

Digital Liminalities: Understanding Isolated Communities on the Edge

Rikke Bjerg Jensen
ISG, Royal Holloway
University of London
Egham, TW20 0EX, UK
rikke.jensen@rhul.ac.uk

Lizzie Coles-Kemp
ISG, Royal Holloway
University of London
Egham, TW20 0EX, UK
lizzie.coles-kemp@rhul.ac.uk

Nicola Wendt
ISG, Royal Holloway
University of London
Egham, TW20 0EX, UK
nicola.wendt@rhul.ac.uk

Makayla Lewis
University of the Arts London
London, N1C 4AA, UK
makayla.lewis@arts.ac.uk

ABSTRACT

This paper brings together three distinct case studies to explore how social isolation and notions of liminality shape ontological security within communities on “the edge” of society. Each case study exemplifies the differing nature of liminality in everyday contexts and the extent to which increased digitalisation perturbs it in multiple ways. Taking an ethnographic approach, the research engaged with seafarers onboard container ships in European waters, communities in Greenland and welfare claimants in the North East of England. It posits that technological innovation must attend to the routinisation of everyday life through which people establish ontological security if such innovation is to be supportive. The paper thus moves beyond existing HCI scholarship by foregrounding the contextual and relational aspects of social isolation rather than the technological. It does so by advocating a ground-up design process that considers ontological security in relation to notions of liminality among communities on the edge.

Author Keywords

Isolation; Communities; Liminality; Ontological Security; Design Principles; Ethnography

CCS Concepts

•**Security and privacy** → *Social aspects of security and privacy*; •**Human-centered computing** → *User studies*;

INTRODUCTION

The notion of social isolation has received growing attention from HCI researchers in recent years, focusing in particular on how digital technologies can alleviate negative effects of

social isolation, e.g. [4, 23, 46, 47]. In these studies, isolation is often related to involuntary social exclusion [52] and as something that can be mitigated by technological innovation, such as designing digital platforms that connect the individual to a wider social network, e.g. [4, 24]. For example, Baecker et al. [4] designed a prototype, *InTouch*, to reduce social isolation of people living with loneliness. At the same time, a more critical body of HCI scholarship is emerging which explores why people choose not to engage with technologies designed to help reduce social isolation, e.g. [78]. Recent HCI research has also shown that the design of many sociotechnical systems deployed in isolated communities is based on user experiences from technologically high-developed contexts [8, 50]. Similarly, research into the use of technology to reduce the effects of social isolation is often developed in places with established digital infrastructures, e.g. [4, 46].

In this paper we move beyond a specific technological focus and encourage the HCI community to be more attentive to the nature of social isolation and the spaces in which it occurs. In our case studies, these are liminal – “betwixt and between” – spaces where, in some ways, people are not integrated into social practices and patterns. The security – or lack thereof – that people feel in these transitional spaces is strongly driven by an internal sense of insecurity. An individual’s ontological security refers to the sense of each being secure in the other (see e.g. [48]), and is founded on basic trust within relationships [35]. Digital design can strengthen the internal sense of security but can also engender a profound sense of insecurity. This is evident from our three case studies on “the edge” of society, which highlight the differing characteristics of liminality and how increased digitalisation challenges everyday routines that help to build and maintain an individual’s ontological security.

Through ethnographic fieldwork with seafaring communities onboard two container ships in European waters, communities in Nuuk in Greenland and welfare claimants in the North East of England, the case studies underpinning this paper highlight the relationship between liminality and ontological security

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

CHI’20, April 25–30, 2020, Honolulu, HI, USA

© 2020 Copyright held by the owner/author(s).

ACM ISBN 978-1-4503-6708-0/20/04.

DOI: <https://doi.org/10.1145/3313831.3376137>

and how the digitalisation of relations and services shapes this connection. The diversion away from a predominantly technological focus should be found in our conceptualisation of the edge as a mental construct as much as a physical space, thus, bringing it into direct conversation with notions of liminality, e.g. [11, 72, 74]. It also differs from Davis et al.'s [22] (see also Hespanhol et al. [41]) notion of the “digital fringe” by not foregrounding digital technology as the means through which to break isolation. The edge is not necessarily defined by technological isolation but by a series of interwoven social, spatial, economic, political and technological or infrastructural isolating factors.

Tying together these conceptual points, the paper asks: how does ontological security respond to different types of liminality within socially and physically isolated communities? And how might we design for them? In so doing, it specifically contributes to HCI in the following ways:

- **Case studies:** we bring three geographically, socially and culturally diverse communities into conversation, providing plurality of voices and experiences of liminality and social isolation; relating them to ontological security and technological innovation.
- **HCI and ontological security:** our communities show how social isolation and ontological insecurity are often closely related in the everyday context; amplified through the liminality of their existence and increased digitalisation, whilst managed through routines.
- **Design approaches:** we suggest a design approach that attends to experiences of being “in transition” and “between”; thus, enabling digital design to be attentive to liminality and its relation to ontological security.

RELATED WORK

We draw on three overarching bodies of literature to underpin the research findings that emerged from ethnographic fieldwork. In particular, this literature helps tie together the multiple characteristics of social isolation that materialised in the three case studies. First, we situate the work within HCI scholarship on the relationship between digital technology and social isolation in a broad sense. We do so by bringing this into conversation with notions of digital and physical remoteness. Second, we speak to the notion of liminality in HCI scholarship and more broadly, thus, bringing to the fore “between” and “transitional” spaces and states of being. Third, we employ a wider interpretation of security that links technological security with an individual’s ontological security through everyday practices.

Social Isolation and HCI

HCI scholarship has discussed notions of isolation from multiple perspectives. However, this is generally related to involuntary social exclusion [52], stemming from “issues of accessibility, functionality and control” [29, p.323]. This form of social isolation is also explored as a lack of both quantity and quality of social contacts [4, 9]. The phenomenon is mainly ascribed to marginalised groups, who are perhaps more prone to encounter structural hurdles to social interaction and integration in their daily lives, for example older people [4]

and people separated from family overseas [64], people living with disability [42] or long-term illness [24], as well as people in remote geographical areas [57]. Various groups have been looked at as case studies in HCI research on social isolation [4, 23, 47], whilst a significant number of studies has focused on social isolation among older people [3, 4, 13, 32, 56]. In particular, digital solutions have emerged as ways of restoring a sense of freedom, independence and varied communication options among socially isolated older people, e.g. [4, 29, 46].

Remoteness

HCI researchers exploring social isolation often highlight a digital divide as well as a rural-urban divide. This is emphasised by Bidwell: “Inhabitants of rural places often encounter a disjuncture between technology and their lived experience that reflects incompatibilities between concepts about communication produced in urban places and rural life” [7, p.145] (see also [8]). Social isolation in these contexts is thus closely tied to geopolitical, cultural and economic contexts. Indeed, Parmiggiani and Katuska [55] explored the role of relevant infrastructures in understanding the dynamics that shape inclusive and exclusive sociotechnical solutions. Scholars exploring the disabling effect of weak (digital) infrastructures have mainly looked at communities in remote or low-income areas [61, 77] as well as mobile communities [75]. For example, Salemin et al. [61] highlight how limited online access leads to a lack of digital skills once connectivity is secured.

A growing body of work within HCI4D and ICT4D has focused on various marginalised communities and their use of digital technologies for inclusivity, e.g. [21, 44, 69]. The wide use of mobile devices to access digital services has been documented in many remote areas, such as Northern Canada and parts of Africa [50, 69, 76]. The use of mobile devices to digitally connect usually serves to support physical or digital mobility and social inclusion [58]. Research on mobile phone use in remote areas or within marginalised communities has shown how the mobile phone is central in extending and securing access to social networks [14, 18]. Scholars have explored ways of designing for what Davis et al. [22] call “the digital fringe” (see also [41]). The “fringe” in this context refers to communities with limited access to resources and digital technology as well as people who are socially excluded or marginalised and, thus, vulnerable to digital under-participation [22].

