CONNECTING FAMILIES?

Information & Communication Technologies, generations, and the life course

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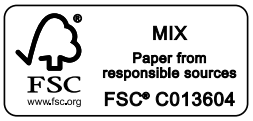


SEVEN

Cross-disciplinary research methods to study technology use, family, and life course dynamics: lessons from an action research project on social isolation and loneliness in later life

Barbara Barbosa Neves, Ron Baecker, Diana Carvalho, and Alexandra Sanders

Introduction

As research on the relationship between digital technology and family life is emerging as an important topic for family scholars (Neves and Casimiro, 2018), what can we learn from sociotechnical research designed and conducted by social and computer scientists? What do we gain by combining cross-disciplinary methods to study technology adoption and its outcomes within family and life course contexts? What challenges do we face? This chapter considers these questions by drawing on a mixed methods project on technology and social connectedness, facilitated by a team of sociologists and human-computer interaction (HCI) researchers (Baecker et al, 2014; Neves et al, 2015, 2017a, 2017b). Informed by sociological studies of technology (MacKenzie and Wajcman, 1999), the team shared a conceptualization of technology as a sociotechnical process of interconnection between technological and human elements.

HCI, a sub-field of computer science and engineering, emerged in the early 1980s to ensure that 'humans and computers [are] interacting to perform work effectively' (Long and Dowell, 1989, p 6). Recently, a growing epistemological shift from a system-centred to a human-centred approach has moved the discipline 'from evaluation of interfaces through design of systems and into general sense-making of our world' (Bannon, 2011, p 50). This 'human-centred informatics' lens has relocated some HCI work from laboratories to the field, aligning with

a sociological quest to understand the complex interplay of social and technological dimensions in everyday life. As such, we posit that both disciplines gain from combining methods and collaboratively studying sociotechnical systems, including how digital technology affects family dynamics and vice versa.

The cross-disciplinary work presented here is based on an *action research project* that evaluated a new digital technology to tackle social isolation and loneliness in later life. As action research projects are focused on addressing practical issues through involving researchers and participants as co-collaborators (Berg, 2004), this strategy enabled systematic action to both solve a problem and advance scientific knowledge in a critical area. Furthermore, action research projects follow a pragmatist epistemology, allowing use of multiple methods (Ivankova, 2014). Although action research projects are employed in both HCI and sociology, cross-disciplinary and mixed methods approaches remain scant, particularly in the study of interventions to tackle social isolation and loneliness among older adults (Franz et al, 2015; Neves et al, 2017b).

Social isolation and loneliness amongst older adults (aged 65+) correspond to a higher likelihood of social disengagement, depression, functional decline, and premature mortality (Cornwell and Waite, 2009; Perissinotto et al, 2012; Steptoe et al, 2013). Loneliness is a subjective feeling of a lack of companionship, whereas social isolation is a scarcity of quality social connections, of social support, and of social participation (Cornwell and Waite, 2009; Perissinotto et al, 2012). While loneliness and social isolation are related, they can be experienced independently of each other: we can be socially isolated but not feel lonely, or feel lonely despite an active social network (group of social ties). Both have similar negative effects on health and social inclusion.

Frail older adults living in institutions (care homes, long-term care, complex continuing care) seem especially vulnerable to these issues (Prieto-Flores et al, 2011). Transitions to care homes (institutionalization) and associated changes in social connections can also contribute to experiences of loneliness and social isolation (Bradshaw et al, 2012; Prieto-Flores et al, 2011). We used a life course perspective to conceptualize these experiences, framing them within life course dynamics that connect the five paradigmatic principles of life course theory – life-span development, human agency, historical time and place, timing, and linked lives (Elder et al, 2003). Of particular importance was the principle of linked lives, which highlights social connections and refers to 'connections [that] extend across generations

