural sites, different approaches have been taken. One strand of research focuses on how mobile devices (audio guides or personal mobile phones) impact offline behavior and experience (e.g., Bowman, 2010; Hillman et al., 2016). Such studies can be located within a traditional ethnographic approach centered around participant observation (cf. Clifford & Marcus, 1986). Other approaches focus on the resulting online artifacts created by visitors to cultural sites (e.g., Budge, 2017; Weilenmann et al., 2013). However, when acknowledging that online and offline experiences are not separate and impact one another, we must study them together, which few studies thus far have done. Exceptions include Hughes and Moscardo's (2017) study, which observes how mobile phone use impacts behavior through a museum exhibition and what types of photographs individuals take during their quest. Their study was conducted under experiment conditions, meaning that mobile phone use was not natural. Studies analyzing naturally occurring offline and online behavior ethnographically differ in their approach, "inflected by the theoretical and practice stances of particular disciplines and fields of study" and developed as part of specific projects and questions (Pink, 2016, p. 162). Such research combines observations and different types of participant interviews. Bareither (2020), for example, in his work on the Memorial to the Murdered Jews of Europe, conducts a digital ethnography by combining on-site and chat interviews with content analyses of Instagram and Facebook posts. This method closely resembles the one proposed in the present article. Bareither (2019) does not elaborate on his interview methods, but he posits elsewhere that ethnographic concepts in the digital context must be further developed. In order to fill this gap, I propose an elaboration on one digital interview method: the Instagram interview.

Researchers in different fields have conducted a variety of digitally enhanced interviews. Amongst them, email interviewing is the most popular asynchronous interview method (Bampton & Cowton, 2014; Dahlin, 2021; Fritz & Vandermause, 2018; Meho, 2014), while skype and other video chats are used for synchronous interviews (Lo Iacono et al., 2016; Serafinelli, 2017). To allow for almost instantaneous interactions embedded in participants' everyday routines, the mobile experience sampling method automatically prompts participants to self-report experiences (van Berkel et al., 2017). While this method mostly corresponds to a quantitative research perspective, it has been developed further, such as in Kaufmann et al.'s (2021) study about individuals' situatedness during the first Covid-19 lockdowns. Their mobile instant messaging interviews present a qualitative approach to interviewing individuals in their everyday life contexts, showing that digital methods can be suitable to study offline behavior, thereby overcoming the online/offline dichotomy. In this article, I present an addition to these methods in the form of the Instagram interview; a mostly asynchronous method, it can be employed to assess online and offline behavior about users' experiences, as well as the intersections between them.

3. Studying Visitors of Memorial Sites: The Project

To illustrate this method, I draw on an exploratory project in which I combine offline and online methods to holistically assess visitor experiences of memorial sites, including their (online and offline) engagement with them. I want to briefly introduce the project to contextualize the method but will only elaborate on methodological findings thereafter. In the overarching project, I focus on two unique sites: The Martin Luther King, Jr. (MLK) Memorial and the inscription for his 1963 "I Have a Dream" speech on the steps of the Lincoln Memorial, both in Washington, DC. In this article, I focus only on the Instagram ethnography studying the former. Dr. King is the only member of a marginalized community honored along the National Mall, the city's prime location for memorials. King is often tokenized as the only representation of the civil rights movement (e.g., Theoharis, 2018), and his memorial contains little information about his life, the movement, or any acknowledgment of the hardships he faced. In this context, the online realm is often considered a potential pathway for individuals to add to or challenge the official narrative told by the institutions (e.g., Florini, 2016). This means that surrounding this site, countless opportunities for engagement exist, which go beyond the possibility of looking

up information about the site on its official website and sharing tourist photographs.

I understand these sites as sites of public memory and tourism, and for both types of engagement, visitors who carry their internet-connected mobile devices can be present at the site while at the same time engaging in the online realm. The fieldwork from this overarching project, however, has shown that visitors do not, in fact, use their mobile devices to look up information while on-site, so they are unable to bring information from the online realm into the physical space, nor do they frequently convey information out of the space, by sharing on social media, for example (Hugentobler, 2022). Instead, mobile phone use at the site was largely limited to taking photographs (Hugentobler, 2022). While the site itself can be considered a "hybrid space," one which is "created by the constant movement of users who carry portable devices continuously connected to the internet and to other users" (de Souza e Silva, 2006, p. 262), much of the online interaction with the memorial and its surrounding narratives does not happen in that physical location, but most often after the visit. This requires an additional method to access individuals' engagement with the site after the visit, assuming that the visitor's experience of the site expands beyond the duration of their presence in the physical location.

This project started with traditional fieldwork. Gathering data for in-depth description (cf. Geertz, 1973, pp. 9–10) in two sets of on-site fieldwork (in 2019 and 2021), I conducted observations, auto-ethnographies, and expert interviews with members of the National Capital Planning Commission and the National Park Service; I also went on commented walks with a member of the National Park Service and a participant from the Instagram ethnography. Furthermore, I conducted short, qualitative interviews with 81 visitors and two tour guides to access visitors' personal perspectives on their own experiences. During this fieldwork, participating in and observing the natural setting of the memorial sites (cf. P. Atkinson, 2017, p. 10), I focused on the atmosphere and patterns, observations that cannot be made through online methods. I also studied visitors' offline and online behavior, including how they used their mobile phones or if previous experiences in the online world impacted their offline behavior and impressions. During the first fieldwork, I found that online engagement with the site hardly happens in the physical location and that time spent on site with visitors was limited, findings which meant I had to adapt my methods. This is a common issue with explorative research, which researchers can anticipate by being flexible in their research design (cf. Dahlin, 2021). Because I could not access individuals' online engagement with the site, I created an Instagram ethnography to complete my research (following the principles suggested by Pink et al., 2016). As sociologist Karen O'Reilly (2005, p. 3) stated, once ethnography becomes digital, researchers have to acknowledge what it means in the digital context to be "watching what happens, listening to what is said, asking questions." To "watch what happens," this study conducts a qualitative content analysis of Instagram posts which studies visible traces of behavior. Much of human behavior can be both intentional and conscious or guided by what a group or social status require (Goffman, 1959, p. 6). This includes social media behavior, meaning that individuals' performances on social media are not random but rather influenced by what individuals think they are supposed to post (e.g., Ditchfield, 2020). This reflects what Norman (1999, p. 39) calls "cultural constraints"—learned conventions about encouraged actions. The content analysis, therefore, goes beyond showing what individuals liked on site or what information they consider worth sharing or adding: It also indicates which conventions impact their Instagram performance (Hogan, 2010). We know, however, that performances by individuals are never the full story (Clifford, 1986) and can indeed differ in their appearance from individuals' motivations, particularly on a social media platform such as Instagram, which is often used to present an idealized version of oneself (e.g., Baym, 2011; Hu et al., 2014; Humphreys, 2018). While the content analysis, therefore, allows conclusions about visible traces of behavior and cultural Instagram norms, the interviews—elaborated on in this article—access conscious motivations and fuller experiences of the site: before, during, and after the visit.

3.1. Choosing a Platform for the Digital Ethnography

To study visitor interactions with the memorial, I focus on Instagram for three reasons connected to the platform affordances, its technological possibilities, and conventions (see Norman, 1999). First, the experience I study is characterized by an inherent duality: Visiting a DC memorial is an act of tourism as well as an interaction with public memory and, thereby, US American identity. Instagram functions according to a similar logic: as the prime visual social networking site, it is ideally suited to sharing tourism images, one of the main uses of social networking sites (e.g., Christou et al., 2020). Additionally, posting on Instagram is used to construct or negotiate personal identity (e.g., Lee et al., 2015), often done by showing an ideal version of oneself, which can include the self as a traveler (Lo & McKercher, 2015) who shares recognizable images (Hugentobler, 2022) or has ideological allegiances. Second, Instagram is an inherently visual medium, as are memorials. Visitors frequently stress that much of their enjoyment stems from the site's beauty. I, therefore, study interactions on a site with a visual focus. Third, Instagram's affordances allow me to study behavior that corresponds to my research question: I study individuals' posts which are aggregated by being tagged at a specific location and thus part of a larger narrative, but at the same time, they are also showcased on users' personal profiles. These Instagram posts thereby serve two functions: They add a personal to a larger narrative, and they create and manage a personal

identity through a curated profile. These posts can then be read as contributions or challenges to public memory and as personal narratives about the self. It is therefore important to choose a platform that corresponds to the research questions. Instagram is particularly suited for interactions with the world that bridge the private/public realm and engage with the world visually.

4. Setting up the Instagram Ethnography

4.1. The Instagram Profile

To access Instagram posts and interact with users, one needs an Instagram account. Previous research has made a case both for using the researcher's personal profile and for creating a profile specifically for the project at hand (e.g., Urbanik & Roks, 2020). Since my project is not necessarily concerned with sensitive data and relies on comparatively short interactions, which require lower levels of trust-building, I decided to create a professional profile and mark it as such. However, when researchers rely on establishing deep, personal relationships with their subjects, it might be worth considering using one's personal Instagram. I set the privacy of my profile to "public" and used my full name as my username. For my profile picture, I used the same photograph as on my website, to which I also linked (see Figure 1; cf. Hine, 2000, p. 74). Both additions help signal the account's legitimacy. Widespread agreement on digital media research ethics posits that researchers must disclose their "professional persona when collecting data in online communities" (de Seta, 2020, p. 90). Despite not studying an online community per se but rather individual Instagram users, I chose to be as transparent as possible about my intentions without influencing the participants' responses. By adding a link to the University of Zurich's Instagram profile, I hoped to legitimize the profile further.

In the next step, I populated my profile because an empty profile appears suspicious: It might seem like a lurker or a social bot (cf. Urbanik & Roks, 2020). So, I added images to reciprocate what I would find on participants' profiles. If I learn something about them when looking at their profiles, so should they when looking at mine. The researcher role I inhabit here is, therefore, closest to sociologist Raymond Gold's (1958, p. 221) "observer-as-participant": I participate by sharing some travel pictures on Instagram but remain more of an observer than an active participant. The selection of images was not random: I chose personal photographs of DC memorials (Figure 2), thereby signaling my interest without framing the sites in any particular manner, keeping captions descriptive.

After contacting several users, I realized that my profile still looked suspicious because I had not shared any pictures of myself, which is unusual for an Instagram profile. As Hu et al. (2014, p. 597) found, "nearly half (46.6%) of the photos in [their sample] belong to Selfies and Friends categories with slightly more self-portraits." Therefore, an absence of photos of people might have contributed to several participants responding to my interview requests by asking if I was really a person or telling me they first thought my message was spam (see Figure 3).

I, therefore, started including images showing me during fieldwork (Figure 4). I also playfully captioned some of those images, inviting the audience into my experience of doing fieldwork in DC, thereby allowing them a glimpse into my life, where the researcher and private person overlap. This strategy likely impacted the response rate since I no longer received messages doubting my identity. I, therefore, recommend constructing a profile that reflects the researcher's current interests, showing themselves as fully human because the site's conventions require it.

4.2. The Sample

To answer my research question, I had to find posts that were (a) about the MLK memorial and (b) engaged with the official narrative. The first condition can be met in two ways: searching for the memorial under either its hashtag or its location tag. I chose the "Martin Luther King, Jr. National Memorial" location tag because the #mlkmemorial included different memorials to Dr. King; it did not just present a collection of stories about the same site. The second requirement, posts engaging with the official narrative, can be argued in different manners. Every social media post mentioning the memorial engages with the official narrative. However, only when narratives go beyond the private realm, such as being tagged at a location, do they become searchable (and

Figure 1. Researcher profile.

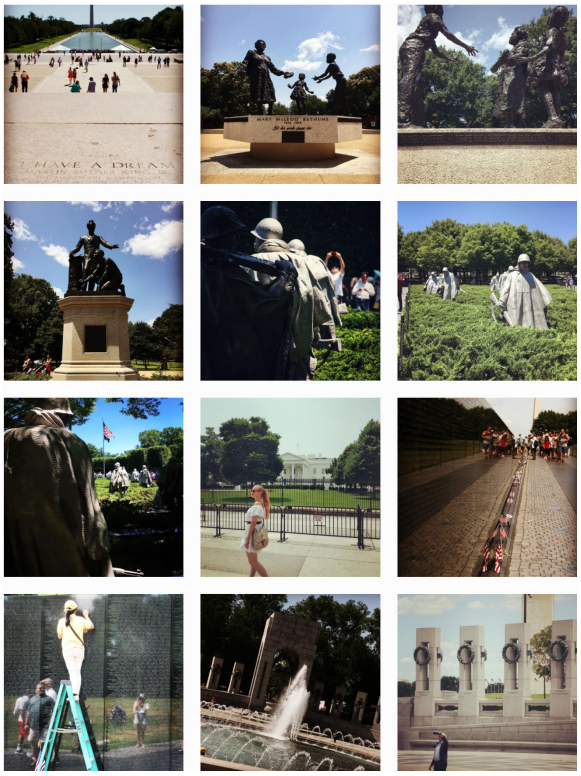

Figure 2. Instagram grid.

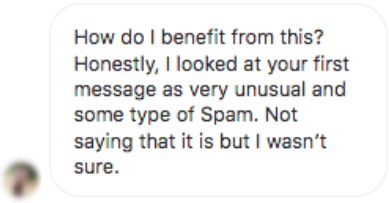

Figure 3. Interviewee hesitation.

Figure 4. Including the researcher in the profile.

therefore viewable by individuals searching for the site) as a collection of narratives about the same topic. They are public and can potentially create bottom-up narratives that differ from the dominant one, thereby challenging it. This sampling method excludes private profiles as only posts on public profiles appear at a location tag. While I, therefore, exclude posts by users who might exhibit different posting behaviors—in line with their privacy preferences—for my research question, focusing on public profiles, in fact, makes sense: I am interested in *public*, individual engagement with the official narrative. This means that, for my research question, private Instagram posts are not relevant.

Sampling began at the location tag, where I saved the most recently tagged post and followed the person who shared the post. This is helpful for two reasons. First, following an account creates a notification on that account, helping the person notice me and my message. Second, by following their account, individuals are more likely to follow me back, which can help counteract the problems that "research-only" profiles often look fake because they have no followers (Urbanik & Roks, 2020, p. 224). At the time of writing, this research profile had 59 followers. After taking a screenshot and following their account, I contacted the user with the recruitment message. I conducted continuous sampling, contacting individuals, and saving posts until someone responded to my request. I then halted sampling to allow sufficient time to conduct the interview. I stopped sampling once I reached theoretical saturation. The response rate for this first study was 19% (118 users contacted, 22 interviewed), which is rather low, but as Norman (1999) claimed, even just a few participants can be sufficient when studying how people use devices. Referring to Jakob Nielsen, he says: "Three to five people will give you enough for most purposes. But they need to be real people, doing real activities" (Norman, 1999, p. 41). Context is essential here: In line with much ethnographic research, which is not meant to be universally generalized (being deeply grounded in context; Kozinets, 2010, p. 59), the number of participants can remain low, given that saturation is reached, and the context of the study is natural.

My proposed method allows researchers to access individuals who share on only one platform, but if this platform is of specific interest to the researcher, this bias is irrelevant. In fact, talking to people on the platform where the behavior under study occurs can be an advantage (Altmann, 2011, p. 100). The sampling method does, however, present other biases. Self-selecting into a research project means that participants are more interested in the topic than the average person (Bethlehem, 2010). Furthermore, individuals who agree to be interviewed through Instagram are likely more experienced Instagram users (cf. Altmann, 2011; Fischer, 2009). However, being able to answer research questions online can also lead to more introverted people participating than in traditional research settings (Hertel et al., 2008). Researchers must consider these issues when adapting their own research questions to Instagram research. Overall, sample biases are comparable to the ones in offline interview methods. The method is, therefore, not inherently inferior, and its advantages will be shown in the following.

5. The Instagram Interview

5.1. The First Interaction: Crafting the Recruitment Message

The first interaction is crucial since it decides if a person chooses to participate. I contacted individuals through the direct messaging function, as avoiding attachments has already been suggested by researchers conducting email interviews (e.g., Meho, 2014, p. 26). One important aspect to consider is message-length. I, therefore, carefully crafted this message, keeping it brief and clear. Because it was still a long message by Instagram standards, I split the message in two so that participants were not confronted with a big wall of text; instead, they would see the messages separately in the message preview, which is available on most smartphones. As Crystal (2001) found, questions should be readable "within a single screenview, without any need for scrolling." It can further create issues if the messages are "complicated or verbose" (Bampton & Cowton, 2014, p. 7). This is particularly true of the first message as it sets the tone for the following conversation. Therefore, I described the project briefly and clearly without giving too much information, which might create a bias in the following responses (Figure 5). For this research project, I did not have to undergo ethics reviews. However, researchers who work with ethics boards must ensure they comply with those guidelines while also catering to the expected communication on Instagram. When using long recruitment messages, researchers should consider sending the second half only after they have received a first reaction. This caters more to the back-and-forth that is common on the platform. In this case, however, researchers must ensure that they have a positive affirmation to all parts of the recruitment message.

While the first message was purposely short, the remainder were crafted according to how the conversation developed. Since Fritz and Vandermause (2018, p. 1644) found in their email interview study that "longer emails tended to elicit deeper thought, lengthier sharing of ideas, and greater revelations," I did not force short questions when interviewees were eager to respond and engage with the topic more deeply. Here, researcher flexibility is crucial as some participants are likely to quit if messages are too long or complex.

To lower the hurdle for participation, I constructed the interview environment as naturally as possible, including options for responding via voice message and encouraging natural language use. For the latter, I included emojis to show the conversational style of discussion I expected. Fritz and Vandermause (2018,

p. 1646) noted that their attempts to reflect participants' language led to enhanced communication and that using emojis improved the authenticity of voice and elicitation of trust. Therefore, I opened with an emoji to signal that I approved of their use, but mirrored participants' emoji use in the following conversation. When individuals did not respond after a week, I followed up once to avoid taxing participants too much and to respect their unwillingness to participate in research. An additional method to increase response rates in those willing to participate but who had simply forgotten is to be active on one's own profile: By posting an image every few days, my profile appeared in the feeds of potential interviewees who followed my account. This subtle reminder can help increase participation without having to explicitly remind people.

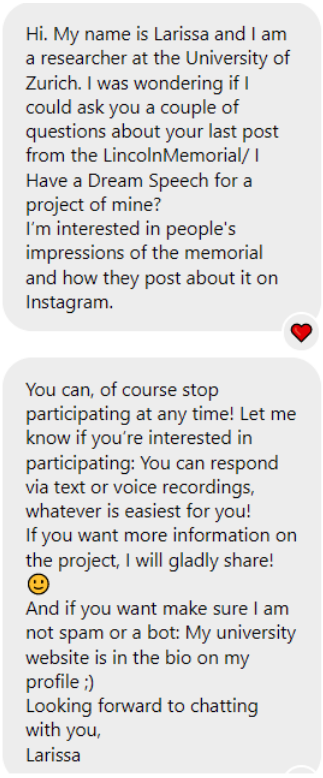

Figure 5. First interaction.

5.2. Crafting the Conversation

The first question was open-ended and geared toward the interviewee's experience at the site. This question was phrased based on the individual's specific post (cf. R. Atkinson, 1998, p. 42). Keeping the question open invites participants to guide the conversation in the direction of subjectively important aspects, allowing observations about how the interviewee understands their own practice (Dahlin, 2021, p. 3). It also enables access to subconscious patterns of thinking and acting (Altmann, 2011, p. 98), which is particularly interesting in routinized behavior such as traveling and Instagram posting. Due to the personal nature of the conversation, researchers can become too casual, particularly if they personally use Instagram as a means of communication. While a certain level of playfulness can be conducive to this type of interview, it is important to still consider each question we ask, so that it always serves our research. Respecting and valuing participants' time requires ensuring that easy access to interviewees does not result in their exploitation. When a more casual exchange about the topic was initiated by the participant, I always participated (cf. Fritz & Vandermause, 2018, p. 1643). However, when the conversation was about something private and irrelevant to the research, I deflected. Some participants asked about my personal opinions of the memorial after I asked them about theirs, and I answered only if I felt confident that I would not influence their following responses. While researcher involvement in this process can be risky, the medium and the topic of conversation are so clearly centered around personal opinions and experiences that it might seem unnatural if the researcher only asked questions and the participant only responded. This is not the type of exchange we are used to on this platform, and interview settings should feel as natural as possible (cf. Gläser & Laudel, 2010). Constantly re-evaluating one's role as a researcher and adapting to the specific conversation is therefore essential.

One way of engaging more without being too dominant in one's own views is to comment on individuals' responses (Figure 6), staying in the background while providing support and encouragement (cf. R. Atkinson, 1998, p. 32). In this short conversation, I gave my perspective on something the participant had just elaborated on. This was the beginning of a long conversation, and at one point, Denaise told me: "I am very impressed with your interviewing skills. You share wonderful compliments, then come in with the next question(s)!" showing

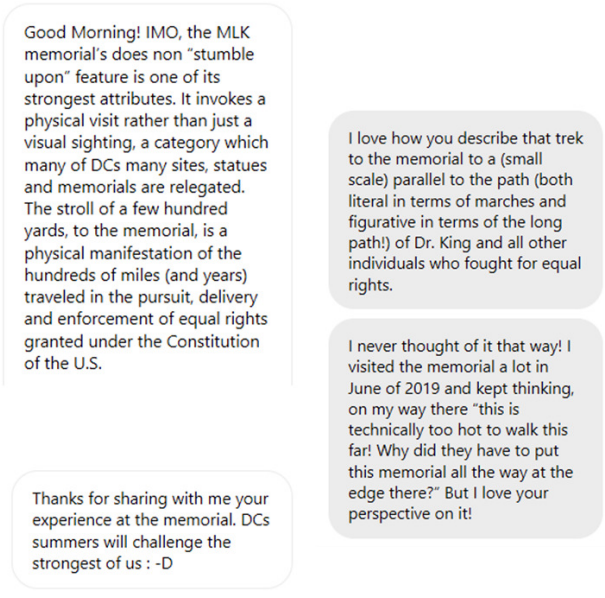

Figure 6. Interviewer reactions in conversation.

that this interview method kept her engaged. Therefore, crafting messages carefully is an important aspect of Instagram research and one we must be particularly mindful of since the platform's interface and the, at times, fast and spontaneous back-and-forth of the messages might entice us to react instantaneously. My interviews showed that finding a balance between a professional exchange and a conversation appropriate for the platform helps ensure interviewee retention and higher involvement.

5.3. Boundaries of Space and Time

The obvious advantage of leading an asynchronous interview online is that distances in terms of geography or timezone no longer matter. This also means that, as researchers, we can access populations we might not otherwise reach, and participants can respond in familiar settings, ideally putting them at ease and resulting in natural, genuine responses (Stewart & Williams, 2005). However, this must be planned diligently during the initial stages of the project to ensure that only populations of interest to the project are studied: Just because we can access far-away populations through the internet, it does not automatically mean we should study them. For my project, the method made sense because I was studying a tourism site: Individuals come from a variety of places to visit and then return to their homes where social media posting about the site most often occurs. Not being dependent on being "on" at the same time also means that researcher and participant can craft their messages when it suits them. Previous work has shown that, when taking time to construct their responses, interviewees tend to think about their answers more (Hertel et al., 2008). This can be seen in some of the messages I received where an individual acknowledged receiving the question but indicated needing more time, such as this: "Ok this is a good one! I'm a bit busy so ima get back to you when [sic] later today!!" He then responded nine days later (after one reminder) with several voice messages (Instagram restricts voice messages to one minute), which totaled five minutes and six seconds, showing that responding on their own time is helpful for interviewees and results in detailed responses.

One significant disadvantage of online interviews is a lack of commitment, and withdrawing participation is easier when the interview is done asynchronously because all participants have to do is stop responding: They do not have to justify their retreatment to a researcher (Kivits, 2005). The phenomenon of losing participants is exacerbated when the interviewer and participants have never met (Bertrand & Bourdeau, 2010). This is a disadvantage that cannot be denied and one that can be frustrating. However, there were plenty of participants who made an effort to participate. For example, I received this message from one interviewee: "Omg Soo sorry for late response. Just had surgery not too long ago and have been recovering from that," showing that there had been an implicit commitment. This conversation then continued for more than 4,000 words. The ease of generating new participants can balance the low response and retention rates: While it is a shame when a participant quits, it is easy to find new interviewees. I always contacted several users in a day which sometimes led to interviews being conducted simultaneously, depending on how fast people responded to my request (some did within seconds while others took several weeks). While this can be straining on the researcher (e.g., Dahlin, 2021), pausing contact with new participants once one interview starts can help keep the workload manageable.

6. Method-Related Insights

One advantage of the Instagram interview is the chat function and its conventions. Scholars have noted that in non-face-to-face interviews, the interviewer cannot observe body language cues (Meho, 2006, p. 1289), meaning that the present method is only suitable for studies in which visual cues are not significant. Their absence, however, can also help the interview situation by reducing social desirability (Fischer, 2009, p. 73). While my profile picture on Instagram makes it clear that I am a white woman, individuals still receive fewer visual cues than they would in a face-to-face setting. It is nevertheless important to reflect on one's visible identity markers and how they might influence a conversation. In my project, ethnicity is a central theme which is why I often explicitly asked interviewees (after the interview) about their impression of me as the interviewer. In the conversation shown in Figure 7, the interviewee frequently brought up his black American identity and how it impacts his opinion of the memorial. By this point, we had been talking for several weeks, which is why it felt appropriate to explicitly talk about my role (cf. R. Atkinson, 1998, p. 35). It was important for

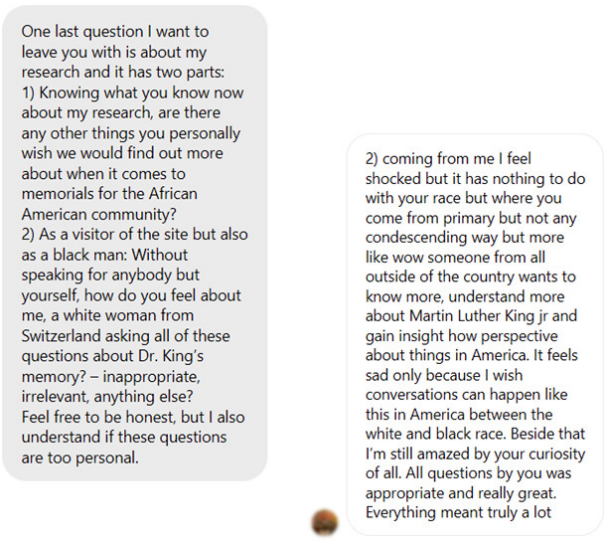

Figure 7. The role of the researcher.

me to acknowledge my membership in the dominant group, particularly in the discussion centering around hegemonic narratives about marginalized communities. Reflecting on one's own identity and its potential impact on responses is crucial but in these personal exchanges, explicitly discussing them can even present an additional value: It allowed me to gain deeper insight into the experience under study.