Critical Perspectives

HCI scholarship has offered some critical perspectives on technologies designed to connect people by looking at cases where individuals choose not to engage with such social technologies. Waycott et al. [78] developed a contextual framework composed of social, personal and technological aspects that influenced people’s decisions not to use digital technology to alleviate social interaction, showing that some people were happy to disconnect from society. For some, the medium of connection was contested or fraught with potential difficulties, whilst for others, the sociocultural knowledge needed to engage with technologies designed to support inclusion was missing. Social isolation can be a voluntary step towards removing oneself from the intensity of everyday interactions. Drolet et al. [25] explored how technologies can be used to help peo-

ple take a step back and focus on their own internal dialogue and introspection. More broadly, social isolation can result from political and economic forms of exclusion. Moutafidou and Bratitsis [52] showed how societal developments, such as globalisation, have created a number of vulnerable populations with limited access to equal rights and opportunities. This form of discrimination, and social exclusion, can occur on various grounds, ranging from gender, ethnicity and age to socio-economic status. Focusing mostly on the loss of agency and less on the material aspects of marginalisation, Moutafidou and Bratitsis suggest approaching the issue through digital storytelling; creating digitally mediated personal narratives to serve as a tool to enable affected individuals to “find and strengthen their voices in order to empower their social, economical and political inclusion” [52, p.224].

Liminality and HCI

The second body of work that helps us ground and connect the case studies relates to liminality; what Turner [73] called “betwixt and between” spaces and processes of transitioning. As recent HCI work has shown, social isolation can be found among individuals who are in transition for a number of different reasons; from healthy to ill [23], from citizen to refugee [18], from employment to unemployment or from one job to another [47]. These transitions can have strong effects on the individual’s social networks and societal status and may therefore directly impact upon an individual’s social isolation and ontological security. In particular, the experience of transitioning has been shown to have disruptive effects on everyday routines. This is exemplified by Long et al. [47] in their study of the link between social isolation and the transitioning into a new professional role for informal care workers.

Building on van Gennep’s liminality framework [74], which centres on three phases of transition (separation, margin, aggregation), HCI scholars have considered the impact of digital technologies on such life transitions. For example, Haimson [38, 39] used van Gennep’s notion of liminality to develop the concept of “social transition machinery”. This exemplifies how different social media platforms and networks often remain separate, yet work together to facilitate life transitions. As highlighted by Haimson et al. [40], van Gennep’s liminality framework has also been used in the context of veterans reintegrating into civilian society. Here, Semaan et al. [66] found that veterans were drawing on a range of social and mobile media to re-establish their identity in a civilian, non-military context. The phases of transition marked out in van Gennep’s liminality framework, and expanded upon by Turner [72, 73] and Bridges [11], also show the importance of considering feelings of insecurity when designing for “digital liminalities”.

Security through Routines

Social isolation can have both supportive and detrimental effects on people’s sense of security, whilst shaping everyday routines that help build and maintain ontological security. Roe, a security theorist, argues [59] that theories of security can focus on the protection of, for example, people and states from harm, but it can also be used to refer to a state of emancipation by living free from fear. Roe describes how security can be both an action and a feeling or a sense. This sense of

security is termed ontological security and can be described as an internal security dialogue within the individual. Croft and Vaughan-Williams [20, p.4] citing Croft [19] describe ontological security as: “the key elements of an ontological security framework are a biographical continuity, a cocoon of trust relations, self-integrity and dread, all of which apply at the level of the individual, and all of which are constructed intersubjectively.” Social isolation affects these elements but, as the literature above shows, in different ways depending on both the causes of and the responses to social isolation.

Moreover, Roe [59] notes how the process of routinisation is an important mechanism for keeping ontological insecurity at bay. From this perspectives, routines are important for maintaining a sense of safety and security [34, 59] because they create feelings of continuity that connect individuals both to the environment in which they are operating but also to the relationships that they have within that environment. Routines are therefore closely tied to place-based activities [10] and are embodied in routine movements, interactions and journeying which often take the shape of loops that locate people within a particular place. As noted by Coles-Kemp and Hansen [17] security through everyday practices includes the rhythms of engaging with and through technology. However, it is not only the connections but the quality and the nature of the relationships developed and maintained through those connections that nurture ontological security.

CASE STUDIES

The three case studies underpinning this paper centre on spaces of liminality as experienced by socially isolated communities on the edge; where increased, and sometimes uneven, digitalisation disrupts everyday routines that help maintain a sense of security. The case studies demonstrate that the efforts undertaken by the individual to re-establish routines are both extensive and varied and are focused on negotiating the social tensions that emerge in the intersection between connectedness and isolation. These tensions, partially introduced by digital technology, are, however, not monolithic across the case studies. As such, the diversity of the case studies ensures that the differing nature of liminality is foregrounded, driven by the felt experiences of transitioning between different forms of connectedness and at multiple scales. This presents ambiguity in each case study. For the seafarers this is evident in the pressures related to being digitally, often unevenly, connected with home, whilst physically isolated (being physically absent whilst emotionally present). For Greenlanders, increased digitalisation of services and infrastructures is ambiguous as it may be associated with post-colonial power imbalances. For welfare claimants, ambiguity is most deeply felt in the sense that being “connected” does not offer a route out of social isolation. Hence, whilst the three case studies contribute nuanced understandings of liminal spaces – and move beyond a one-dimensional representation of social isolation – they all show, albeit differently, how the routinisation of tasks and practices interwoven in liminal spaces are responses to unwanted social isolation. They are established to improve an individual’s ontological security. We argue that this needs to be considered when designing for socially isolated communities on the edge(s) of society.

Case Study One: Seafaring Communities

Seafarers live and work for months at a time in small, yet, diverse and international crews and have little contact with life at home. This case study engages with such constrained and liminal aspects of life at sea, to understand how they shape feelings of security and the social tensions that arise when routines are disrupted. While existing research relating to social isolation on ships has predominantly focused on the mental well-being of seafarers [1, 63, 68] and the role of social isolation in suicide among crew [49, 71], industry surveys have shown the significance of onboard internet connectivity [30, 43] for seafarers who often rely on online access to connect with people at home. Online access is, however, limited and fragmented. Whilst most seafarers have some online access, this is often restricted in terms of data allowance, accessible content and types of connectivity, e.g. no streaming, no video calls and no downloads [43]. Existing survey data highlight that seafarers rely on available connectivity for communication beyond the confinements of the ship [70].

For the seafarers in this case study, notions of social isolation on the one hand and liminality on the other, were linked to fragmented onboard connectivity. Ontological security was established through routines, often through regular contact with family members and work shifts, that aimed to minimise the impact of social isolation and being disconnected.

Study Design and Data Analysis

Ethnographic in nature, this case study was designed to engage with seafarers where they live and work; onboard ships. This is in line with previous ethnographic work with seafaring communities; e.g. [5] provided an ethnographic account of life onboard merchant ships, [62] explored transnationalism on ships through onboard fieldwork, whilst [81] focused on cruise ships, and [31] reflected on gender and positionality in engaging with seafaring families. The present study engaged 43 seafarers onboard two container ships, one with onboard Wi-Fi facilities and one without (see Table 1). The ships had spacious living accommodation, recreational and socialising spaces and entertainment facilities, including pre-recorded local news media, television series and movies.

	Ship 1	Ship 2
Location	European waters	European waters
Timings	14-30 Mar 2018	2-16 May 2018
Participants	22 (8 officers, 14 crew)	21 (8 officers, 13 crew)
Gender	Male	Male
Age	23-57	21-59
Nationality	Filipino, Ethiopian, Indian, Sri Lankan, Ukrainian	Filipino, Chinese Indian, Sri Lankan, Ukrainian
Language	English	English

Table 1. Research design and structure for the seafaring case study.