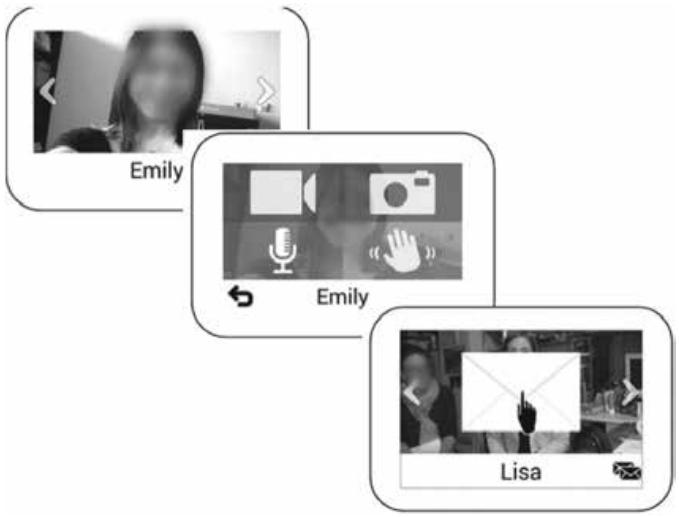
and across people's lives through convoys of friends and relatives' (Elder, 2000, pp 1617–1618). Additionally, institutionalization was understood as a critical life transition in which individuals experience changes to their personal/social state, role, and identity (Elder et al, 2003).

Literature on social isolation and loneliness suggests that new communication technologies can lessen the risks of both in later life by enhancing opportunities for social connectedness (Findlay, 2003; Masi et al, 2011). Social connectedness is fostered by strengthening ties between 'linked lives' through meaningful interactions with close relatives and friends; it is the quality and not the quantity of social interactions that minimizes the risks of loneliness and social isolation (Cooney et al, 2014; Gierveld et al, 2015). Older adults, however – particularly those who are frail and require aged care support – are less likely to adopt new technologies, more likely to discontinue usage with age, and are significantly affected by lack of technology accessibility and digital literacy (Neves et al, 2013, 2015; Berkowsky et al, 2015). Even among those who used digital technologies before entering residential care, active use is affected by life course-related socioeconomic factors, including access, frailty, and reduced social participation (Berkowsky et al, 2015; Neves et al, 2017a, 2017b). While research has shown that institutionalized or frail older adults want to maintain connections with family and friends through different media (Tsai et al, 2015; Sayago et al, 2011), they are limited by the aforementioned factors.

To address the complex needs and aspirations of this group of older adults, we co-created an accessible, Android- and iPad-based communication app (Baecker et al, 2014; Neves et al, 2015). This technology was designed with and for older adults who are potentially frail, institutionalized, concerned with maintaining social connectedness with loved ones, or experiencing difficulties with standard technologies because of motor issues or digital skills. The app enables users to send audio, images, and videos created on their tablet, and also has a 'wave' (text) feature that forwards a pre-set message to recipients (see Figure 7.1). Media is sent to recipients' devices as an email attachment to which they can respond. Users' contacts are displayed as a list through which they can swipe, much like a digital photo-frame (Figure 7.1). During exploratory design studies, users expressed a clear preference for regulating when they sent and received communication, not wanting a real-time device comparable to the telephone. The app is therefore asynchronous. To accommodate users with motor or visual limitations, the interface features large, non-textual touch icons that respond to swipes and taps but do not require typing. To develop and test this app, we used principles of participatory research design (Ehn, 2008) and a

'social shaping of technology' approach, which considers the multitude of social, cultural, economic, and symbolic elements that affect the design, implementation, and effects of technology (MacKenzie and Wajcman, 1999). The app was deployed in two Canadian care homes to evaluate adoption and use of the technology, and its feasibility as a means of enhancing social connectedness for frail residents.

Figure 7.1 The contact list interface showing one contact (top), the message options interface with four options (middle), the new message notification interface (bottom)



Combining methods: computer science and sociological approaches

Deployment and feasibility design

Our action research project combined a deployment and a feasibility study. A deployment is a common type of field study in HCI that trials a novel technology or prototype with its target users in situ. Deployments aim to assess the adoption and impact of new technologies within the intended 'everyday practice' context of usage (Siek et al, 2014). A feasibility study tests a previously unexamined intervention with a population about whom we lack in-depth knowledge in a real-life/constrained setting rather than an ideal experimental environment (Bowen et al, 2009). Both employ mixed methods. As such, these two approaches complemented each other in the pursuit of our research aims: the deployment helped analyse how participants adopted and used the app within their daily contexts, while the feasibility study allowed

evaluation of both *acceptability* (adoption and appropriate use of the technology) and *efficacy* (the results of that usage) (Bowen et al, 2009).

