Enriching Social Sharing for the Dementia Community: Insights from In-person and Online Social Programs

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The dementia community faces major challenges in social engagements, which have been further complicated by the prolonged physical distancing measures due to the COVID-19 pandemic. Designing digital tools for in-person social sharing in family and care facility settings has been well explored, but comparatively little HCI work has focused on the design of community-based social technologies for virtual settings. We present our virtual fieldwork on remote social activities explored by one dementia community in response to the impacts of the pandemic. Building upon our previously published on-site fieldwork in this community, we expand on our initial publication by follow-up interviewing caregivers and facilitators and reflecting on a virtual social program. Through thematic analysis and contrasting in-person and online formats of the program, we deepened the understanding of virtual social engagements of the dementia community, examining their efforts to leverage physical objects and environments, enhance open and flexible experiences, and expand collaborative space. We propose to open new design opportunities through holistic approaches, including reimagining community social spaces, rethinking agency in people with dementia and caregivers, and diversifying HCI support across communities and stakeholders.

CCS Concepts: • **Human-centered computing → Empirical studies in accessibility**.

Additional Key Words and Phrases: social computing, community-based research, videoconferencing, assistive technology

1 INTRODUCTION

The dementia community can be conceptualized as a group of people affected by dementia and those working in dementia-related areas within a larger society. It encompasses people with dementia along with their families and friends and a diverse group of professionals who provide care and facilitate activities. Prolonged physical distancing measures due to the COVID-19 pandemic have further complicated the delivery of social programming (e.g., art, music, or storytelling groups) for people with dementia. Within face-to-face family and care settings, HCI research has explored digital tools for social sharing ("sharing for the purpose of communicating with social contacts and fulfilling relational goals" [44]). For example, personalized ambient displays have been developed for reminiscence and conversations among family members [14]. Print media devices have been built to prompt quizzes for interactive group activities in care homes [25]. In co-located community contexts, emerging social programs in cultural establishments such as libraries (e.g., [20]) and museums (e.g., [35]) have proven effective in creating positive experiences for both people with dementia and their caregivers. However, comparatively little work has focused on the design of community-based social technologies for virtual settings.

These gaps and emerging challenges motivate our fieldwork in the dementia community, the on-site followed by the virtual, to identify opportunities for technology design. Our motivations for community and online settings echo the Alzheimer's Association's most recent call for better supporting families living with dementia through

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community-based long-term programs while recognizing technological and accessibility challenges during the transition to remote care delivery [2]. The current technological toolbox has not yet reached its full potential for improving the quality of life for families living with dementia. A better understanding of how to provide virtual community-based social programming could positively impact a greater number of people while using fewer resources, with the added benefit of creating interactions and collaborations for the dementia community. The pandemic has heightened recent demands on and shifts to virtual socialization, but the valuable insights from these new community initiatives can benefit HCI research and practice in the long run, integrating co-located and virtual activities and exploring holistic social computing approaches to enriching social sharing in the dementia context.

This article presents our virtual fieldwork, reported for the first time here, focusing on remote social activities explored by the dementia community in response to the impacts of the COVID-19 pandemic. It builds upon our on-site fieldwork, originally published at ACM CHI 2020 [16], focusing on in-person social activities in the dementia community through observations and interviews with people with dementia, caregivers, and facilitators. We expand on our initial publication by adding new materials from follow-up interviews of three caregivers and two facilitators from the first study and reflections on 35 sessions of a virtual social program (which captures the online experiences of people with dementia not directly through interviews). Revisiting the themes from the first study, we broaden the scope of our work to online settings and correspondingly offer an expanded spectrum of opportunities for technology design. This article contributes (1) a deepened understanding of virtual social engagements of the dementia community by comparing and contrasting in-person and online settings and (2) a set of considerations to expand design space through holistic approaches, including reimagining community social spaces, rethinking agency in social experiences, and diversifying HCI support across communities and stakeholders.

2 RELATED WORK

2.1 Empowering People with Dementia in HCI Research

HCI research increasingly focuses on empowering people with dementia, leading to frameworks such as *critical dementia* and *technology narrative* that help reposition research approaches to designing for and with people living with cognitive impairments. *Critical dementia* positions people with dementia as competent, engaged, and capable of expressing themselves meaningfully, and HCI researchers interact with them in an empathic and empowering way, encouraging their perspective, creativity, engagement, and rich emotional expression [43]. *Technology narrative* aims to understand the lived experiences of people with cognitive impairments and emphasize the enjoyment of life with technological support over traditional narratives of suffering from impairments [52]. Inclusive design practices engage people with dementia and expand design spaces, enabling researchers to build empathic relationships and co-create with participants [25, 45, 49]. Experience-centered design keeps participants' experiences alive in the design process and helps researchers turn from solutionist thinking to explorative thinking, focusing on engaging with and responding to experience [58].

HCI researchers have explored diverse fieldwork strategies to empower people with dementia and engage them in design, e.g., exploring props and music [59] and using probes to design personal artefacts [75]. Prolonged fieldwork has proven to be an effective approach to uncovering design requirements, e.g., by yielding implementations that acknowledge participants' preferred media and the lack of internet access in care facilities [25]. Prior work has shown that participants can strengthen their engagement in the co-design process as co-researchers and collaborators [4]. More recently, the collective efforts of HCI researchers working in dementia care contexts have revealed higher-level considerations. For example, ethical complexities have been examined through the lenses of situated practice, emotion, and everyday experiences, drawing attention to research impact and clarity, as well as assistive products' technological end-of-life [31]. A human rights-based approach has further been proposed to create a respectful environment that actively engages people with dementia throughout the design process [10]. Empowering people with dementia can have broad impacts, e.g., through self-authored content that effectively reduces the stigmas surrounding dementia [40].

2.2 Personalizing Technologies for People with Dementia

Person-centered design approaches have been widely adopted to aid people with dementia in reminiscing and sharing, e.g., developing digital life storybooks to improve person-centered care [70] and integrating personally tailored design with existing routines of participants' everyday lives [49]. People with dementia can be involved in appropriating media content [25] and personalizing interactive media [30, 32] for their preference and enjoyment. In particular, it has proven effective to focus on positive memories and feelings and avoid triggering distress or unpleasant memories [46] while reducing the pressure to produce a correct answer or recollection. Generic prompts, e.g., regional materials adopted by CIRCA [3, 65]), have shown effectiveness in avoiding possible frustration or tension when people with dementia fail to recognize personal items [3]. Other successful strategies include prompting reminiscences through non-personalized materials covering all life periods [64] and mitigating negative memories through playful design [69].

A wide range of technologies has been explored to support the diverse communication needs of people with dementia. Individualized interactive sound players can mobilize everyday sounds to evoke meaningful social and reminiscing cues and experiences at home [33]. AI-driven personalization can potentially support the fluctuating accessibility needs of people with dementia, particularly in terms of adaptive interfaces for changes in various types of memory [51]. Notably, robotic pets have been developed as functional household appliances to facilitate playful interaction in daily practice in residences [53], and low-cost robot pets have been examined in terms of usability and impact in varied use contexts [37].