Access to ships was secured with the assistance of a large shipping company, which enabled one researcher to carry out empirically grounded research during two voyages in European waters. The researcher embarked in London and Rotterdam,

respectively, and disembarked in Piraeus. Both two-week voyages included several port stays in Hamburg, Antwerp and Le Havre, which lasted between 12 and 36 hours. The study adopted an unobtrusive methodology designed to work around routine tasks and schedules. Group discussions and conversations were arranged in non-formal setups (e.g. during meal hours, socialising and between work shifts); the researcher was able to observe and engage with all aspects of work tasks. The research was approved by the research ethics committee at the researcher's institution.

Three forms of data were captured during the research process: (1) written notes from group discussions; (2) researcher observations captured in note form; and (3) images captured by the researcher, see Figure 1. A thematic analysis, inspired by Gillian Rose's analytical approach [60], enabled qualitative interpretations of both visual and textual data. Systematically categorising and interpreting these data in relation to the seafarer context, revealed a series of themes, including mobility, health and safety, stress and fatigue, work pressures, family pressures, food and fitness, rhythms and routines, onboard camaraderie, and loneliness and homesickness. This case study focuses on the routinisation of everyday tasks and pressures related to social isolation, and their intersection with digital technology and ontological security.

Routinising Social Isolation

The analysis of the data revealed how social isolation takes many forms onboard ships and how everyday routines are structured to negotiate social tensions related to fractured connectivity. In response to what makes seafaring different to other work communities, one crew member on Ship 1 noted: "We're kind of 'hidden' from everyone else. We're here, on a ship, relying on each other and technology for most things." The edge, in this case, is thus captured by the sense of being invisible. All participants, except for two deck cadets, were experienced seafarers and had spent most of their lives at sea. They highlighted how feelings of being socially isolated and disconnected from "the rest of the world" made them "crave" other forms of connectedness. Social isolation was seen to be amplified by recent changes to seafaring, including: less time in ports and limited shore leave, increased automation and ship monitoring, reliance on technology rather than on people power, reduced speed, stricter socialising and alcohol consumption policies, and larger ships with smaller crews.

The researcher embarked when each ship arrived at its first European port. Prior to this, both ships had been to several ports in Asia. One crew member on Ship 2, which had no onboard internet, noted: "The voyage from Singapore to Rotterdam is the worst [...] we don't go into port and are completely isolated from the world for three weeks." The crew on Ship 1 also stressed how their 50MB weekly data allowance meant that they had almost no contact with people at home during long sea passages. The priority for everyone on both ships was thus to buy a European SIM card when they reached Europe: "When we arrive in Rotterdam, we're desperate. And if the SIM card seller doesn't show up in port immediately, everyone's sad" (Ship 2).



Figure 1. Seafarers on container ships inhabit liminal spaces, which shape how social isolation is felt and negotiated. Photos: author's own.

In these moments, when connectivity was restored, the seafarers spoke of the relief, pleasure and happiness they felt at being in contact. The movement of the ship, in and out of port at specific times, made this a routinised practice, which enabled them to manage and negotiate their ambiguous existence between being connected, not connected or somewhere in between. One of the younger crew members noted how being able to see his newborn baby, who he had not yet physically met, through FaceTime made him feel *“like I can make it through another week”*. This was seen as critical for the seafarers as they experience closeness and distance in differentiated ways, shaped by their everyday life onboard ships, whilst intimately connected with life at home. *“We might be physically distant but we’re not distant emotionally,”* was noted by one crew member on Ship 1.

This kind of everyday ambiguity was further distorted, and sometimes disrupted, by uneven and unreliable digital connections. On Ship 1, all crew members explained how they would *“budget”* their 50MB weekly data allowance. Whilst some would make their data last by not exceeding 7MB per day, others would save their data to use on one particular day. The primary purpose for connecting was to communicate with family, mainly through WhatsApp and Imo – other services, such as Facebook and Instagram, were seen to *“consume too much data”*. Group discussions revealed how crews rationed their internet usage by using low data consumption apps or by structuring their work and rest routines to connect when the ship was in phone signal range: *“Sometimes you don’t want to go to sleep because there is a chance that you will have a signal”* (Ship 1). This needing to connect every time the opportunity arose often perturbed the routinisation required to establish and maintain a sense of security.

Onboard observations also revealed that the ontological security gained from the routine of managing social isolation by rationing data usage or by trying to predict when the ship would be within phone signal range would often be disrupted by changing sailing schedules: *“You may have planned to message someone or speak to your family when you’re in a certain port on a certain date, but when the schedule then changes, these plans are disrupted and you feel alone”* (Ship 2). Several examples were given where crew members had missed

a child’s birthday or a friend’s anniversary or wedding due to unforeseen delays or changes. Being physically separate from people at home, whilst having to negotiate uneven and sometimes non-existent digital connections, intimately shaped feelings of insecurity.

Pressures of Breaking Isolation

The case study highlighted how the reworking of seafarer lives, increasingly interwoven with fragmented digital connections, created a series of pressures. Financial pressure in particular dominated the data in relation to social isolation. Participants spoke of differentiated salaries between crew members depending on rank and nationality, and how this impacted on their ability to stay connected. For most of the crew, it was not an option to buy SIM cards in every port: *“It’s fine for officers to spend a lot of money on phone cards, but it’s different for ratings.”* They would therefore weigh up the value of spending money on a SIM card in one port over the other. Crews on both ships also noted that they were prime targets for scammers who were selling SIM cards that did not contain either the minutes, speed or data that they were promised. These SIM card sellers were described as *“the Mafia”*: *“in most ports, SIM card sellers come onto the ship to sell their stuff. We call them ‘the Mafia’ because they cannot be trusted but we’re reliant on them for connectivity.”*

Participants’ ability to connect with people at home on a regular basis was understood to ease transition into home life when returning from up to nine months at sea. In this phase of transition, being in frequent contact allowed them to keep up to date with everyday events and activities at home. This sense of being *“in control”* of their lives helped them maintain a sense of routine and strengthen their sense of security. Yet given the uneven digital landscape onboard both ships, crew members spoke of *“being out of sync with home life”*, which also contributed to individual feelings of social isolation.

Case Study Two: Greenlandic Communities

Greenland, an autonomous country within the Kingdom of Denmark, has a total population of around 56,000 who live in around 78 settlements and towns along the country’s Western and parts of its Eastern coastline [37]. Extreme weather conditions and vast geographical distances impede the development of reliable physical and digital infrastructures between and beyond these settlements. This second case study is situated within this particular environment, where liminal spaces and social isolation affect people’s access to essential services, including health care, education and affordable internet access [53]. This case study shows how unequal access to digital connectivity in Greenland evokes feelings of insecurity and misrepresentation, underpinned by questions of cultural identity, isolationism and increasing political and economic independence from its former coloniser, Denmark.

Study Design and Data Analysis

The methodological design for this case study was driven by the co-production of knowledge and shared learning with communities [2]. The equal standing and collaboration of both the researcher and participants was key to the study’s research design [65]. An ethnographic approach was employed, which built on three different qualitative research methods. First,

ethnographic fieldwork was carried out in Nuuk, Greenland, and with Greenlandic communities in Denmark in May-June 2018 and November 2017 respectively. Field observations were documented in a field diary. Second, 37 in-depth, semi-structured interviews were conducted and were, depending on the respective setting, either audio-recorded or documented through note-taking. Third, four focus groups with two to six participants that lasted between one and three hours were organised in four different locations: the university, a participant's home, an office and a civic centre. The design of the focus groups asked participants to engage with one or two of the following participatory mapping options [16]:

- 'The Map': participants were invited to draw their perceived information flows coming in and out of Greenland in the form of a map. They were free to decide on layout and were encouraged to discuss contents and motivations.
- 'The Force Field': participants were asked to write their perceived advantages and disadvantages of using digital technology on post-it notes. They then discussed their notes, sorted them in categories and organised them to indicate the relevance of each category.
- 'The Timeline': participants were asked to describe how their interactions with their online and offline environments had changed over time, identifying and debating what actors and objects had affected these developments.