To examine the feasibility of the app to enhance user-perceived social connectedness, we conducted a two-month app deployment (2014) in a long-term care facility and a three-month deployment (2015) in a multi-care retirement community. The sites were located in Toronto, Canada. To explore sociotechnical factors of adoption and use (acceptability) as well as the potential of the technology to enhance social connectedness within a specific setting (efficacy), we combined different social research techniques: semi-structured interviews, psychometric scales (Duke Social Support Index and the UCLA Three-Item Loneliness Scale), and field (participant) observations. But we also aimed to test and improve the technology's functions and interface, as at the core of a deployment study is understanding how the user experience and the technology can be redesigned and enriched iteratively (Siek et al, 2014). As such, we included three techniques commonly used in HCI: usability testing, accessibility testing, and log data and analysis.

Usability testing asks users to perform representative tasks on a technology to help researchers refine its quality by finding key flaws (Lazar et al, 2010). Mostly, these tests are conducted to evaluate the ease of use and learnability of a technology's interface (Franz and Neves, 2018). Although typical usability testing requires participants to execute a set of tasks (to assess speed of task performance and type/rate of errors by users), specific types of usability techniques – such as the *Think Aloud* protocol and its variants – facilitate insight into the participant's mental model of the system (Franz et al, 2018). This protocol requests participants to verbalize their thoughts while performing tasks (Lewis, 1982). Our usability testing included a list of tasks and the Think Aloud approach when possible (depending on participants' impairments).

As accessibility issues can be strong inhibitors of technology use – especially among frail, institutionalized older adults – accessibility testing is another valuable technique (Sayago et al, 2011). Though the most prevalent method used to determine whether a system meets accessible design standards is an assessment by experts (Franz et al, 2018), we utilized an accessibility evaluation with our participants due to its documented benefits over expert evaluation, which include the capacity to observe the severity of accessibility issues in practice (Web Accessibility Initiative, 2010). These tests included inspecting if accessibility standards were met and ranking elements such as colour contrast, font size, and auditory and weight factors.

Lastly, log data and analysis were used to measure frequency of use and types of messages sent and received (audio, video, text, or picture). Logs are actions recorded by a device or computerized service while it is being used, ranging from clicks to shared content (Dumais et al, 2004). Logs have the advantage of capturing actions and not perceptions of actions; instead of relying on participant-reported frequency of use, we measure how many times the technology is being used. Nonetheless, we were not interested in replacing participants' perceptions with 'real' traces of use; rather, we aimed to compare both to find patterns and differences. Additionally, logs have to be combined with other data as they show 'what' action was performed, not 'how', 'why', or its impact.

Stages and procedures

Our studies featured pre-, mid-, and post-deployment stages. These stages changed slightly from the first to the second study, as we learnt from the original deployment (see Table 7.1). Despite the changes, the results were consistent across the two studies. Yet refining procedures allowed us to gather more in-depth data to contextualize our findings. At pre-deployment, participants and a study partner (one relative, caregiver, or friend) received individual training in the use of the app and tablet (which only had our app installed). The training showed participants how to use the technology, having them send and receive different types of messages. Researchers privately administered a social support and loneliness scale with each participant, and created a baseline profile to record their social network composition, social interaction levels, and sociodemographics. Participants were then provided with the tablet with our app for use as they saw fit over a period of two to three months. In the second study, we also interviewed study partners at the pre-deployment stage to ascertain their perception of participants' social interaction levels, engagement, and relationships.

The mid-deployment phase occurred four to six weeks after pre-deployment. Here, we re-administered the aforementioned scales and conducted accessibility and usability tests that included questions and tasks related to app use. In the second study, accessibility and usability tests were conducted post-deployment to give participants enough time to engage with the device, as we concluded from the first deployment that users needed time to become familiar with, and critical of, the technology.