2.3 Social Sharing as a Design Context in Dementia

HCI work in art therapy for dementia has explored sharing as a social process, demonstrating its empowering values and the benefits of having a visible audience [13]. For people with complex communication needs, artmaking can create a space for expression and communication [45], which calls for careful reinterpretation and contextualization to avoid misinterpretation or criticism [41]. The digital artwork sharing process benefits from a material workspace and its customized use, and gifting artwork to others has been found to be a valuable form of social sharing [44].

Recent design work has enhanced technological aids to better support shared social experiences for people with dementia and their families. For example, a tablet app provides opportunities for meaningful and pleasurable joint activities through cooperative games for family visits to care centres [60]. A communication system integrates digital messages with printed postcards to promote lasting social contact and inclusive social dynamics within families [73]. More broadly, technology can enable social agency for people with dementia, offering opportunities to create and maintain social connections [25] and share stories in a meaningful way [63]. Conversation tools can connect different generations within a family and increase participants' agency in social settings [79]. Interactive group activities, such as quizzes prompted by print media devices, have proven successful in fostering co-created experiences and encouraging people with dementia to make social contributions [25]. Moreover, social technology can help relieve facilitation burdens, e.g., conversation aids like CIRCA make it easier to facilitate a shared interaction with no need for caregivers to prompt question after question to sustain the conversation [3].

2.4 Supporting Remote Interaction in Accessibility Contexts

With the recent shift to remote interaction during the pandemic, accessibility research has addressed the complex communication needs of vulnerable populations in virtual environments, e.g., for people with vision impairments

[47] and hearing impairments [68]. One study investigated the videoconferencing experiences of the aphasia community and uncovered their unique and creative adjustments to AAC communication strategies (including nonverbal utterances, props, and gestures) [62]. In senior residence settings, HCI research has facilitated immersive virtual reality and drawn attention to benefits, risks, and challenges in full immersion through an ethic of care perspective [76]. A wide range of literature from fields including geriatrics and nursing has revealed the benefits and limitations of using videoconferencing to foster social connectedness among older adults [71], echoed by HCI research findings on older adults forming a community of practice to tackle usability issues of online conferencing tools [66].

Meanwhile, recent HCI work in dementia covers a variety of virtual elements, e.g., online platforms for dementia information [21], self-management systems adopted by people with mild to moderate dementia [24], and interaction between sensory changes and everyday technology use [23]. Studies have also examined the impacts of the pandemic through the lenses of residence staff perceptions [36] and multi-stakeholder teamwork in designing virtual reality exergames [61]. The increased need for virtual interaction has prompted the development of best practices for remote summative usability testing involving people with dementia [80].

Prior HCI work shows the ability of people with dementia to enjoy the process of creating and sharing art and stories. The primary social occasions of previous studies have aimed at families and care facilities, where group activities build upon familiarity and trust between people with dementia and families, friends, or long-term care staff. To fill in the gap for probing community contexts (i.e., public activities outside of home and clinical settings), our previous work contributes to understanding socialization in public events and diversifying social sharing spaces for people with dementia, especially in community-based group settings [16]. However, remote interactions necessitated by the COVID-19 pandemic pose extra challenges and demand an extension of our work to virtual settings.

3 METHODS

3.1 Research Settings: The In-person and Virtual Tales & Travels Program

Our fieldwork was situated in the Tales & Travels program (adapted from [67]), which provides an exemplary case of effective community programs for people with dementia. This storytelling-oriented social program for people with dementia (usually in the early to middle stages) is hosted by the Westmount Public Library,[1] Greater Montreal, Canada, in collaboration with the Alzheimer Society of Montreal. In its in-person format prior to the COVID-19 pandemic, the program invited people with dementia, as well as their caregivers, to the library to explore various countries by browsing books and print materials, tasting featured snacks, and watching travel guide videos. Each session had one theme country and lasted about two hours. Our on-site fieldwork in 2019 involved non-intrusive observations of Tales & Travels and semi-structured interviews with dyads of people with early-middle stage dementia and their primary family caregivers, individual caregivers, and Tales & Travels facilitators (see Table 1, Column 1–4).

Since February 2021, Tales & Travels has been adapted to an online format to accommodate social distancing restrictions. Each session lasts about 45 minutes via Zoom, starting with 5-minute greetings and a brief introduction of the theme country. Then, a 30-minute story time is held in 2–3 breakout rooms. The session ends with a 10-minute video time for the whole group. Our virtual fieldwork, conducted in 2020 and 2021, involved online interviews (prior to the launch of virtual Tales & Travels) with a subset of caregivers and facilitators who participated in the original fieldwork (see Table 1, Column 5), followed by reflections on volunteering and facilitation experiences at virtual Tales & Travels.

In both the in-person and virtual iterations, Tales & Travels creates a friendly group setting and encourages people with dementia to share stories and memories while socializing within the group. This program was of

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[1] https://westlib.org/iguana/www.main.cls?surl=home

Table 1. Participant backgrounds

ID[1] (Gender/Age)	Relationship	Dementia conditions	Professions	Participated in both studies
P1 (M/84) & C1 (F/74)	Spouses	Mid-stage Alzheimer's		C1
P2 (M/90) & C2 (F/78)	Spouses	Mid-stage Alzheimer's		
P3 (F/80) & C3 (F/52)	Neighbours	Mid-stage vascular		
P6 (M/76) & C6 (F/70)	Spouses	Mid-stage frontal temporal		C6
P7 (F/81) & C7 (Atypical[2]/56)	Common-law[3]	Early-middle stage Alzheimer's		
C4 (F/75)	Spouse	Mid-stage vascular		
C5 (F/61)	Daughter	Father: diagnosis unclear; Mother: late-stage Alzheimer's		C5
C8 (F/54)	Daughter	Father: mid-stage Alzheimer's		
F1			Librarian	
F2			Coordinator, Alzheimer Society	F2
F3			Coordinator, Alzheimer Society	
F4			Librarian	F4

[1] P – People with dementia, C – Caregivers, F – Facilitators.
[2] Self-described.
[3] Since the publication of [16], the legal status of P7 and C7 was retroactively changed from friends forming a de-facto family to common-law companions.

particular interest due to its tailored design but not our sole focus. In our on-site and virtual fieldwork, a broader orientation offered richer insight by allowing participants to compare and contrast their social experiences in various community activities. Investigating the in-person and remote versions of the same social program also provided opportunities to uncover the common and distinctive challenges in physical and virtual social settings.

3.2 Study 1: On-site Fieldwork

3.2.1 Study design. Our on-site fieldwork was guided by two research questions: (1) What challenges do people with dementia encounter when sharing stories and socializing within a small group in a community setting? And (2) what materials and prompts are effective in supporting people with dementia in social sharing in this setting? More methodological details are described in our previous publication at ACM CHI 2020 [16].

This study consists of three parts:

(1) We conducted semi-structured dyadic interviews with people with early-middle stage dementia and their primary family caregivers (e.g., the spouse) and individual interviews with primary family caregivers (where the person with dementia was unavailable) to understand the experience of sharing stories and attending social activities as or with a person with dementia. These interviews helped characterize the ways in which

communication and socializing change over the progression of dementia. As adopted by previous HCI research involving persons with cognitive impairments (e.g., [52]), interviewing dyads could hear the voices of both care-recipients and caregivers.