The research design, which was approved by the research ethics committee at the researcher's institution, aimed to empower individuals to engage in research activities in a way that best suited their communicative needs in order to foster reflection and participation. Participants were mainly recruited with the support of local gatekeepers in Greenland. They were between 18 and 70+ years of age, identified mainly as Greenlandic or had strong bonds with the country. They worked in various sectors, including politicians, artists and shop assistants. All textual and visual data were transcribed, digitised and annotated, before being thematically analysed. Initial themes included: identity, representation, collective security concerns and resilience, regional differences, mobility, privacy and economic opportunities. We focus on identity, representation and resilience as these were the themes interwoven with ontological security and social isolation in the context of digital connectivity.

Fragmented Social Isolation

Internet access in Greenland is both expensive and, in certain parts, unstable [27]. Although Greenland's digital infrastructure has improved in recent years, several breakages of the internet sea-cable, coupled with high costs, especially for mobile data, makes internet access an uncertain and expensive commodity. This creates spaces where unstable digital connectivity is relied upon for everyday routines essential for maintaining a sense of security. Participant maps illustrated how digital connections within and beyond Greenland were uneven and disrupted, leaving participants feeling in a state of "between" connected and not connected to their wider social networks.

Social isolation was in many ways connected to experiences of this fragmented digital landscape and was shaped by routine practices of securing online access. As an example, the fieldwork in Greenland revealed how people structured their lives around access to free Wi-Fi, to avoid having to pay for expensive mobile data. Participants noted how they would plan their day according to anticipated periods of disconnectness, thus, being in a constant transition between digital isolation and digital connectivity. As one participant noted: "*I run home where I have Wi-Fi as people might be waiting for my decision [on a work project].*" The local library, being the only place in Nuuk with free Wi-Fi facilities, therefore became a meeting-point for those seeking connectivity. Even after opening hours, people would linger along the outer walls of the library to access the complimentary Wi-Fi inside. Participants spoke of the frustrations they felt when seemingly everyday routines of accessing information and interacting with people using digital means were hampered due to poor infrastructures and high costs.

Whilst alternative modes of accessing the internet were made possible through e.g. library-provided Wi-Fi in the Greenlandic capital, such options were not available to people living in more rural and remote settlements. The restrictions embedded in the uneven infrastructures across the country therefore also resulted in the exclusion of certain voices in public, digitally facilitated discourses. This was emphasised by a representative from the National Museum in Nuuk, who described how a young visitor from the East coast had not been able to load any visual content from the website due to limited digital connectivity. As a result, the museum adapted the file size of their online visual content: "*[Better internet access] is extremely important because we are the National Museum of Greenland; we are not the national museum of Nuuk – and anybody else who has internet access.*" Greenland itself is thus a fragmented digital space, connected through practices of inclusion and exclusion.

The fieldwork underpinning this case study was conducted in Nuuk, however, most participants also spoke of friends and family members living in remote settlements or of their own experiences of living in or visiting these places. A majority of participants had moved to Denmark or Nuuk from smaller Greenlandic towns or settlements for personal, but mainly professional reasons. Given the high prices for air-transport to the more remote areas of the country, digital means of communication assumed an essential role in the maintenance of family relations and, as a result, in the maintenance of ontological security. Regional differences in digital connectivity, however, rendered these practices often difficult, leading to misunderstandings as well as experiences of frustration and disconnect: "*we can't see how they are doing. We just found out my cousin has a daughter and I did not know it – yes, his girlfriend was pregnant and I did not know that because they don't have internet they don't post a lot. But it has been 10 years since I last visited them.*" This physical and digital disconnection increased participants' sense of being socially isolated, as they relied on knowing that their family and friends were "healthy", "happy" or "working" for their own sense of security. This was also linked to not being able to provide support for family and

friends living in remote areas, which, for many participants meant that they could not contribute to the safety and security of parents or grandparents, for example.

Participants also spoke about how increased connectivity might create deeper insecurities within currently disconnected and isolated communities. This related to two factors: a lack of digital skills and increased social isolation, and, for many, these were intimately connected. As an example, the divergence between specific life-style representations promoted through many digital media and their applicability and feasibility in Greenland was seen as increasing the distance between Greenlandic communities and “the wider world”. A participant from Nuuk was concerned about what would happen if better internet access would make inhabitants of the smallest settlements “see what they don’t have”. Another participant in Nuuk described how they dealt with the divergence between ideas advocated online and his life in Nuuk: “*Travelling is not so easy here but whenever I start to think about it, I remind myself why it is nice to be here in Greenland: I have my career and a great job opportunity here, I feel that I can have an effect on the community. In Europe: life is easy, everything is in reach. If you think of something: you can do it.*” There was a sense of being “secure” in Greenland and the geographic isolation of the country offered a sense of “protection”.



Figure 2. “Free Wi-Fi” – Street-art in Nuuk. High Internet prices affect many Greenlanders in their everyday life. Photo: author’s own.

Social Exclusion and Routinisation

Beyond the everyday context of social isolation and security, isolation has historically been ascribed to Greenland and other Arctic communities because of their geographical inaccessibility as well as (neo-)colonial narratives. Controlling access to information and limiting interactions were essential tools for early colonialists in order to maintain colonial power [54]. This artificially maintained isolation, through the control of information, also determined how life in Greenland was framed and perceived in Europe, geared towards reassuring and romanticising colonial imaginations [45]. The lasting effects of these selective and externally controlled imaginaries of Greenland are found in the continuous stigmatisation of Greenlanders and representations of Greenlandic everyday life as backward-looking [26, 28]. One participant noted: “*the idea of Greenland in Denmark is a very standardised one that was created in the 20s and the 30s, the 40s and the 50s by the people that went on expeditions to collect as much old-fashioned stuff as possible.*” During group discussions,

participants highlighted how feelings of being socially excluded and isolated were directly tied to misrepresentations and post-colonial imaginaries. This also kept them in a liminal state between multiple places, identities and futures. In particular, for participants who had lived outside of Greenland, their identity as Greenlanders was often seen to be a socially isolating factor – in Greenland, this was often amplified through digital media. One participant highlighted: “*We live in the same Kingdom [as the Danes] but they don’t know nothing [sic.] about it [Greenland].*” For them, their ontological security was thus closely tied to routines of negotiating multiple forms of connectedness and ambiguous identities.

Sharing local knowledge and accessing wider information networks without online restrictions was important for many of the participants as a way of shaping and framing their cultural identity, countering imaginaries of social exclusion and isolationism. This was seen as particularly significant in the current phase of transition when Greenland is moving towards increasing political and economic independence from Denmark. One participant described the role of social media for the local identity-formation: “*We talk so much about culture and how to expose Greenlandic culture to the outside world, what message do we want to send. And it is so hard – because we really want to say: ‘This is us! And drum-dance and tupilaks – but it is ours!’ Take these [traditional Inuit] tattoos for an example . . . the digital age had everything to do with this because suddenly people can see what is going on in Canada and what is going on in Alaska and what is going on with Native Americans and they feel such big part of this and we would not hear about it if it wasn’t for social media.*” Despite the perceived reinforcing effect of internet access to notions of self-determination and community, two issues were identified during the data analysis which appeared to foster experiences of social isolation: unequal accessibility across the country as well as the disabling effect of lacking physical infrastructure. Both were seen to reinforce participants’ feelings of “betweenness” and insecurity.