At post-deployment, we repeated the scales and conducted semi-structured interviews with participants and study partners. Over the

course of the study, we visited participants weekly to collect field observations and answer questions.

We applied two scales: Wardian et al's (2012) Abbreviated Duke Social Support Index, which includes social interaction and satisfaction rating subscales, and Hughes et al's (2004) Short Revised UCLA Loneliness Scale, which comprises yes/no questions about feeling left out or isolated and lacking companionship. The semi-structured interviews, which lasted approximately 40 minutes, were used to explore participants' experiences with the app and to understand their use and non-use, communication with relatives, and social engagement. Study partners were also interviewed to gather their feedback on use, preferences, challenges, and opportunities with the app. The usability and accessibility tests lasted an average of 40 minutes and consisted of tasks (including sending and accessing different types of messages) and questions about features, weight, colour, font, and volume. In the first study, we tried the Think Aloud technique and used Likert-type scales (1 to 5, from Strongly agree to Strongly disagree) but found that participants struggled with both (Neves et al, 2015). In the second, questions were open-closed and based on a qualitative and comparative approach (Franz et al, 2018). Both usability and accessibility tests were video-recorded; we filmed how participants' hands interacted with the technology to improve usability. Observations used an unstructured format, allowing note-taking when appropriate – these notes described interactions and reactions, how participants used the app, the context, and activities. The app recorded logs measuring time, frequency, and type of use; message content, however, was not recorded. Participants were aware of what was being recorded.

Table 7.1 Deployment stages and data collection

Deployment stage	**First study** (2014, *n* = 4)	**Second study** (2015, *n* = 12)
Pre	• Individual training session • Psychometric scales • Baseline profiles	• Individual training session • Psychometric scales • Semi-structured interviews • Semi-structured interviews with study partners
Mid	• Psychometric scales • Usability tests • Accessibility tests • Log data & analysis	• Psychometric scales • Semi-structured interviews • Log data & analysis
Post	• Psychometric scales • Semi-structured interviews • Semi-structured interviews with study partners • Log data & analysis	• Psychometric scales • Semi-structured interviews • Semi-structured interviews with study partners • Usability tests • Accessibility tests • Log data & analysis
← Participant Observation (throughout the study) →		

Data analysis

Interviews and usability and accessibility tests were analysed with qualitative profiling and thematic analysis. Field notes complemented the interviews and contributed to the qualitative profiling, which allowed us to craft profiles for and contextualize each participant (Seidman, 2006). Thematic analysis was employed to detect themes within and across cases, which were both identified in the data and using a priori categories (namely technology-related codes) (King and Horrocks, 2010). At least two researchers coded independently, then collectively to test for convergence. A third ensured basic inter-rater reliability (Patton, 1990) of half of the data by manually counting discrepancies in assignment of codes and themes, reaching over 90% for all interviews and tests. Usability and accessibility tests were also analysed with descriptive and correlational statistics to measure speed of task performance, type and rate of issues encountered, and number of tasks successfully completed (Franz et al, 2018).

Scales were analysed descriptively and with Friedman and Sign tests, which are nonparametric techniques suiting our sampling. This analysis aimed to measure differences over time (from pre- to post-deployment). We adopted a liberal criterion regarding our small sample size (n = 16), as health practitioners also use these scales to assess individual patients and gather baseline information (Neves et al, 2017a). However,

advanced statistical analysis was not feasible. Logs were analysed with descriptive statistics and confidence intervals, as analysis of variance significance testing is not as useful in log analysis since we look for both effect size and its practical significance (Dumais et al, 2004).

Participants

The first study included five frail 'oldest old' people (aged 80+) living in a long-term care facility and five relatives. The second comprised 13 older adults living in a multi-care retirement community and their study partners (relatives or friends). One participant withdrew in the first study due to health decline, and one participant in the second due to lack of interest. As such, our data relates to 16 participants.

Recruitment challenges of institutionalized and frail older adults include their declining health, compressed life expectancy, and ethical concerns (Hall et al, 2009), which affects timeframes of longitudinal studies. Participant recruitment was facilitated by care home staff, and older adults with cognitive impairments that restricted capacity to provide consent were not enrolled. The project was approved by the University of Toronto Research Ethics Board (REB) and all participants gave verbal and written informed consent.