Another advantage of the Instagram chat is that the language used in online contexts is likely natural (Crystal, 2001). In my project, this was partly due to the familiarity with the platform: Instagram is used in private settings for interpersonal communication. The natural language can be seen in typos which indicate that the participants did not proofread their answers. Participants often used emojis and colloquialisms in their responses, indicating that they were using language "the way they do in most of their everyday interactions" (Meho, 2014, p. 41). This everyday use of the platform is also reflected in individuals sending me additional material: Several participants shared personal photographs to illustrate their visit or included links they found on the topic which they thought were interesting. This gives more context to the experience and shows that an Instagram post about the memorial site does not exhaustively represent a person's interest in the topic. In this sense, it complicates the research process, but it also shows the complexity of engagement which is never quite "done."

One insight from the interviews, which has implications for adapting this method, is individuals' insistence that their images "speak for themselves." Interestingly, in their interviews, participants voiced a desire for their audience to learn things that are invisible in their posts. For example, one interviewee did not include a caption (Figure 8), but in her interview, she said she had chosen the picture because: "It makes an impact both visually & meaningfully. He's part of the whole & large like a mountain, but unfinished. There's work yet to be done. I wanted to share ALL of that with others."

While this interpretation corresponds to the artist's intention (National Park Service, n.d.), it requires an in-depth reading of the image, one that viewers of the post might not make, also because the gap in the mountain—the "whole"—from which the statue of King is "removed" is invisible in all photographs in this post. Therefore, had I only looked at this post, I would not have been able to conclude what its creator's intentions were, making the interviews with creators a necessary addition to the methodological toolkit for researchers who want to understand the practices behind Instagram posting.

When asked about their experiences on site and what the memorial means to them, several interviewees gave intimate responses. This shows that interviewing through a social media platform—even after a visit—can be an appropriate method to access emotions as it helps individuals open up. One interviewee, for example, told me: "What I would like others to do is show empathy for black people in America because we are hurting and crying for help." And he later continued by writing:

> Seeing it [the memorial] again was very meaningful to see a black man who looks like me was an ice breaker. When I mean ice breaker I mean that a lot of black boys or girls that grew up didn't get to [see] a statue/memorial of someone black and that make us feel as if we weren't good enough or smart etc that we couldn't lead or move a nation. It served as a big inspiration forreal [sic].

While these types of conversations can also occur in face-to-face settings, the combination of anonymity and intimacy on Instagram can increase their likelihood. However, I also received a message from one interviewee, saying: "Next time you come to DC let me know in advance so we can talk more on the subject. There are certain conversations I won't have on social media." When asked to elaborate on the type of topic, he was hesitant to discuss it online; he only responded: "Let's just

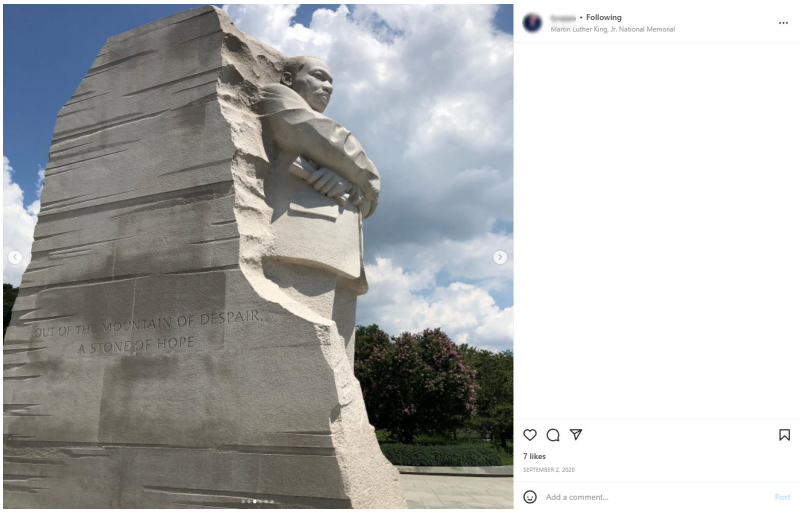

Figure 8. A picture speaking for itself.

say all the data entered and exchanged on the internet passes through a central location for each government. While we have freedom of speech it doesn't mean that we won't [sic] have freedom of consequences." This interviewee is a black man living in America who posted from the MLK memorial saying that people must fight in difficult times (caption abbreviated to ensure anonymity). This individual apparently has critical views of the US government and the public memory of Dr. King, including how it is celebrated at the memorial. However, Instagram is not the place for him to share this in detail, neither in his post nor in an interview. This example reiterates that Instagram posts do not always encapsulate an individual's full opinion of what they show (in this case, the memorial site and, by extension, public memory of Dr. King), making interviews with their creators a necessity. However, it also shows that individuals differ in their willingness to discuss personal and controversial topics online. Researchers must therefore ensure their research topics are suitable for the Instagram interview and consider offering alternative forms of interviewing when interviewing individuals who might endanger their own safety by discussing controversial topics or conspiracy theories, particularly ones that believe that the government is monitoring all behavior. When such groups are of interest to the research, the Instagram interview, just as other online interviews, is likely unsuitable. In those cases, researchers can use Instagram to recruit individuals for offline interviews (see more on this in Section 7). Overall, however—as scholars have claimed for online conversations more broadly (e.g., Pertierra, 2018, pp. 96–97)—Instagram interviews tend to be conducive to personal and intimate interactions.

Lastly, I found that when people are invited to share their experiences and opinions, they seem to enjoy sharing, which helps retain participants. This is counterintuitive to much of what we know about online interviewing: that answers tend to be short and non-committal (cf. Altmann, 2011, p. 101; Fischer, 2009). While that was sometimes true for this study, I also led long and in-depth conversations; in one example, a conversation that spanned two months and totaled almost 6,000 words. Another interviewee switched from text messages to audio recordings, saying: "So I'm going to start sending out voice messages because the questions are getting better and require more extensive answers" showing his interest in the discussion. This further became visible when participants would follow up with me to either hear about updates on the project or to talk about new ideas they had about the topic. In one case, during my second fieldwork, I even met with one participant, Denaise Seals; we visited the memorials together and continued the discussion in person (Figure 9). During our walk, Denaise told me: "I'm grateful to have this with you today because, as I've said [whispers]: I have never seen the reflecting pool. And when you said you wanted to see Lincoln, I went 'oooh' that will be interesting to find it!" This shows that when the interview topic corresponds to individuals' personal interests, not only is their quality of response high, but interviewees themselves can profit from the conversations, which—in a way—compensates them for the time invested.

7. Overcoming the Online/Offline Dichotomy in Access to the Field

Denaise and I met online through her Instagram posts of the MLK memorial. Before embarking on my second fieldwork, I asked Denaise, who lives in the area, if she would like to join me on a walk around the memorial (as well as the other memorial in this project). She agreed, and we met for a one-hour-and-twenty-seven-minute walk, during which I recorded our conversation and we took photographs that we later shared with each other. Our conversations during this time were connected to what we had discussed online, but they also

Figure 9. Denaise Seals and I at the MLK Memorial, in 2021. Note: Used with permission.

touched on even more personal aspects. It felt like we already knew each other and going on a walk together was conducive to even more intimate conversations and more spontaneous reactions to the sites. It can also help to gain a deeper understanding of individuals' experiences who are not as comfortable typing lengthy messages or, as mentioned above, discussing controversial topics online. I only met with one individual on site. However, this offline interaction, initiated through online contact, can be purposefully integrated into a project when researchers plan this during the initial stages. For this project, it proved easier to create offline connections through initial online interactions than vice versa. During fieldwork, I asked individuals for their email addresses to contact them after the visit (Fieldwork 1) and gave out my card with my email and Instagram, with an invitation to connect (Fieldwork 2), which resulted in almost no interactions. However, the contacts I made online were eager to meet "in real life." While I only managed to meet Denaise, several others said I should contact them when I was back in town. The Instagram interview can therefore be used as a recruiting method but only after the interview was conducted: This is to ensure that a relationship between researcher and interviewee has been established, ensuring the necessary trust and interest in a joint site visit, as well as to help manage expectations as to the types of conversations to be had.

8. Conclusion

In this article, I have shown that the inclusion of Instagram interviews in a (digital) ethnography provides more advantages than simply allowing for interactions when in-person interviews are impossible. The method has inherent advantages compared to in-person interviews in the context of visits to cultural sites and research questions that are (also) interested in individuals' visual engagement with the site. Taking advantage of the platform's location-based affordances, it is an online method that allows sampling through an offline location, which not only makes access to a dispersed population easier but actually enables it in situations when offline methods have proven unproductive. As part of a purely digital or a mixed-method ethnography, the Instagram interview can be used to study intersections of offline and online spaces because it is a medium that bridges that gap: Users post about their offline lives on Instagram, visit places in the physical world that they have seen on "the gram," and they use the app to talk to friends they know from online or offline contexts. Using Instagram to interview individuals also means reaching them through the platform on which they share aspects of exactly those phenomena under study: Having logged onto Instagram, participants were already in an appropriate mindset and ready to talk about their travel experiences and their understanding of public memory because the platform affordances and cultural constraints encourage engagement with such experiences.

In an increasingly connected world, few aspects of our daily lives occur exclusively offline. The online realm often impacts our experiences in the offline world to the extent that many experiences can no longer be considered purely "offline." It can be as simple as our movement through a city being guided by an online map or as complex as the potential for creating an Instagram post impacting where we go for dinner, what seat we sit in, and what we order. In order to study these types of entangled experiences—and individuals' thoughts and motivations connected to the experience—I propose the Instagram method as an additional interview method for qualitative research interested in (cultural) tourism experiences. By interviewing visitors to cultural sites through Instagram after their visit, researchers can move beyond learning about individuals' motivations for social media posts, allowing us to contextualize their online content within their experiences occurring on-site (both offline and online). This helps us see how visitors, in fact, use memorial sites and how they negotiate their meanings, including how they post about them on Instagram. Therefore, the Instagram interview should not be understood as an online method of accessing offline behavior: It is a method for interviewing individuals about entangled offline and online experiences on a platform that is perceived to bridge that gap.

Lastly, the main contribution of adding the Instagram interview to the researcher's repertoire when studying individual cultural tourism experiences lies in allowing researchers to study the complex phenomenon of experiencing a cultural site in a manner that acknowledges the complexity of the experience: It does not necessarily end once visitors leave the site. They might reflect on their visit, think about it in the context of their daily lives, reflect on it when they read an article in the newspaper, and, especially when we talk about sites of tourism and public memory, engage with the site actively on social media. The act of posting about an offline experience is not an "after the fact" accounting of an experience; it is part of the experience itself. Posting about a site and making sense of it in the context of one's personal life, one's personal (online) identity, is part of the visit and must be included in the study of the visitor's experience. When we conceptualize visits to cultural sites, or tourism sites more broadly, as spanning across the space and time of the physical presence of the visitor at the site, we must adapt our methods to study these experiences. We must consider the full experience, including its online components: before, during, and after the visit.

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Conflict of Interests

The author declares no conflict of interests.

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About the Author

Larissa Hugentobler is a research and teaching assistant at the University of Zurich, where she is pursuing her PhD in communication and media research. Her research focuses on experiences impacted by digital interactions with the physical world and centers on nonprofessional content creators and marginalized communities.

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Article

WhatsApp as a Tool for Researching the Everyday Lives of Venezuelan Refugees Settling in Brazil

Amanda Alencar [1,*] and Julia Camargo [2,3]

[1] Department of Media and Communication, Erasmus University Rotterdam, The Netherlands
[2] Department of Communication, Higher School of Advertising and Marketing, Brazil
[3] Department of International Relations, Federal University of Roraima, Brazil

* Corresponding author (pazalencar@eshcc.eur.nl)

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Abstract
In this article, we explore the role that WhatsApp can play as a research tool for investigating the experiences of settling refugees. Messaging apps can help researchers collect data about people's everyday lives while also providing insights into processes that are difficult to study as they happen. The communicative affordances of messaging apps also facilitate spontaneous interactions in research and the flexibility needed when working with mobile groups of people, such as refugees. We build on our experience of interacting together with Venezuelan refugees through the Conexión Sin Fronteras (Connection Without Borders) WhatsApp group, which was designed by the researchers in the form of an intervention focused on building community among Venezuelans settling in the city of Boa Vista, Brazil. Our experience shows that data collection in WhatsApp allows researchers to obtain relevant insights into social support, relationship-building, and negotiations of rules in a group context. However, our research outlines challenges related to the varied engagement of participants in WhatsApp group chats and the difficulty for researchers to be always present during group conversations. Limitations to the use of WhatsApp in research with refugee populations also include restrictions in terms of internet capacity shaping the types of data participants choose to share. In this context, it is crucial to address barriers to access to connectivity and create opportunities to enhance refugees' literacy regarding data collection in digital spaces. We hope these findings will contribute to the development of inclusive methodological approaches using mobile apps in refugee settings.

Keywords
messaging apps; refugee settlement; Venezuelan refugees; WhatsApp; WhatsApp groups

Issue
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1. Introduction

The proliferation of smartphone devices and access to affordable mobile connectivity have facilitated the adoption and use of mobile messengers among people globally. The multimedia affordances of smartphones and messaging apps allow users to send text, share real-time locations, voice recordings, pictures, emojis, GIFs, hyperlinks, documents, and videos. Due to their deep integration into everyday routines, messaging apps can be seen as useful tools to research people's lives, experiences, and interactions in a variety of contexts (de Gruchy et al., 2021). A growing number of studies have identified that mobile instant messaging apps can widen participation of population groups that are hard to reach or involve in research given their vulnerable social and economic situation (Kaufmann, 2018; Marzi, 2021).

The present article explores the adoption of WhatsApp when working with refugee communities. Specifically, the analysis builds on our experience of interacting together with Venezuelan refugees through the Conexión Sin Fronteras (Connection Without Borders)

WhatsApp group, an intervention project aimed at fostering social community building among the participants. Interventions can be defined as "purposively implemented change strategies" developed to accomplish a desired behavior or outcome at the individual, group, or community levels (Fraser & Galinsky, 2010, p. 459). For the intervention in this study, we adopted a longitudinal design with WhatsApp as a research tool for accompanying the lives of Venezuelan refugees in Brazil in order to analyze how their engagement in the WhatsApp group can support their settlement process. In this article, our focus is not on evaluating the intervention or presenting the changes in participants' life trajectories during the study, but on the possibilities and limitations of using WhatsApp for studying the refugee experience of settlement. This article begins by providing a brief overview of the research context and studies on the use of mobile apps for data collection. It will then go on to develop a more detailed account of the project, followed by the analysis and conclusions.

2. Contextualizing Venezuelan (Forced) Migration in Brazil

Since 2015, four million Venezuelans have fled hunger, violence, and hyperinflation in their country. Official statistics estimate that, by the end of 2021, 305,000 migrants from Venezuela arrived in Brazil (International Organization for Migration, 2021), with the majority crossing the border city of Pacaraima and proceeding to Boa Vista, capital of the state of Roraima in northwestern Brazil. The legal situation of Venezuelans is determined by two "regularization" routes of the Brazilian government, which allow them to apply for a residency permit or refugee status (International Organization for Migration, 2021). Despite awareness of the complexity and diversity of circumstances shaping both legal pathways for Venezuelans, this article utilizes the term "refugee(s)" in the broader context of forced displacement in an effort to include as many perspectives and experiences as possible. Brazil is regarded as a country with pragmatic, humane, and progressive asylum and refugee policies, which include entitlement to work, freedom of movement, and access to social services (Martuscelli, 2021). In practice, however, Venezuelans do not have access to a state program that supports their integration trajectory, and many depend on the large support network of international, national, and local organizations and networks to alleviate their precarious conditions of life in Roraima. These challenges are reinforced by Venezuelans' inability to sustain continuous and reliable digital access and connectivity that can facilitate their access to information, job and educational opportunities, health assistance, social connections, etc. (see Alencar, 2020). Within this context, it is important to highlight that one in two Venezuelans living in Boa Vista does not feel sufficiently informed and 69% do not have Wi-Fi access (R4V, 2020).

Digital access and use among refugees are conditioned upon various contextual factors. The lack of support from government and humanitarian organizations regarding the provision of adequate digital infrastructures (Witteborn, 2021), as well as restrictive telecommunication policies can impact refugees' access to digital connectivity and spaces (United Nations High Commissioner for Refugees, 2021). On the other hand, the needs and experiences generated from the migratory process have led refugees to create tactical forms of technology use. Recent evidence suggests that Venezuelan refugees share their cell phones with family, friends, or acquaintances, motivated by their need to communicate with family members, build social relationships, search for administrative information, and in some cases, transfer money to Venezuela. This study considers the precariousness and social and digital inequalities affecting the lives of Venezuelans in Boa Vista, factors that require ethical attention and care from researchers when it comes to the implementation of methodological approaches using mobile apps in research with marginalized communities in diverse settings.

3. Using Mobile Messaging Apps as a Tool for Data Collection

Messaging apps have a demonstrated capability to address the methodological challenges of researching people's everyday life contexts and "real-time" experiences (Kaufmann et al., 2021). Mobile messengers enable people to establish individual and collective connections at any point in time and across different time zones (Mols & Pridmore, 2021), with the possibility of collecting audio-visual and textual data that can be shared online between participants and researchers and within research teams (Jailobaev et al., 2021; Marzi, 2021). The new opportunities of using mobile messaging apps for qualitative in situ data "can provide insights into processes that are otherwise difficult to study, or that can be lost if accessed in retrospective accounts only" (Kaufmann & Peil, 2020, p. 231).

There is a growing body of literature that recognizes the affordances of smartphone devices and messaging apps for data collection and participant interaction in qualitative research (de Gruchy et al., 2021; Manji et al., 2021). A significant analysis and discussion on the subject were presented by Kaufmann et al. (2021; Kaufmann & Peil, 2020). In their study, the authors accompanied young adults throughout their everyday life contexts and interviewed them about their daily routines and momentary experiences, while prompting participants to employ the various multimodal features afforded by WhatsApp (e.g., sending texts, voice messages, pictures, videos, emojis, GIFs, etc.) to express themselves. In contrast to quantitative methods for mobile apps that adopt standardized questionnaires in fixed schedules, Kaufmann et al. (2021) highlight the potential of mobile messengers to offer spontaneous interactions between participants

and researchers, making it a flexible and open research process that is characteristic of qualitative research (p. 3). Considering the ease and routinized use of mobile phone apps combined with their near-synchronicity, these technologies can allow interactions to take place in a less intrusive way (Jailobaev et al., 2021).

Furthermore, spontaneous interactions using mobile phones can reduce power imbalances and inequalities in research (Nash & Moore, 2018). In this regard, Dawson et al. (2020, p. 212) highlights that instant messaging apps should be used as a method to promote "friendly and natural-feeling conversations," as this approach helps balance the participant-researcher power relations, enhancing the voices of the groups under study. Previous research has stated that flexibility of data collection via messaging apps, such as WhatsApp, facilitates the recruitment of participants regardless of their geographical location, while also retaining contact with them should they move to other places (de Gruchy et al., 2021; Kaufmann & Peil, 2020). This is especially true when considering the participation of mobile groups of people in research, such as refugees (Kaufmann, 2018). Researching refugees' everyday lives can be challenging due to the volatile conditions of their migratory trajectories and situations (Beduschi, 2018). Several factors related to the lack of stability in the host communities, temporality of living conditions (e.g., living in temporary camps), as well as the difficulties that researchers experience to access social networks of refugee migrants make them one of the most hard-to-reach population groups (Shaghaghi et al., 2011).

To date, only a few studies were found that have adopted mobile messaging apps in the context of data-gathering strategies among refugees. With an emphasis on the analysis of refugees' daily practices of digital media use, messaging apps have been used by researchers as digital tools to stay in contact with refugee participants and to conduct interviews (Kaufmann, 2018; Marlowe, 2019; Twigt, 2018; Zijlstra & Van Liempt, 2017), as well as part of the ongoing participatory research (Godin & Donà, 2021; Leurs, 2017). A recent study by Palmberger (2022) involved the use of digital diaries among refugees to record their digitally mediated care practices through screenshots from WhatsApp communication with family members. Despite the importance of these approaches, there remains a paucity of evidence on the methodological potential of messaging apps for researching refugee processes. This article is contributing to filling this gap in knowledge by examining the longitudinal application of the mobile messenger WhatsApp within one intervention study with Venezuelan refugees in Brazil.

4. Study Design: The Conexión Sin Fronteras WhatsApp Group

The WhatsApp group Conexión Sin Fronteras (Connection Without Borders) was designed by the researchers in the form of an intervention focused on building community among Venezuelan refugees settling in the city of Boa Vista. This intervention aimed at analyzing how participants' interactions in the WhatsApp group could potentially enhance their experience of settlement. Our decision to use WhatsApp as a research tool in this project was motivated by the prevalence of the mobile app as a means of communication within the Venezuelan community in Brazil. Recent reports revealed that 39% of Venezuelans have indicated their preference for WhatsApp when it comes to receiving information (R4V, 2020). The possibility of utilizing the attention participants routinely devote to their most relevant digital space enables researchers to accompany them through specific life experiences (Kaufmann, 2018; Kaufmann et al., 2021).

We recruited 18 Venezuelans with different housing and living conditions in Boa Vista. They lived in rented apartments, refugee shelters, settlement occupations, and in some cases, were in street situations. Most of the participants were unemployed, while others were doing small daily services in the building and construction sectors, informal jobs, care, or domestic services. None of the participants had a mobile phone or a smartphone when they arrived in Brazil. Some reported having to sell their phones in order to pay for their trip to Brazil, whereas others left the devices with their family members so that they could communicate with each other. At the time of the research, all the Venezuelan participants attended Portuguese classes and a computer lab program at the Technological Reference Center of the city's public university in the context of local integration initiatives for migrants and refugees. As coordinator of the technology center, the second author of this article has been actively involved in a range of initiatives aiming at improving refugees' access to ICTs, which helped in our engagement with the community. We started recruiting participants in the first week of lessons at the center, as it was important for the project's approach to community-building that they did not know each other yet. Through short informative sessions during class time, researchers were given the opportunity to present the study to potential participants, explain their role as researchers, and invite them to participate in the project. The recruitment process resulted in a diverse group of participants (e.g., in terms of age, gender, educational levels, disabilities, sexuality, etc.), making it possible for the inclusion of multiple perspectives and narratives in the analysis. The sample included 10 women and eight men, aged from 18 to 64 years old, and living in Brazil between two months and two years. There were also differences regarding levels of school education (from incomplete first years of education until graduation) and categories of marital status (single, married, widowed) among participants. For this study, pseudonyms are used as names to protect the privacy of participants. We also employ the expressions "group members" and "group participants" to highlight

the way Venezuelans referred to themselves throughout their engagement in the WhatsApp group.

As part of the intervention design, we organized introductory sessions to provide participants more details about the project, answer their questions and give them sheets and informed consent forms in Spanish, approved by the Ethics Review Board of the Federal University of Roraima. These sessions were scheduled at two different times to best accommodate the availability of participants. Considering power imbalances that occur in the design of projects with refugees and our own position as privileged researchers in both Western and non-Western academic settings, we aimed at engaging in a relationship of reciprocity with participants through which both groups would be responsive to each other's needs during and beyond the research process. In the context of postcolonial indigenous methodological approaches, the principle of reciprocity implies that "the research must be mutually beneficial for both researchers and the local communities while listening to participants' voices and considering their needs and goals" (Restoule, 2008, p. 203). Based on this perspective, we claim that the relationship between the researchers and community members in this project was transactional, meaning that we provided each participant with a smartphone and basic data packages to use the internet every month and in exchange the participants provided the researchers with access to the personal information shared via the WhatsApp group. The smartphones used in this project were donated by the UN Refugee Agency in Boa Vista and the costs of the internet credits (€3,40 per month to each participant) were covered by Voorbereidend Jaar Erasmus, an educational program at Erasmus University Rotterdam supporting sociocultural and digital inclusion of refugees in the Netherlands. The provision of the phones and funding for the material costs was made possible through the researchers' collaborations with these organizations in previous initiatives. By the time the project was completed, the researchers informed participants that they could keep the smartphones for themselves.

The project started officially in January 2019 and spanned eight months. We first conducted interviews with the participants to familiarize ourselves with their stories, communication practices, and everyday life. After participants' smartphones were set up, we created the Conexión Sin Fronteras (Connection Without Borders) WhatsApp. It was envisioned that the WhatsApp group would serve as a collaborative space where participants could send messages to the group at any time and share experiences related to their everyday lives in Brazil. This accords with intervention approaches to WhatsApp groups in health research that used the technique of free (unstructured) and participant group observation (researchers were also members of the WhatsApp group), allowing researchers to immerse themselves in the research process and learn directly from participants' experiences in the groups (Arroz et al., 2019; Henry et al., 2016). Arroz et al. (2019) stated that the fact that researchers are members of the WhatsApp group can potentially lead to bias in the research process and provided ways to minimize this risk, such as active participation of researchers in clarifying questions raised by participants as well as in raising questions about participants' interactions in the group.