Case Study Three: Welfare Claimants

This case study presents a group of long-term unemployed people in the North East of England who experienced an enforced social isolation as a result of economic and social deprivation. It shows how changes in welfare and the digitalisation of welfare delivery, which intensified their sense of social isolation and drove up their feelings of ontological insecurity, also positioned them in a state of liminality. The digitalisation of welfare is often a contested policy in the UK [15] that follows in the tradition of citizen activation [51]. However, as this case study shows, if the policy is perceived as hostile, digitalised delivery of that policy is perturbing the liminal still further and disrupting everyday routines that make the space feel safe and secure.

For the people in this case study social isolation was primarily created through low income and a low sense of agency to escape the situation. Low income affected all aspects of everyday life which in turn increased feelings of social isolation. Opportunities for meeting people were limited by little money for entertainment; essential activities such as shop-

ping become arduous because limited funds are available for purchasing food and transport to and from the shops and the internet access needed to undertake the digital welfare tasks is limited. These stresses combine with the fear of falling foul of the welfare conditions to increase levels of anxiety and social isolation. Participants showed that they attempted to offset this anxiety through routine activities such as looking after pets and attending a community centre in which they could socialise whilst undertaking welfare tasks. The case study therefore indicates that, for digitalised welfare policies to yield positive outcomes, individuals need to feel connected to and supported by social and community relations.

Study Design and Data Analysis

This case study was designed as an auto-ethnographic diary study to gain deeper insights into the lived experiences of those using digital services to claim welfare. The diary study captured the job-seeking activities and related administration that constituted the main day to day activities. Participants were recruited following an ethnographic study in a community centre in the North East of England that ran dedicated sessions to support job seeking and welfare claiming. Seven people agreed to take part in the diary study and the study was approved under the research institution's research ethics process.

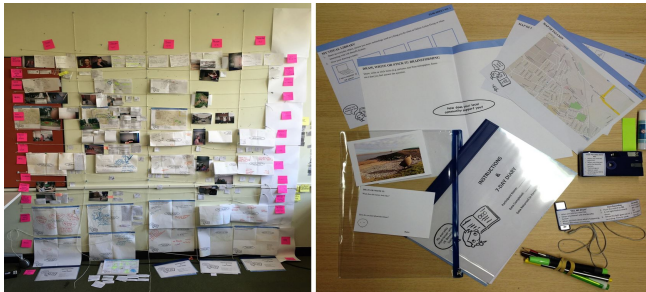


Figure 3. Left: The analysis wall. Right: The diary pack contents.

Inspired by the idea of cultural probes [33], information gathering kits were used to explore and understand the everyday public and hidden routines [80] and emotions of welfare claimants interactions with the UK welfare system, both online and offline. The kit comprised: an audio-recorder, disposable camera (24 photos), blank storyboard template with a prompt that asked participants to visualise their average day, a map of their local area and the UK, two postcards (one that asked each participant what their future looked like and one that asked them to draw a map of their life), a seven-day diary that asked them to draw and describe their daily interactions with the welfare services and with community support centres, and a sheet for articulating the things that made them feel secure and insecure (see Figure 3). The variety in the diary pack allowed participants to choose a preferred form of expression, ensuring they did not feel hampered or self-conscious when expressing themselves [67, 79].

After receiving the completed information gathering kits, the researchers photocopied the paper-based materials, developed the disposable cameras and transcribed the audio-recordings. Furthermore, environmental descriptions were added to the

transcripts, e.g. external or indoor sounds. The data underwent multiple viewings and potential themes were noted, this ensured that the findings presented in this paper were grounded in the empirical data. A process similar to affinity diagramming [6] (see Figure 3) was used to produce the themes in the case study. These included self-reflection, local environment, wider environment, friends and family, animals (pets and wildlife), the community centre, food and drink, technology, interaction with the online or offline welfare system, and safety and daily routines. The data presented a rich understanding of the participants everyday experience with and within the welfare system and it was in this data that references to social isolation and notions of liminality emerged.

Connected and Yet Isolated

The participants reported in some detail the points at which they felt secure and insecure during their everyday lives. As part of this reflection, participants noted in their diaries that they felt isolated within the welfare system itself, partly because of the fear of falling on the wrong side of the welfare rules. The focus on digitalisation as a means of efficiency is reflected in the UK's Welfare Reform Act 2012 [36]. The drive for efficiency limits the options for support: "*They just tell you what to do but give you no help to do it.*" It also results in limited support for using the digitalised services, further engendering a sense of isolation within the welfare system: "*No help to use internet if you have no experience.*" One participant illustrated the effects of the efficiency drive through an article in the SUN newspaper "*Job Centres out of a Job!*" [12] which reported how difficult it was to reduce the numbers of long-term unemployed and only about a third of claimants managed to find work.

Being stuck in a cycle of not being able to find work but receiving no help to break this cycle exacerbates a feeling of social isolation. The data show that social isolation occurs for two main reasons: negative or hostile interactions with the welfare system and the restrictions on opportunities for social interaction resulting from a lack of money.

Interactions with the welfare system formed a major part of their day to day routines and participants were overwhelmingly negative about engaging with the welfare system. Interactions with the welfare services ranged from unhelpful, "*unsympathetic with peoples issues*", to hostile, "*they belittle people and make them uncomfortable*". Benefit sanctions, where welfare is removed for a period of time, were something that was feared as a result of not complying with the benefit rules for arbitrary reasons "*they sanction people's money for silly reasons*". The maps also show how being within the welfare system exacerbated the sense of being socially isolated from society and being unseen and uncared for by the government: "*sanctions are an excuse to save money for the government.*" In this sense, it is an involuntary isolation that is re-enforced by a digitalisation that removes opportunities for positive interaction with the system and which gives rise to a sense of frustration and anger.

The continuous engagement with a welfare system that participants felt was hostile reduced their sense of agency and self-efficacy, and the focus on digitalisation as a means of

efficiency rather than as a means of building and maintaining positive relationships between the individual and the state, exacerbated this isolation. One participant visually represented the Jobcentre Plus (government funded welfare support office) as a brick wall, with the title *“Helping Point”* above the drawing. The sanction regime also led to a loss of agency: *“Do this do that or your money will be stopped.”* The digitalisation is a means of enforcing the sanctions regime as it is used to gather data upon which the sanctions decisions are made. The participants felt no agency to respond to this system, *“just plod on and see what happens”*.

The sanction programme emerged as a vicious circle because being sanctioned further reduced participants’ sense of confidence and agency, whilst also reducing their financial security and limiting or removing what little options they had for meeting people outside the home. It also increased the stresses of unemployment, further reducing the capacity for social interaction and for coping with the additional stresses that occur in everyday life. As a result, this case study shows that welfare claimants can become housebound and cut off from meeting friends and family, whilst the opportunities for making new friendships are reduced.

Routinisation and Breaking the Isolation

The sense of being locked into and isolated within the welfare system created levels of stress and anxiety that could only be broken by routine and interaction with kin and friendship networks. Interaction with the welfare services was stressful, at the behest of the welfare service provider and laced with a sense of stigma and negative judgement, *“prejudged as to what you can do”*. The types of routine that helped were proximal, social routines. For example, all participants reported routine journeys (mainly by foot), routine interactions at the community centre and the completion of routine tasks (such as shopping). The audio-recordings revealed that interaction took place during all these routine activities. These interactions were typically on mundane topics, often with people that were recognised but were only known in passing.

The isolation was also broken by interacting with animals or birds and being outdoors. One participant reported: *“Always feel better after listening to the sea and or feeding the ducks. Only way for me to relax.”* For one participant, dogs as a family pet also provided an opportunity for interaction with other dog walkers and also provided routine through dog walking. The importance of pets was reflected in the number of photographs taken of the dogs that participants owned. When asked what made participants feel safe, close family members and dogs were often the answer. Pets also provided a means of breaking up the isolation of being housebound. This was further broken up by the use of television as a background sound; for example, one participant included with their diary pack an audio-recording of watching and commenting on television programmes for four hours as an example of a typical afternoon activity.