Participants' ages ranged from 74 to 95 (M = 83.9; *SD* = 5.5); ten identified as female and six as male. Participants in the first study were Chinese Canadians. Data were collected in their native languages with the assistance of staff and a Cantonese-speaking researcher. All except one participant were digitally illiterate (had never used a digital device) and had to learn touchscreen gestures (tapping/swiping). In the second study, the sample included Canadians, British Canadians, American Canadians, Latin American Canadians, Italian Canadians, and Japanese Canadians; all participants were fluent in English and had higher levels of education. Four of the 12 were digitally illiterate; eight had used a computer before, but only had a basic or medium-level understanding of the system (struggling with some functions). Eight participants joined the study with relatives, and four with friends. All participants had health limitations (from motor impairments to Parkinson's) and were considered frail by the staff.

Lessons learned

General findings: acceptability and efficacy of the app

Combining studies allowed observation of differences in uptake and use, even within the small sample (Neves et al, 2015, 2017a, 2017b). Eleven participants used the app weekly (average two days per week), whereas five were occasional users (once every two weeks). At post-deployment, two of the occasional users stopped using the app: one did not get messages from his only contact in the app (his son); the other was 'more interested' in knitting and cooking. The most reported motivation to use the tool was to connect/reconnect with grandchildren, 'the digital generation'. Participants shared that by using a digital tool they hoped to feel closer to their grandchildren, particularly since moving to a care home. Adoption of the tool was influenced by different sociotechnical factors (from attitudes to usability of the technology), including life course dimensions such as life history (past experiences with technology, life transitions, socioeconomic and educational experiences), linked lives (social networks, family support), age-related roles (grandparenting), agency (choices and actions), and place (living settings).

Some participants were active users, enjoying sending and receiving messages, while others were more passive, preferring receiving messages. One participant noted: 'I just like to get pictures and see my grandchildren dancing and acting in China… the dog chasing my grandchildren and they laughing out loud'. Overall participants had a clear preference for types of messages, preferring to receive text and send audio. Yet these preferences were in contrast with the communication patterns of relatives and friends, who mostly sent picture and video messages. Other divergent intergenerational practices, norms, and expectations were found in both studies regarding reply time and (a)synchronicity. Reply time issues included our participants not replying quickly to messages, sometimes taking one or two days. Relatives, particularly grandchildren, found this delay 'annoying'. Our grandparents thought this reply time was appropriate as they need to 'think before reply'. So while our participants praised the asynchronous nature of the app, as they could control time and type of interactions, relatives had a preference for synchronous (real-time) communication. Relatives' preference for a synchronous tool led most participants to question their choices or feel 'discouraged' by family.

All participants, even those who were digitally illiterate at the study's commencement, reported high perceived usefulness of the app for

social interaction due to its simplicity and options. But not having at least one tie actively involved in the project meant that for two participants the app had no use and was potentially detrimental. One confided that, 'if he [son] doesn't answer then I don't need this… I am just here waiting'. The app therefore had the potential to make participants more aware of family tensions and their own loneliness and/or social isolation. Nevertheless, it increased the sense of social interaction (communication frequency and type) with family and friends for 13 participants. However, only six reported high perceived social connectedness at post-deployment – those with relatives living abroad or far away. These participants used the app to reconnect, communicate more frequently, and deepen relationships with those relatives.

We concluded that, to facilitate the adoption of the app and its feasibility to enhance social connectedness and tackle both social isolation and loneliness, participants needed *adjustment periods* to learn to use the app and to *manage different intergenerational preferences, norms, and expectations.* Furthermore, *having geographically distant relatives* amplified the app's feasibility to contribute to higher levels of social connectedness. Although the app is a promising tool to address social isolation and loneliness, it is also limited by the aforementioned sociotechnical factors (see also Neves et al, 2015, 2017a, 2017b).