(2) We conducted semi-structured interviews with facilitators of the Tales & Travels program. We looked into the facilitators' perspectives on participants' preferences and challenges when sharing stories and socializing, as well as the use of prompting materials.

(3) We observed the Tales & Travels sessions to focus on participants' verbal and nonverbal cues as an indication of their preferences and challenges when socializing, examining the effectiveness of multisensory materials. We also observed how facilitators maintain conversations and mediate emerging challenges.

Before starting the data collection in March 2019, the first author was a registered volunteer for the Alzheimer Society of Montreal and volunteered for nine Tales & Travels sessions from February 2018. This preliminary work helped in understanding the procedures and activities, getting to know the participants, and joining the community. It further minimized the impact of the researcher's presence during data collection, as the first author became a familiar and friendly face to regular participants at Tales & Travels.

3.2.2 Data collection and analysis. This study was reviewed and approved by our institutional research ethics board. The interviews (see Table 1, Column 1–4) and observations were run concurrently from March to July 2019. We conducted 5 dyadic interviews and 3 individual caregiver interviews (C4, C5, and C8). C4's spouse was present but did not participate in the interview. All the couples interviewed (including C4 and her spouse) were living together at home; C5 and C8 were primary caregivers of parents with dementia living at facilities. We interviewed 4 facilitators (F1–F4), aged 27–32, two males and two females. Two were Alzheimer Society coordinators with degrees in psychology and special care counseling, and two were librarians with master's degrees in library and information studies.[2] At the time of the interview, the most experienced facilitator had run 43 sessions, and others had facilitated 9, 15, and 24 sessions.

Each interview took 1–2 hours, and each participant was compensated with $30 or a gift of approximately the same value. All interviews were audio-recorded and fully transcribed with Amazon Transcribe, and then proofread manually.

We observed 11 people with dementia across 8 Tales & Travels sessions. The lead facilitator introduced the project to attendees and identified which tables were open to observation and then assigned the first author to a table (without identifying to the first author which tables, if any, declined participation). The first author took an observer-participant role, greeting participants and sitting at the table with them as she did during preliminary work. She did not actively engage in the conversations but politely responded when asked a question. She used a pen-and-paper-based observation guide and took detailed field notes in a non-intrusive manner and without collecting any identifying information. Some still images were taken of the room and table configuration, with care taken to avoid capturing any identifying information. After each session, the field notes were promptly expanded both descriptively and reflectively.

We conducted a thematic analysis [7] on the interview transcripts and observational field notes with NVivo 12.[3] The first author performed inductive open coding in an evolving way throughout interviews and observations. The authors met regularly and discussed the codes as they emerged, which helped the first author reflect on and revise them. The initial codes were later developed into themes and subthemes through axial coding. After the data collection was completed and the initial codebook was developed, the second author helped finetune the themes and interpret the quotes and examples.

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[2] To protect the anonymity of the facilitators, we reported their backgrounds collectively, instead of detailing on the individual level.

[3] https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home

3.3 Study 2: Virtual Fieldwork

As we concluded the on-site fieldwork (published at ACM CHI 2020 [16]), the COVID-19 pandemic severely disrupted the community programming like Tales & Travels. To support social interactions in a sudden, urgently-needed shift to virtual environments, the organizers of Tales & Travels rapidly developed an online version of their program. To better understand virtual social sharing, we must expand the scope to examine online social activities and critically contrast the findings from in-person and virtual settings. Insights from online activities can have a prolonged impact on community-based social programs and HCI research in the dementia context.

3.3.1 Study design. Our virtual fieldwork is guided by three research questions (RQs):

- RQ1: What are the emerging challenges in virtual social engagements for the dementia community from the perspectives of caregivers and professionals?
- RQ2: What strategies and materials are effective in supporting the dementia community in virtual social engagements?
- RQ3: What usability features of the technological tools enable or hinder virtual social engagements for the dementia community?

This virtual fieldwork consists of two parts:

(1) We conducted semi-structured online interviews with a subset of caregivers and facilitators who participated in the previous study in 2019. The interview questions focused on how physical distancing changed the social lives of people with dementia and their caregivers in the first year of the pandemic, as well as how professionals adjusted their work to continue helping them stay socially active and navigate emerging challenges in virtual settings. Building upon direct the input of people with dementia from our on-site study and prior work (e.g., [25, 44]), these interviews aimed to add caregiver and professional perceptions on supporting the broader dementia community in virtual social engagements. The semi-structured approach allowed for a consistent set of data, while maintaining flexibility for a deeper understanding of participants' perspectives.

(2) After the conclusion of our interviews, the Tales & Travels social program for people with dementia was adapted to an online format, and the first author was invited to join as a volunteer facilitator. We reflected on the first author's volunteering and facilitation experiences at the virtual Tales & Travels. Our reflections aimed to analyze the strengths and challenges of virtual social programs inclusive of people with dementia and their caregivers, exploring technological opportunities to better support the dementia community in social activities.

3.3.2 Procedure. This study was approved by our institutional research ethics review board. Interview invitations were sent via email or text to the caregivers and the facilitators in our previous study. Due to the additionally challenging nature of virtual conversations, we did not approach people with dementia directly but encouraged caregivers to relay comments from their loved ones. We later triangulated and confirmed caregivers' perspectives with our reflections on virtual Tales & Travels. The interviews were about daily life and work, with minimal privacy concerns and very low risk for our participants. Participation in the interviews was confidential.

Participants could choose to be interviewed via email, telephone, or Zoom. We advised participants not to include sensitive or identifiable information in emails. As they all chose telephone or Zoom, the interviews were only audio-recorded. When using Zoom, we sent meeting links directly to each participant, created a waiting room, set a password to gain entry, locked the meeting once started, informed participants that they could log in with only their first name or pseudonym for further confidentiality and that they had the option of turning their video off. We turned off the cloud recording feature and recorded the audio directly to our own device. After the participants expressed their interest in the interview, we provided an informed consent form via email (or another remote means preferred by the participant). Before we presented our questions, we asked participants to confirm that they had read the form and consented to participate via email or text or verbally.

Invited by F4, the first author joined the virtual Tales & Travels as a volunteer and later a facilitator, including the pre- and post- session facilitator debriefs. With the permission of the facilitators, she took reflexive notes after each session. In our previous on-site fieldwork, the first author participated as an observer and took notes during the sessions. In contrast, she attended the virtual sessions as a volunteer/facilitator, and we report on these post-session reflections on her experience.

3.3.3 Data collection and analysis. Five interviews with three caregivers and two facilitators (see Table 1, Column 5) were held via Zoom between November 2020 and March 2021. Each interview lasted 30–55 minutes, and each participant received a $30 honorarium.

Our reflections included 35 virtual Tales & Travels sessions from April to December 2021. Of these sessions, the first author joined 26 as a volunteer and 9 as a facilitator. Hosted by 2–3 facilitators, each session usually involved 3–6 people with dementia, some of whom might be accompanied by their family caregivers. After each session, she took reflexive notes on informative incidents, including both the positive experiences and the challenges encountered. She also recapped pre- and post- session debriefs with the other facilitators, highlighting their strategies and comments. These reflective notes enabled us to learn from the first author's participant-observer role without recording any personal information.