Social activities to break isolation were low cost and routine activities. One participant saw going to Bingo each afternoon as a way to break isolation and also offered the potential to inexpensively, at least temporarily, break from the isola-

tion of being inside the welfare system. For our participants, digital interaction was not the answer for breaking isolation. Accessing the internet was seen as expensive in terms of devices, broadband and network data. A lack of internet access, confidence and digital know-how, resulted in participants going to community centres to find support. Both the social isolation and the isolation within the welfare system were also broken by finding community groups and other parts of civil society able to support interaction. These groups were popular because: *“All [services] available for free with no stigma attached”*. This resulted in increases of confidence and agency: *“New found self confidence.”* Such groups offered more than services. Participants talked about how they offered friendship and routine through regular sessions and tea breaks. This sense of friendship was reflected in the way that community interactions were drawn by participants. Being part of such a group was not simply about being cared for but also about being able to care for others: *“I share my knowledge with others to find jobs to apply for.”*

DISCUSSION

The case studies illuminate distinct experiences of social isolation. They highlight the differing nature of liminality and multiple phases of transitions that shape everyday practices and routines by individuals and communities to establish and maintain security. By bringing these conceptual frames into conversation with the individual case studies, the paper puts forward a series of design interventions that engage with social and technological liminal spaces. The findings illustrate that whilst digital technology is routinely used to connect with wider support networks – be it friends, family or digital services – the fundamental feelings of social isolation remain. Whilst the case studies represent diverse communities, they clearly illustrate that for technology design to be effective, design must take into account the underlying social, economic and political features of everyday life. In designing for socially isolated communities, we encourage the CHI and HCI communities to broaden the understanding of isolation, on the one hand, and liminality, on the other, and to connect it to feelings of security; which our case studies show are interwoven.

Understanding the Liminal Edge

In discussions between the authors, it became clear that the participants in the three case studies shared a sense of insecurity in their everyday lives, which was amplified by their social isolation and their existence on the edge of society. This insecurity was coupled with frustrations over interactions with sometimes disruptive and uneven (and hostile) digital technologies and services, which were seen to intensify their experience of being socially isolated. In Case Study One, the ontological security gained from routine tasks and regular contact with “people at home” was disrupted by the ship moving in and out of connectivity. In Case Study Two, fragmented digital infrastructures and high costs of internet access shaped participants’ sense of social isolation. In Case Study Three, participants were forced to use digitalised welfare services, yet, such services were often the cause of their exclusion from the local community and society at large. This is not to suggest that isolation and insecurity are inseparable, but it shows

how, for our participants, being socially isolated perturbed their feelings of security. Moreover, digital technology was not experienced as a transition out of isolation or as a mechanism for gaining ontological security. This differs from some existing HCI4D and ICT4D work which highlights how digital technology can support marginalised communities with their integration into society more broadly, e.g.[21, 44, 69]. While Case Study Two touches on aspects of what Davis et al. [22] referred to as the “digital fringe” – understood as communities marginalised due to limited access to resources or digital technology – our paper moves beyond this notion. Our participants noted how digital technology itself became an agent of social isolation and insecurity, showing that in order for digital technology, and the services that it facilitates, to be beneficial, participants needed to feel secure in their digital interactions.

Designing for Social Isolation

Participants in all case studies noted how technology intensified or created notions of social isolation. This was most noticeable in Case Study Three, where participants felt isolated both within and outside the digitalised welfare system. In Case Study Two, participants noted how access to digital content shone a light on their everyday lives and enabled them to see “what they could never have”. In Case Study One, seafarers noted how onboard social isolation was intensified during long periods of disconnection. To this end, participants in all case studies did not view available technological systems as supportive and often felt that such technologies, and the services that they were meant to provide, were de-humanising.

HCI has a central future role to play in designing to reduce social isolation experienced by communities on the edge of society, as exemplified by our three case studies. For some of our participants, particularly in Case Study Three, the edge was a feeling of being socially isolated within a system that did not offer the support they needed to feel secure and where they did not have the economic means to reduce their social isolation. Moreover, the liminality of their existence meant that digital services did not offer them a route out of isolation. For others, in Case Study Two, for example, the edge functioned as a representation of Greenland as both geographically and infrastructurally disconnected. The connected colonisation in this case shaped how the technology was felt as liminal. Case Study One was dominated by temporal aspects of liminality that led to particularly fragmented feelings of security. Our participants in all three case studies showed how the edge is experienced as “between” or transitional and as intimately connected with feelings of security and insecurity.

A design approach focusing on technological innovation alone would not be successful within these communities. We therefore propose that HCI considers the underlying social, economic and political aspects that exist around the technological and were shown to have a direct and indirect impact on our participants’ sense of security and social isolation. We further suggest a design approach supported by the following principles so that services, technologies and practices that are perceived to be isolating are received as supportive by the communities they are intended to serve:

- A clearer understanding of the needs of people who are experiencing social isolation and the role local professionals and local services play in reducing or supporting them, e.g. community centres and projects, social or support workers, friends and family and fellow community members.
- Active collaboration between people living on the edge, government and policymakers, local authorities and professionals to share ideas and co-design potential solutions with an aim of creating policies, interventions or technologies that reflect the social interaction needs of people experiencing or being stuck in a liminal existence; thus bringing awareness of connection issues and a process for planning (preparedness).
- The gearing of digital services to the temporality of different liminal spaces. In all three case studies, people connected to relations and services at different speeds. The different speeds also had different causes. Digital design needs to not only respond to this different gearing but be attentive to the different reasons for the multiple speeds.
- Development of resources that take into account people “in transition” or “between”, e.g. IT, communication, and social media training that considers people with limited or intermittent access to technology, broadband and network data. This is particularly important for isolated and disconnected communities facing rapid and accelerated digitalisation programmes.

CONCLUSION

Grounding our findings in three distinct communities on the edge of society, we have shown how social isolation and feelings of security are interwoven and shape digital interactions. The three case studies also highlight the differing nature of liminality in everyday contexts and how spaces “between” connected and disconnected – and transitions between the two – perturbs everyday routines needed for the individual to establish ontological security. We have suggested how the HCI community can support digital design that attends to people’s sense of security and experience of liminality. This can be done by designing interventions and community-led engagements that attend to wider social, political economic and geographical aspects shaping social isolation. We see this paper as a starting point for a wider programme of engagements with communities experiencing social isolation on the edge of society, focusing on their sense of collective and individual security. We posit that the HCI community is uniquely positioned to lead such a programme.

ACKNOWLEDGEMENTS

We would like to thank our participants for taking part. Without their efforts, enthusiasm and energy this work would not have been possible. Jensen’s contribution is supported by the Sailors’ Society, Coles-Kemp’s contribution is supported by EPSRC awards EP/N02561X/1 and EP/K006266/1. Wendt’s contribution is supported by the Leverhulme Trust and the UNESCO Chair in ICT4D. The underlying research data are openly available from Figshare at: <https://doi.org/10.17637/rh.11537505> (seafaring), <https://doi.org/10.6084/m9.figshare.c.4807245.v1> (Greenland) and <https://doi.org/10.17637/rh.11527932> (welfare claimants).