In this study, we, the researchers, positioned ourselves as members and facilitators of the group, stimulating unstructured conversations and posts while proposing questions associated with participants' experiences and situations throughout the project. Every week, we asked participants questions about their settlement processes that involved the use of their mobile devices. Additionally, we asked them to further elaborate on the main issues, situations, and information that they shared in the group. The topics ranged from information on basic needs and support, jobs, romance, ways of coping, and political discussions, to name but a few. Participants were encouraged to use the whole range of WhatsApp features (send pictures, videos, emojis, screenshots, links, etc.) for their responses (Kaufmann, 2018; Kaufmann et al., 2021). There were times when we needed to remind the group to answer the questions of the project while retaining flexibility due to the challenging circumstances of participants' lives. In total, data from the WhatsApp group generated 341.4 MB in storage, with 921 media posts (image, video, and audio files), links, and documents.

Access to the group was strictly limited to the participants and researchers in the project. Since the inception of the WhatsApp group, all participants were properly informed by the researchers that their information posts and interactions on WhatsApp would be used for academic purposes. Standard ethical procedures (confidentiality, consent, data protection, etc.) were complemented by a practice-based ethics approach that allowed for constant negotiations of interactions among group members (Møller & Robards, 2019). In this way, ethical considerations became part of the entire WhatsApp group project and not just a side activity (Marino, 2020). Through an open and collaborative space, we decided together that the contents of posts and interactions from participants would not be shared outside the group.

Within the study, we also organized monthly meetings in person at the Technology Center to discuss further participants' experiences and specific topics that concerned the entire group. The integration of WhatsApp in a qualitative multi-method research design allowed for enhanced insights into the collaborative and learning process of participants as a group (Arroz et al., 2019; Henry et al., 2016), following the exploratory and participatory objectives of this project. In the last month of the project, we conducted interviews with participants about their experiences of engaging in the WhatsApp group and how this shaped their settlement processes. Given that the first author was based in The Netherlands

and the second author in Brazil, the organization of the project among the researchers has been mostly managed via WhatsApp, except for the initial and final interviews, which were conducted by both researchers in situ. Drawing upon the findings emerging from this study as well as empirical discussions of messaging apps as research tools, the next sections analyze the strengths and weaknesses of using WhatsApp as part of a longitudinal method for gathering data and studying the lived experiences of members of the Venezuelan refugee community while settling in Brazil.

5. Strengths of Utilizing WhatsApp for Data Gathering When Working With Refugee Settlement Communities

The WhatsApp group generated a sense of community and feelings of belonging among participants. The Venezuelans in this study appreciated the possibility of being connected to new people as well as learning about their professional and personal developments throughout the research process. As one participant said: "The project was very good because many of us met new people, had opportunities and doors opened to many friends. I saw in the group that many of my peers are working, taking courses, doing other things" (Pilar, a 44-year-old woman, doctor, waiting for the regularization of her diploma to be able to work). For Laura, (a 29-year-old woman, mother of three, housewife), the WhatsApp group project brought opportunities for the participants as well as for researchers beyond the research project:

> It helped me a lot as a person. It was very innovative to participate in something like that [WhatsApp group research] because I never saw this in Venezuela and here I had this opportunity….Because I know that it will be of some use to me or to you [referring to researchers] as well.

From the outset, participants were engaged in jointly creating a community by starting their own conversations. This offered the researchers the possibility to observe how conversations unfolded in the group, which might have been different if the researchers had initiated the conversations. Interactions in the group started with participants introducing themselves and saying how they first used their phones. The group's first post was from Josiane, a 19-year-old woman, pregnant with her first child, who shared in the group a screenshot of the message she sent to her mother saying: "Hi mom, I'm already connected to you" (Figure 1). Josiane has not spoken to her mother since she arrived in Brazil, two months earlier. Other participants interacted with Josiane's message and shared their experiences about their first phone use and feelings of missing their family. This group interaction occurred in a spontaneous way, allowing everyone to participate as they would like, including, us, the researchers.

Considering the engagement of participants in the WhatsApp group for the benefit of community building, many were willing to share with the group information about their everyday life, which they knew was also being shared with researchers. In one case, Mr. Edward (a 63-year-old former teacher from Bolivar state) shared humorous material showing his daily routine taking care of his granddaughter in one of the refugee shelters. As shown in Figure 2, members reacted by making jokes, which provided the researchers with an opportunity to access momentary but genuine feelings of happiness experienced by participants.

At the same time, the development of spontaneous interactions among group members enabled by the informal, free-and-ease communication style (e.g., light responses, emojis, visual illustrations) also allowed researchers to obtain insights into moments of anxiety affecting participants' experiences (Jailobaev et al., 2021). For example, a WhatsApp snapshot in Figure 3 shows that group members sent messages of encouragement, support, and tranquility, especially with the use of emojis, when one of the members said he was feeling nervous and anxious prior to his job interview.

The WhatsApp group became a relevant space that participants used to obtain and share all kinds of information. The group was often populated by messages

Message 1 (from Josiane): Mom
Message 2 (from Josiane): I'm already active for you.
Message 3 (from Josiane): Mamaaaaa
Message 4 (from Josiane's mother): How are you my beautiful girl

Figure 1. Screenshot of the WhatsApp communication between Josiane and her mother.

Valeria the super girl

Message: Be very careful that she can fly away ☺. Because it will be Valeria, the super flying girl.

Figure 2. Snapshot from the communication on WhatsApp showing the humorous material produced by Mr. Edward.

and website links related to job opportunities, education, health, legal procedures, recipes, cultural celebrations, and news from Venezuela, functioning as a source that participants had access to daily. Within this context, it was also possible to observe that the group space was used as a mechanism for collective checking of contents that raised suspicion among participants. In one of the cases, the group verified and judged as false the information about food donations by a supermarket chain in the city, and in another case, the group also analyzed the news on the plan of invasion of Venezuela by American troops to remove the Venezuelan President Nicolas Maduro from power. In this study, the design of the WhatsApp group in the form of an intervention focused

Message 1 (from a group member): Hi everyone, there are 10 people left for my turn in the interview and I feel [despair and nervousness face]. Asking God that everything goes well.

Message 2 (from a group member): Brother, rest assured, have faith in God and in yourself, what is for you, it's for you, relax, this job vacancy is yours.

Message 3 (from a group member): Whis you the best of luck, don't worry, everything will be alright. Let´s go! (Participant name) [contentment face].

Figure 3. WhatsApp snapshot of group messages of support.

on building community among resettling refugees facilitated relationship building and support that extended beyond the app. Some Venezuelan participants reported helping their peers by accompanying them to places, such as hospitals, banks, government offices, or training for job interviews, while also taking photos of themselves during these moments through their mobile devices and sharing them in the group. Aside from bringing direct benefits to the participants, the group also enabled us to better understand participants' immediate requests for help and provision of assistance in ways that would not have been possible had the researchers adopted another method of digital ethnography (e.g., conducting individual WhatsApp chats with participants, or following participant interaction on Facebook groups).

During our analysis and reflections on the use of the WhatsApp group in this project, we came to realize that conflicts in the context of the WhatsApp group can function as a means for further observation of how relationships among refugees resettling take place and are being negotiated in real-time. Management of participants' expectations regarding the care and attention of other members emerged as an important issue. Compared to group relations in other networks such as Facebook, WhatsApp group dynamics can generate more intimacy and dependencies, shaping members' expectations about responsibility and pressure to respond (Mols & Pridmore, 2021, p. 3). One of the most emblematic situations experienced in the group involved the temporary departure of one of the participants who reported not receiving sufficient attention from others after going through a delicate health problem. Yannine (28-year-old woman who arrived in Brazil with her boyfriend and his family) posted several messages in the group about the alleged lack of support, calling members insensitive and saying that she thought the group was like a family to her, but there was actually a relationship of hypocrisy among group members, except for just a few. Yannine's attitude towards the group led to a situation of conflict, with several members trying to explain their difficulty in helping beyond the app, especially because of their work routine, childcare responsibilities, or limited financial conditions. The fact that many participants disagreed with Yannine made her leave the group for a few hours. It was up to Mrs. Nora, (oldest member of the group, 64-year-old woman, mother of a 16-year-old daughter; she used to work as a lawyer in Venezuela and now works as an elderly caregiver) to appease the situation. Mrs. Norka developed a unique ability in the group to encourage participants with messages of gratitude, faith, and optimism. In her post, she asked the group to reflect on the content of their messages and reminded them that all participants were going through emotional and financial hardship because of their migratory condition. In her own words:

> We [the group members] are doing our best in providing support, but I believe this WhatsApp group is not a place "to do therapy" and that many people could be hurt by the level of pressure and judgment that Yannine imposed on us.

These messages were also sent to Yannine in a private chat, which helped the group overcome this conflict and recreate possible meanings of belonging and a sense of community. Through access to this WhatsApp data, the researchers were able to learn how the technology offered a space for the conflict to unfold as well as to resolve it.

Furthermore, conflicts in the group provided researchers with access to information about how participants negotiate appropriate sharing and group norms. Throughout the WhatsApp project, participants shared images and videos of important moments that happened in their lives during settlement, such as finding a job, moving to a different city, birth, finding love, etc. On some occasions, there were disagreements in the group about the type of content that could be posted, as has occurred with an adult-content video featuring nude images of people which was shared by one of the participants. Such content ignited anger in another participant, Karen (43-year-old woman, civil engineer, living with her three children and husband in one of the refugee shelters), who said that this kind of visual material was not suitable for the group and that she feared that her children could see this message, as the phone was shared with her family. Other participants also commented on the ethical aspects of the video, dividing opinions about the freedom/restriction of posts on this theme. Several times, we as researchers did not participate in group discussions due to the uncertainty throughout the project on whether our role as project leaders could have any coercive effect on participants' interactions in the group (Arroz et al., 2019). Such an approach highlights the opportunity of collecting data in ways that might have not been possible due to power differentials that tend to lead to self-censorship among participants. For instance, participants chose not to accept that certain contents (e.g., pornography) are shared in the group while reinforcing the rule regarding group membership after one of the members asked if an acquaintance could be added to the WhatsApp group.

From in situ and real-time observations of participants' interactions enabled by the WhatsApp platform (Kaufmann & Peil, 2020), it was possible to attain deeper knowledge of the conditions of digital precarity experienced by Venezuelans settling in Boa Vista. Throughout the WhatsApp group experience, participants found additional ways to connect their devices to the internet in different city locations. Amelia (41-year-old woman, housewife) said she would often go with her three children to a nearby mall with free internet connection so that everyone in her family could use the phone without having to acquire data, whereas Diego (32-year-old man, resident in a refugee shelter) reported that he accessed the internet in a public square since the shelters did

not offer access to communication devices, nor Wi-Fi. While these examples can be associated with challenges of retaining refugees' participation in research using messaging apps, they also serve to highlight the everyday acts of resistance to economic hardship and exclusions characterizing migrant struggles in diverse settings (Varela-Huerta, 2021). This can be seen in the case of Leonardo (a 26-year-old man who migrated to Brazil to work as a mason) who sold the smartphone device he received from the project to provide financial support to his family in Venezuela. Leonardo shared this information on a confidential basis only with us, researchers (via the private chat on WhatsApp), when making the decision to withdraw from the project.

6. Weaknesses in Using WhatsApp as a Tool for Data Collection Among Refugee Communities

The analysis of WhatsApp messages showed that the platform provided a space for Venezuelans to interact almost daily during the entire project. Compared to responses to the weekly questions, the methodological dynamics that stood out the most in the WhatsApp group were spontaneous interactions among group members, which allowed researchers to collect data in ways that were not previously planned. These voluntary, unstructured conversations in the group had the advantage of providing rich, unexpected insights into participants' lived experiences and "in real-time" (Kaufmann et al., 2021). Yet, it was important to account for the differences that emerged regarding the engagement of participants in WhatsApp group communication, as this can be a disadvantage when using WhatsApp as a tool for data collection in research with refugee communities. It appears that the level of interaction in the WhatsApp group was related to the kinds of motivations that Venezuelans had to join the group, such as the case of Adriano (48-year-old male, unemployed, and living in a refugee shelter with his wife and three children), the participant who interacted the most with group members. As Adriano explains: "Being part of the WhatsApp group was an opportunity to make friends and enhance my social network."

Nonetheless, a small number of participants did not engage constantly, highlighting the challenge of retaining participant interaction in remote research (Kaufmann et al., 2021). Mario (a 31-year-old business administrator, unemployed, father of a newborn), was active in answering the weekly questions of the project, but less engaged in the group conversations. We learned from some participants that the conversation topics and participants' behavior affected their level of engagement in the group. Daniel was a 19-year-old man, resident of one of the city's refugee shelters, who dreamed of becoming a soccer player. When talking about the interactions in the group, Daniel stated that he was not very interested in the subjects that emerged during group chats. For Marta (a 31-year-old single mother with three children and unemployed), her busy daily routine was not an impediment to participating in the WhatsApp group. She commented that her engagement became increasingly less intense as she felt disappointed with some of her peers: "The attitude of three people in the group is negative; they are proud, arrogant….For this reason, I have not participated much lately. They believe the group is for gossiping." Although the varied engagement of participants in WhatsApp group chats could potentially lead to an imbalanced representation of participants' voices and experiences, the methodology in the WhatsApp group context we studied was not designed to have control over participants' posting behavior (e.g., fixed schedule for posting new content or sending messages). Instead, the possibility that members had to engage in spontaneous interactions in the group offered better opportunities to access different forms of knowledge that were not foreseen but spontaneously brought by participants (Henry et al., 2016).

On the other hand, we recognized from our experience of using WhatsApp in a group context that it was not always possible to follow the discussions as they happen because of the great amount of information shared and the relatively quick time of emergence and resolution of conversations in the group. At least once during the day in our different time zones, we checked the group activity and interacted with participants by answering questions they raised (e.g., about legal procedures, city addresses, etc.), or commenting on the content they shared in the group chat. Similar to other studies (de Gruchy et al., 2021; Manji et al., 2021), we needed to consider the limitations of data collection and sharing using WhatsApp in research with low socioeconomic status populations. It became clear that some choices when it comes to sharing are related to internet capacity, which may constrain the availability of data for analysis in ways that cannot be predicted. In our WhatsApp study, we observed the employment of digital strategies among participants regarding the data economy, such as avoiding the download of very heavy video content and apps or storing them in their devices to avoid using internet data and searching for free Wi-Fi. This can be illustrated in one of the posts by Mariana (22-year-old, studied architecture in Venezuela) who was careful not to share her videos in the WhatsApp group to prevent group members from spending their data (see Figure 4).

Another important aspect to highlight when using mobile messaging apps as part of a data-gathering strategy among refugees concerns the datafication of these populations (Witteborn, 2021). The process of datafication transforms individuals or populations into digital data that can be traceable and categorized (Adey, 2004). Digital data generated from social media activity (searching for information, navigating through a specific location, or sharing photos online) can be captured by government and private actors to verify refugees' identities and determine their access to rights, assistance and services (Madianou, 2019; Witteborn, 2021). We learned

Message 1 (from a group member): Good afternoon! God bless. That's part of what I'm doing with my phone, I'm collecting information and sharing as well. If you want to see some videos of the interviews, I can send them to you here (the only issue is that they are a bit long) [smiling face]. That's why I only share them on Facebook and recommend them via Instagram in case you want to see them.

Message 2
This videos are only video presentations.

Message 3
These*

(Video caption: Necessary documents to live in Brazil)

Figure 4. WhatsApp snapshot of posts by Mariana.

from this research that participants engaged in different social media platforms and apps through their smartphones to make sense of their new surroundings and navigate settlement on their own terms. Yet, it is uncertain whether our refugee participants were aware of how their data are collected for the interest of the digital platforms they used, including WhatsApp. While datafication concerns a major challenge to the development of contemporary digital methods, this process does not necessarily make WhatsApp a problematic platform for data collection in refugee contexts. In fact, previous research suggests that the end-to-end encryption introduced in the application to protect user privacy can facilitate data security (Rössler et al., 2018, as cited in Kaufmann et al., 2021). In her study with Syrians in their new city of Vienna, Kaufmann (2018) showed that her participants felt comfortable using WhatsApp to engage in daily chats with the researcher, which helped build trust throughout the process. This is particularly relevant when projects include vulnerable populations.

Finally, concerns regarding the possibility of having the smartphones stolen were widely spread among participants, given the insecurity of life in Boa Vista. In this case, it is recommended that researchers and participants discuss these risks and collectively create guidelines around safety, such as not using smartphones in dangerous areas (Marzi, 2021). For instance, some participants said that they did not take their devices with them when they left the shelters, whereas others reported being cautious about using their phones both inside the shelters and in the city's public spaces. In one case, the participant had his phone stolen and it was only after a friend lent him the phone that he could inform the group that this had happened.

7. Conclusions and Critical Considerations

In this study, we adopted a longitudinal design using the Conexión Sin Fronteras (Connection Without Borders) WhatsApp group as an intervention project to build community and explore the settlement experiences among Venezuelan refugees in Brazil. We focused on the analysis of participants' interactions and activities in the WhatsApp group while assessing the opportunities and limitations of using WhatsApp as a data-gathering tool in refugee research. In so doing, we demonstrated the

potential of WhatsApp to capture refugees' digital and physical spaces of everyday life through its application for data collection in a less structured way. This enabled us to access unique and unexpected occurrences and situations within participants' daily routines and follow important events, changes, and hardships during their lived experiences of adjustment to the new surroundings. We also showed that the experience of accompanying refugees in the WhatsApp group revealed relevant insights into relationship-building in a group context and that went beyond the digital chat, which in turn allowed us to meaningfully engage with the agency of participants to reach out to each other to request and provide help as they resettled.

However, the use of WhatsApp in research with refugee communities does not come without challenges. The lack of engagement in WhatsApp group chats for some refugee members and the impossibility for us to be continuously active during group conversations are factors that researchers need to consider when adopting an unstructured approach to data collection via WhatsApp groups. At the same time, given that the process of collecting data in longitudinal designs can be much time-consuming for both participants and researchers (Kaufmann et al., 2021), flexibility was required when establishing weekly contacts with participants for the questions or conducting daily checks of the activities in the group. Acknowledgment of limitations regarding internet access is key to understanding the data that are produced in projects involving the use of mobile phones in marginalized and vulnerable communities.

In this context, researchers need to account for the existing social and economic inequalities that can affect the adoption of messaging apps in the research process (de Gruchy et al., 2021). At a global level, where low- and middle-income countries have become the locus of increasingly intense journeys of refugees (Baeninger, 2018), we believe that a series of precautions are necessary when conducting research in digital environments based on refugees' experiences in south-south routes. Here the questions of "who the access to digital connectivity is for," "where it comes from," and "how it is established" become relevant, especially regarding forcibly displaced populations, located outside of the Western experience. It is in this context that we claim that research cannot serve to further reinforce digital vulnerabilities and inequalities in these locations. Precarious digital infrastructures in some places in the Global South, financial difficulty in acquiring a digital device with constant access to data packages and digital literacy issues can be frustratingly impactful for participants and researchers aiming to use WhatsApp as a research methodology.

Thus, it is important to reflect on geographic locations, social markers, and collective life trajectories, as well as the specificities of refugees' experiences and needs in relation to digital connectivity. Aside from ensuring that the lack of financial means to own a mobile phone device with internet and digital skills levels are not aspects constraining the selection and participation of refugee populations in research, researchers should adopt methodological approaches to help reduce the risk of reproducing power inequalities in refugee research. Taking into consideration participants' motivations to join the research project, including both material benefits and the possibility of access to various forms of support, can foster the development of reciprocal relations between researchers and community members (Restoule, 2008). Through initial interviews as part of the multi-method approach adopted, we could identify participants' needs related to media use, which informed the design and implementation of our WhatsApp-based intervention. At the same time, the opportunity we had to conduct monthly face-to-face meetings with participants during the project supported further reflections about their settlement experiences across online and offline spaces, enhancing their trust and engagement in the WhatsApp group.

Moreover, there is an opportunity for increased digital media literacy that researchers need to meet by engaging participants in discussions about data obtained via mobile phones, apps, or social media. The same opportunity is valid and has already been advocated in other epistemological reflections on the use of digital technologies in migration governance (Madianou, 2019), including critiques of digital apps by development agencies that increase datafication and constrain the production of migrant knowledge (Witteborn, 2021). The intensity of forced displacement movements in the Global South also represents an opportunity to intensify decolonial methodologies in this area of study. A collaborative and spontaneous approach to the use of messaging apps, such as WhatsApp, can help refugees and researchers construct new forms of knowledge production that are inclusive, sustainable, and meaningful in forced migration contexts.

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Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Amanda Alencar is an associate professor specializing in the study of digital media in Europe and Latin America, with a focus on how technologies shape refugees' experiences of belonging. She leads several projects related to digital place-making, translocalism, and displaced populations. Alongside her academic work, she coordinates a critical digital literacy program for students with a refugee background at Erasmus University Rotterdam.

Julia Camargo is a PhD candidate in the Higher School of Advertising and Marketing (ESPM), São Paulo. She is also a coordinator in the project Portuguese for Hosting Refugees and Immigrants from Venezuela. Her research interests focus on immigrant integration and identity formation processes on the Brazil–Venezuela–Guyana border. Julia has authored and edited four books (in Portuguese) on issues related to international relations and migration, as well as media representation of war conflicts in Latin America and Iraq.

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Article

Researching Motherhood in the Age of Short Videos: Stay-at-Home Mothers in China Performing Labor on Douyin

Guanqin He [1,*], Koen Leurs [1], and Yongjian Li [2]

[1] Graduate Gender Programme, Department of Media and Culture Studies, Utrecht University, The Netherlands
[2] Department of Media and Communication, Erasmus University Rotterdam, The Netherlands

* Corresponding author (g.he@uu.nl)

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Abstract
Addressing the particular context of China, this article has two aims. First, it offers reflections on the possibilities and limitations of using user-generated short videos (vlogs) as research data both methodologically and ethically. We specifically explore the potential of centering vlogs as a new format for examining motherhood behavior across online and offline spaces. Secondly, it adds to the thematic literature on the (re)production and representations of motherhood. We critically examine the rising phenomenon in China of the stay-at-home mother, by exploring how these mothers use short video platforms. Inductively learning from the thematic analysis of short videos of stay-at-home mothers published on Douyin, the patterns in the data indicate three distinct forms of labor are performed through digital motherhood practices: domestic labor, affective labor, and entrepreneurial labor. Drawing on these patterns, we update the original framework of "motherhood 2.0," which was coined in the 2010s to address mothering practices in industrialized western societies. We extend this framework and conceptualize "motherhood 3.0" by analyzing a type of Chinese community-based intersectional performance of motherhood, gender, and labor that we see emerging in digital cultural production centered on short videos. Mediated labor within online and offline motherhood practices is informed by social, cultural, and technological factors. Digital technologies and mobile media communication provide new means for stay-at-home mothers to navigate between their roles as devoted mothers and their pursuit of self-actualization.

Keywords
digital motherhood practices; Douyin; labor; stay-at-home mothers; vlog

Issue
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1. Introduction

The social media representation of women and their daily lives has become an important arena where cultural constructions of femininity can be evaluated, negotiated, replicated, and contested (Tambunan, 2020). User-generated content and gendered digital practices are intrinsically connected in our era as social media platforms promise to empower female users to have greater autonomy over their digital self-representations, voice, and visibility (Lupton & Pedersen, 2016; Wotanis & McMillan, 2014). Female content creators perform diverse types of labor as they engage with digital cultural production while drawing on technological affordances to make themselves visible in public discourse. Simultaneously, social media platforms are profit-oriented. They generate profit by linking audiences to targeted advertisements while enabling content creators to monetize their labor in the broader context of the digital attention economy (Abidin & Brown, 2018; Nixon, 2017).

In this article, we address, in particular, the digital representations of motherhood on the platform Douyin in China. Previous studies have examined how

motherhood practices are performed, negotiated, and evaluated on different mobile media platforms. Various media spaces have been reviewed, such as discussion forums (Mackenzie, 2018), films (Schweller, 2014), Facebook (Anderson & Grace, 2015), Instagram (Germic et al., 2021), WhatsApp (Lyons, 2020), and Youtube (Kennedy, 2019). Scholars have paid ample attention to the impact of digital technologies on the construction and representation of motherhood, addressing topics including identity construction, belonging, knowledge sharing, and community-building (Archer, 2019; Mackenzie & Zhao, 2021; Orton-Johnson, 2017).

Focused on the Anglo-America context of middle-class couples, the term "motherhood 2.0" has been coined to refer to the interweaving of digital media and maternal identity on Web 2.0 social media platforms, blogs, and reality TV. It elucidates how the strategic appropriation of digital affordances may facilitate the emergence of diverse motherhood subjectivities. Mommy bloggers and stay-at-home social media content creators circulate their identities, emotions, and experiences into the public sphere, which helps women to diversify conventional, homogeneous understandings of mothering and motherhood. Women develop a stay-at-home career by strategically embracing the possibilities of these mediums to generate income while working from their homes (Schweller, 2014). The growing popularity of interactive, mobile short video social media platforms such as Douyin (the Chinese equivalent of TikTok) complicates the mediated experiences of stay-at-home mothers. We contend that further conceptual elaboration is needed to address the degree to which these tools have created new opportunities for domestically repressed voices. These developments require us to become attentive to new patterns and narratives empirically and methodologically, to understand the changing and novel characteristics of mediated motherhood practices beyond motherhood 2.0. Moreover, the changing media landscape also creates new methodological possibilities and challenges for media and communication researchers interested in how people navigate offline and online spaces. For this purpose, in this article, we reflect upon our methodological decision-making steps in relation to ethical considerations. We discuss how we navigated (a) the challenges of conducting fieldwork during the COVID-19 health pandemic, (b) obstacles resulting from seeking to engage with profit-driven micro-celebrities, as well as (c) platform affordances that limited possibilities for ethnographic research.