We conducted a thematic analysis on the interview transcripts and reflexive facilitation notes within MAXQDA2022.[4] The first author performed inductive open coding, and both authors discussed the codes and themes as they emerged and evolved. The initial results from facilitation reflections were presented to F4 (the lead facilitator) for member checking to ensure accurate interpretation of the data and respect for participants' privacy. Any information that might potentially compromise the privacy of any participants, caregivers, or facilitators was removed or rephrased. The member checking process, increasingly recognized as essential in accessible computing research (e.g., [5]), provided additional validation and feedback on our reflections.

4 FINDINGS

In this section, we detail the findings from our virtual fieldwork, reporting them here for the first time. We analyzed this dataset independently from our earlier data but drew from the previously published on-site fieldwork to aid interpretation. This was particularly important because all participants in the virtual fieldwork also participated in the on-site fieldwork. Thus, the follow-on interviews and reflections were built upon a shared understanding established in the earlier work. This influenced how participants framed their responses and how we contextualized our interpretations of the new dataset. While we did not reanalyze the Study 1 data in full, we selectively present prior results where they add depth or contrast to the virtual fieldwork findings.

Our thematic analysis of the virtual fieldwork data reveals three themes, all of which interrelate in addressing our RQs (see Table 2). First, "complexities in social engagements for the dementia community" highlights how the pandemic magnified and shifted caregiving and socializing challenges, including the individual resilience and the collective effort in navigating hard times as a community. Second, "roles of technology in new social engagements" focuses on the strengths and challenges of technological tools in new social engagements explored by the dementia community. Third, "re-building social experiences as a virtual community" learns from the successes and setbacks of recently adapted online social programs, particularly Tales & Travels, to investigate system features in fostering community connectedness in virtual settings. Most summaries of the Study 1 results were cross-referenced in the third theme. Given the intertwined nature of virtual social activities and the chosen online platforms, undoubtedly some findings are specific to virtual programs while some are more generic to virtual interactions or videoconferencing tools. We do not aim to disentangle the two within the scope of this paper.

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[4] https://www.maxqda.com/

Table 2. Theme overview

Themes and subthemes	Definitions	Relation to RQs
Complexities in social engagements for the dementia community - More challenging social lives with more complicated caregiving situations - Individual resilience and collective support	Highlighting how the pandemic magnified and shifted caregiving and socializing challenges, including the individual and the collective effort in navigating hard times as a community	Addressing RQ1 in caregiving and community contexts
Roles of technology in new social engagements - Much-needed online activities - Additional demands on caregiver support	Focusing on the strenths and challenges of technological tools in new social engagements explored by the dementia community	Addressing RQ2 and RQ3 in technological contexts
Re-building social experiences as a virtual community - Leveraging physical objects and environments - Enhancing open and flexible experiences - Expanding collaborative space - Technological accommodations	Learning from the successes and setbacks of recently adapted online social programs, particularly Tales & Travels, to investigate system features in fostering community connectedness in virtual settings	Addressing RQ2 and RQ3 in social programming practice

4.1 Complexities in social engagements for the dementia community

4.1.1 More challenging social lives with more complicated caregiving situations. The sudden yet prolonged physical distancing restrictions resulted in complex caregiving situations for each family, as reported by all caregivers. C1 and C6 were caring for their husbands at home, and both families' daily lives were further complicated by the pandemic. C1 described how they were "fortunate" to receive home visits from various care professionals, even with several disruptions along the way due to the changing pandemic restrictions. Being more confined at home amplified the household maintenance needs and conflicting attitudes towards outside assistance.

> C1: [My husband] really likes [those visits] although he keeps saying, 'I don't need a babysitter…' … he's still somewhat negative about people coming to help me. … probably being home [makes me] very aware I live in a very big house. There's a lot needs to be done that isn't getting done.

Similarly, C6 appreciated the occasional assistance with daily tasks, but she had to run errands quickly: "I can't really leave him [at home alone]." She stressed how the cancellation of her husband's usual community programs partly contributed to his significant physical and mental decline, which required accommodations to their living space.

> C6: It's been very, very, very difficult. [He] has gone from being pretty much autonomous to being almost totally dependent because there's no more outings. He used to go three times a week to the Alzheimer Society. He used to go to the day center. So, there's been nothing … no socialization. … I had major renovations. … I have a shower that … he can go in with a walker… And he barely walks … for the last week or so, he hasn't even been very hungry, which is unusual for him. *[Later]* He sleeps most of the day. He's more incontinent than he was … He's had a couple of falls.

People with dementia living in care facilities were extremely vulnerable in a healthcare crisis, with both their physical and mental wellbeing at risk. Their family caregivers faced additional challenges with respect to the rapidly changing restrictions at the residence and in the home area. C5 recounted the intense strain on her mother and their family, as well as the facility's "lack of communication:"

> C5: [In] the early months of COVID, my mother was diagnosed as being positive but asymptomatic… [After] a few months… she was negative. And so, I was able to go see her, dressed like an astronaut. … The residence she was at, 50% of the residents died. … [Those] months were extremely stressful because the staff was sick… you'd call, and nobody would answer...

Caregivers and their loved ones faced less structured social lives and reduced social circles. C1 described how they missed dining with guests, travelling, and socializing with the sailing club, all of which used to be their routine for years.

> C1: [My husband] does miss the fact that we're not entertaining people, … 'Why isn't anyone coming to eat with us?' *[Later]* [He] is missing some of the exterior people that we socialized with quite a bit.

C6 explained the nuanced effects of being isolated, especially in winter, and excluded from the community. Such changes of routine and disconnection from their children and extended social circles made her feel trapped and much less motivated:

> C6: … ever since the weather has changed, we're in the house all the time … nowhere to go, and no one to see. … it's very hard to be included … when you can't participate when you can't actively contribute anything. *[Later]* We don't do anything. … I don't feel like doing anything. … I feel like I'm in a cage … I know I need to be grateful because we have a nice big house and everything, [but] it's still a cage.

C5 highlighted the lack of "spontaneity of a leisure activity," including her efforts to reduce the risks of exposing her mother to the virus and missing unplanned leisure time out of their house.

> C5: … everything has to be planned [and] calculated … one thing that I'm missing [is] being able to just [go somewhere] … I try to restrict doing anything with others until after I see my mother … because I don't want the risk of catching anything and passing it on to her.

This subtheme deepened the understanding of the Study 1 theme "Active Social Lives and Community Programs," as summarized below [16]:

> Dyads described how it was beneficial and enjoyable for participants with dementia to remain socially active despite the burden it placed on their caregivers to manage these activities. Day programs became an important part of many participants' social lives, in some cases their only structured routine. Typical programs included Alzheimer Society meetups, Parkinson's dance classes, day centres, art therapy, specialized museum guided tours and art workshops, home visits from recreational therapists, and activities in facilities. Although the range of events was somewhat limited, they served an important role for the participants with dementia, providing an opportunity to be part of something. C6 described these engagements as offering *"more than taking enjoyment from the activity per se. It's more the idea of going … to something, being part of [the] activity."*

4.1.2 Individual resilience and collective support.

Participants endured many frustrations throughout the pandemic with the loss of socialization on which they depended for emotional support. As C6 summarized, "the COVID, it has taken the *joie de vivre*..." She described the sudden deprivation of social contacts leading to depressing thoughts:

> C6: I overthink everything … something in my head … goes around and around and around… what we miss [is] the contact… I'm very social. … Every Sunday I [used to] have [a] minimum of 10, 11 people. … I took a real dive… so sudden.