REFERENCES

- [1] Iris Acejo. 2012. Seafarers and transnationalism: Ways of belongingness ashore and aboard. *Journal of intercultural studies* 33, 1 (2012), 69–84.
- [2] Derek Armitage, Fikret Berkes, Aaron Dale, Erik Kocho-Schellenberg, and Eva Patton. 2011. Co-Management and the Co-Production of Knowledge: Learning to Adapt in Canada’s Arctic. *Global Environmental Change* 21, 3 (8 2011), 995–1004.
- [3] Benett Axtell and Cosmin Munteanu. 2019. PhotoFlow in Action: Picture-Mediated Reminiscence Supporting Family Socio-Connectivity. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*. ACM, INT050.
- [4] Ron Baecker, Kate Sellen, Sarah Crosskey, Veronique Boscart, and Barbara Barbosa Neves. 2014. Technology to reduce social isolation and loneliness. In *Proceedings of the 16th international ACM SIGACCESS conference on Computers & accessibility*. ACM, 27–34.
- [5] Polina Baum-Talmor. 2014. *From sea to shore: ethnographic account of seafarers’ experience onboard merchant ships*. SAGE Publications, Ltd.
- [6] Hugh Beyer and Karen Holtzblatt. 1999. Contextual design. *interactions* 6, 1 (1999), 32–42.
- [7] Nicola Bidwell and Dianna Hardy. 2009. Dilemmas in situating participation in rural ways of saying. In *Proceedings of the 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group: Design: Open 24/7*. ACM, 145–152.
- [8] Nicola J. Bidwell and David Browning. 2009. Pursuing Genius Loci: Interaction Design and Natural Places. *Personal & Ubiquitous Computing* 14 (2009), 15–30.
- [9] Diana Luskin Biordi and Nicholas R Nicholson. 2013. Social isolation. *Chronic illness: Impact and intervention* (2013), 85–115.
- [10] David Bissell. 2013. Pointless mobilities: rethinking proximity through the loops of neighbourhood. *Mobilities* 8, 3 (2013), 349–367.
- [11] William Bridges. 2004. *Transitions: Making sense of life’s changes*. Da Capo Lifelong Books.
- [12] Jim Brown. 2014. TR Week Seven B. (2014). <http://probationmatters.blogspot.com/2014/07/tr-week-seven-b.html>
- [13] Kynthia Brunette, Matthew Eisenstadt, Erik Pukinskis, and William Ryan. 2005. Meeteetse: social well-being through place attachment. In *CHI’05 Extended Abstracts on Human Factors in Computing Systems*. ACM, 2065–2069.
- [14] Bronwyn Lee Carlson, Lani V Jones, Michelle Harris, Nelia Quezada, and Ryan Frazer. 2017. Trauma, shared recognition and indigenous resistance on social media. *Australasian Journal of Information Systems* 21 (2017).
- [15] Mandy Cheetham, Suzanne Moffatt, Michelle Addison, and Alice Wiseman. 2019. Impact of Universal Credit in North East England: a qualitative study of claimants and support staff. *BMJ open* 9, 7 (2019), e029611.
- [16] Jacques Chevalier and Daniel Buckles. 2013. *Handbook for Participatory Action Research, Planning and Evaluation*. (2013).
- [17] Lizzie Coles-Kemp and René Rydhof Hansen. 2017. Walking the line: The everyday security ties that bind. In *International Conference on Human Aspects of Information Security, Privacy, and Trust*. Springer, 464–480.
- [18] Lizzie Coles-Kemp, Rikke Bjerg Jensen, and Reem Talhouk. 2018. In a New Land: Mobile Phones, Amplified Pressures and Reduced Capabilities. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*. ACM, 584.
- [19] Stuart Croft. 2012. Constructing ontological insecurity: the securitization of Britain’s Muslims. *Contemporary security policy* 33, 2 (2012), 219–235.
- [20] Stuart Croft and Nick Vaughan-Williams. 2017. Fit for purpose? Fitting ontological security studies ‘into’ the discipline of International Relations: Towards a vernacular turn. *Cooperation and conflict* 52, 1 (2017), 12–30.
- [21] Hilary Davis and Jane Farmer. 2018. Including the Rural Excluded: Digital Technology and Diverse Community Participation. In *Digital Participation through Social Living Labs*. Elsevier, 223–244.
- [22] Hilary Davis, Luke Hespanhol, Jane Farmer, Joel Fredericks, Glenda A Caldwell, and Marius Hoggemueller. 2017. Designing Participation for the Digital Fringe. In *Proceedings of the 8th International Conference on Communities and Technologies*. ACM, 321–324.
- [23] Hilary Davis, Frank Vetere, Shawn Ashkanasy, Gavin Dyson, Penelope Schofield, Kate Thompson, Giselle Withers, and David Thomas. 2008a. Towards social connection for young people with cancer. In *Proceedings of the 20th Australasian Conference on Computer-Human Interaction: Designing for Habitus and Habitat*. ACM, 319–322.
- [24] Hilary Davis, Frank Vetere, Shawn Ashkanasy, Gavin Dyson, Penelope Schofield, Kate Thompson, Giselle Withers, and David Thomas. 2008b. Towards social connection for young people with cancer. In *Proceedings of the 20th Australasian Conference on Computer-Human Interaction: Designing for Habitus and Habitat*. ACM, 319–322.
- [25] Audrey Drolet, Thomas Lemonde-Marzell, Pablo Matos Da Silva, Kim Lamontagne, and Marjorie Bédard. 2019. SENTIÖ: Reconnect with Yourself to Better Connect with Others. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*. ACM, SDC07.

- [26] Ann Fienup-Riordan. 1995. *Freeze Frame : Alaska Eskimos in the Movies*. University of Washington Press. 234 pages.
- [27] Greenlandic Agency for Digitization. 2014. *Borgerne og IT i Grønland*. Technical Report.
- [28] Helene Forsberg Madsen. 2016. *Udsatte Grønlandske Kvinder i Danmark*. Technical Report. Rådet for Socialt Udsatte, Copenhagen.
- [29] David M Frohlich, Christopher Lim, and Amr Ahmed. 2016. Co-designing a diversity of social media products with and for older people. In *Proceedings of the 7th international conference on software development and technologies for enhancing accessibility and fighting info-exclusion*. ACM, 323–330.
- [30] Futureonautics. 2018. The Crew Connectivity Survey. (2018).
- [31] Roderick G Galam. 2015. Gender, reflexivity, and positionality in male research in one’s own community with Filipino seafarers’ wives. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, Vol. 16.
- [32] Anderson C Garcia and Silvana de Lara. 2018. Enabling aid in remote care for elderly people via mobile devices: the MobiCare case study. In *Proceedings of the 8th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion*. ACM, 270–277.
- [33] Bill Gaver, Tony Dunne, and Elena Pacenti. 1999. Design: cultural probes. *interactions* 6, 1 (1999), 21–29.
- [34] Anthony Giddens. 1984. *The constitution of society: Outline of the theory of structure*. Berkeley. (1984).
- [35] Anthony Giddens. 1991. *Modernity and self-identity: Self and society in the late modern age*. Stanford university press.
- [36] HM Government. 2012. Welfare Reform Act 2012. (2012).
- [37] Statistics Greenland. 2019. Population. (2019).
- [38] Oliver Haimson. 2018. Social media as social transition machinery. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (2018), 63.
- [39] Oliver Haimson, Jed Brubaker, Lynn Dombrowski, and Gillian Hayes. 2016. Digital footprints and changing networks during online identity transitions. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. ACM, 2895–2907.
- [40] Oliver L Haimson, Bryan Semaan, Brianna Dym, Joey Chiao-Yin Hsiao, Daniel Herron, and Wendy Moncur. 2019. Life Transitions and Social Technologies: Research and Design for Times of Life Change. In *Conference Companion Publication of the 2019 on Computer Supported Cooperative Work and Social Computing*. ACM, 480–486.
- [41] Luke Hespanhol, Hilary Davis, Joel Fredericks, Glenda Amayo Caldwell, and Marius Hoggenmüller. 2018. The Digital Fringe and Social Participation through Interaction Design. *The Journal of Community Informatics* 14, 1 (2018).
- [42] Nick Hine and John L Arnott. 2002. Assistive social interaction for non-speaking people living in the community. In *Proceedings of the fifth international ACM conference on Assistive technologies*. ACM, 162–169.
- [43] Nautilus International. 2017. An investigation into connectivity at sea. (2017).
- [44] David L Johnson, Veljko Pejovic, Elizabeth M Belding, and Gertjan Van Stam. 2011. Traffic characterization and internet usage in rural Africa. In *Proceedings of the 20th international conference companion on World wide web*. ACM, 493–502.
- [45] Stefan Jonsson. 2016. Where Humanism Finds its Ends: Lessons from Pia Arke and Katarina Pirak Sikku on the Difficulty of Narrating the Arctic. *Studies in Travel Writing* 20, 3 (2016), 226–236.
- [46] Azmina Karimi and Carman Neustaedter. 2012. From high connectivity to social isolation: communication practices of older adults in the digital age. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work Companion*. ACM, 127–130.
- [47] Kiel Long, Lyndsey L Bakewell, Roisin C McNaney, Konstantina Vasileiou, Mark Atkinson, Manuela Barreto, Julie Barnett, Michael Wilson, Shaun Lawson, and John Vines. 2017. Connecting those that care: Designing for transitioning, talking, belonging and escaping. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*. ACM, 1339–1351.
- [48] Bill McSweeney. 1999. *Security, identity and interests: a sociology of international relations*. Vol. 69. Cambridge University Press.
- [49] Alex Mellbye and Tim Carter. 2017. Seafarers’ depression and suicide. *International maritime health* 68, 2 (2017), 108–114.
- [50] Roberta M. Melvin, Andrea Bunt, Erick Oduor, and Carman Neustaedter. 2015. The Effect of Signal Expense and Dependability on Family Communication in Rural and Northern Canada. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems - CHI '15*. ACM Press, New York, New York, USA, 717–726.
- [51] Lydia Morris. 2019. Activating the welfare subject: the problem of agency. *Sociology* (2019).
- [52] Anna Moutafidou and Tharrenos Bratitsis. 2018. Digital storytelling: giving voice to socially excluded people in various contexts. In *Proceedings of the 8th International Conference on Software Development and Technologies for Enhancing Accessibility and Fighting Info-exclusion*. ACM, 219–226.