The particular position of stay-at-home women in contemporary China can best be understood by attending to its historical genealogy. Traditional Confucian patriarchal norms expected men to dominate outside the home, relegating women to the private, domestic sphere. In the Maoist era, however, Chinese women enjoyed high employment rates, while state-supported welfare services, such as nurseries and canteens lightened the burden of domestic labor. Women were expected to work rather than stay at home to be supported and fed by others. Housewives became stigmatized at that time (Fang & Walker, 2015). In the late 1970s, public domestic institutions were abandoned with the so-called "reform and opening up" which resulted in market individualism. Women inherited the burden of reproductive labor again as a result of the post-socialist national transformation. Nevertheless, it is noteworthy that women's duties in supporting their families are being re-evaluated and increasingly recognized. Simultaneously, the expansion of social support networks has provided individuals with more options while also raising social expectations for housework and childrearing. From prenatal care to early childhood education, mothers are investing significantly more time and effort. In this scenario, more women return to the home and become housewives. Or perhaps better and more specifically, they become stay-at-home mothers as we like to consider them. Stay-at-home mothers commonly embrace new parenting and digital techniques and implement them with their children, which strengthens their ethics of motherhood (Fang & Walker, 2015).

Focusing on Douyin, which has become a rather popular platform in China, particularly after the growth of 4G and 5G mobile connectivity (estimated 600 million users in June 2022), we address the potential of short-video mobile media platforms to create hybrid communicative spaces, witnessing the performance and transformation of women's forms of labor, identity performativity, and interpretation of motherhood. By centering the self-representations of Chinese stay-at-home mothers on Douyin, we scrutinize how mobile media are used as technological devices to capture everyday lives across online and offline spaces. More specifically, we take vlogs published on Douyin as an entry point to explore the intersections of motherhood, digital labor, affective work, and platform commercialization.

This article is structured as follows. In the theoretical framework below, we connect forms of gendered, domestic, and digital labor and address the affectivity of women's work. Subsequently, we provide methodological considerations and reflections on researching the phenomenon of stay-at-home mothers in China. In the empirical section, we discuss three distinct forms of labor these mothers performed in the short videos. We suggest the term motherhood 3.0 to examine the role of mobile media in negotiating motherhood and the digitalization of labor.

2. Theoretical Framework

2.1. Gendered Digital Labor

Digital labor refers to "companies" deriving economic value from the commonly unpaid leisure-oriented activities of everyday users of digital platforms (Gandini, 2021). Monetizing digital labor and targeted advertising reflect

a capital accumulation model underpinning well-known social media platforms such as Facebook, YouTube, and Douyin (Fuchs, 2013). In recent years, the concept of digital labor has been taken up in various disciplines to analyze the production, consumption, and reproduction activities associated with it through digital technology and media (Gandini, 2021; Scholz, 2013). Meanwhile, the global context of contemporary digitalization has witnessed a "process of dematerialization of reproductive labor" (Fortunati, 2007, p. 139). It has led to new ways of monetizing digital labor that do not always transfer monetary value to the individuals or groups performing the labor, but rather contribute to the enterprise's overall revenue. Consequently, the barrier between production and leisure has become increasingly blurred. Labor time seeps into leisure time and vice versa (Fuchs, 2013).

The domestic space is a valuable entry point for thinking about the nature of digital labor on commercial platforms (Jarrett, 2016). There are parallels between the digital labor of using online social networks and what has been traditionally considered "women's work." The feminization of digital labor manifests in its invisibility, unpaid/low wage, and marginalized status. It is also associated with feminized expectations of flexibility, passion, and emotional labor (Arcy, 2016; Duffy & Schwartz, 2018). It is gendered in two ways: performed by the female body and gendered as a form of reproductive work. Traditionally, in the domestic space, although women perform domestic tasks like cooking, cleaning, and child-rearing, the products, and services that arise from their labor are consumed directly rather than traded in marketplaces (Oksala, 2016). Similarly, some labor conducted in the digital spaces of social media goes unpaid and unrecognized, blurring the barrier between online-offline consumption and production (Duffy, 2017). Marxist frameworks regard these goods and services as having an exclusively utilitarian value, not a monetary value (Oksala, 2016). In other words, these activities are unproductive in capitalist economics.

Jarrett (2016) introduces the term "digital housewife" to describe the similarities between the unpaid work of housewives and social media users. She noticed that neither outcome gets paid, yet both generate use-value. The wage labor generated by houseworkers, and the data generated by digital labor are commoditized and alienated. Inalienable emotions, such as happiness, social solidarity, and general knowledge, as well as the social relationships they produce, are likewise of use value (Tan et al., 2020). In the dominant heteronormative conception of private domestic spaces, unpaid stay-at-home mothers produce non-commoditized products such as emotional care, whereas salaried husbands consume such care and support to generate commoditized labor hours. While the housewife's affective labor is not exploited directly through monetization, it is still integral to capitalism's long value chain (Fortunati, 1995; Tan et al., 2020). Jarrett (2016, p. 17) underlined that, in both circumstances, labor is capitalized and has socio-cultural and gendered significance; it has the potential to generate economic value through social, emotional, and affective ties; and it possesses inalienable social value and meaning.

2.2. Women's Work and Affective Labor

Affective labor refers to carrying out work that has not typically been commoditized, such as child-rearing at home or caring for sick or elderly family members (Oksala, 2016). Unlike emotional labor (Hochschild, 2012) occurring in the context of waged employment, from a Marxist feminist perspective, affective labor becomes a form of reproductive labor rather than productive labor (Mäkinen, 2021). As a subcategory of "immaterial labor," affective labor is "embedded in moments of human interaction and communication…: a feeling of ease, well-being, satisfaction, excitement, passion—even a sense of connectedness or community" (Hardt & Negri, 2000, p. 293). Leurs (2019) proposed the notion of "digital care labor" to indicate that affective labor does not only generate positive (or negative) sensations or states of mind in others, but also produces social networks, forms of community, and biopower (Hardt & Negri, 2000).

Historically, women have been the primary creators of affective labor. Fortunati (2007) argues that women's material labor in the domestic space, such as cleaning, cooking, and laundry, is commonly overlooked. More importantly, their reproductive labor (sex, pregnancy, childbirth, and nursing), as well as other fundamental parts of the immaterial realm (care, love, education, and socialization), are disregarded. In other words, it is not only the direct material inputs provided by the unpaid labor of domestic work that contributes to the household economy; rather, it is the free labor of women, including the gifting of affect, including personal and domestic maintenance that contributes (Andrejevic, 2009; Jarrett, 2014). The concept of affective labor elucidates how capital has undergone cultural and subjective shifts at the margins of expanding boundaries (Coté & Pybus, 2007), enabling people to recognize how capital utilizes social relationships and emotional intensities beyond wage employment (Mäkinen, 2021). Consequently, affective labor is not a novelty of labor exploitation; it has always been at the backbone of the capitalist chain of value generation and exploitation. What is new is how it circulates between offline domestic and online spaces, as we discuss below.

Visibility labor adds a new layer to understanding affective labor in a broader context of the contemporary digital attention economy. Abidin (2015) highlighted the connection between digital visibility labor and offline affective labor. This lens is useful to account for the domestic context of stay-at-home mothers in China. Lack of visibility compels their affective labor to become invisible; as a result, it will be further devalued and underpaid. The potential for visualizing invisible

affective labor is significant in the current social media era, where platforms serve as a crucial stage (Schwarz, 2017), enhancing the visibility, mediation, and materialization of labor in the public domain. With the framework outlined above, we can become attentive to labor as a complex, multi-faceted process, which can be generative to address the gendered division of labor in families and the meaning of what labor might mean and entail for stay-at-home mother content creators navigating offline-online lives on Douyin.

3. Methodological Considerations

This article reports on pilot research conducted in light of two research projects: Guanqin He's study "Digital Crossroads in China: Chinese Women Negotiating Migration, Urbanization, and Digitization" which explores digital experiences of female gig workers with a migration background in China; and Yongjian Li's study "Integrating Through the Digital: ICT's, Internal Elderly Migrants in China and their Place-Making." He received ethical clearance from the Utrecht University Faculty Ethics Assessment Committee—Humanities (22-027-02), while Li received permission from the Erasmus University School of History, Culture and Communication Ethics Review Board (20-14-Li).

3.1. Navigating Methodological, Ethical, and Practical Challenges

The imbalance of power between researchers and research participants can be accentuated in online environments. Researchers can lurk in communities by remaining unseen. The data collection process can increase the distance between researchers and research participants (Clark-Parsons & Lingel, 2020). As we prepared to use Douyin videos as research data, we considered the methodological and ethical challenges of our research plans. The first "ethically important moment" (Guillemin & Gillam, 2004) we encountered in our research was deciding over what constitutes "publicly available" data. Within the growing debate on the ethics of social media research, the consensus remains that scholars in specifically defined situations can rely on "publicly available data" when studying digital culture (Markham & Buchanan, 2012; Markham et al., 2018). Informed consent is not required if digital data is considered public by those making and publishing content or when it is "naturally occurring" (Silverman, 2007) according to the majority of institutional ethics committees (Ravn et al., 2020). We agree however also that it is important for us researchers to be cognizant of the right to privacy in the digital domain, and therefore reflection is needed about how boundaries between public and private digital spaces are drawn and experienced (Mackenzie, 2016).

The binary logic constructed by how platforms conceptualize privacy in simple, technical terms—data are either publicly disclosed or not publicly accessible—is untenable (boyd, 2008). Seeking to subvert this dualism, Ravn et al. (2020) advance an understanding of "the public" based on the "imagined audience" (Marwick & boyd, 2010), emphasizing that ethical decisions should be based on knowing what users perceive as their public and how their posts are addressed to this public. In addition, each social media platform has distinctive affordances that impact research. Socio-technical affordances and the in-built functions of platforms should be taken into consideration as we navigate our research engagements ethically (Ravn et al., 2020). In this sense, we concur with the suggestion of the Association of Internet Researchers (AoIR) to acknowledge the significance of context-specific, case-based research (Markham & Buchanan, 2012).

In our case, accessing research participants in the offline contexts of their daily lives would be challenging, and it has grown considerably more difficult over the past two years, as the COVID-19 pandemic has rendered in-person/offline research impossible due to social distances and travel constraints (Kaufmann et al., 2021). This was particularly the case in the context of China, where zero-COVID policies have resulted in prolonged periods of lockdown. This further complicated our desire to collect geographically diverse data across Chinese localities. However, long before the COVID-19 pandemic era, media and communication researchers started to realize that in-person interactions are no longer "the gold standard against which the performance of computer-mediated interaction is judged" (Hine, 2005, p. 4). In particular circumstances, online research methods may be preferred, or equally acceptable to offline research methods (Howlett, 2021).

The stay-at-home mothers we consider in our study orient themselves towards these platforms as a part of their daily lives, their activities purposefully occur simultaneously and constantly across online and offline spaces. The platform Douyin offers us particular methodological entry-points to study their purposeful digital mediation of everyday life. For example, content producers might choose to explicitly announce publicly their "authenticity." #RecordRealLife (#记录真实生活) is a hashtag that Douyin initiated and actively promotes; it has been watched 165.22 billion times until 24 June 2022. Videos with tags typically receive more views. Although we did not target those explicitly in our data gathering, the majority of the videos we collected were also tagged with #RecordRealLife. As people become more familiar with digital platforms in their daily lives, online self-representations may resemble offline self-representations (Griffith & Papacharissi, 2010). The genre of vlogging from a realistic perspective, in an unedited and documentary style, creates a sense of directness in real life. The creators condense their daily life into short movies and post them simultaneously on Douyin. The affordances of short video platforms promote synchronous or asynchronous author-viewer

interactions. Researchers thus can also approach their daily recordings synchronously or asynchronously via mobile devices, following the posters and their routines as if they were accessing a self-curated documentary that offers a particular glance at their personal lives. We aim to advance our understanding of short-video social media platforms as entry points for comprehending how people in their daily lives purposefully navigate between online and offline lives. In our case, by considering the online spaces curated by stay-at-home mothers we can already learn a lot about the interrelationships with their everyday life offline too.

In designing our research protocol, we explored the possibility of pursuing online interviews to allow stay-at-home mothers to co-research with us their digital media representations. However, we found that online access proved to be an insurmountable hurdle. As we conducted our research using our smartphones, we found that while Douyin enables multiple forms of information exchange (text, video, images, audio), synchronous and asynchronous, exchanges between users require users to follow each other. When users are not following one another, the interface of Douyin only allows any user to send one text message to another user until they get a response. As public accounts with at least 20,000 followers, approaching these stay-at-home mother micro-celebrities (Senft, 2008) requires either insider status (Mavroudis & Milne, 2016) or business identity. After initially observing the vloggers as a follower for six months as part of a digital ethnography, we noticed that they only responded to comments that had attracted a high volume of likes or comments from peers or loyal fans. Stemming from the platform affordances and the status of our research target group, we thus had very limited chances to recruit or obtain individual consent. Therefore, we finally decided to pursue an online-only research methodology. For this purpose, we created a research-only Douyin account for the sole purpose of data collection.

3.2. Data Collection

To build our corpus of data, a python-scraping program was used to retrieve videos hashtagged with #Housewives(家庭主妇) and #Stay-at-homeMothers(全职妈妈) as well as associated publicly accessible metadata from the online archive of Douyin. To ensure that diverse full-time mother representations were also included, we utilized a snowball sampling strategy to expand our search beyond these popular hashtags, for instance leading us to hashtags such as #TheRoutineOfAStay-at-homeMother and #RecordRealLife. In three rounds of scraping conducted between November 2021 to February 2022, an initial sample of 698 videos published between March 2021 and February 2022 was established. It should be noted that as a result of Douyin's anti-crawling mechanism, the corpus we used for this study does not include all the videos tagged with these hashtags in Douyin's online archive. This anti-crawling mechanism functioned as follows: When the access frequency of any same IP address exceeded a threshold it would be identified as a crawler and the IP address would be blocked. The search results can be expected to have been influenced by the popularity algorithm, but they are not limited to a particular minimum number of followers, views, or likes. Based on this, we went through the metadata and manually collected 12 accounts with the highest frequency (see Table 1). Throughout this article, we include pseudonymized account names. We purposefully sampled (Patton, 2002) vloggers with different fan bases (ranging from 20,000 to over 2 million) and from diverse geographical regions in China (including but not limited to Beijing, Shanghai, and Shenzhen). Subsequently, we collected the top five most liked videos with associated hashtags from each account, and the sample size in the current study is 12 stay-at-home mother vloggers and 60 Douyin posts. All Chinese texts, including phrases, hashtags, captions, and comments, were translated into English by the authors.

Table 1. List of vlogger accounts (data retrieved on 31 December 2021).

Account name	Follower count	Location
Yu	257,000	Shenzhen
Di	1,454,000	Beijing
Jiajia	484,000	Shandong
Tang	445,000	Zhejiang
Meimei	20,000	Zhejiang
Wang	278,000	Zhejiang
Meng Meng	45,000	Nei Menggu
Leilei	2,224,000	Zhejiang
Han	280,000	Shanghai
Lu	50,000	Henan
Yuan	551,000	Zhejiang
Shen	45,000	Anhui

Following recommendations from the AoIR (Markham & Buchanan, 2012) for ethical decision-making, we further weighed whether the digital presence of the stay-at-home mothers on Douyin could be considered as constituting publicly available data or not. To do so, investigating Douyin's specific affordances was necessary to understand the context-specific "perceived privacy" and "perceived public data" of the stay-at-home mothers under study. Douyin's settings enable users to manage what they publish publicly. Thereby they select from a variety of privacy options. Likes, followers, publicly published videos, and recommended products will be publicly featured on their homepage (see Figure 1). Users have the option to restrict access to their following lists, follower lists, and liked videos. The profiles included in our study all are open and public-facing. In addition, the e-commerce nature of the presence of stay-at-home mothers on Douyin reminds us of another affordance worth considering. On the platform, the feature of "merchandizing on behalf" (*daihuo*) embeds an icon in the video linked to the product (Kaye et al., 2021). The homepages of all accounts included in our study had the function of "recommended product window," along with "word of mouth" and the number of products sold (see Figure 2). Such a public commercial function supports our assumption that the social media users of this community are intentionally posting content in the public domain for all potential customers to see. We also would like to acknowledge that we were limited in establishing our corpus. Notwithstanding our efforts to de-identify the visual materials of posters we studied, we blurred faces and excluded children as much as possible, although we realize that some scholars argue that modifying people's images is just as unethical as displaying the full one (Gross et al., 2003). Even if we conceal data sources and make data pseudonymous, it is nearly impossible to circumvent the ethical dilemma posed by the fact that a triangulation of pseudonymous data points may potentially be traced back to specific individuals (Ravn et al., 2020; Zimmer, 2010).

3.3. Data Analysis

Content analysis is a crucial research technique to analyze the influence of Douyin on Chinese culture and community (Yang, 2022). We followed the approach to thematic analysis as described by Braun and Clarke (2013) to analyze textual and visual data, as it is theory-agnostic and case-based. Considering the multimedia nature of user-generated content on Douyin, we employed an intuitive approach to visual data analysis. The affiliated texts, visual elements, and commentaries of these sampled videos were selected and coded for thematic analysis to search for patterns. Following the linear six-phase approach (Braun & Clarke, 2006), we observed patterns in the data indicating three distinct forms of labor: (a) domestic labor; (b) affective labor; (c) entrepreneurial labor is performed through digital practices. We illustrate how performing these forms of labor embodies stay-at-home mothers' agency, motherhood, and visibility to generate benefits and incomes in the following discussions.

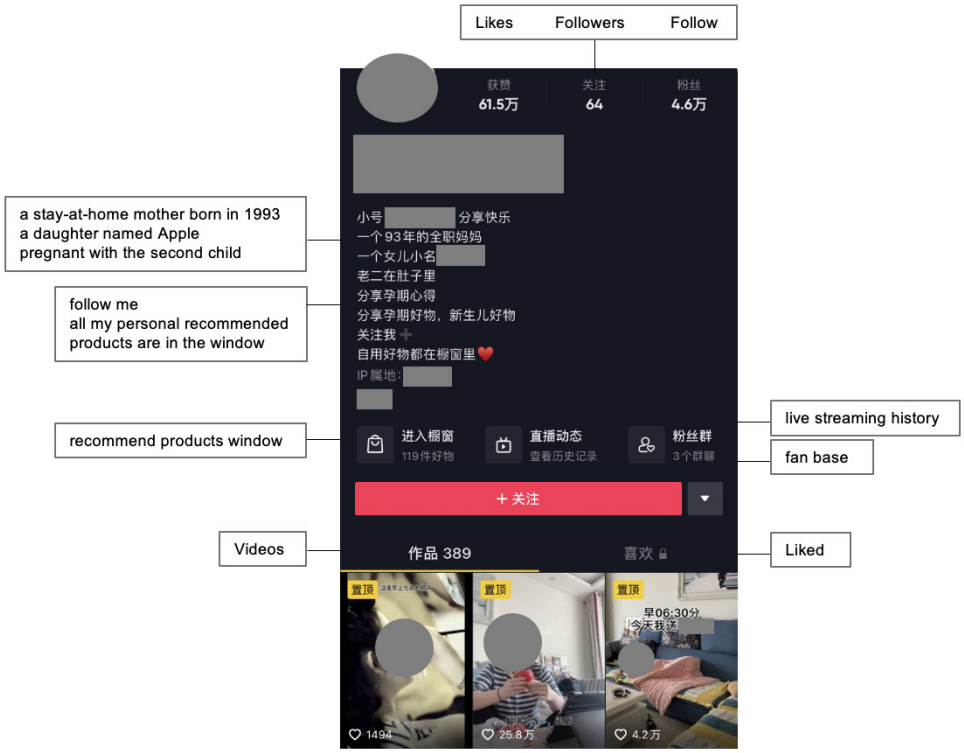

Figure 1. Meng Meng's homepage.

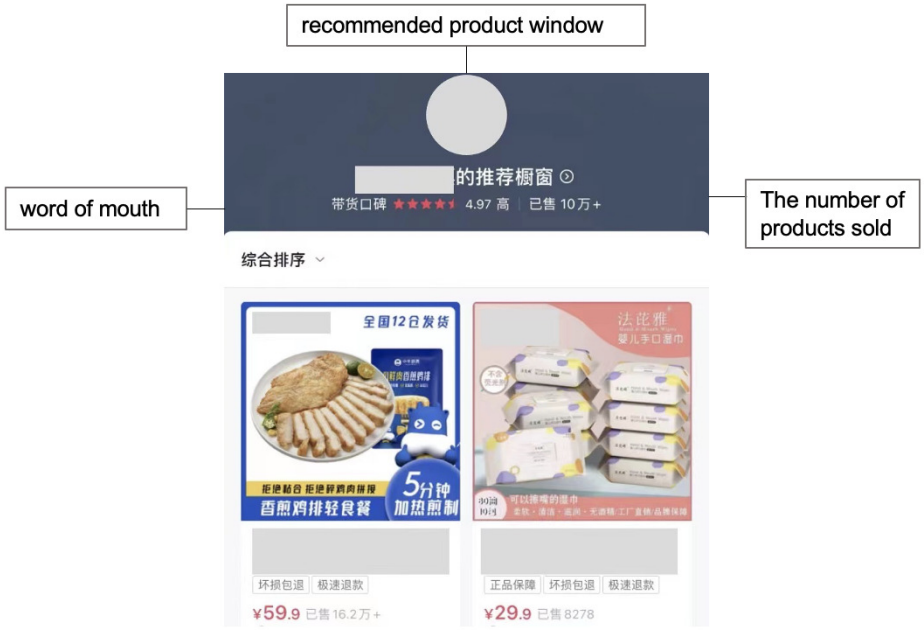

Figure 2. Di's recommended product window.

4. Results and Discussions

4.1. Motherhood as a Performative Practice: Digitally Mediated Domestic Labor

Digital media sustains performative motherhood practices, complicating the relations between online and offline spaces. Stay-at-home mothers in China are chronicling their daily lives through digital media in the form of vlogs and creating an online space for their daily performance of motherhood. In their self-representational videos, maternal identity and obligations are regularly reinforced and internalized while simultaneously can be seen as being actively renegotiated.

We specifically retrieved texts from the profiles of the sampled vloggers, based on which we generated a word cloud map (see Figure 3). In account profiles, mother vloggers identify themselves first and foremost as mothers, putting children as the priority and emphasizing their motherhood. Tang, for example, positions herself as a mother with two children. Mei Mei stresses she has been a stay-at-home mother for eight years, with an eight-year-old daughter and a six-year-old son. Meng Meng (see Figure 1) introduces herself as a stay-at-home mother

Figure 3. Word cloud of mother vlogger's profiles.

born in 1993 with an elder daughter, Apple, and a second child on the way.

As a prominent storytelling strategy, the mothers in the short videos deliver a fairly homogeneous narrative of their everyday life routines (see Figure 4, summarized by authors) which is organized around the labor of child and domestic care. It is worth noting that the stay-at-home mothers featured in vlogs are typically available 24/7, focusing their attention on children, families, and the domestic setting. As Di, one of the vloggers, said in her post: "Taking care of children day and night has developed into an obligation and responsibility." As we can see from the daily ritual visualized in Figure 5, Jiajia's cleaning routine as mediated on Douyin indicates stay-at-home mothers have to navigate normative expectations of caring, domesticity as well as generating income.

In addition to showing their daily routine and rhythms of housework and childcare, mothers share why they choose to be stay-at-home mothers and how they enjoy motherhood in their videos.

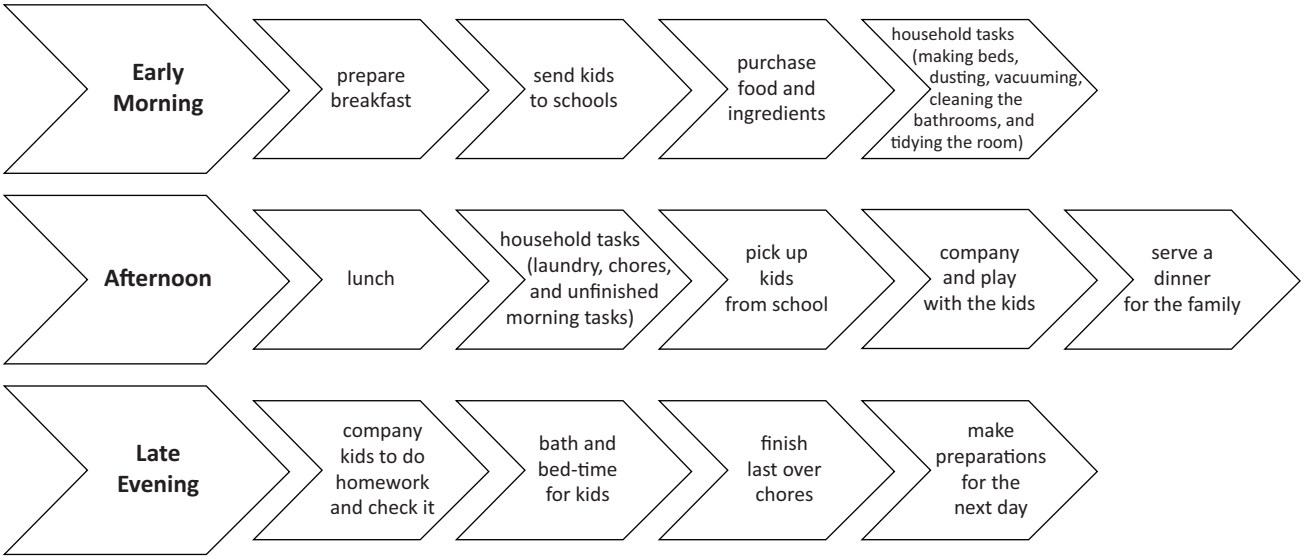

Figure 4. Timetable of stay-at-home mothers on Douyin.

Figure 5. Timeline of Jiajia's cleaning routine.