Caregivers demonstrated prominent resilience by staying positive and taking comfort in reciprocal help. C6 coped by baking, reading, knitting, and playing puzzles, and she appreciated the opportunity to open her swimming pool to the neighbourhood and receive help with groceries.

> C6: Over the summer, it was fun… I set up a tent in the… backyard, and the kids [in the neighbourhood] would come and swim. … I got to know people better… They phone and say: 'You need anything at the grocery store…?' *[Later]* I'm hopeful that we'll get through it… I'm doing my best, but it is difficult… I used to always say no to help, but now I'm saying yes.

Similarly, C1 showed her resilience through optimism and reconciliation, "trying to think the positives" and "come to terms with it" despite going "through some real downers." In addition to extra efforts with holiday decorations to lighten the mood, she took pleasure in getting newspaper deliveries and supporting local restaurants.

> C1: [One] of the positives is the Gazette comes six days a week. So, I am very thankful to have that little routine... we're trying to help the local businesses … I can phone [the restaurants], and they have it ready and they write on the bag: 'Have a good meal...'

Tenacious professionals adapted to sudden, drastic changes in the workplace, including temporary furlough for one of the facilitators. Both facilitators tried to rebalance work and life while remaining mindful of their clients' challenges. F2 described how she built some symbolic divide between work and life and how the Alzheimer Society team diligently provided caregiving support.

> F2: [The] physical… limit between work and… private life [pre-pandemic] just doesn't exist anymore now. … I had to find ways of… having these new… symbolic limits [like] changing when I stopped working… *[Later]* … it's really hard for the people we're working for at the Society. They're having a very, very difficult time. And it's important to do our best to make them feel better, even though … we can't do things the way they were before. … on the team, everyone's doing their best.

Members of the dementia community navigated the emerging challenges collectively by relying on each other to cope with changes, uncertainties, and losses. When Tales & Travels resumed online, the facilitators often observed the returning participants' deterioration, offering each other facilitation hints and emotional support. Through support groups or other personal connections, caregivers inevitably heard about the decline of others in their network, including speech loss and dramatic personality change: "another one that [we] will be losing [at Tales & Travels]. Very sad" (C1). C5 described how she missed a previous participant at Tales & Travels who passed away.

> C5: … you get very attached to them, and you know that they're vulnerable … I was really, really saddened to hear that [this participant] had passed… I know you're not supposed to have favourites, but she was my favourite. … I just loved her, and she was always so positive and so inquisitive.

Professionals had always been cognizant of participants' deterioration, which was the nature of dementia but now worsened by the pandemic. F4 described "bracing" himself when preparing to reach out to participants whose physical, mental, and social conditions were possibly affected during the lockdowns.

> F4: [Deterioration] happens even before the pandemic, where we'd come back from the summer, and someone would… have advanced a lot in their disease...[Now,] physical mobility may have been reduced… social interactions reduced, mental health for caregivers and the people with [dementia] … we're talking about people in the age group that are … affected more likely by COVID… I'm bracing myself a little bit for that.

More broadly, the dementia community was sensitive to the changing physical and mental space for interactions and contributions. Caregivers missed previously frequent visits downtown to cultural establishments such as museums. In C1's words, "all of that physical space… was so necessary to us." C5 and C6 noticed how the pandemic shifted people's attitudes towards each other, sometimes frustrated by discrimination against their loved one with dementia.

> C5: I find the world is angry… People… don't acknowledge you… the world has become rude… people see [each other] as a walking virus… you'd walk down the sidewalk and people would, like, go to the opposite sidewalk. … this sense that human beings are a danger to each other…
>
> C6: Part of my frustration is… it's disrespectful… It's a weird, weird, weird world. … I see some discrimination [against us]. I've never felt that before. [I] see… people avoid [us].

4.1.3 Theme summary. The first theme brought forward the nuanced effects of the pandemic and remote interactions on families living with dementia. Our findings revealed complicated and fluid caregiving situations both at home and in residences, as well as less structured and less motivated social lives with a heightened lack of spontaneity. We delved deep into the individual and collective efforts from members of the dementia community to reconcile with the dramatic changes throughout the pandemic. These findings explored nuanced losses, social and emotional connections, and space for mutual support, highlighting the interdependence between the dementia community and the broader social landscape of shifting interpersonal interactions and physical space.

4.2 Roles of technology in new social engagements

4.2.1 Much-needed online activities. As families living with dementia tackling complex social engagements, professionals echoed their clients' difficult loss of routine due to the cancellation of in-person programs. They worked hard to adjust to the shifting social and technological environments by being much more active on social platforms such as Facebook and Instagram. F2 further stressed the Alzheimer Society's urgent efforts to switch to virtual activities and offer any support possible, despite having limited resources.

> F2: It's very difficult because … people don't have their usual routines … we're really doing our best at the Society to … maintain contact and … offer our support. … it definitely isn't the same as what we used to have … like Tales & Travels [which] was a really big part of their weeks. We managed to … do some little things … like the Laughter Yoga. … it's just an hour [per] week … they're still in their living room in their home that they don't get out of.

F2 described their awareness of technological challenges when adapting in-person programs to virtual formats:

> F2: … online activities for people living with dementia, … it really depends on their abilities. But for people who are in more moderate stages… it's hard for them to do several things at the same time. And focusing on the screen is already a lot. … a lot of our clients… don't even have Internet at home. [Some] have a tablet at home, but honestly, they just don't know how to turn it on. [Some] can use their email, but outside of that… it's just unknown territory… [for those] who are technologically challenged… it's really the main way we have now to reach out to people.

F4 echoed their devotion to the program, being mindful of clients' urgent need for socialization.

> F4: Tales & Travels was… on my mind… I was in contact with everyone... [I] was mindful of the fact that people are already in difficult situations when they're at home, not receiving as many services as they need... they are probably on one of the top lists of… our patrons that could use some support… So, I reached out to the Alzheimer Society… about how we would move the Tales & Travels to Zoom.

Such timely adjustments towards virtual programming were greatly appreciated by caregivers, yet C1 highlighted her appreciation of close interactions in the community and pointed out that virtual social programs might need more planning.

> C1: Part of what was such fun [at Tales & Travels] was the coming together, and [the librarian] and the snack… Yes, we can watch the videos [online], but it was more that interaction… we can show each other the maps and the pictures. We could hold them up. But it was that human coming together. *[Later]* The socialization is not the same. Spontaneity is less as we do not have access to all the materials which used to be on the tables. … I find Zoom meetings have to be more formally organized.

Virtual visits facilitated by care facilities were deeply appreciated: "[The staff] would bring the iPad to her room… we would be able to see her, so that was really nice" (C5). With her husband at home and his brother also living with Alzheimer's in a residence, C1 faced the combined challenge of two caregiving scenarios. She described her brother-in-law as being "very restricted" at the residence and feeling "very upset about [lockdowns]" while frequent video calls helped:

> C1: He does have a [web] portal. So, we do have video chats, probably every day, sometimes three or four times a day.