- [53] Lasse O Nielsen, Hans J Krebs, Nancy M Albert, Nick Anderson, Sheryl Catz, Timothy M Hale, John Hansen, Lise Hounsgaard, Tae Youn Kim, David Lindeman, and others. 2017. Telemedicine in Greenland: Citizens' Perspectives. *Telemedicine and e-Health* 23, 5 (2017), 441–447.
- [54] Mark Nuttall. 1990. Greenlandic: political development of an Inuit language. *Polar Record* 26, 159 (1990), 331–333.
- [55] Elena Parmiggiani and Helena Karasti. 2018. Surfacing the arctic: politics of participation in infrastructuring. In *Proceedings of the 15th Participatory Design Conference: Short Papers, Situated Actions, Workshops and Tutorial-Volume 2*. ACM, 7.
- [56] Sonja Pedell, Frank Vetere, Lars Kulik, Elizabeth Ozanne, and Alan Gruner. 2010. Social isolation of older people: the role of domestic technologies. In *Proceedings of the 22nd Conference of the Computer-Human Interaction Special Interest Group of Australia on Computer-Human Interaction*. ACM, 164–167.
- [57] Miguel Kiyoshy Nakamura Pinto, Ermanno Pietrosevoli, Marco Zennaro, Marco Rainone, Pietro Manzoni, and others. 2018. A LoRa enabled sustainable messaging system for isolated communities. In *Proceedings of the 4th EAI International Conference on Smart Objects and Technologies for Social Good*. ACM, 118–123.
- [58] Gina Porter, Kate Hampshire, Albert Abane, Alister Munthali, Elsbeth Robson, Mac Mashiri, and Augustine Tanle. 2012. Youth, mobility and mobile phones in Africa: findings from a three-country study. *Information Technology for Development* 18, 2 (2012), 145–162.
- [59] Paul Roe. 2008. The 'value' of positive security. *Review of international studies* 34, 4 (2008), 777–794.
- [60] Gillian Rose. 2016. *Visual methodologies: An introduction to researching with visual materials*. sage.
- [61] Koen Salemink, Dirk Strijker, and Gary Bosworth. 2017. Rural Development in the Digital Age: A Systematic Literature Review on Unequal ICT Availability, Adoption, and Use in Rural Area. *Journal of Rural Studies* 54 (2017), 360–371.
- [62] Helen Sampson. 2013. *International seafarers and transnationalism in the twenty-first century*. Manchester University Press.
- [63] Helen Sampson and Michelle Thomas. 2003. The social isolation of seafarers: causes, effects, and remedies. *International maritime health* 54, 1-4 (2003), 58–67.
- [64] Pedro C Santana, Marcela D Rodríguez, Víctor M González, Luís A Castro, and Ángel G Andrade. 2005. Supporting emotional ties among mexican elders and their families living abroad. In *CHI'05 Extended Abstracts on Human Factors in Computing Systems*. ACM, 2099–2103.
- [65] Kristina Sehlin MacNeil and Jillian Marsh. 2015. Indigenous Research Across Continents: A Comparison of Ethically and Culturally Sound Approaches to Research in Australia and Sweden. (2015).
- [66] Bryan Semaan, Lauren Britton, and Bryan Dosono. 2016. Transition resilience with ICTs: 'Identity awareness' in veteran re-integration. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. ACM, 2882–2894.
- [67] Ruth Stalker-Firth. 2007. Inside your users' minds: The cultural probe. *A List Apart* (2007).
- [68] Olivia Swift and Rikke Bjerg Jensen. 2016. The mixed blessings of the internet. *Nautilus Telegraph* (2016), 20–21.
- [69] Gregory Taylor. 2018. Remote Rural Broadband Systems in Canada. Available at SSRN 3357266 (2018).
- [70] The Mission to Seafarers. 2018. Seafarers' Happiness Index. (2018).
- [71] Deborah L Trout. 1980. The role of social isolation in suicide. *Suicide and Life-Threatening Behavior* 10, 1 (1980), 10–23.
- [72] Victor Turner. 1969. Liminality and communitas. *The ritual process: Structure and anti-structure* 94, 113 (1969), 125–30.
- [73] Victor Turner. 1987. Betwixt and between: The liminal period in rites of passage. *Betwixt and between: Patterns of masculine and feminine initiation* (1987), 3–19.
- [74] Arnold Van Gennep. 1909. *The Rites of Passage* (1960 edition). (1909).
- [75] Nagendra R. Velaga, Mark Beecroft, John D. Nelson, David Corsar, and Peter Edwards. 2012. Transport Poverty Meets the Digital Divide: Accessibility and Connectivity in Rural Communities. *Journal of Transport Geography* 21 (2012), 102–112.
- [76] Fie Velghe. 2013. Literacy acquisition, informal learning and mobile phones in a South African township. In *Proceedings of the Sixth International Conference on Information and Communication Technologies and Development: Full Papers-Volume 1*. ACM, 89–99.
- [77] Sameer Verma and John P. Ryan. 2016. A Framework for Information Access in Rural and Remote Communities. In *2016 IEEE International Symposium on Technology and Society (ISTAS)*. IEEE, 1–4.
- [78] Jenny Waycott, Frank Vetere, Sonja Pedell, Ameer Morgans, Elizabeth Ozanne, and Lars Kulik. 2016. Not for me: Older adults choosing not to participate in a social isolation intervention. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*. ACM, 745–757.

- [79] Stephen Wensveen, Kees Overbeeke, and Tom Djajadiningrat. 2000. Touch me, hit me and I know how you feel: a design approach to emotionally rich interaction. In *Proceedings of the 3rd conference on Designing interactive systems: processes, practices, methods, and techniques*. ACM, 48–52.
- [80] Eviatar Zerubavel. 1985. *Hidden rhythms: Schedules and calendars in social life*. University of California Press.
- [81] Minghua Zhao. 2002. Emotional labour in a globalised labour market: Seafarers on cruise ships. (2002).