Di is the mother of two girls. She has become what Abidin and Brown (2018) described as a micro-celebrity with 1.454 million followers (as of 31 December 2021). Originally from the Shandong province in Eastern China, Di has lived a "floating" life in Beijing for nine years and has been a stay-at-home mother for four years (see Figure 6). As she states in one video:

> When I came to Beijing, I was filled with many ideals and ambitions and wanted to have my career in Beijing. Because of the family division of labor, I became a stay-at-home mother and began to take care of my children day and night….I learned to integrate with the family and take care of the family, and constantly got used to giving.

She confesses that she encountered numerous misunderstandings and unpleasant moments. Neighbors would judge her for leaving her husband to work alone to support the whole family. Family members and relatives agree she should dedicate more time to her children. Such hurtful comments impacted her feelings and lowered her self-esteem: "The years of working as a part-time vlogger on Douyin have made me confident and calm." Di acknowledges that being a vlogger brings her a strong sense of empowerment, cures her sensitivity by breaking the complete reliance on her husband's wages, and supports her family financially during tricky times. By recording and sharing her daily life as a stay-at-home mother on Douyin, she has met many other mothers from the online community. These connections fostered a sense of connectedness, mutual understanding, and empathy.

As digital technology opens up a new sphere in which mothers and their experiences are narrated, Douyin has developed into a critical arena through which mothers' stories, identities, and practices are contested and redefined (Orton-Johnson, 2017). The videos of stay-at-home mothers bring the invisible unpaid labor of women performed in the private domestic sphere into public discourse and transform it into visible digital labor, providing new possibilities for the digital continuation of motherhood through social media. Motherhood is performative (Butler, 1997). Stay-at-home mothers in the videos internalized childcare and housekeeping as their responsibilities. Their representations of motherhood in their day-to-day maternal practice, at times reinforced dominant gendered and heteronormative paradigms of family and society. Di's digital presence illustrates how the performativity of motherhood and digital mediation emphasizes the mother's initiative and self-consciousness. Performative motherhood, in this way, complicates one-dimensional understandings of female identities and motherhood practices. They are not only subordinated under patriarchal structures. They are also active agents crafting their own identities with agency. Through digital visibility, the stay-at-home mothers who volunteer to become mothers and assume childcare responsibilities are not necessarily seen as succumbing to patriarchal stereotypes of domestic labor, rather they display self-realization and self-reflection, just like Yu's monologue in her top viewed post (see Figure 7),

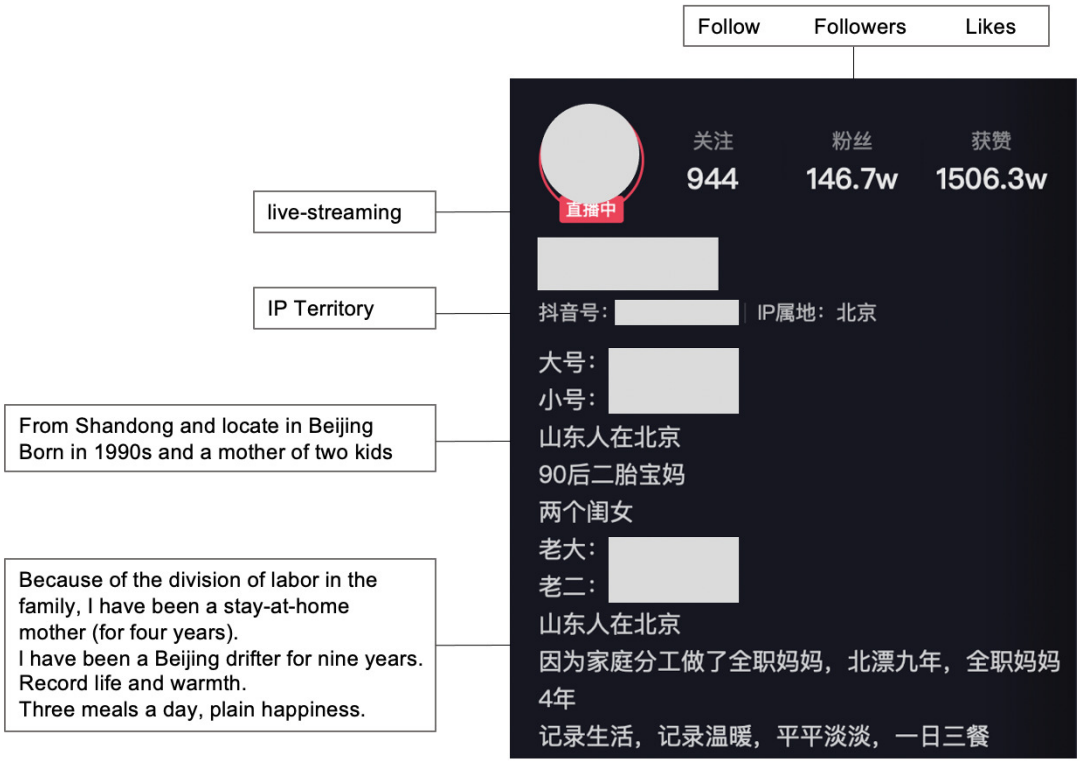

Figure 6. Di's profile.

Figure 7. Screenshots of Yu's post.

similar to other female bodies that chose to pursue other trajectories (Oh, 2009).

Daily recurrence does not necessarily imply replication, on the other hand. The advent of digital media has the potential to provide more agentic representations of how stay-at-home mothers deal with diverse challenging scenarios and resolve everyday issues, thereby regaining a sense of independence. "Recording daily real life" was a common theme in the mothers' profiles. Shen emphasizes in her profile that each video is "real life." However, their confessions in the videos reflect a tension between making rational choices of developing their careers and being devoted stay-at-home mothers to keep their children company and cared for, echoing Michel Foucault's concept of the paradox of subjectivation (Foucault, 1982). That is, possibilities for agency lie not outside of but within the existing power structures. Performativity enforces, rejects, or reinterprets norms with each repetition, exerting agency (Butler, 1997; Foucault, 1978). Each re-enactment of motherhood reinforces and challenges normative conceptions (Oh, 2009). As Banet-Weiser (2015) suggests, the mere act of making non-normative identities visible comes to stand as a political act in and of itself. The visibility of motherhood becomes empowering, shattering what digital housewives perceive to be the cultural silence surrounding maternity (Van Cleaf, 2020). Through their representations (see Figures 5 and 7), stay-at-home mothers can digitally exhibit their typically unseen domesticity and obtain recognition and support from online communities and followers. Meanwhile, this interaction consumes and requires substantial affective labor.

4.2. Sharing Intimacy: Mother Vlogs as Affective Labor

Stay-at-home mothers and their self-presentations on Douyin frequently include details of family life, as well as intimate relationships. Mäkinen (2021) points out that although these presentations may not offer a comprehensive picture, vlogs draw an audience precisely because they promise authentic depictions of a person's personal life and emotions, eliciting a sense of connectedness and empathy within the audience. In the videos, the mothers frequently share personal details and demonstrate apparent genuine emotions when interacting with others. This contributes significantly to their perceived credibility, authenticity, and intimacy as micro-celebrities (Abidin, 2015; Raun, 2018). By narrating their personal lives with ordinariness and everydayness (Abidin, 2018), and using affective registers, mother vloggers can build a relationship of trust with their followers. For instance, Di revealed that her luxury mansion in Beijing was purchased by her husband's parents. Jiajia opened up about her own childbirth misadventures. The 33-year-old has been outspoken about showing her white hair to the camera in answering viewers' questions about why she appears elderly. Yuan engaged commenters in a discussion regarding her complaints about her husband's passivity. By sharing relatable experiences, the mothers form networks with peers sharing similar experiences and

emotions. As it remains a choice to do so, the emotional exposure of stay-at-home mothers should be understood as a particular form of affective labor (Marwick, 2013). The mothers strategically cultivate digital intimacy. Their authenticity generates a significant following of committed fans which can be monetized.

Affective labor and digital labor are complementary. The convergence of digital and affective labor represents a site of political, economic, and social importance (Kelsey, 2019, p. 44). Through digital platforms, stay-at-home mothers can become inextricably linked:

> It was like seeing my daily routine, day after day. (Wang's comment)
>
> I feel deeply connected, and I am going through the same ordeal myself. Stay-at-home mothers are cheering together. (Jiajia's comment)
>
> May every mother love, embrace life, and grow stronger. (Leilei's comment)

These remarks taken from the comment section illustrate how mothers receive emotional support. The online affective interaction space results from two-way interaction. An intimate relationship between vloggers and followers can be established and developed, making it possible for affective solidarity to circulate. Simultaneously, empathy generated online is spatially transferred online and offline. The comments not only arouse empathy but also serve as a forum for sharing knowledge and assistance. Viewers can ask about various aspects and details in the comments section, and mothers can supplement information from the videos or share commercial product information in the form of text comments.

However, we recognize the vulnerability of this affective labor (Mäkinen, 2021) and realize that intimacy and openness can result in vulnerability. Through digital media, a relationship of cruel optimism (Berlant, 2010) is developed by these stay-at-home mothers. While their video comment areas remain rife with questions and cyber-bullying, they respond actively to malicious comments. Despite demonstrating the difficulties inherent to being a stay-at-home mother, the vlogs remain positive and cheerful, displaying their confidence in living life. In this state, the subject constantly imagines the achievement of ideals and, in their unreality, clings to painful hope. Pleasure "sticks" to various cultural objects (such as the family) creating an imagined "cloud of possibilities" (Ahmed, 2010; Berlant, 2010). Vlogs get (over)determined to be pleasurable, and their acquisition is viewed as a path to live the "good life" (Berlant, 2010). Cruel optimism reveals the deep-rooted alienation of female labor (Kelsey, 2019). This is also a form of strategically performed digital labor that favors commodification, as audiences may be more inclined to follow those micro-celebrities that provide a positive, inspirational outlook on life.

4.3. Making Money on Douyin: Platformed Entrepreneurial Labor

Douyin has become a site where stay-at-home mothers as micro-celebrities seek to exploit their labor and transform themselves into "mumpreneurs" (Archer, 2019). Scholars have found that Chinese mothers are experiencing a context-specific "double bind" revolving around the contradiction of being a devoted mother and a career woman (Lazar & Sun, 2020). Stay-at-home mothers on Douyin, weaving digital environments into their daily offline lives, actively participate in the mammoth capitalist digital empire of Douyin and (re)produce what we refer to as "platformed entrepreneurial labor."

The boundaries between public and private, domestic, and societal, have already been blurred and intertwined since the early days of neoliberal capitalism, which has affected every aspect of life. Different from the conventional e-commerce business model of "people looking for goods," Douyin's "interest e-commerce" product sales model is "products looking for customers." Within this business model, Douyin and the platform economy stemming from it redefine the boundaries of labor in the contemporary Chinese context and point to a turn towards "immaterial labor," enabling the commodification of immaterial service, cultural product, knowledge, or communication (Hardt & Negri, 2000). As a form of platformed entrepreneurial labor, stay-at-home mothers actively engage in Douyin e-commerce, monetizing the online traffic of their obtained attention from their followers and viewers. For example, Jiajia shares that she livestreams every night after her child's bedtime, and sells children-rearing-related products, such as food, clothing, or cleaning products. In June 2021, Di reached 5.25 million yuan in her live streaming sales (see Figure 8). There is also an e-commerce entry (recommended product window) within her profile where her followers can directly purchase the products that she recommends. Those with high sales and attention will get a certification from the platform as a "high-quality e-commerce author" (see Figure 9). It will show up on their profile page, which in turn will attract more followers and clients.

Since representations of stay-at-home mothers in vlogs seek to convey an embodied authentic experience, many other mothers from their community, as viewers and consumers, could be enticed to consider their recommendations. The merchant-customer relationship between stay-at-home mothers and other follower-viewers mirrors the traditional commentator-mummy blogger's relationship in the motherhood 2.0 model. Yet, we highlight a notable difference here. The affordances of Douyin enable all the followers of a vlogger to receive instant replies or join a fan-based chat group where they can share and exchange information in sync. This is in contrast to blogs, where creators and followers could only engage by leaving comments and receiving responses, and where instantaneous two-way communication was not afforded. A typical sentence shared

Figure 8. Di's live streaming sales in June 2021.

among these vloggers' profiles goes like this: "Thank you for your likes and attention." These mothers are aware that viewer feedback will impact their standing as micro-celebrities. Similarly, viewers could also guide them with their remarks and questions, shared during their live streaming or in the comment sections, such as "Dear, what mask are you using? Which brand do you recommend?''

This demonstrates that in the age of short videos, immediate interactions and feedback are expected.

Platformed entrepreneurial labor as a mediated mixture of forms of domestic, affective, and digital labor illuminates our understanding of stay-at-home mothers' agency and subjectivity. They navigate systematic and structural exploitation of neoliberalism and capitalism by performing motherhood in the context of the platform economy. This provides opportunities to generate their own income and feel better rather than solely having to rely on their "breadwinner" husbands, as indicated in Di's case discussed above.

Albeit we recognize the empowering role of the Douyin platform and its affordances in monetizing the platformed entrepreneurial labor of stay-at-home mothers, it is necessary to note that this form of delivery still conforms to a fairly traditional hetero-patriarchal and neoliberal framework of exploitation. In addition to performing domestic labor, they also need to manage their relationship with their followers as potential customers, all the while exposing their daily lives to the camera and being subject to observation and judgment, becoming datafied and monetized by Douyin.

4.4. Motherhood 3.0 in the Age of Short Videos: The Online and Offline Space Nexus in Digital Motherhood Practices

Through the analysis of three distinct forms of labor performed by stay-at-home mothers on the platform Douyin, our findings demonstrate the process by which short videos further blur boundaries between online

Figure 9. Yu and Leilei are certified as high-quality e-commerce author.

and offline spaces, thereby developing and complicating motherhood 2.0. As previously stated, the term "motherhood 2.0" described the presence and visibility of mothers on so-called web 2.0 platforms such as in particular mummy blogs, alongside for example real-life television shows. We propose that motherhood 3.0 extends the original paradigm, with the focus on the immediate interactive relationships between mother influencers and content consumers, specifically including mothers with lower education or migration backgrounds from non-western-centric contexts and their labor performance on short-video platforms. It further points out the eagerness of self-representation of Chinese stay-at-home mothers with a more nuanced focus on their distinctively situated performance of motherhood on short video platforms.

Douyin's multi-functionality has resulted in a multilayered context, shaped by synchronous communication and experienced porous boundaries between communities and celebrities. The spatial-temporal affordances of Douyin provide opportunities for connections across time and geographical constraints, enabling mother vloggers to produce video content, live stream, and interact with followers whenever and wherever they want by using their smartphones. The convergence of online and offline space encourages the circulation of offline domestic practices and provides new platforms and means of communication for the reconfiguration of mothers from being "absent present" online and offline to "doubly present " in their domestic sphere and public online community. These spaces that are embedded with digital motherhood practices further magnify the affective and invisible domestic labor performed by stay-at-home mothers while simultaneously enhancing the visibility of mother vloggers. The entanglements of online and offline labor and spaces provide mothers with extra opportunities for income, which is also an example of platform labor as stated previously. The three forms of labor interrelate and co-constitute each other as boundaries between contexts collapse. At the same time, these forms of labor may allow for a renegotiation of the subjectivity of stay-at-home mothers, the division of labor, and their family relations.

5. Conclusion

This study explores Chinese stay-at-home mothers' self-presentational videos on Douyin and considers the three distinct forms of labor they perform in the videos. Recontextualizing motherhood 2.0 in the age of short videos, we update the concept to motherhood 3.0 by demonstrating how stay-at-home mothers in China use Douyin to perform their motherhood and bring their private offline lives online and become publicly visible, while their labor becomes visible and monetized.

Mobile media platforms have the potential to offer opportunities to address the aforementioned dilemma of aspiring to be both a devoted mother who can company and take care of their children and a more independent, self-reliant woman through the commodification and monetization of their various types of labor. However, we acknowledge that the digital economy's exploitation and alienation of labor cannot be divorced from recognizing patterns of sustaining capitalism and reproducing hegemonic heteronormative and patriarchic representations. The uneven inclination between motherhood practices and its commercializing process is associated with multiple online and offline normative spaces (Van Cleaf, 2020). Furthermore, it shows that Foucauldian power-knowledge structures duplicate power systems in which individuals feel bound to power dynamics that regulate their offline lives in a supposedly value-neutral setting (Georgakopoulou-Nunes & Bolander, 2022). This study demonstrated stay-at-home mothers "work" in public spaces, albeit online, other than performing reproductive labor in the domestic space, which could be a promising development as it makes them visible on their own terms. The findings of the current study add color to feminist media studies research by revealing the interrelationships between various forms of gendered labor across online and offline spaces performed by Chinese microcelebrities on the Douyin platform.

We can become accountable for the limitations of our study by acknowledging that our methodological approach enabled us to obtain a particular "partial view" (Haraway, 1998, p. 590) of stay-at-home mothers' digital practices. Douyin, with its particular affordances coupled with the particularities of the micro-celebrity digital culture of stay-at-home mothers it fostered, rendered it virtually impossible for us to recruit participants or establish trust relations needed to pursue in-depth interviews. This challenge became even more complex resulting from COVID-19 health pandemic lockdown measures. These factors together led us to pursue empirical data gathering through an online-only methodological approach. This approach allowed for gathering a particular set of original empirical data: our study has indicated Douyin can serve as an intermediary for researchers to carry out an observational study of performances oriented towards particular public audiences, in our case audiences in pursuit of watching authentic mothering practices.

We recognized the heterogeneity of the stay-at-home mother community, but as we are tied to the information provided by the authors on Douyin, we were unable to make claims about the class identities of mother vloggers. This highlights the significance of follow-up ethnographic research with stay-at-home mothers. Although in methodological reflections we may suggest mining this seemingly endless world of data points, these data points in our analysis mustn't be divorced from the individuals who have given life to them (Patterson, 2018). The videos Douyin users choose to share on the site tell us stories about the way they perceive the world, the way they see themselves, and the way they want to be considered by others (Patterson,

2018). As researchers, with the constant evolvement of social media spaces, we need to ensure that our ethical stance complements the affordances of the platform and its user cultures and that we let the practices and preferences of the communities we study guide our methodological decision-making.

As Douyin continues to flourish, we have witnessed the potential for women with lower education and rural to urban migration backgrounds to become online micro-celebrities. Moving forward, further research could look into how these women are motivated to make videos, as well as experience changes and challenges in physical spaces. Therefore, it is vital for researchers to consider alternative and creative approaches to network vloggers, and micro-celebrities, and to constantly optimize and reflect, for instance, on how to negotiate the multiple identities of researchers involved and their ethical dilemmas when conducting digital ethnography. Last but not the least, we specifically highlight the opportunities and relevance that Douyin as a platform provides in decentralizing and (re)contextualizing western-centric analytic notions in non-western contexts research.

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Conflict of Interests

The authors declare no conflicts of interest.

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About the Authors

Guanqin He is a PhD candidate at the Institute of Cultural Inquiry ICON, Department of Media and Cultural Studies, Faculty of Humanities, Utrecht University. She is currently conducting her CSC-funded project Digital Crossroads in China: Chinese Women Negotiating Migration, Urbanization, and Digitization, focusing on the intersection of gig workers, gender, migration, and digital media. Her research interests include gender, social media, migration, and cultural studies.

Koen Leurs is an associate professor in gender, media, and migration studies at the Graduate Gender Program of the Department of Media and Culture, Utrecht University, the Netherlands. Leurs is PI in the project Co-Designing a Fair Digital Asylum System (2022–2023). Recently he co-edited the *SAGE Handbook of Media and Migration* (2020), together with Kevin Smets, Saskia Witteborn, Myria Georgiou, and Radhika Gajjala. He is currently writing the monograph *Digital Migration Studies* (SAGE, 2023). Leurs is a member of the editorial board of the journal *Media and Communication*.

Yongjian Li is a PhD candidate and researcher at the Department of Media and Communication at Erasmus University Rotterdam. Through an intercultural lens, his work lies in the intersection of digital media, aging and migration, ICT and mobility, and feminism. His current work focuses on migrant (self)representations on different media platforms, focusing on how technologies shape people's digital experiences and practices of identity, place, and belonging.

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Article

Methodological Reflections on Capturing Augmented Space: Insights From an Augmented Reality Field Study

Moritz Schweiger * and Jeffrey Wimmer

Department for Media, Knowledge, and Communication, University of Augsburg, Germany

* Corresponding author (moritz.schweiger@phil.uni-augsburg.de)

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Abstract
The growing popularity of augmented reality has led to an increased overlaying of physical, offline space with digital, augmented space. This is particularly evident in the public space of big cities, which already feature a multitude of holographic content that can be experienced via augmented reality devices. But how can we methodically capture the interrelation between physical and augmented space? In this augmented reality field study, a historical building was holographically reconstructed in its original size on a public city square. The test people were then able to move around and view the hologram from different angles via high-tech augmented reality glasses. Due to its explorative character and constantly changing field conditions, including, among other things, the Covid-19 pandemic, we had to critically reflect and adapt our methods to take into account technical, environmental, social, operationalisation, and recruitment issues. After evaluating our solutions to these issues, this article aims to illustrate the methodological challenges and opportunities of augmented reality field studies and to provide an overview of best practices for capturing the interrelationship of physical and augmented space.

Keywords
augmented reality; augmented space; locative tracking; methodology; polarity profiles; spatial meaning; spatial movement; spatial perception; thinking aloud

Issue
This article is part of the issue “Across Mobile Online and Offline Spaces: Reflections on Methods, Practices, and Ethics” edited by Katja Kaufmann (University of Innsbruck) and Monika Palmberger (University of Vienna).

1. Introduction

Augmented reality (AR), defined as the holographic overlay of physical space with virtual objects in real-time (Azuma, 1997), is bound to the conditions of physical space like no other medium. As such, it also has the potential to fundamentally change our personal relationship with physical space by adding new layers of meaning to it (Liao & Humphreys, 2015). This is particularly evident in urban space, which, as a burning lens of media developments, is already affected by a multitude of holographic content like AR navigation apps, Pokémon Go, or augmentations of tourist attractions (Aurigi & Cindio, 2008). Even today, users can experience historical structures like the Berlin Wall (Zaubar, 2021) or buildings at their original location as holograms on their smartphone (e.g., the Urban Augmented Reality application launched by the Netherlands Architecture Institute; Verhoeff, 2012, p. 160). Of all the fields of application within the realm of the smart city, urban planning and tourism are set to be influenced the most by AR in the near future (Allen & Robinson, 2018), as has been shown in a number of interdisciplinary studies. For instance, Reinwald et al. (2014) demonstrate that the holographic representation of an urban construction contributes to a better architectural understanding for stakeholders compared to traditional visualization methods (e.g., building plans). Oleksy and Wnuk (2016) conclude that the

holographic reconstruction of the Warsaw Ghetto conveys its cultural meaning to tourists more powerfully than a two-dimensional representation on a personal computer. While these results indicate a short-term effect of AR on the knowledge of specific stakeholders like urban planners and tourists, they also give rise to a set of general questions regarding its long-term influence on the city dwellers' relation to space: How does AR, in general, and holographically reconstructed buildings, in particular, change our perception of space and the personal meaning it develops in our daily lives? And how can we methodically capture the appropriation of both physical (offline) space and augmented (online) space, experienced through head-worn AR?

To answer these questions, we began by researching historical buildings with potential significance for city dwellers that were to be reconstructed in AR and chose the stock exchange of Augsburg, Germany. This building, which had been destroyed during air raids in the Second World War but was never rebuilt, was holographically reconstructed in its original size at its original location on the city's central square. Test people were then able to view the building as a hologram by wearing high-tech AR glasses (Microsoft HoloLens 2) that project virtual objects onto a display in front of their eyes. Since this display is transparent, there is a "perceptual illusion of non-mediation" that makes the hologram appear to be real which is also known as "presence" (Lombard & Ditton, 1997). In order to resurrect this building in AR, old photographs, paintings, and postcards were assessed. Using mobile AR glasses, test people were able to move freely around the square, observe the hologram from different angles, and walk into it. Using this approach, we sought to illuminate how AR might influence the relationships of city dwellers to the urban space based on three dimensions: the spatial perception of the square (dimension 1), its spatial meaning in the lives of city dwellers (dimension 2), and their spatial movement patterns on the square (dimension 3). The project was initiated and realized by an interdisciplinary research group comprising architectural historians and computer and communication scientists analysing the digitalisation of the city (www.digista.de). Since our scientific research was the primary focus, urban stakeholders like city planners or local politicians were not involved in the project.

In order to capture the appropriation of augmented space within these three dimensions, we relied on a mixed-method approach using both qualitative and quantitative tools. Due to its explorative character and constantly changing field conditions, including the Covid-19 pandemic among other things, we had to critically reflect and adapt our study to take account of several unpredictable obstacles. These included the technical and environmental issues of working with highly sensitive AR equipment on a public square in winter, the development and combination of theoretical frameworks and empirical tools, extensive interviewer training, and the administrative issues involved in implementing a field study during a pandemic. After evaluating our theoretical, empirical, and practical solutions for these emerging obstacles, the following article sets out to present insights into the methodology of an AR field study and to provide an overview of best practices regarding data collection and data analysis when capturing the interrelationship of physical and augmented space.

First, we will provide an overview of the theoretical background, taking into consideration various dimensions of augmented space and empirical tools used to capture it (Section 2). Next, we dive into the methodological issues when capturing augmented space (Section 3.1), divided into technical and environmental issues (Section 3.2); interviewer issues (Section 3.3); operationalization issues with standardized questionnaires, thinking-aloud protocols, and locative tracking (Section 3.4); and, lastly, recruitment and issues that arose due to the Covid-19 pandemic (Section 3.5). These empirical opportunities and pitfalls of AR field studies are evaluated and discussed in the final section (Section 4) of this article.