All three caregivers took on new engagements themselves with the help of technologies. For example, C6 enjoyed online games with her family, such as interactive treasure hunts and virtual escape rooms. C1 managed to continue her previous in-person yoga classes virtually but lacked the bandwidth to find the similar replacement for the Zumba she enjoyed. She had to balance keeping her husband company and engaging with virtual activities, in addition to managing screen fatigue.

> C1: … I haven't joined in all of the things [the Society] is offering. I think it's fatigue of being on the screen... *[Later]* I'm missing … Zumba … I just haven't taken the time to look for [a virtual alternative] … because [my husband] gets angry with me being on the screen too long.

More positively, C5 appreciated that "technology allowed a certain level of normalcy," and she was enthusiastic about new virtual activities, "completely tied to [her] laptop." Regularly via Zoom, she started morning stretch exercises with a local trainer and learning ukulele through a local women's centre. She also took a statistics course to complete her sociology degree and enjoyed family time online. Her accounts highlighted positive roles of technology in remote interactions with respect to emotional satisfaction and control.

> C5: I'm connecting to you emotionally [over Zoom] on the same level as if I was in at the library with you... *[Later]* [Learning] ukulele, that I may have not done in person. … if you feel a bit embarrassed, you just turn your video off [or mute] … social distancing provides us the opportunity to control our feelings in a way through technology that we can't in person.

4.2.2 Additional demands on caregiver support. In finding new social activities for their loved ones, caregivers explored new technological tools, both tangible and virtual, to help with specific needs. For example, a robot dog provided C1's husband with a much-needed source of focused interaction and social stimulation.

> C1: [My husband] doesn't seem able to focus, and I think that's the hard part for him now. ... we have bought … a robot dog. … It's so big and it's like a golden colour and has a little red white neck and it barks and it whines and it breathes deeply, and then it closes its eyes. [He] has a dog, and his brother has a dog. And sometimes when we're on video chat … with the two dogs and they're barking at each other, and this seems to bring a lot of [joy] … [My husband] talks to that dog every single day for about half an hour … he's occupied because he gives the dog the life history of dogs and his life [and] interacts with that dog.

C1 deemed the robot pet "a lifesaver" that can keep her husband entertained and provide her with some short respite. Other technological tools, however, required additional caregiver attention. Zoom enabled C6's husband to continue his art therapy remotely, but C6 had to provide technical and procedural support because his cognitive decline prevented him from navigating the virtual environment and physically drawing on his own. C6's accounts on caregiver support were later echoed in virtual Tales & Travels as we observed that many caregivers were needed in setting up Zoom and accompanying their loved ones in virtual sessions.

> C6: … he can't handle [Zoom]. … [the art therapist] sends me the link every week. … I set him up. Some days he cooperates. Some other days he doesn't want to … at least he sits there and talks to her. … he can't really [paint by] himself anymore. So, she sent me photocopies of [drawings] and carbon paper. And I trace it onto a canvas, and then he paints it. … I have to be sitting almost next to him. … I have the one that I've traced. … when they discuss a colour, I write it on the copy … so that I know what he's supposed to be doing because I'm not artistic. … when he first started, he would just … look at the picture and … draw it freehand.

C5 and her family members worked together to stimulate her mother as much as possible during 30-minute virtual visits arranged by the residence. However, the conditions of late-stage Alzheimer's required more tangible interactions than the virtual:

> C5: … through WebEx … we would connect through different computer, so [my nephew] would be on his computer; my brother on his; I would be on mine. … we would be trying to stimulate her. … when I visit, I bring my phone, and so my brother visits virtually, and vice versa. I don't think she reacts very much to the phone or the iPad. I think it's more the touch … She's very, very low functioning… there's no communication. … if she had been younger or at an earlier stage of her Alzheimer's… it would have been a different experience.

4.2.3 Theme summary. This theme highlighted the timely adjustments to virtual social activities, a collective effort of the dementia community. A prominent burden fell on the caregivers to explore and support new activities for them and their loved ones. Participants reported positive roles of technologies in facilitating new engagements, e.g., video chats, robot dogs, online classes and games, and social media, while facing challenges such as access, fatigue, distraction, and the lack of physical interactions.

4.3 Re-building social experiences as a virtual community

4.3.1 Leveraging physical objects and environments. The facilitators built upon the previous in-person experiences and elements to adapt the Tales & Travels community to virtual settings. The librarian prepared an online folder with the materials mirroring those used during the in-person sessions, e.g., fun facts, images, Google map links, and YouTube travel video links. The facilitators met 30 minutes before the session to discuss how to arrange breakout rooms based on participant inscriptions, like the way they discussed table arrangements in the in-person sessions.

The following summary of the Study 1 theme "Effective Agencies for Social Interaction – Tangible, multimedia, and multisensory materials" provided more background information of diverse materials in the in-person format [16]:

> Tales & Travels mobilizes many materials to engage participants in storytelling and socializing, including books, fact sheets, large print images and maps, objects and artefacts, clothing and textiles, food, music, and videos. People with dementia and caregivers are free to engage with their preferred media and materials. Facilitators reported their efforts at tailoring prompts to various themes, e.g., F3's successful use of tropical clothing as a visual cue to spark interest and conversation. Technologies were used selectively at Tales & Travels. In a memorable example, a participant was excited to revisit his hometown via Google Street View projected on a large screen. The wide range of multisensory materials improved communication and enhanced participants' experiences. Themed snacks, such as Jamaican patties, a Swiss cheese platter, and Armenian treats, were well-received. Several facilitators and caregivers also confirmed the advantages of tangible objects and themed artefacts.

However, as F2 articulated in the interview before the launch of virtual Tales & Travels, losing the physical ambiance and interactions was a significant challenge for such a social program:

> F2: It was just… nice being there… sitting in the room and the ambiance. It was… something in itself, the beautiful room [and] the furniture… the voices around of people laughing and being happy to be here… shaking hands. … [Switching to virtual is] better than nothing... [but] it's definitely sad to think about Tales & Travels online.

The Study 1 theme "Normalized and Friendly Environments" contrasted the loss of physical ambiance in virtual settings [16]:

> Caregivers described public spaces and open environments as bringing a sense of normality, sparking spontaneous expressions, and offering opportunities for social interaction. Regarding Tales & Travels in particular, caregivers stressed how its location, a public library in an attractive historical building, affirmed the experience of normal life and provided a sense of belonging to the community. Though targeted at people with dementia, Tales & Travels does not dwell on the disease; it simply invites everyone to join the community and public space. Without dementia being mentioned, we observed participants joyfully sharing travel experiences, life stories, news, knowledge, and humor. As a dynamic and open-ended program, Tales & Travels increases participants' experience of normalcy and ease with telling, discussing, listening to, and responding to stories.

Nonetheless, the facilitators tried to connect to the physical space as much as they could and create an "intimate" experience. For example, F4 showed participants around the original Tales & Travels library room through his camera whenever he could. When planning the virtual Tales & Travels, F4 carefully considered his position at the library when running Zoom in accordance with public health safety measures.