Cross-disciplinary insights

By combining social and HCI research methods, we were able to strengthen our data collection and analysis, uncovering a richer understanding of technology adoption and its impacts on older adults and their linked lives with family and friends. Our cross-disciplinary approach also shed light on the interplay of sociotechnical context(s) (technology, residential settings), structure (sociodemographic and socioeconomic factors, such as social class, age, gender, social norms), and agentic elements (attitudes, meanings, experiences).

Our social research methods, namely semi-structured interviews, psychometric scales, and participant observation, helped contextualize long-term app use, providing insights into adoption, appropriation, use, and perceived effects. Importantly, they showed how people are affected by their life experiences in adopting technology and how people shape their use to suit interests, social dynamics and roles, needs, aspirations, and constraints in their everyday lives. Having pre- and post-interviews with different users (participants and study partners) added to our understanding of the app from multiple angles and 'end users'.

This combination of methods is advantageous for sociologists and for HCI researchers interested in a 'human-centred informatics' framework. For example, it allowed us to refine HCI usability and accessibility testing: our observations and analyses of the results helped identify that the Likert-type scales were not the most appropriate instrument for our participants, who would tell a story instead of selecting a score or ask us if their story matched any of the scores (Neves et al, 2015). We could also visibly note impression management efforts (Goffman, 1956) – the need to make a good impression on the researcher and be positive about the app – during the usability and accessibility sessions of the first study. Two participants who only had use of one of their arms indicated that the device was easy to lift and carry, although we could see them struggling; additionally, all participants reported not having difficulties with the app, while we saw them struggling with some functions throughout the study. These tests were set up as informal activities, but the feeling of being tested or evaluated did not seem to subside. These findings led to adjusting the test procedures for the second study, as we:

- opted for task-based questions, that is, asking participants to 'lift the device' before answering about its weight. We saw answers changing in the first study: two participants reported that the device was easy to lift during the sessions, but when asked later to perform it, both acknowledged that it was not that easy when only having use of one hand;
- emphasized that their role was to find issues with the app so we could improve it;
- used comparative questions to assess different features and their preference (swiping vs. tapping); and
- asked about how other older adults would perceive or assess that technology.

This adjusted approach gave us a better grasp of their mental models of the system and helped reduce impression management efforts, as participants became more critical as testers.

Sociologists also experienced a threefold gain from adding usability and accessibility tests to their toolbox. Firstly, exploring how people simultaneously use, adapt, and perceive functions (and their models of technology) deepens our understanding of sociotechnical systems and the practices and embodied performances surrounding them. Secondly, the sessions and their video recordings uncovered new strategies of use. When the app was not responding as our participants intended,

they would try different gestures, including gestures not taught during the study. For instance, when tapping was ineffective, they would try tracing the icon with their fingers. These strategies helped further deconstruct ideas about learning processes in later life, often perceived as passive. Thirdly, the sessions highlighted the impression management of researchers: we continued to use 'correct' terms, such as tapping and swiping, while most participants would use other terms (touching, punching, caressing, among others). This language disconnection was particularly noticeable in the usability and accessibility tests: we never adopted their terminology and they did not adopt ours. These tests gave a new view into our position in the field and its implications, contributing to researchers' reflexivity.

The use of logging data, however, fell short of its promise. Due to problems with Wi-Fi connection in some areas of the care homes, functions and timestamps were not recorded consistently over time. There were also several 'missing events' (events not logged), 'dropped data' (gaps in logs as data were aggregated when logs grew in size), and 'misplaced semantics' (meanings of logs changing as events were encoded with tags and data) (Dumais et al, 2004). From this, we learnt that a more precise definition of metrics and a continuous curation of logs (cleaning data errors, distortions, and keeping semantics consistent) should have been a core concern during fieldwork. Despite these issues, the general picture of use recorded by logs seemed to match perceptions of usage by participants and study partners. Nevertheless, a more accurate dataset would have allowed us to explore the relationship between 'actual use' and 'perceived use'.

Despite these limitations, our mixed methods design strengthened our research. Although this approach allows for data triangulation, we were interested in moving beyond this by having methods 'talking to each other' to uncover data patterns and inconsistencies. By embracing the messiness of deployment, mixed methods, and cross-disciplinary studies, we were able to capture and analyse the complexity of technology adoption and use and its relationship to social, technology, and family dynamics.