2. Theoretical Background

As a site-specific medium, AR might be described as "a form of creative contribution, which not only adds to space but inherently also modifies it" (Verhoeff, 2012, p. 162). While this modification is often related to spatial concepts like "hybrid space" (de Souza e Silva, 2006), "third space" (Thielmann, 2007), or "augmented space" (Allen & Robinson, 2018), it is less the space itself and more our relation to space that is modified through AR. Consequently, scholars should focus less on constructing theoretical (and often hypothetical) concepts about the emergence of augmented space and more on investigating our personal relationship to it. This relation to space is often a very subtle one, which forms gradually over years through daily habits, personal memories, and unconscious perceptions often unknown to the subject. Thus, for a systematic survey of AR, it is important to consider the various dimensions that constitute an individual's relationship to space. To achieve this goal, some AR scholars refer to abstract theoretical models indicating a complex nexus of spatial dimensions to describe an augmented engagement with space—e.g., Liao et al. (2020), building upon Lefebvre's triad of perceived, conceived, and lived space. Others simply focus on one spatial dimension (mostly spatial perception, e.g., Woods, 2020), neglecting other aspects of our multi-dimensional relationship to space. However, if we step back and take a look at the ongoing discussion regarding the "spatial turn" (the increasing attention to spatial circumstances in social sciences), at least three spatial dimensions can be identified: the perception of space (Löw, 2008), the meaning of space (Gustafson, 2001), and its influence on human behaviour (de Certeau, 1985). Since each of these dimensions describes a key aspect of our personal relationship to space, they might be termed as

spatial perception, meaning, and movement. While bearing some resemblance to Lefebvre's (1991) triad of perceived, conceived, and lived space, these dimensions offer a more appropriate, hands-on approach to explaining our multifaceted engagement with space. If we transfer these considerations to augmented space, which is defined as the holographic overlay of urban space with virtual objects (Allen & Robinson, 2018, pp. 262–263), there are several ways in which AR applications or content can influence our relationship with the city: It might change how we perceive the cityscape (i.e., augmented spatial perception, following Löw, 2008); the personal meaning of urban places with regard to the self, to others, and to the environment (i.e., augmented spatial meaning, following Gustafson, 2001); and the way we behave or move through the city (i.e., augmented spatial movement, following de Certeau, 1985). These assumptions form the main research question:

> RQ: To what extent does the holographic reconstruction of a historical building through AR influence (a) spatial perception, (b) spatial meaning, and (c) spatial movement in the city?

The interview study took place between February and March 2021 and was carried out by three interviewers (one research assistant and two student assistants) from the Department for Media, Knowledge, and Communication (University of Augsburg). The participants were recruited via third parties and selected based on their place of residence and length of residence in Augsburg (or the district of Augsburg). In addition, we ensured an even gender distribution. A total of 78 Augsburg residents (40 women and 38 men) took part in the study. Before meeting at the Rathausplatz, the participants had to fill out an online questionnaire capturing their spatial perception and spatial meaning prior to the AR experience. On the day of the survey, the interviewer explained the background of the study and the AR glasses to the participant, who was then able to view the hologram and speak everything that came to their mind. After the AR experience, they both walked to a seminar room close to the Rathausplatz where the participant had to fill out a second questionnaire capturing their spatial perception and meaning after the AR experience. The survey was completed with a short interview.

When searching for theoretical frameworks and empirical tools to conceptualize and capture these three dimensions of augmented space, it is striking that most AR studies focus only on one spatial dimension and often derive their categories from highly specific considerations. For instance, Tsai (2020) analyses the place satisfaction (i.e., a narrow form of spatial meaning) of heritage tourists provoked by different AR applications. She concludes that AR can generate a positive impact on the visitor's satisfaction with heritage tourism sites that is mediated by user engagement and perceived authenticity. While studies like these allow for new insights into the influence of AR on a single spatial dimension, our goal was to analyse the appropriation of augmented space with regard to several dimensions. This means that our approach should allow for a more general, multi-dimensional analysis of augmented space that is not limited to specific considerations and intervening factors. Instead of creating empirical tools to generate tailor-made results that are restricted to certain applications and/or places (e.g., place satisfaction in heritage tourism sites), we were looking for theoretical concepts and methods which allow a sufficiently high level of abstraction. This holistic perspective should improve the generalisation and comparability of our results. To capture (augmented) spatial perception, semantic differentials are a practical and valid tool for individuals to assess a perceived surrounding. Originally implemented by Osgood et al. (1957), semantic differentials are a rating scale in which the respondent is asked to describe his or her perception on a scale between two polar adjectives. This method, which is used regularly in architectural studies to measure the experience of built environments—e.g., the 36-item semantic environmental scale by Küller (1991, p. 122) to assess the Sturup Airport—was also utilised in the early 2000s to compare the sensory perception of building interiors and their identical, virtual reconstructions (Westerdahl et al., 2006). Kuliga et al. (2015, p. 368) adopted the empirical concept into a semantic differential to capture the perception of a non-existent, virtual building based on 20 polarities. While these semantic differentials have proven useful for analysing the perception of entirely virtual environments, they have never been implemented to assess the spatial perception of holographically augmented, physical environments.

Finding a method to capture (augmented) spatial meaning posed more difficulties since most empirical tools are customised to measure the significance of preselected places of interest instead of providing a holistic perspective. For instance, Manzo (2005) analyses the multidimensional meaning of home and residence via semi-structured interviews, while Lalli (1992) uses a 20-item urban-identity-scale to capture the personal relevance of the city of Heidelberg. While these studies successfully measure the significance of specific places, there is a lack of theoretical framework and empirical methods suited to holistically capture the spatial meaning of different types of places. One exception is the three-pole model by Gustafson (2001), who conceptualizes spatial meaning in relation to the self, others, and the environment. Based on an extensive interview study, he assigns different attributes to each of these poles (self, others, environment) and its axes (self–others, others–environment, self–environment). This allocation of meaning within a field of poles and axes helps to "avoid simplified categorization" and allows for "analyses that recognize the plurality and complexity of meanings" (Gustafson, 2001, p. 12). For instance, the significance of a place can be measured by personal experiences

(self), a certain clientele (others), or institutions (environment) that people associate with that particular place. Furthermore, the model can be applied to places of various different types and scales, e.g., a residence, neighbourhood, village, city, region, nation, or continent. Due to its high degree of abstraction and its holistic perspective, Gustafson's (2001) three-pole model of spatial meaning also lends itself to the analysis of augmented space. However, it has never before been applied in the context of virtual, or, respectively, augmented environments.

Finally, virtual objects or holograms can influence our behaviour in space, specifically our movement patterns. For instance, the more they perceive them to be real, people tend to adapt their movement in augmented or virtual environments to avoid colliding with virtual objects. This "perceptual illusion of non-mediation" (Lombard & Ditton, 1997), referred to in media effects research as "presence" (Wirth et al., 2004), can alter the way we move through space. To capture this spatial behaviour, most studies rely on built-in tracking systems in the devices to locate respondents' motion. The spatial movement can then be visualized and compared in movement paths. For instance, the comparison of walking lines in virtual reality (VR) by Steptoe et al. (2014) shows that virtual objects with a higher rendering quality tend to generate a higher sense of presence and a stronger adaptation of movement patterns compared to virtual objects with a lower rendering quality. While tracking lines have been established to analyse entirely virtual environments, the question that arises is how to adjust this empirical tracking tool to capture spatial movement (c) in augmented environments.

3. Methodological Issues When Capturing Augmented Space

3.1. Study Design and Overview of Issues

To capture augmented spatial perception (a), spatial meaning (b), and spatial movement (c), we conducted a field study on the central square in Augsburg that had been augmented by a holographic reconstruction of the former stock exchange building. The first part of the data collection took place a few days before the AR session. Each participant had to fill out a preliminary online questionnaire that had been sent to them via e-mail to indicate their perception of the non-augmented square and the personal meaning it unfolds in their daily life. After that, the participant met the interviewer at the central square in Augsburg. The interviewer explained the AR glasses to the participant and provided a short overview of the study. After sanitising and putting on the AR glasses, the study participants were able to view the hologram of the Augsburg stock exchange in its original size and at its original location (Figures 1 and 2). First, they listened to a short audio file explaining the historical background of the building and the square. Afterwards, they were able to move freely around the square, view the hologram from different angles, and say aloud everything that came to their minds (thinking aloud, the second part of the data collection). The third part of the data collection took place after the AR session when the participants followed the interviewers to a nearby interview room and filled out a follow-up questionnaire on a tablet. After that, they were shown a point-of-view (POV) video recording of their previous AR session on a laptop and were asked to think aloud again.

During our research process, we encountered several methodological issues that can be traced back to the novelty of the technology, the current lack of AR field studies, and a de-contextualized research focus. Thus far, most empirical studies working with sensitive AR equipment have limited their research to controllable laboratory settings and/or a mono-dimensional perspective on space (e.g., place satisfaction, following Tsai, 2020). Multi-dimensional field studies combining their interest in different relationships to space are scarce and rely mainly on guided interviews and the influence of small-scale, generic AR content on handheld devices (e.g., the influence of Pokémon Go on spatial perception, following Woods, 2020). For this reason, the multitude of sociological methods—both quantitative or qualitative, traditional, or explorative—has yet to be fully introduced and adapted to AR field studies, especially those concerning head-worn devices. However, in addition to the many opportunities they provide, AR field studies using AR glasses still pose several issues for the scholars that should now be discussed in further detail (see Table 1).

3.2. Technical and Environmental Issues

Implementing an AR field study with a large-scale, building-sized hologram on a public city square poses several technical and environmental issues, which often build on each other and should thus be described in one section. To guarantee a consistent starting position and reliable field conditions, interviewers had to start every session from the exact same location and place the hologram of the historical building precisely in its original location when adjusting the AR glasses (errors in hologram positioning). After sanitizing the AR glasses and handing them over to the study participant, the interviewers had to monitor and adapt to constantly changing field conditions in order to guarantee stable AR exposure and reliable data collection (Figure 1). Technical issues posed the biggest challenge since the hologram tended to disappear (hologram break-off during usage) or move away from the spectator as a result of jerky body or head movement or harsh weather conditions like low temperature, rain, or snow (highly sensitive AR equipment, unpredictable weather conditions). In this case, the interviewer had to leave the participant at the break-off point, walk back to the starting point, readjust the AR glasses, re-sanitize them, walk back to the participant, and restart the session again.

Table 1. Overview of methodological issues when capturing augmented space.

	Issues
Technical/Environmental	• Errors in hologram positioning • Hologram break-off during usage • Highly sensitive AR equipment • Unpredictable weather conditions
Social	• Curious and/or intrusive passers-by • Participant's feelings of insecurity
Interviewer	• Extensive interviewer training • Step-by-step interviewer guideline (script) • Flexibility and strength of nerve
Measurement	• Limitations of established methods in AR studies • Multi- instead of mono-dimensional perspective • Finding concepts of spatial meaning • Combining mixed methods
Recruitment and Covid-19	• Developing a hygiene concept • Agreement with police and health authorities • Difficulties in recruiting older participants

3.3. Social Issues

Another important methodological issue was the social context of the experiment and regular encounters with passers-by. While police officers and city authorities had been previously informed about the study and were rather reserved, we were regularly watched and sometimes even approached by curious pedestrians who asked about the study or if they could try out the AR glasses themselves (curious and/or intrusive passers-by). Due to our interviewer training, the interviewers were able to anticipate and respond to these encounters by providing additional information on the project or by referring or the university's VR and AR lab for try-outs. However, these encounters reportedly led to a feeling of social pressure or exposure for some of our participants: "But I paid more attention to the other people, how they perceived us, whether they were watching us, whether I seemed strange. I felt a bit like an outsider" (No. 75, female, length of residence: four years). This feeling of social attention is not uncommon in AR field studies (Hofmann & Mosemghvdlishvili, 2014, p. 277), especially when working with high-tech equipment like the Microsoft HoloLens 2. However, other participants were not bothered by these intrusions at all:

> There was also a moment when the other person came to us and wanted to join in. Then again, the wall [of the holographic building] was slightly broken, but I didn't find that so disturbing. I didn't feel like an outsider. (No. 70, male, length of residence: five years)

Regardless of the participants' attitudes towards these intrusions, AR scholars should be aware that the technology they are using is an unusual sight for most bystanders and is likely to provoke a reaction, either in a positive or a negative way (participant's feeling of insecurity).

3.4. Interviewer Issues

To be able to adapt to these technical and environmental issues and unstable field conditions, the interviewers had to be briefed accordingly (extensive interviewer training). An interviewer guideline was created at an early stage of the study design and expanded regularly until it comprised detailed, step-by-step instructions. Just like learning a script, interviewers had to be prepared against all eventualities and practice their responses in several pre-tests, in which they played either the participant or the interviewer. The interviewer guideline was complemented by a best practice video tutorial in which all relevant actions and responses were portrayed by the lead investigator. To keep track of all possible technical and environmental issues during the data collection process, the interviewers briefly reported on their experiences after each session in a shared interviewer diary (Google Docs). These potential threats or changes to the existing methodology were regularly discussed and the guideline was adapted accordingly (step-by-step interviewer guideline/script). Despite these preparations, interviewers working with high-tech AR equipment always had to remain flexible and calm in order to adapt to continually changing field conditions (flexibility and strength of nerve).

Figure 1. Test subjects wearing AR glasses on an augmented city square.

3.5. Measurement Issues

3.5.1. Limitations of Established Methods for Capturing Augmented Space

As the global number of AR users grows and is expected to reach 1,73 billion active users in 2024 (Statista, 2021), so does the number of AR studies and scholars attempting to analyse its influence on users (Pognon et al., 2020). While this has led to the development of valid and reliable research tools—especially for assessing the usability of AR applications—there are a number of empirical limitations when it comes to capturing our relationship to augmented space.

First, quantitative studies on augmented space mostly rely on post-stimulus questionnaire data collected directly after the AR experience. For instance, the augmented reality immersion questionnaire by Georgiou and Kyza (2017) helps in measuring an augmented spatial perception during and after AR usage, without comparing it to the non-augmented perception of a particular place (preliminary and follow-up questionnaires and polarity profiles).

Second, qualitative studies on augmented space often make use of explorative methods mainly designed for analysing the long-term influence of AR. For instance, Richardson et al. (2022, p. 673) combine participant observations with in-depth interviews and re-enactments to discover spatial "scenarios of use" for Pokémon Go in the city of Badalona, Spain. While these methods may be useful for investigating established AR applications like Pokémon Go, they are less suited for exploring the influence of high-tech AR glasses on our relationship to space, since users have not yet developed any spatial "scenarios of use" (Richardson et al., 2022, p. 673) that they could re-enact. Instead, qualitative methods that are less structured and more open are required to elicit unfiltered statements on immediate and/or reflected emotions and thoughts (concurrent and retrospective thinking-aloud protocols).

Third, mixed-method studies on augmented spatial movement often use locative data tracked by the AR device to generate walking lines and compare patterns of movement (Steptoe et al., 2014). However, this "circus of numbers, lines and points, contradictory in information and strangely empty in narrative is a peculiar rendition of meaning" (Wilmott, 2016, pp. 1–2) that should always be contextualized with interview statements. On the other hand:

> Interviews provide participants' narratives about what they think they do with their devices, yet do not necessarily bring insights into how these play out experientially….[Thus,] collaborative mapping exercises [are useful] to understand their perceptions of the spatiality of their use outside the home. (Pink et al., 2016, p. 242)

Therefore, a logical combination of tracking- and interview-data is needed in order to investigate augmented spatial movement (locative tracking and verbal evaluation). To avoid these limitations, we used and improved the following research tools that will be described in detail in the following sections.

3.5.2. Preliminary and Follow-Up Questionnaires and Polarity Profiles

When measuring the appropriation of augmented space, it is important to consider its multi-dimensional nature rather than focusing on one-sided or overly specific concepts (multi- instead of mono-dimensional perspective). To determine (in)significances of the influence of AR on spatial perception and spatial meaning, we used preliminary and follow-up questionnaires and mean value comparisons. The influence on spatial perception was captured via polarity profiles including 20 opposite pairs derived from the study by Kuliga et al. (2015, p. 368). The test subjects (n = 78) were shown a questionnaire before and after viewing the hologram to record

how they perceived the city square in its augmented and non-augmented form on a six-point Likert scale. Comparing these questionnaires resulted in a polarity profile for each participant's perception of space, showing both an augmented and non-augmented spatial perception. These individual profiles were summarised and tested for statistical significance by comparing the means of connected samples (see Figure 2).

Polarity profiles like this combined with single mean comparisons are a clear and hands-on means of capturing the influence of AR on spatial perception on a visual scale. For instance, a score of two out of six on the "cold–warm" polarity means that the city square in its augmented form is perceived as rather cold compared to its non-augmented form. This example of an augmented spatial perception proves to be significant, whereas the differences in the "bare–decorated" polarity could not be generalized for all study participants. While polarity profiles allow for a diverse and detailed overview of the augmentation of spatial perception, they also tend to swamp the viewer with a multitude of incoherent insights, especially when illustrated in an unstructured manner.

To structure our results and increase comparability, a factor analysis (principal axis analyses with oblique rotation, oblimin, delta = 0) was then calculated to reduce the 20 polarities to a few factors. Two items were excluded from the analysis due to double factor loadings or factor loadings that were too small. This resulted in the five factors of a differential spatial perception comprising a total of 18 polarities (see Figure 2). It shows the differences in spatial perception induced by viewing the hologram on a differential scale from −6 to +6. For instance, our participants perceived the augmented square as less accessible (−2.01 scale points) and less simplistic (−1.08 scale points) compared to the non-augmented square.

Deducing standardised tools to measure an influence on spatial meaning posed more difficulties, as described in further detail in Section 3 (finding concepts of spatial meaning). After identifying the three-pole model by Gustafson (2001) as a suitable concept, it had to be operationalized and adapted for questionnaires. First, the different elements and attributes of spatial meaning were articulated into 56 questionnaire items by university students in a creative pro-seminar and integrated into an online survey. After evaluating this survey (n = 181) by means of a factor analysis, a total of 30 attributes were assigned to capture spatial meaning in relation to its six constituting elements: self, others, environment, self–others, self–environment, and others–environment (Figure 3). This catalogue of items was rated by the test subjects (n = 78) before and after viewing the hologram on a five-point Likert scale. The comparison of before and after questionnaires resulted in a profile of augmented spatial meaning similar to those created to capture spatial perception. However, this time, the graphs did not range between polarities but between the scale points of the Likert scale (1 = *strongly disagree* to

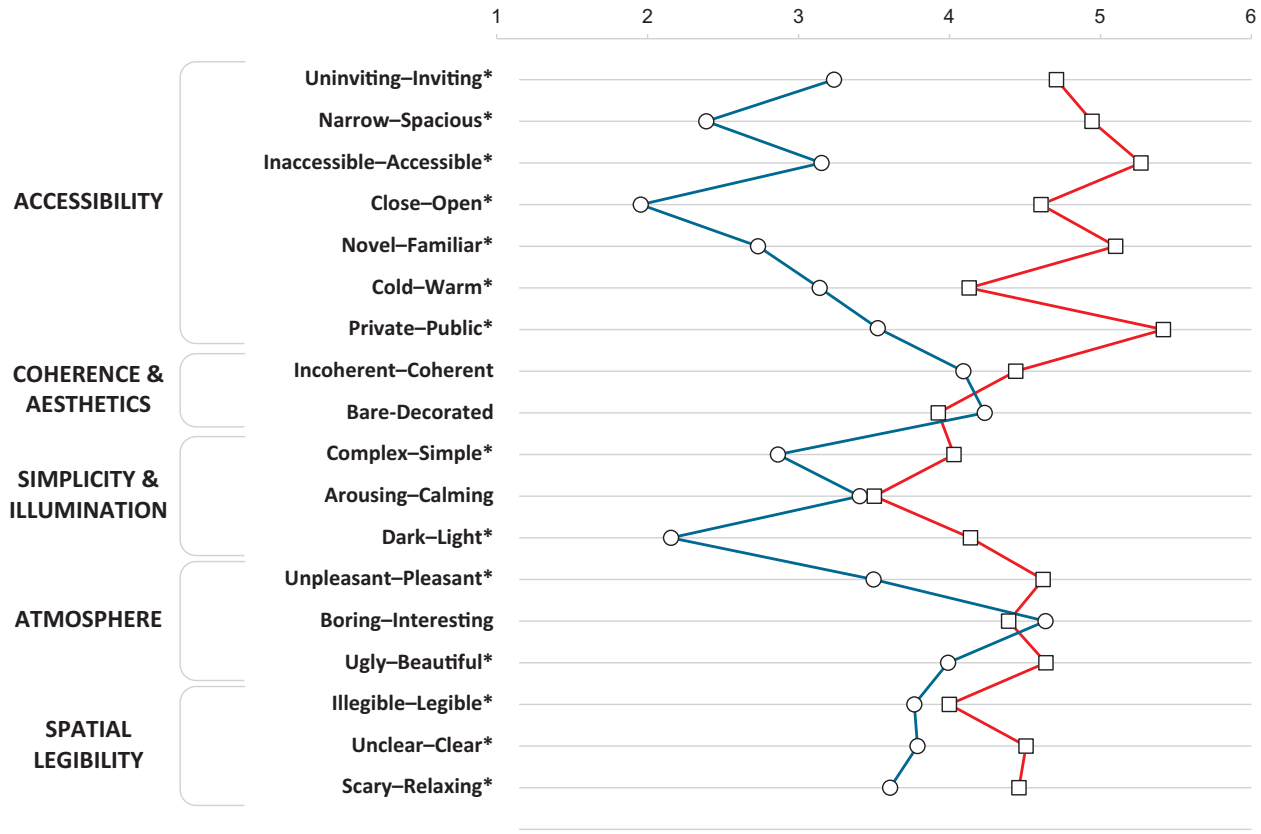

Figure 2. Augmented (blue) and non-augmented (red) spatial perception. Note: * = mean comparison significant.

Figure 3. Augmented (blue) and non-augmented (red) spatial meaning. Note: * = mean comparison significant.

5 = *strongly agree*). Using comparisons of means in connected samples, we tested this empirical tool to measure augmented spatial meaning for statistical significance.

Again, a factor analysis was calculated to reduce the complexity of this visual tool and to increase its comparability, whereby four items were excluded from the analysis due to double factor loadings or factor loadings that were too small. This led to the creation of five factors of augmented spatial meaning, consisting of 26 items in total: self (five items), others (five items), environment (three items), others–environment (five items), and self–others and self–environment (eight items; Figure 3). Unlike in Gustafson's (2001) theoretical model, the items measuring spatial meaning with regard to self–others and self–environment could not be sufficiently differentiated by participants, which led to the merging of these two elements into one single factor. It shows that test subjects consider attributes like "meeting new people" or "the chance to experience something" as part of the same construct, which scholars

analysing spatial meaning should take into consideration when implementing Gustafson's three-pole model in their studies.

3.5.3. Concurrent and Retrospective Thinking-Aloud Protocols

In addition to standardized questionnaires, the influence of AR on spatial perception and meaning was also explored using qualitative thinking-aloud-protocols (TAP; combing mixed-methods). This method is commonly used in human-computer-interaction research to assess the usability of technological or software applications. However, there is an ongoing methodological discussion on the suitability of four different forms of TAP: concurrent vs. retrospective TAP and undirected vs. directed TAP (van den Haak et al., 2003). In simpler terms, they also might be named instant vs. subsequent TAP and guided vs. unguided TAP. While some scholars point out the reactivity of concurrent TAP, which tends to overstrain the participant, others refer to its potential to elicit spontaneous responses compared to a TAP in retrospective (Alshammari et al., 2015). The same applies to instructions. While most scholars rely on undirected TAP to allow for an unfiltered expression of thoughts, there might be studies where "the verbal probe may be constructed to induce the subjects to generate information specifically relevant to the hypotheses under consideration [i.e., directed TAP]" (Ericsson & Simon, 1980, p. 222). With regard to AR studies, TAPs are mostly implemented in the concurrent, undirected form to instantly evaluate the user interface of holographic applications in specific situations (Santos et al., 2016).

Due to these mixed views on TAP as an empirical method, we decided to evaluate its most prevalent forms to verify their validity before conducting our field study. As part of a pre-test, participants were asked to say aloud everything that came to their minds while experiencing the hologram on the city square, using both open-ended (i.e., undirected) and space-specific questions (i.e., directed). During this concurrent TAP, their statements, gaze direction, and gestures were videotaped via the built-in recording system of the Microsoft HoloLens 2, which records the POV of the user. Immediately after the AR experience, the POV videotape was shown to them on a laptop in a private room close to the city square and they were asked to think aloud again, this time in retrospect.

The pre-test showed that undirected TAP in AR, while undoubtedly eliciting unfiltered reactions on obvious aspects like usability, is less suitable for capturing specific aspects like augmented space. It mainly led to overblown statements regarding the graphic quality in general, the light weight of the AR glasses, or the intuitive handling of the application:

> So, it's definitely very detailed for that. Yes. Okay, wow!…Well, I think it's amazing, I can see the buildings really well, even from the 3D view. I can really see around the corner, which impresses me….And the picture is now much more stable than before, probably because the menu window is gone. No, that's great. (Pre-Test No. 2, male, length of residence: five years)

This focus on graphics and usability might be traced back to the fact that head-worn AR is not yet established, and many subjects were wearing AR glasses for the first time.

In directed TAP, queries can guide the narrative of the subject towards specific aspects of the AR experience. For instance, interviewers could ask the participants to share their thoughts on how the hologram might change the square in their eyes, which often provoked statements on an augmented spatial perception. They also asked them what personal associations they have with the square, which triggered thoughts about an augmented spatial meaning. Despite the advantages of directed TAP in guiding the statements into a direction relevant to our research question, its disruptive character can be seen as a trade-off. Some participants initially had problems focusing on the hologram while simultaneously having to direct their statements to specific aspects of the AR experience. Some initially wanted to speak freely about other aspects of the AR experience, like its graphic quality or usability. However, even those participants quickly adapted to this form of directed TAP and after a short time casually shared their thoughts and feelings about spatial perception or meaning. For instance, one participant described how the holographically reconstructed building fundamentally changed her relationship with the city square:

> I think that it [the real building] would definitely change my relationship to this square or would have changed if it had been there….I went to school here, there in [anonymised], that's not far away, we often sat here ourselves in the summer and I think it would definitely have changed my relationship to the city centre. (No. 72, female, length of residence: 20 years)

With regard to the timing, we found that concurrent TAP is better suited to capturing spontaneous reactions or references to special AR content, while also evoking cognitive overload and a sense of social undesirability regarding pedestrians. Some participants had problems with immediately articulating their thoughts during usage or reported a feeling of being watched. In retrospective TAP, an ego-centred video recording of their AR experience was shown to the subjects on a laptop, while their verbal comments were captured via microphone and screen recording. This led to more reflected statements and in-depth thoughts since subjects could relive their previous AR experience and focus on specific aspects they had previously overlooked. However, these reflected, retrospective thoughts might also be a disadvantage for certain research questions.