> F4: … this will be a very intimate, … intense Zoom experience, … it will be better for me to be at the library than at home. … I have to choose where I'll place myself, too. But I think it would be nice ... The library is empty right now. … like nine employees sharing this huge space and we're encouraged to spread out… I found a spot on the third floor… like a wall of books behind me. It's kind of cool.

In the planning stage, F4 learned from other librarians running virtual programs to explore ways to enhance participants' experiences, e.g., by offering program-specific objects within the library's loan services.

> F4: [One colleague said] that we could potentially have items at the library ready for people to pick up and then use those items in the session. … it could be … images we've typically had in Tales & Travels. … I have to search and find which items would actually be interesting to have, and then there would be the element of coordinating the pick-up... The library already has a system in place for picking items up… I may put it on the back burner.

Such offerings could potentially improve the experience, as echoed by a caregiver's interest in pulling out the maps of countries explored in previous Tales & Travels. Facilitators found ways to introduce physical senses, including presenting the virtual background of landmarks as a poster behind us. This explanation also helped quietly resolve possible confusion about virtual background among participants.

As F4 ran the program from the library, other facilitators and participants joined from their homes, creating opportunities to bring items in front of the camera to share with the group. For example, a caregiver found their photo albums of the Alps in the 1950s. Facilitators showed various souvenirs from the theme country, such as fridge magnets, a huge beer glass from Munich, a Swiss watch, and a Swiss army knife. Themed clothing was easier to arrange, e.g., the first author wore a Japanese traditional happi shirt for the Japan sessions, which then inspired a caregiver to show her happi bought from her trip to Japan. All these physical elements might need more logistical planning to be shared in the in-person sessions, yet remote delivery afforded easy and spontaneous communal sharing of objects. This demonstrated one of the few advantages of remote settings, i.e., the ability to pull in personal artefacts was better supported as attendees were at home and could share personal possessions as the need arose.

In the virtual sessions, however, minor profanity and dress issues (e.g., attending in a bathrobe) occasionally occurred while this was never observed in the in-person sessions at the library. These incidents may result from lowered inhibitions at the participants' own residences than in public or new cognitive requirements to perceive their home as a public space via Zoom. Being mindful that the casualness of these private settings could be conducive to inappropriate dress or language, the facilitators resorted to mediating strategies such as advance reminders, conversational redirection, and rearranging of breakout rooms. The facilitator debriefs also touched on the subtle impacts on the participation from the positioning of participants and their caregivers. Possibly due to their personalities or stages of dementia, some participants chose to sit further away from the screen and the camera, leaving their caregiver in charge of the meeting controls or relaying conversations.

The Study 1 theme "Mediating Social Cues and Communication" showed that facilitation challenges depended in virtual settings [16]:

> People with dementia can have difficulty interpreting social cues. Self-awareness of these limitations can prevent them from engaging in public settings. Public events add further challenges as strangers may not recognize the dementia conditions or know how to respond. Nonverbal cues are also easy to misread, and even facilitators struggled sometimes to *"indicate [these cues] subtly"* (F3) and not to hurt participants' feelings or self-esteem. Other communication barriers relate to memory, attention, personality, responsive behaviour, and diverse language, cultural, and community backgrounds. Facilitators tried to mediate such difficulties by getting to know participants so that they could better arrange tables and pairings to manage group dynamics and avoid conflicts.

4.3.2 Enhancing open and flexible experiences. Virtual platforms could hold many attendees, and online lectures hosted by the Westmount Public Library for the general public did reach larger audiences than the capacity of their physical lecture hall, as observed by F4. However, programs like Tales & Travels relied on small groups to ensure conversational opportunities. F4 recognized the challenge to aid each participant in "figuring all the logistics out about the social interactions" and reaching as many participants on the lengthy wait list as they could. Before launching the virtual version, he carefully considered how to offer conversational environments suitable for participants' needs, preparing to make timely adjustments through trial and error.

> F4: I'll have to experiment with breakout rooms in Zoom [with] the six to eight people split into two groups… in a more conversational… situation… [With] three to four people [per room], you can offer pretty good… almost one on one conversations. … we're doing two [sessions] back-to-back… because I want to try to reach out to as many people as we can. … both sessions [per week, up to] 16 participants… *[Later]* I [discussed with] the Alzheimer Society [about] how many people work … in a Zoom meeting when there are people [with] dementia. … that number varied when we were in person. … depending on the… attention span or like of individuals. … we'll have to start from scratch and say, 'Okay, this group worked well together. This didn't…'

From the beginning, F4 was mindful of the challenges of engaging people with dementia remotely, as well as additional difficulties such as "missing social cues," which "could be a bigger obstacle for… people with dementia." He tried to find mitigating strategies such as offering one-on-one attention and multimedia stimuli.

> F4: … some people may not engage with the screen. [Just] me talking about a country… doesn't make it very different from just… with bad sound and video… But if I'm saying someone's name… 'Oh, what do you think?' … that might get someone to engage more... *[Later]* And as you're learning about the music and the history of it, you can play and discuss and then move back... And I hope that

> that will transfer well to Zoom. … music has been one of the elements that really has had the big reactions in Tales & Travels… I hope that … a screen share with audio [will] be effective.

In addition to the previous summary on mediating social cues, another Study 1 theme "Effective Agencies for Social Interaction - Person-centered stimuli" helped to ground F4's considerations for remote delivery [16]:

> Caregivers respected the personalities, interests, and experiences of people with dementia, trying to find effective, person-centered stimuli. At Tales & Travels, the facilitators made efforts to know each participant, e.g., who was interested in what topics, who preferred their coffee black, who wanted to take printed maps home, etc. Thus, they tailored materials and topics to the needs of different participants. Moreover, facilitators managed to bond with participants and build upon their previously told stories to discover new layers of experiences, turning repetitions into opportunities and joining the conversation. As Tales & Travels is like a *"conversation group,"* sometimes *"the leading is implicit… We're just facilitating the conversations, but we were also in the conversation"* (F4).

During debriefs at virtual Tales & Travels, facilitators discussed how to assess whether participants enjoyed the session and agreed that no single measure would suffice. They took participant comments like "interesting" as a good sign. In fact, the virtual delivery saw the same excitement from participants with dementia about the countries they grew up in or were familiar with. Similar questions about the country were discussed, e.g., 'where's the capital?' Pictures of animals, such as Bernese mountain dogs, received the same immediate warm, joyful reactions. It was encouraging for the facilitators to hear some participants delightfully say, "I got my friends back" or "It's nice to have friends on your computer." In another encouraging example, a participant at a care home was initially frustrated and wanted to leave the session, but his mood and attitude changed as he chatted with the facilitator. Mid-session, he started expressing motivations to focus on the positive side and showed enjoyment.

The facilitators carefully arranged breakout rooms to balance the need for one-on-one attention and group interaction, but fewer interactions between participants with dementia were observed than in previous in-person sessions. Nonetheless, participants enjoyed the group setting and sometimes commented, "the more the merrier" when waiting for more people to join.

In addition to a flexible group setting, virtual Tales & Travels offered open experiences through diverse choices of topics and materials. The facilitators would ask, 'Any picture caught your eye?' while browsing pictures or videos through screen sharing, thus giving control to the participants. They adopted spontaneous sharing of multimedia materials, such as recordings of national anthems, folklore for group reading, and interactive maps for exploring landmarks. The facilitators adjusted the handling of these media on the go according to participants' reactions. For example, they usually played only the opening part of a national anthem but kept it playing until the end when a participant appeared to enjoy herself and conduct along with the music.