Challenges and opportunities for technology, families and life course studies

These methodological reflections help identify the challenges and opportunities of cross-disciplinary and mixed methods research to study technologies, families, and the life course. With regard to challenges, agreeing on ethical conducts in terms of procedure and practice can be

complex – particularly in the era of big data and 'public' massive data collection of human behaviour (or its traces). For instance, our team had to discuss the benefits and perils of recording and accessing the content of messages sent and received through our app. We decided not to log that data, but it had to be negotiated with all team members. Informed consent, participant incentives, and risk management strategies were also actively discussed, as standards varied. Beyond axiology, our HCI researchers were focused on 'real use', while the sociologists focused on contrasting 'real use' and perceptions over time. Sociologists were also more interested in a life course perspective, particularly in terms of life transitions and linked lives. These interests – related to different epistemologies and ontologies – had to be properly accommodated. In addition, potential limitations of a pragmatic epistemology, such as short-sighted practicality, can be more challenging in cross-disciplinary teams studying the digital as a tool and a method, that is, a system allowing for both social life and sociological analysis. Other aspects included subjectivity and intra-comparability issues when refining (and de-standardizing) instruments throughout the research process. Finally, adjusting translation processes was essential: team members had to learn to be open to different expertise and to communicate effectively; knowledge transfer and mobilization had to be based on disseminating complex cross-disciplinary work in a cohesive, accessible, and targeted manner.

Regarding opportunities, our study showed that a more complete understanding of use of digital communication technologies can enhance knowledge of shared family meanings and social practices, in both structural and agentic terms. For instance, examining technology adoption/use and its context(s) allowed observation of dimensions that directly shape the life course, including family praxis, intergenerational roles, and age and gendered performances (Hagestad and Dykstra, 2016). We argue that technology, as a sociotechnical system, is also one of these dimensions. The growing pervasiveness, embeddedness, and role of digital technology in Western societies means that, increasingly, these technologies should be recognized as a part of trajectories/transitions rather than as an external element. The experiences of one of our participants illustrates how technology can be a central dimension in key turning points: Jen, a librarian, retired when the computerized library system changed from one she was familiar with to one so different that it caused her constant anxiety. Her decision was, in part, motivated by technology. By situating technology in its social context, we can investigate how it shapes society and how, in turn, society shapes it (MacKenzie and Wajcman, 1999). Moreover,

social scientists gain from participating in the process of technology development: by being part of the 'black box' of technology (Latour, 1999), they can further sociotechnical knowledge of – and contribute to – the design, implementation, and use of technologies.

Combining disciplinary perspectives and techniques also affords several methodological benefits to family and life course research. For instance, cross-disciplinary methods can help bridge micro and macro polarizations within family and life course research, enabling better access to their interplay and to the meso level. Furthermore, the combination of methods can assist in mapping family and life transitions 'in action'. Though the use of data from multiple time points underpins life course studies, these inquiry types are often based on retrospective methods that capture data before and after participants' experiences of the phenomena under study (Bengtson and Allen, 1993). Deployment studies instead promote continuous study of these phenomena, and the repetition of methods and/or stages facilitates flexibility and self-correction over a study's course without affecting inter-comparability. Moreover, the diverse methods presented here provided access to both 'recorded and observed' life moments and histories (Hagestad and Dykstra, 2016, p 68). Employing methods from unusual academic partners in life course work can foster creative and innovative approaches to research, and encourage examination of atypical or underexplored angles.

In brief

1. Combining social and human-computer interaction methodologies strengthened a mixed methods research project that evaluated the adoption, use, acceptability, and efficacy of a digital communication tool to address issues of social isolation and loneliness in later life.
2. Main challenges included the management of diverse research perspectives, interests, expertise, and ethical considerations.
3. Cross-disciplinary mixed methods approaches can enhance family and life course studies by: highlighting the micro/macro interplay in individual lives, capturing the immediacy of life transitions, facilitating access to observed and recorded life moments and histories, and identifying underexplored angles.

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