Based on this pre-test, we decided to use directed-concurrent TAP during the AR experience to provoke

spontaneous reactions regarding the influence of the hologram on spatial perception (a). The effects on spatial meaning (b) and spatial movement (c) were captured immediately after the AR experience in an interview room close to the city square via directed-retrospective TAP.

3.5.4. Locative Tracking and Verbal Evaluations

The spatial movement was collected mainly by means of locative tracking within the AR glasses. This method was initially implemented by scholars on VR like Steptoe et al. (2014), who investigated the "presence" of virtual objects by analysing the movement patterns of their participants. By implementing this empirical tool in our AR field study, we were able to generate walking lines and compare how subjects placed themselves vis-à-vis the hologram. The walking lines of our participants were layered over a satellite map of the city square. The area in light blue indicates the location of the hologram.

Figure 4 shows that most participants initially approached the hologram straight from the starting point (located at 0, x-axis) and then turned right to walk alongside its front façade or to circle it entirely. Only a small number of participants walked right through the hologram or traversed it entirely, while others decided to distance themselves to capture its full size. Comparing these walking lines indicates a strong sense of presence, whereby the hologram was partially perceived as a non-mediated, real object. However, locative tracking provides only a one-sided, initial insight into the presence and augmented spatial movement and has to be contextualized with the verbal evaluations of TAP. Only then can the participants' motivation for moving through augmented space and for adapting their movement patterns be analysed fully. For instance, one participant who entered the hologram later described the inner conflict felt before breaking into its space: "My mind just said: 'Don't stress out, there is nothing in front of you.' But somehow my body first said: 'Damn, there's a wall, normally we don't go through walls.' Exactly, that was probably a bit of a conflict." This shows that the reasons for feeling (or breaking into) a hologram's presence can be manifold and might influence our movement patterns in different ways. However, this augmented spatial movement can only be captured by combining locative (but incoherent) tracking data with qualitative, contextualizing statements (combining mixed methods).

3.6. Recruitment and Covid-19 Issues

The AR field study took place between February and March 2021. Due to lockdowns and contact restrictions during the Covid-19 pandemic, we encountered considerable recruitment difficulties. For instance, a strict hygiene concept had to be developed in consultation with the Augsburg health department and local police authorities (development of a hygiene concept, agreement with police and health authorities). However, these measures were not enough to entirely alleviate the reservations of older city dwellers, who reportedly did not want to participate in the study for fear of infection (difficulties in recruiting older participants). As a result, the average age of our sample is just 24 years old (minimum: 18 years of age, maximum: 54 years of age).

Luckily for scholars dealing with the appropriation of space, it is not so much age but the length of residence along with personal memories and experiences

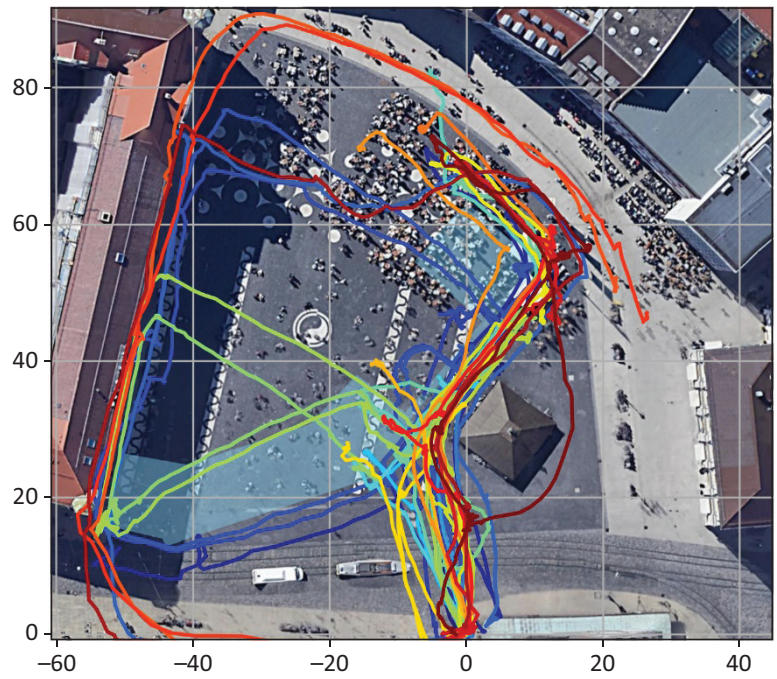

Figure 4. Walking lines in augmented space.

that are decisive for the development of spatial meaning (Gustafson, 2001). In our case, even younger city dwellers can develop a personal connection to urban space if they have lived in the city long enough to build a bond to certain places like central squares. For this reason, participants who have lived in Augsburg or the surrounding area for less than three years were excluded from the study; the average length of residence in the study is 11 years (minimum: three years, maximum: 39 years). The study participants were thus recruited based on their place of residence and length of residence in Augsburg (or the district of Augsburg). In addition, we ensured an even gender distribution (40 women, 38 men). No further sampling criteria were applied due to the recruitment difficulties caused by the pandemic.

4. Methodological Conclusions for Capturing Augmented Space

AR has the potential to fundamentally change our relationship to space by augmenting our perception, the personal meaning we associate with certain places, and our movement patterns. In our field study, we combined established empirical methods of social scientific research—both quantitative and qualitative tools—to capture the formation of augmented space.

Preliminary questionnaires (or interviews) are an appropriate tool to sensitise the participants and to focus their attention on their relationship with physical space before overlaying it with virtual content. Only then can a participant evaluate their augmented spatial perception, meaning, and movement by comparing it to their previous experiences in daily life. Polarity profiles and mean value comparisons are useful tools to visualise these temporal aspects of spatial relations. They illustrate the mixing of physical, offline space and virtual, online space which ultimately results in the appropriation of an augmented space.

However, even with this sensibilization for spatial relationships, test subjects tend to focus on technical or graphical aspects when using AR (or VR) glasses for the first time, which may be attributable to the novelty of these high-tech applications. For this reason, unlike usability studies, AR scholars investigating augmented space (or spatial references in general) should stick to directed TAP to avoid deviations and to elicit spontaneous, verbal reactions relevant to the research question. In concurrent TAP, interviewers may direct (but not compel) the participants to express their thoughts and feelings about apparent, graspable concepts like spatial perception (e.g., "How would this change [the place] in your eyes?"). Unapparently, more abstract concepts like spatial meaning, sense of presence, or spatial movement should be explored using retrospective TAP. By combining these two forms of verbalization, which Ericsson and Simon (1980) regard as a hybrid mode of TAP, the participants are given the opportunity to complement their instant reactions to holographic content with a deeper, more reflected perspective on AR. This retrospective TAP should be carried out immediately after the AR experience in a private environment and can be supported by re-watching a video-recorded POV from the AR glasses.

In order to direct TAPs and analyse the statements that they generate, "basic theoretical assumptions are necessary" that might later be used as a coding scheme for qualitative data analysis (Wirth et al., 2004, p. 353). To code augmented spatial meaning, the elements of the three-pole model by Gustafson (2001) might serve as fitting categories for deductive analysis. However, with regard to spatial perception, we took an inductive approach by assigning the qualitative statements to the five factors of augmented spatial perception based on our factor analysis: accessibility, coherence and aesthetics, simplicity and illumination, atmosphere, and spatial legibility.

This shows how our mixed-method approach not only enhanced the data collection by combining the visualising potential of factor analyses and polarity profiles with the contextualising potential of qualitative statements but also added to our data analysis. Without the participant's concurrent and retrospective TAP, the questionnaire results would have only scratched the epistemological surface of augmented space. Without the prior questionnaires on spatial perception and meaning, participants might have been confused when it came to speaking about their personal relationship with physical space and its augmentation during the AR sessions. Moreover, without the locative tracking and walking lines, the insights about spatial movement would have been based on the video material and TAP, making it much harder to compare.

With all of these aspects in mind, high-tech AR applications like the Microsoft HoloLens 2 remain a delicate technology that is still susceptible to many technical and environmental issues like holographic tracking problems, unstable weather conditions, and social reactions of curious pedestrians or authorities. As such, implementing an AR field study requires detailed interviewer guidelines (script) and the interviewer's ability to adapt to constantly changing field conditions.

The results of this work point to new fields of study in the sociology of space that are also touched on in this specific aspect of the intersections between different spaces. How can the meaning of space on a physical, offline level be measured and differentiated from its significance on a virtual, online level? How can we guide the participants' attention to the ever-converging hybrid of offline and online space? And what are appropriate research areas for hybrid space in a literal sense?

The challenge of answering these questions lies in the technological, environmental, interviewer, measurement, and recruitment issues that often accompany AR field studies. As well as tackling these issues, scholars must consider that in hybrid space, the meaning of virtual environments is most likely linked to the significance of the physical environment rather than the other way

around. Without their previous experiences and memories relating to the central square in Augsburg, the participants would hardly have been able to reflect on their augmented spatial meaning. However, since our personal relationship with space is often a very subtle one, participants should be sensitised to that relationship before taking part in the study. In addition to preliminary questionnaires, a detailed study description might be an appropriate solution. Only when participants are aware of the research focus (e.g., spatial meaning) can they better reflect their subliminal and maybe even subconscious relationship with certain places (e.g., public city squares). Finally, though humans can develop a personal relationship with any kind of hybrid space, scholars should focus on places that are potentially charged with layers of meaning rather than places that are likely to be insignificant. For our study, we chose the central square of Augsburg that had been layered with personal and historical meaning and augmented it with a building-sized hologram and AR glasses. We hope this might motivate AR scholars working with sensitive equipment to take themselves outside the safe haven of laboratory settings and bring the significant potential of head-worn AR into the field.

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Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Moritz Schweiger is a research assistant at the Institute of Media, Knowledge, and Communication at Augsburg University and a member of the research project DIGISTA (The Digital City) and KODILL (Competence Development Via Interactive Learning Videos). His research interests include augmented and virtual reality, cultural studies, and the influence of entertainment on our everyday lives.

Jeffrey Wimmer is a professor at the Institute of Media, Knowledge, and Communication at Augsburg University and a member of the research project DIGISTA (The Digital City) and KODILL (Competence Development Via Interactive Learning Videos). His research interests include the public sphere and participation, mediatisation, and virtual worlds.

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Article

Community Internet of Things as Mobile Infrastructure: Methodological Challenges and Opportunities

Chelsea P. Butkowski [1,*], Ngai Keung Chan [2], and Lee Humphreys [3]

[1] Annenberg School for Communication, University of Pennsylvania, USA
[2] School of Journalism and Communication, The Chinese University of Hong Kong, Hong Kong
[3] Department of Communication, Cornell University, USA

* Corresponding author (chelsea.butkowski@asc.upenn.edu)

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Abstract
From smart devices to homes to cities, Internet of Things (IoT) technologies have become embedded within everyday objects on a global scale. We understand IoT technologies as a form of infrastructure that bridges the gaps between offline spaces and online networks as they track, transmit, and construct digital data from and of the physical world. We examine the social construction of IoT network technologies through their technological design and corporate discourses. In this article, we explore the methodological challenges and opportunities of studying IoT as an emerging network technology. We draw on a case study of a low-power wide-area network (LPWAN), a cost-effective radio frequency network that is designed to connect sensors across long distances. Reflecting on our semi-structured interviews with LPWAN users and advocates, participant observation at conferences about LPWAN, as well as a community-based LPWAN project, we examine the intersections of methods and practices as related to space, data, and infrastructures. We identify three key methodological obstacles involved in studying the social construction of networked technologies that straddle physical and digital environments. These include (a) transcending the invisibility and abstraction of network infrastructures, (b) managing practical and conceptual boundaries to sample key cases and participants, and (c) negotiating competing technospatial imaginaries between participants and researchers. Through our reflection, we demonstrate that these challenges also serve as generative methodological opportunities, extending existing tools to study the ways data connects online and offline spaces.

Keywords
community networks; infrastructure; internet of things; LPWAN; mobile communication; qualitative methods; sensing technologies

Issue
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1. Introduction

Our interactions with the digital and physical worlds are constantly shaped by overlapping infrastructures. They enable our survival, transportation, and connectivity through vast systems that are also implicated in an equally vast array of power relations. Star (1999) defines infrastructure as a far-reaching, relational apparatus that is ubiquitously embedded within our surroundings but also invisible and mundane. Because infrastructures exist to facilitate everyday work and social practices, they also develop over time as outdated technologies fade and new ones emerge. In this article, we examine the Internet of Things (IoT) as one particular type of emerging technology that links online and offline spaces.

IoT can be understood fundamentally as networks and sensors (Bunz & Meikle, 2018) that connect “things” or the physical environment to the internet. It is not just

made up of smart refrigerators telling us when we're low on milk, but sensing networks that enable new "addressing, speaking, seeing, and tracking capabilities" (Bunz & Meikle, 2018, p. 4). With radio-frequency identification (RFID) and GPS technologies, for example, we can locate and address where almost anything is, such as cars, phones, products, or deliveries (Frith, 2015, 2019). We can see who is ringing our doorbell when we're not home but also see the soil water content of a field of corn (Bunz & Meikle, 2018). We can track our health and activities with a level of detail and at a scale that was previously unattainable (Neff & Nafus, 2016). As Bunz and Meikle (2018) argue, IoT sensing networks help us make sense of the world around us. Put another way, IoT not only tracks and communicates data about the physical environment that it is embedded in but also invites users to see the world in a particular way through the eyes of such sensing networks (Bunz & Meikle, 2018). From a media and communication perspective, these "technological systems embody ideas about the ways in which we organize ourselves and each other, and they also provide means for us to make meaning about the social organization" (Bunz & Meikle, 2018, pp. 5–6).

The rise of sensor networks has given way to what Andrejevic and Burdon (2015) have called the sensor society, which relies on increasingly ubiquitous, passive detection of an array of different kinds of data and applications. A sensor society is one deeply committed to the logics of big data in which tech companies and corporate interests shape practices of surveillance, power, privacy, and interpretation (Burdon & Andrejevic, 2016). An important critique of the sensor society is that "there are structural asymmetries built into the very notion of a sensor society insofar as the forms of actionable information it generates are shaped and controlled by those who have access to the sensing and analytical infrastructure" (Andrejevic & Burdon, 2015, p. 21). While this might be true for many mobile sensors, especially the ones that are developed by corporate actors for profit-making purposes, community-based IoT can be designed with local knowledge in mind, which offers a new way to think about power, surveillance, and meaning.

In this article, we draw on a community-based IoT network project which aims to use low-cost technology (low power wide-area networks [LPWAN]) to help local communities define and develop their own IoT data networks. As a participatory research project (DiSalvo et al., 2010; Hall, 1992; LeDantec, 2016), this study represents a counterexample of the kind of sensor society that Andrejevic and Burdon (2015) describe. Because community-based IoT networks as infrastructures are deeply embedded in people's daily life (Star, 1999), we ask the following questions: What are the methodological challenges and opportunities for studying an invisible yet ubiquitous IoT at the intersection of online and offline spaces? As IoT is not yet stabilized, both technologically and discursively, how might we delimit the boundaries of IoT? The project involved two primary aspects. First, we studied public discourse around LPWAN. We attended industry conferences and interviewed LPWAN experts and hobbyists. Second, we are working with a community (e.g., non-profits, schools, and local government) to build a public LPWAN network that reflects and prioritizes local needs, not capitalist structures. However, this is not an easy task. In this article, we explicitly examine and reflect on the methodological implications of designing and studying emerging IoT networks as they connect online and offline spaces across communities. To preface our methodological reflections, we situate IoT within literature on mobile infrastructures and science and technology studies (STS) before describing our case study in greater detail.

2. Internet of Things and Infrastructures

We approach IoT networks fundamentally as an infrastructure for several reasons. First, our larger project examines the materiality, physicality, location, installment, and hardware that form these networks and the processes involved in their development (Parks, 2015). Focusing on IoT networks as mobile infrastructure forces us to take seriously how the system is materially being built and deployed to link online and offline space. As LPWAN is still largely in the invention stage (Bar & Galperin, 2004; Hughes, 1983), we are interested in the infrastructural imaginaries of IoT networks, that is, "the ways of thinking about what infrastructures are, where they are located, who controls them, and what they do" (Parks, 2015, p. 355). Within mobile media research, there have been calls for researchers to examine infrastructures beyond those that already exist, to study the ways that they are built and unbuilt through political, economic, social, technical, and regulatory means (Horst, 2013). Moreover, as Mattern (2015) argues, new infrastructures often rely on and are built upon previous infrastructures.

Mobile infrastructures are commonly associated with cellular or wireless networks like LTE, 3G, 4G, 5G, or Wi-Fi (Frith, 2015). Communication and media research about these networks has used a technology studies framework to examine the social construction of such networks (Campbell et al., 2021; Horst, 2013). In their study of 5G discourse, Campbell et al. (2021) suggest that 5G networks are closely associated with the connectivity of both people and objects. From cars to packages delivered to your door, their research suggests that the leading telecoms are constructing mobile infrastructure as essential to a better, more healthy, economically prosperous, and socially just world.

There are many examples of IoT systems that are fully commercially deployed as well as in the early development stages. While most people have interacted with IoT through RFID tags or GPS, whether they know it or not (Frith, 2019; Wilken, 2019), newer forms of sensing networks, including LPWAN, the object of the analysis, are being developed and have not yet reached broad

commercial deployment. Figure 1 illustrates the distinction between cellular networks, short-range networks (e.g., Bluetooth), and LPWAN. These new IoT networks do not just connect objects but also rely on sensors that "detect and communicate changes in their environment" (Bunz & Meikle, 2018, p. 1). For this reason, they can be powerful tools for collecting environmental data, but they can also enable questionable surveillance practices.

By situating IoT as infrastructure specifically, we align our project with broader technological configurations and social practices. While major US telecoms and internet service providers are investing in LPWAN technology, current emerging community-based IoT networks are very similar to community wireless networks in the early 2000s (Forlano, 2006; Forlano et al., 2011; Powell, 2008). Such networks involved multiple stakeholders such as municipalities, tech hobbyists, and non-profit civic organizations. They try to exist outside the reach of corporate telecoms and internet service providers but sometimes work in tandem with such companies to actualize their goal of creating a community or public network with a sustainable business model. More recently, community-wireless and civic technology projects leverage the power of data and networked technologies for progressive environmental and social action (Gabrys, 2019; Powell, 2021). Ultimately, our work builds on existing methodological scholarship on infrastructure (e.g., Bowker et al., 2010; Horst, 2013; Mattern, 2015; Star, 1999) and STS (e.g., Klein & Kleinman, 2002; Law, 2016) to highlight tensions in the research design and data collection processes when studying new, mobile, and embedded technologies like IoT.

3. Studying the Social Construction of Developing Technologies

Technological development is just as much a social, economic, and political process as it is a technical one (Bijker et al., 1987; MacKenzie & Wajcman, 1999). The social meanings and practical applications of new technologies emerge through consensus and contestation among various social actors and artifacts, including designers, manufacturers, retailers, governing bodies, users, and the material objects themselves (Horst, 2013; Humphreys, 2005). These ideas are central to research in STS, which prioritizes the social and material shaping of technologies, rather than technological determinism alone, as a central force of change (Lievrouw, 2014). For example, the social construction of technology (SCOT) framework is specifically concerned with theorizing this process by defining the social groups most relevant to a developing technology and their differing perceptions of the uses and problems the artifact presents, also known as interpretative flexibility (Pinch & Bijker, 1984). SCOT posits that contested new technologies can stabilize over time as their perceived problems resolve or change across relevant social groups.

Emerging technologies are defined through several attributes, including their novelty and their promising yet uncertain futures (Rotolo et al., 2015), but technological change is also a multidirectional and nonlinear process (Bijker et al., 1987). Our research is dedicated to examining IoT technology as it emerges rather than retrospectively investigating a technology that already plays a relatively stable role in society (Hughes, 1983; Marvin, 1988). IoT is also a distinctly communication-oriented technology, and our project lies at the nexus of communication and STS scholarship. Whereas communication research examines technology primarily through effects research or social constructionist viewpoints, STS positions the social and material elements of technologies on equal footing (Latour, 1992; Lievrouw, 2014). We aim to place a similarly shared emphasis on the people, objects, and spaces that shape IoT, especially because it is a network designed to enable the digital connectivity of "situated things."

Although STS provides important theoretical insights into the social construction of technologies, explicitly methodological scholarship on *how* to best apply these insights in the field is less prominent (Felt et al., 2016). STS is rooted in epistemological—and ultimately methodological—thought, evident in flagship research on the social shaping of the scientific method and its embedded assumptions of objectivity (Harraway, 1988).

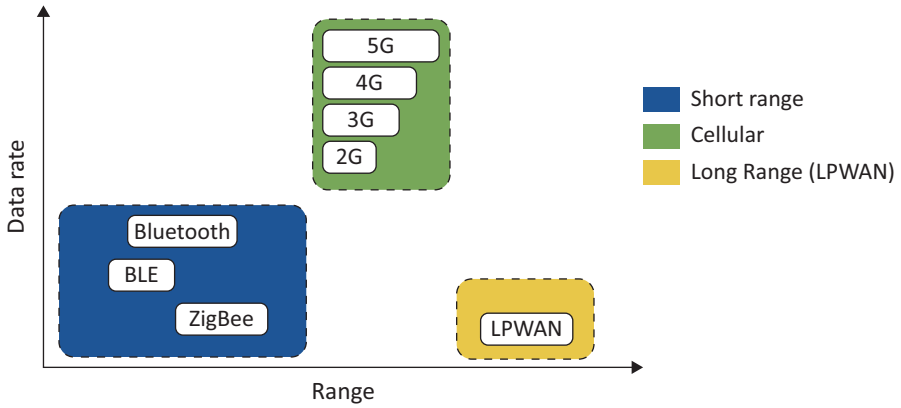

Figure 1. Distinction between different network infrastructures. Source: Hernández (2018).

STS scholarship generally draws on qualitative techniques and a case study approach to facilitate in-depth, specialized engagement with singular technologies and social configurations. Yet it has also attracted criticism for its lack of engagement with methods, including issues of sampling specific to the social study of technologies (Klein & Kleinman, 2002). Recent scholarship has begun to remedy this deficit (e.g., Law, 2016), but more engagement with the methodological considerations of studying technologies across the social and material as well as the digital and physical is needed. We argue that studying emerging mobile infrastructures like LPWAN presents unique methodological challenges to researchers, and we set out to address them by bridging communication and STS approaches.

4. Case Study: Rural Internet of Things and Low-Power Wide-Area Networks

The goal of the project is to build a statewide public IoT network that connects previously unconnected rural spaces to help bridge digital divides. Rural digital divides are often defined as a lack of broadband connectivity (Ali, 2021), but they also include the ways that rural communities can socially, economically, and environmentally benefit from various kinds of networked technologies. Rural computing (Hardy et al., 2019) as well as data feminism (D'Ignazio & Klein, 2020) and sustainable human–computer interaction (DiSalvo et al., 2010) offer frameworks for thinking generatively about network technologies in rural communities. These frameworks feature (a) working with communities to meet their needs and (b) ensuring data networks reflect collective values of environmental and social justice. Rural computing respects and takes seriously the values and landscapes that more agrarian communities embody.

Not all computing needs call for broadband technology. In this project, we are studying LPWAN, a kind of wireless network designed to connect sensors across long distances at low data rates, low power needs, and low cost. Data rates are the speed at which data are transmitted. LPWAN sensors do not transmit data quickly like cellular but can be helpful for monitoring environmental factors like temperature or air quality, which can be tracked over hours, days, and months rather than milliseconds. The material dimension of LPWAN is composed of sensors—battery-operated devices that collect and transmit data on environmental factors such as movement, air quality, and temperature—and gateways—Wi-Fi-enabled intermediary devices that transmit sensing data to data management applications. LPWAN connectivity between sensors and gateways allows sensors to be placed in remote or hard-to-reach locations with limited internet access or electrical power while still transmitting and storing sensing data.

As mobile infrastructures continue to grow and change, we set out to help researchers studying them anticipate the obstacles they may encounter, navigate logistical and ethical research challenges, and build trustworthy qualitative inquiry. Ultimately, we reframe the major challenges of studying IoT deployments and mobile infrastructures more broadly as opportunities to enhance the reflexivity and participatory character of our work while also attending to the physical, digital, and social components of developing networks.

We draw on this LPWAN case study to illustrate the methodological challenges and opportunities of studying emerging mobile infrastructures for several reasons. Firstly, LPWAN has been marketed as one of the key wireless networks for building massive IoT applications, such as fleet management, environmental monitoring, and smart metering, as well as far smaller IoT applications, such as food cabinet monitoring or animal observation, in locations with limited cellular connectivity (e.g., basements and rural areas) and large spaces (Lundqvist et al., 2019). IoT applications, therefore, require a large number of connected devices that can transmit and communicate data signals across long distances at a low cost. Yet both LPWAN and the IoT applications it supports are emerging infrastructural technologies with potential for success and failure, a process which is also accompanied by emergent social norms and practices. Secondly and relatedly, the scalability, flexibility, and cost-effectiveness of LPWAN also allowed our research team and community members to build the infrastructures based on local needs. Thirdly, because of the social and commercial potentials of LPWAN and, more broadly, IoT, these infrastructures constitute complex assemblages of artifacts (e.g., sensors and gateways), physical sites where sensors and gateways are situated, human actors (e.g., developers and users), and organizations (e.g., industry organizations and local governments). Theoretically, these kinds of sensing networks are valuable sites for exploring how infrastructures bridge the gaps between online and offline networks.

Our research on LPWAN is triangulated across multiple modes of data collection. Over the course of 13 months starting in April 2021, we conducted nine interviews with current LPWAN experts, users, and researchers for in-depth insights into LPWAN design and usage; participant observation at five international industry conferences and local community meetings hosted by The Things Network (TTN), an international collaborative open-source network for LPWAN network development; and three participatory workshops with 18 IoT researchers and potential stakeholders within their local communities to examine how users familiar and unfamiliar with LPWAN imagined the technology. Participants in the community workshops included IoT designers and developers, local government officials, business owners, educators, and community advocates centering around topics of agriculture and municipal development.

We drew inspiration from Hardy et al. (2019), who argue for the importance of designing *from* rural communities rather than *for* rural communities, as the communities themselves know better than academic researchers

about their local needs, values, and goals. Moreover, we drew on values-in-design work (Flanagan et al., 2008; Wong & Mulligan, 2019) to bring conversations of privacy and surveillance into the community-based discussions of the early network design process to actively avoid personal privacy issues that often arise with sensor networks (Andrejevic & Burdon, 2015; Bunz & Meikle, 2018). Through these methods, we gain insights into the social construction of IoT as a communication infrastructure and observe frictions in its development. Furthermore, we experience frictions within our own work and positionalities as communication researchers in IoT spaces. These methodological challenges furnish insights into the distinctive nature of studying emerging network infrastructures that connect online and offline spaces.

5. Methodological Challenges and Opportunities of Studying Emerging Internet of Things Infrastructures

Through this case study of LPWAN, we have uncovered three key methodological challenges that shape research on emerging mobile infrastructures between offline and online environments. Considerations include navigating structural knowledge gaps between participants, sampling within a shifting technological landscape, and incorporating situated community perspectives into the research process. Ultimately, we understand each of these challenges as furnishing distinct opportunities to bridge imagined and tangible divides between the digital and physical components of mobile infrastructures.

5.1. Transcending Infrastructural Invisibility and Abstraction

At this stage in its development, IoT can be difficult to understand or even imagine, a characteristic that emerges partially by design. Yet this abstraction presents logistical and ethical research challenges in studying IoT sensing networks like LPWAN. The visibility of LPWAN to its users is constrained across multiple levels. On a functional level, LPWAN is an infrastructure, which, according to Star (1999, p. 380), makes it "by definition invisible, part of the background for other kinds of work." Rather, infrastructural systems become visible to their users only when they malfunction in ways that interfere with everyday tasks (Finn, 2018; Frith, 2019; Star, 1999). Even on a technical level, LPWAN sensors are intended as undetectable features of an object or landscape due to their small size, mobility, and replicability. Finally, on a developmental level, LPWAN is also a relatively new and emerging technology. It is not widely known outside of specialist niches, and it requires programming knowledge for installation and upkeep. Recent IoT deployments for personal and domestic use have taken various forms, such as smartwatches or smart assistants. However, municipal and industrial LPWAN applications remain largely abstruse.

Therefore, LPWAN stakeholders and users navigate a complex boundary between technological visibility and invisibility that complicates interview and observational dynamics. While stakeholders set out to build a "seamless" sensing network to facilitate everyday tasks, they must also make LPWAN more visible to spark awareness and adoption among companies, municipalities, educators, and hobbyists. A key aspect of transcending the invisibility and abstraction of LPWAN infrastructure to potential users and communities are "use cases" or examples of how the system works. LPWAN's potentialities are far-reaching but also difficult to perceive and access. "Use cases" vary widely, from tracking livestock in mountainous terrains to monitoring energy consumption in apartment buildings, from sensing trashcan capacity in urban areas to sensing air quality in community gardens. These things could be accomplished with other technologies, but the distinct benefits of LPWAN are largely derived from cost efficiency, as LPWAN gateways are much cheaper than cellular connectivity and battery-operated sensors enable remote accessibility. In our fieldwork, "use cases" were seen extensively in industry conferences and explained by LPWAN advocates. Use cases were not exclusively adopted by technology companies for selling the technology (Sadowski & Bendor, 2019); instead, LPWAN advocates and hobbyists could also articulate desirable futures. For example, while corporate actors at industry conferences discussed the general applications of LPWAN (e.g., "smart utilities" and "smart buildings") and their market potential, local users might consider how LPWAN gateways and sensors could be customized for their home or business use. As such, LPWAN depends on its local users and developers to determine how the sensing network should be deployed based on their own needs and capabilities. Therefore "use cases" both uniquely tie LPWAN to the specific local context (e.g., fields vs. urban streets) while also demonstrating different kinds of sensory data (e.g., location, environmental factors, energy use). Thus "use cases" become illustrative mental models of how data connects online and offline space while also concretizing infrastructural abstraction.

As researchers, we contribute to the de-obfuscation of LPWAN within the data collection process. However, playing the role of technological intermediary imbues our work with added obstacles and responsibilities. When observing and interviewing stakeholders or previous users of LPWAN, we assume the role of student or learner (Lofland et al., 2006). LPWAN's abstraction can make it difficult for researchers to understand, just as it presents complications to users. In turn, teaching us, as researchers, about the "seemingly obvious" features of LPWAN becomes both a generative source of data about the interpretative flexibility of these technologies and a communicative hindrance at times, as we do not want LPWAN-fluent interviewees to believe that we are wasting their time with technological basics. Our project also involves interviewing and facilitating

discussions with potential LPWAN users who have not yet adopted the technology to help identify potential localized "use cases" for LPWAN in their communities. In these situations, we become the arbiters of knowledge to make sensing technologies visible to our participants. Our role within this emerging mobile infrastructure compounds questions about the logistics and ethics of studying technological development. We as researchers are often involved in the making of infrastructures with different forms and degrees of engagement, even though we may not work directly with tech companies and designers (Vertesi et al., 2016). Due to the epistemic authority of academia, our presence and data collection can indeed be a form of intervention. For instance, the ways that we described the potential utility of LPWAN and codified what counts as value in a given locality could shape how participants, particularly those with limited knowledge about LPWAN, would perceive the technology.

Because LPWAN infrastructures are emerging and largely invisible, it can be tempting to answer these methodological questions by focusing solely on discourses and imaginaries surrounding the technology (Parks, 2015). Instead, we problematize LPWAN's invisibility by centering its materiality (Lievrouw, 2014). The value of LPWAN is determined through its material characteristics: the placement, sensitivity, and connectivity of sensors. If LPWAN is not always visible, then it is concrete and interactive. In line with other materially-driven methodologies (e.g., Abildgaard, 2018), we consider materiality as a methodological resource and opportunity for studying emerging mobile infrastructures by making technological knowledge tangible. We employ materiality methodologically by identifying the locales and physical contexts in which both LPWAN sensors and gateways are situated. The specific locations of the network infrastructure can convey the goals of the specific network, for example, on a school campus, within an apartment building, or on public buses. Are sensors widely distributed outdoors across acres of agricultural fields or along waterfronts to help monitor flooding? Are they densely deployed within a tall building to improve energy efficiencies in apartments and businesses? How does the deployment of the network impact the "quality" of the data created through the network? By focusing on the materiality of the sensing network, we examine the mundane decisions that developers and users make to dramatically impact the kinds of data collected and shared. Identifying and describing the material deployment of LPWAN makes visible the kinds of data that mobile infrastructures often hide.

We also worked to de-obfuscate IoT through workshop discussions. In addition to studying how LPWAN has been deployed elsewhere, the aim of our project's participatory workshops was to develop and brainstorm potential future use cases with community members. To do this, we had to first explain what LPWAN was and give a few examples of sensor networks. This occurred to varying degrees both during recruitment as well as in the workshop itself. The choice of "use cases" to share with communities was challenging. While we wanted to inform participants about common kinds of sensors available and envision how they could be used, we did not want to overly determine the uses of such LPWAN implementations. Therefore, we spent the majority of our time explaining how the sensors and gateways connect (see Figure 2) and then gave a variety of different examples which showcased different kinds of sensors based on recent university student projects rather than large-scale municipal LPWAN deployments (see Figure 3). The goal was to demonstrate a breadth of LPWAN examples to generate creative thinking for potential local use cases.

5.2. Managing Boundaries Amid Technological Change

Beyond visibility, LPWAN's status as an emerging technology also positions it as a technology in flux. Although technological change is always a non-linear, multidirectional process (Bijker et al., 1987), emerging technologies—and the institutions behind them—are particularly subject to social and structural transformations (Rotolo et al., 2015). These changes are also in constant dialog with material and physical shifts in the

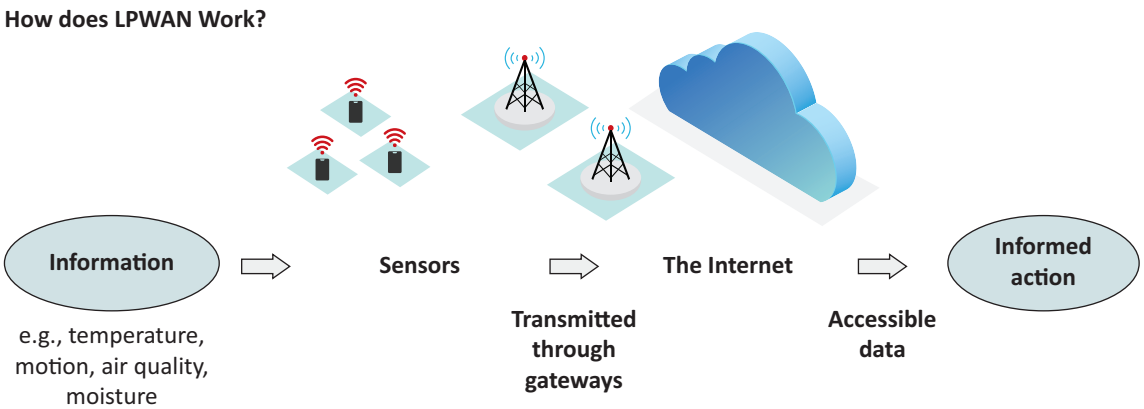

Figure 2. Description of LPWAN network from community workshops.

Figure 3. Slide of example "use cases" from community workshops.

LPWAN landscape that shape network functionalities. For example, different kinds of sensors are emerging to work with LPWAN gateways. Companies and organizations are trying to develop and extend their own LPWAN networks beyond just TTN, such as Helium, which runs blockchain incentives and pays people to host gateways in their homes. LPWAN is subject to external political factors like the Covid-19 pandemic or supply chain disruptions. Within TTN, the network coverage and subsequent usability of LPWAN connections regularly grows and shrinks in networks structured largely by user needs and behaviors rather than a centralized provider. In other words, because users volunteer to install and maintain their own gateways, the shape of network connectivity is subject to change. It is also subject to the policies and knowledge of existing institutions and leaders. For example, we interviewed a middle school teacher who deployed a TTN-based neighborhood air quality sensing network alongside his students. He recounted the bureaucratic obstacles of building an IoT network, saying:

> Our [school] tech department doesn't even know what this is, so we can't get past our [school] network security with it. We have to run it off of a hotspot….That's a challenge. We tell our principal or science supervisors, and they don't know what we're talking about, which is good and bad because we can just do it.

As a result of these factors, it can be difficult to define and maintain the boundaries of constantly shifting technologies, mobilities, policies, and priorities. In our role as researchers, these shifting physical, digital, and social boundaries present challenges to systematic sampling of cases and participants.

Sampling is a key focus of methodological scholarship on qualitative inquiry (Lofland et al., 2006) and anticipating change in both the communities of interest and the research project itself is often a part of that process. However, studying an emerging technological infrastructure requires researchers to infer the scope of potential cases and investment of potential participants to make multilevel sampling decisions. We have used several strategies to define cases for analysis within the existing structure of LPWAN deployments. We initially selected TTN as an entry point of analysis because of its decentralized, non-hierarchal organizational structure, which also made it particularly accessible to our research team. While sampling on the organizational level creates natural case boundaries, these organizations are especially vulnerable to change and even failure that can destabilize the distinctions between cases and their individual significance. For example, we observed as TTN and many of its partner organizations attempted to incorporate Covid-19 contact tracing technologies as a potential use case and then slowly removed them as bigger tech companies saturated the contact tracing market. Centering organizations may also cause researchers to overemphasize some users and "master narratives" (e.g., powerful stakeholders and ideas) over others, a criticism that has been leveled at STS research (Klein & Kleinman, 2002; Star, 1999).

We sought to extend our initial sampling strategy by prioritizing offline spatial dynamics. We have built more specified samples based on municipalities—key geographic locations where LPWAN and TTN adoption are expanding. Due to the importance of LPWAN's physical structures that allow sensors and gateways to communicate with one another in offline spaces, geographic sampling enables us to adjust our research to the material characteristics of the local network infrastructure

and the needs of localized participants within this network. It also means that participants may have less specific knowledge of LPWAN than the broad swath of already experienced and invested stakeholders that organizations provide. Therefore, sampling participants across organizations and municipalities requires us as researchers to define the relative investment of potential informants in LPWAN. We found ourselves asking questions such as: Which activities constitute usage or potential usage of LPWAN or TTN? What is the minimum amount of LPWAN knowledge required for an interview? How might and should our study and interview experience shape user investment in and perception of LPWAN and TTN? These sorts of operational questions are important to any study, but their urgency intensifies in researching a rapidly changing and unstable technology. Managing boundaries that determine what or who is truly relevant to the study of an emerging mobile infrastructure requires in-depth investigation beyond a singular organization, locality, or apparatus. The goal here was to leverage the multiplicity of infrastructure to consider how LPWAN brings together assemblages of people, organizations, and artifacts.

While we navigate these challenges of boundary management and sampling primarily through sustained engagement with our technologies and communities of interest, we also view them as opportunities to engage with the structural dynamics of LPWAN across its online and offline environments (Klein & Kleinman, 2002). Within our community-based work, we sought out three different sectors within communities: local municipal leaders, small businesses, and non-profits. The aim of our research is to make contributions that can stand the test of technological change, extending beyond LPWAN in its current form to provide insight into wider social dynamics of technological, and specifically mobile and infrastructural, development. In doing so, we set out to examine the people (e.g., municipal leaders, designers, social justice advocates, and data subjects), artifacts (e.g., sensors, gateways), and environments (e.g., physical, technical) that facilitate LPWAN deployment.

5.3. Negotiating Competing Technospatial Imaginaries

A key precept of constructionist theories of technological change is that people in different social positions will have correspondingly different visions of the same technologies (MacKenzie & Wajcman, 1999). The differences between these visions generate insights into the social norms and tensions surrounding technological development. In studying the social construction of a sensing technology like LPWAN, however, the locus of interpretative differences is uniquely positioned between the physical and digital. In other words, physical and spatial considerations are at the center of LPWAN deployment and usage, including questions of how and where sensors and gateways should take up space. These are not just logistical and technological considerations; instead, different social groups may have distinct norms and expectations about how they experience LPWAN (Strengers et al., 2019). Whereas municipal leaders might imagine an LPWAN infrastructure layered over their existing city infrastructure to collect air quality data, for example, they also must store the data digitally and manage the installation and upkeep of sensors situated in space. Municipal residents might focus on their homes and communities, viewing smart cities as intrusive and risky. While the data can inform municipal and personal decision-making across both of them, the different scales and goals of these groups can present obstacles to communication and collaboration surrounding shared spaces and technological change.

In our research practice, we actively consider how competing technospatial visions of LPWAN differ and coincide. However, we also examine how they might be reconciled in scholarship and practice. We aim to make socially situated visions of LPWAN legible both to ourselves as researchers and to the social actors involved. Namely, we consider how individuals and groups in different social positions can communicate across their imagined spatial logics to better define the ethical and logistical implications of sensing networks from a community perspective. We present this as a methodological challenge because it involves constructing situations wherein people with distinct perspectives on LPWAN can articulate their technological visions and reflect on those of others different from themselves. Because of LPWAN's abstraction, communicating across perspectives on technology and space can be difficult. We set out to provide tools to facilitate this communication and furnish insights about LPWAN by putting different perspectives into conversation.

We have reframed this challenge as an opportunity to engage with interactive, participatory methods. For example, we conducted workshops with a diverse team of LPWAN researchers and designers from various areas of expertise (e.g., electrical engineering, public policy, sustainability) alongside our workshops with community leaders and business owners to examine the convergences and divergences in their viewpoints on LPWAN. To design the workshops, we drew from literature on group collaboration and technology (Wilson et al., 2020) to engage in a series of scaled brainstorms centered on answering questions about what a public LPWAN should look like. This involved individual, partnered, and group idea generation activities with people from different backgrounds and knowledge bases. Activities centered on "big questions" for discussion including "What are the key challenges for your community, and how could a network of IoT sensors help to address them?" and "What does a public IoT network look like?" The notes that participants captured and presented during the workshops served as our main source of data. While we uncovered many similarities across participants, a major question illustrates points of divergence: LPWAN for whom and by whom? This question points to different participant

visions of LPWAN users and stewards and, in turn, how sensing networks should be distributed to meet the needs of these potential stakeholders. This question also reflected concerns about LPWAN relating to security and ethical data use, including for those who may be affected by the technology but do not use it themselves. We collected and actively consolidated these visions through the workshops in materials like the ones depicted in Figure 4.

There were multiple competing perspectives on how LPWAN could help the community. Time and again, different ideas surfaced, which, if deployed, would constitute significant privacy infringements (e.g., tracking children to ensure they get enough active play or exercise as part of a community-wide program to promote children's health). While the goals of many of these visions for LPWAN were admirable, as workshop facilitators, we raised concerns about the privacy infringements such projects would raise. Within the workshops, we also witnessed discussion and debate among participants about the costs and benefits of user privacy ramifications for suggested LPWAN applications. Sometimes the concerns were less apparent, such as the idea of offering financial incentives to those households who consume less water or electricity. However, the monitoring of household utilities has been shown to reveal significant personal information (Lisovich & Wicker, 2008), which, if developed through a public project, could be used in unintended ways. Therefore, as researchers, we made the conscious decision to steer projects away from potentially privacy-infringing use cases.

6. Conclusions

Regardless of the future of LPWAN, mobile infrastructures will continue to shape our everyday experiences of online and offline spaces, as well as the continued study of technological development. We outline some of the key methodological challenges that emerged from our study of LPWAN as a mobile infrastructure. LPWAN relies on networked sensors to observe objects and conditions that physically surround them. This can include motion, temperature, air quality, water levels, and a host of other environmental factors. Studying LPWAN as one kind of IoT-based network, we encountered several key frictions in our roles as researchers. These challenges encompass the invisibility and abstraction of infrastructural, materially embedded, and emerging technologies like LPWAN; defining technological futures and individual investment to sample cases and participants; and translating competing visions of technology and space across social groups. In navigating these obstacles, we reframed them as opportunities to center materiality alongside discourse, engage with structural considerations in sampling, and utilize group interviewing and participatory design across divergent technological expertise and conceptions.

We conclude with some considerations for conducting trustworthy research on emerging mobile infrastructures between online and offline spaces, drawing together the challenges and opportunities illustrated above. First and foremost, studying emerging technologies across physical and digital realms requires close attention to the ways that the design and discourses of

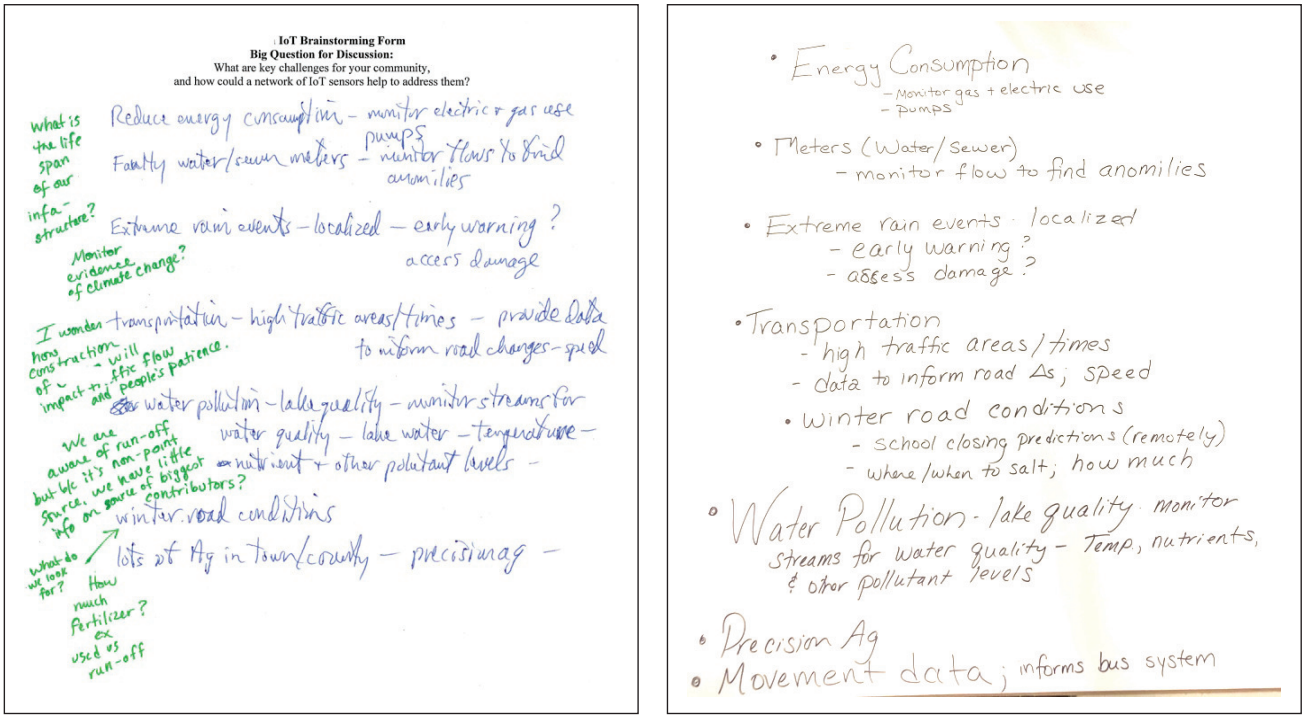

Figure 4. Brainstorming materials from participatory IoT workshops with community leaders: Individual brainstorming sheet with partner feedback (left) and group poster consolidating "use case" ideas produced from it (right).

online and offline spaces mutually shape one another. This includes how emerging technologies become visible, tangible, and legible to potential stakeholders through intertwined processes of material engagement and cultural imagining. In turn, the research process can also reshape and further entangle a technology's physical and digital properties.

Furthermore, establishing and maintaining infrastructures involves many kinds of human and nonhuman actors. Network infrastructures are embedded in local and digital communities with distinct characteristics, and they are shaped by these communities in turn. Following the SCOT approach, a technology opens to plural yet potentially conflicting interpretations, especially before particular meanings come to predominate and stabilize (Pinch & Bijker, 1984). As we illustrated earlier, analyzing the process of infrastructural development in its early stages presented methodological challenges for delimiting the boundaries of what counts as LPWAN and who has the power to speak authoritatively about the technology. Pinpointing the co-production of emerging technical and social orders, Jasanoff (2004, p. 278) argues, "important normative choices get made during the phase of emergence….Once the resulting settlements are normalized (social order) or naturalized (natural order), it becomes difficult to rediscover the contested assumption that were freely in play before stability was effected." As such, the early developmental efforts represent a valuable analytical point of departure for navigating and seeking out a multitude of perspectives on LPWAN across online and offline spaces.

Yet studying a technology as it emerges also involves grappling with the responsibility to make "hidden" physical and digital infrastructures visible as a part of data collection. The effects of infrastructures on local communities can sometimes seem indirect as "ordinary" users experience infrastructures "in the background" and may have little ability to impact their implementation (Star, 1999). Researchers must balance the tradeoffs between involving everyone who might have a vested interest in the network—even if those people are uninformed or unmotivated to understand it—and those with the existing knowledge and power to influence the network. While gaining insight from community members who stand to be affected by a technology can be foundational to design, implementation, and research efforts, the researcher's presence can also impact how technologies will be taken up and understood within communities. Reflexivity about the researcher's role in a field site is always an important consideration in qualitative research (Lindlof & Taylor, 2017; Lofland et al., 2006), but it is especially worthy of attention in this case. It underscores the importance of using community-centered participatory research approaches (Schuler & Namioka, 1993) that directly involve community members in design, data collection, and interpretation of research findings to examine technological uses and effects, but also the values of the research project.

Taking these considerations into account, mobile infrastructures face ongoing issues of sustainability and governance that make their continued study across online and offline spaces especially important. For example, proposed "public" IoT networks could offer broad-based coverage, but they also raise questions of stewardship, funding, data ownership, and security for municipalities, businesses, schools, and individuals, particularly in rural areas. In a mobile ecosystem currently composed of mostly privatized commercial networks, new infrastructural configurations present new avenues for research. Across these different configurations, however, shared methodological models and standards can help to reframe challenging research dilemmas into generative directions for studying technological development.

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Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Chelsea P. Butkowski (PhD, Cornell University) is a post-doctoral research fellow at the Center on Digital Culture and Society within the Annenberg School for Communication, University of Pennsylvania. She studies how people use digital media technologies to make sense of their identities and environments. Her recent research investigates the everyday politics of mediated self-making, visual media representation and marginality, and the design and discourses of participatory technologies.

Ngai Keung Chan (PhD, Cornell University) is an assistant professor in the School of Journalism and Communication at the Chinese University of Hong Kong. His research interests include critical data studies, the gig economy, platform governance, and digital labor. His current research project examines how precarious workers encounter, interpret, and manage algorithmic technologies as part of their daily work practices.

Lee Humphreys (PhD, University of Pennsylvania) is professor and chair of the Department of Communication at Cornell University. She studies how people integrate communication technologies into their everyday lives. She has published extensively on mobile and social media, exploring questions of identity, time, space, and privacy. She is also founding director of the Cornell's Qualitative and Interpretive Research Institute.

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