To establish a concrete connection with the theme country, the facilitators often searched and shared the weather and the time of the notable cities, often comparing them to local conditions as a conversation starter. The first author tried bringing more personal and local materials into the conversation, including travel photos taken in the theme country and pictures of relevant local attractions (e.g., the Japanese garden in the Montreal Botanical Gardens and the Egyptian and Moroccan collections on the Montreal Fine Arts Museum website).

The above choices and presentation of materials and topics echoed two subthemes of the Study 1 theme "Effective Agencies for Social Interaction:" "Mature and intellectual activities" and "Positive and inclusive topics" [16]:

> Participants expressed their interests in sharing skills and expertise, bringing their life experiences to the table and contributing in their own ways. Mature and intellectual activities can help create appealing and engaging opportunities. C5 articulated that it was critical to respect participants' maturity and intelligence, instead of belittling them. Caregivers also mentioned intellectual social events presenting opportunities for them to share interests and hobbies with people with dementia,

> as well as learning together. At Tales & Travels, we observed mutual learning processes to explore a country's nature landscape, culture, fun facts, and cuisine. In particular, talking about one's home country encouraged more storytelling and strengthened the motivations for active sharing.
>
> Tales & Travels showed that topics such as traveling and animals are positive and attractive, enabling participants to follow the discussions easily and express their opinions at any point. C2 mentioned that it was easier for P2 to follow facts and documentaries since the discussions around such topics did not require them to remember all the previous content. C3 confirmed that the concept of travelling through historical periods or geographical locations with images and videos allowed for an appealing excursion beyond the boundaries of everyday life. In contrast, facilitators pointed out the negative impacts of disturbing or unpleasant topics.

Virtual programs of a more physically engaging nature encouraged participation more effectively. In an email follow-up after first sessions, C1 mentioned: “I find active conversation is more difficult with Zoom as [one] tends to get off topic very easily [or] into repetitive loops, which is hard to change or stop and [another] has difficulty verbalizing especially if he is not familiar with the country.” In contrast, she found virtual yoga more enjoyable because the verbal instructions were easier to follow and the exercises were complemented by social opportunities.

> C1: Yoga on Zoom is much more participatory! The teacher is talking and demonstrating at the same time. If you know the poses you do not need the visual presentation but when it is a variation it is helpful. Most of the time I just need the audio to stay on track, but I do enjoy the pre and post chats with other participants.

F2 further explained the advantages of the well-received Laughter Yoga program inclusive of people with dementia and their caregivers, highlighting the accessibility and pleasure of nonverbal participation.

> F2: Laughter Yoga sessions every week for people living with dementia and their caregivers [is] a big hit. … we made it really open for people to do either together or [alone]. … very accessible to everyone… you don't need to be able to talk or… even following instructions… [At] some point when everyone is laughing, it just makes you laugh as well.

4.3.3 Expanding collaborative space. Although engaging participants with dementia in virtual settings proved challenging, facilitators tried to invite everyone into a collaborative space to create more interaction opportunities by adopting facilitation strategies of conversing rather than presenting. They thoughtfully left long pauses for participants to collect their thoughts and speak up, and sometimes participants would ask about each other's heritages and families. An effective strategy observed was to choose countries and topics related to participants' backgrounds. Facilitators often acknowledged and built upon participant input, as well as sharing participants' insights from the first session with those in the second session. Simple phrases like "as you said" could express confirmation, agreement, and encouragement. When a participant voiced interest in any of the visual materials provided, the facilitator would quickly search online for more detailed illustrations.

In this virtual space, collaborations among facilitators were more frequent, spontaneous, and integrated into the process. Together, they often found fun facts or explained details about the country, e.g., when the participants were curious about a glacier that one facilitator showed on screen, the other searched and explained the term “ice tongue.” On another occasion, when F2 was asked about her Zoom background of the Malacca city, F4 went to find Malacca on the Google Maps.

Facilitators often reminded each other about the hobbies and passions of each participant to engage them better in the future. They emphasized learning from the program and each other, expressing a common sense of fulfillment and joy. However, holding such a personal program virtually could be stressful and intense for the facilitators, as F4 anticipated below.

> F4: [It]'s always been the program that I felt was most… effective and… it meant the most… almost on a personal level… It's gonna be [a] really intense Zoom experience with a lot of paying attention and clicking and making sure [of everything]. … Tales & Travels is always… very, very tiring.

Notably, the inclusion of caregivers played a bigger part in the collaboration to make virtual Tales & Travels successful. When envisioning virtual programs for people with dementia, C5 pointed out that both people with dementia and caregivers would benefit from the activities, and she articulated how virtual programs could create a change of space and interactive rhythm as a form of respite from restrictive routines.

> C5: [People with dementia] are not doing it alone. They have their caregivers to help… It's probably more of a help to the caregivers because it gives them an idea of what to do, … and they get to do something themselves… [If] they're helping someone do yoga, they might be doing the yoga. With art therapy… they're also involved with doing the art… [Zoom] momentarily pulls you out of your reality into another… you're connecting with someone. You're in a different space… You're not at home alone, just staring at the walls… Tales & Travels… I remember… I would leave there: 1) happy to have participated in an activity that that made others feel good and 2) what I learned about all these countries… it was as good for me as what I felt. I was… sharing with others. *[Later]* … it demands [attention]. It's not a respite anymore for the caregiver but …a respite in the sense that they could derive something from it as well… they're interacting with… their loved one or the person they're caring for in a different way.

Caregivers needed to keep their loved ones on track in Zoom sessions, helping them by operating devices or directing their attention. Some participants needed specific assistance, such as the translation or explanation of the ongoing conversation. In the interview before the launch of virtual Tales & Travels, F4 envisioned the need for caregivers' help, highlighting the strength of Tales & Travels to traditionally involve caregivers:

> F4: Tales & Travels series has always been for caregivers and people with dementia… It's not strange for me to ask that the caregiver be there, whether it's to help with the interaction or to participate themselves for their own good or to guide through the technology.

Meanwhile, F2 mentioned that "people miss seeing each other," in particular caregivers lost the opportunities of such social programs to connect with each other in the library:

> F2: [There] was a moment for them, … sitting on the bench at the front door, they would just chat all together during the session like an informal caregivers' meeting.

Later on, when debriefing on the virtual Tales & Travels, the facilitators agreed on several occasions that the caregivers chatting with each other was a good chance for them to connect, even though such scenarios were deemed less preferrable in pre-pandemic in-person sessions, distracting participants with dementia from interacting with each other. Caregivers with living and travel experiences in the theme country shared more, recounting their trips, discussing landmarks, filling the gaps for the facilitators about local features, and sharing their travel pictures in session or via email afterwards. We observed that one caregiver attended many sessions by herself even when her husband did not feel like joining, which showed her appreciation and enjoyment of this community social group.

In the virtual sessions, the increased involvement of caregivers, along with the encouragement from facilitators, expanded the Study 1 theme "Collaboration and Teamwork," as summarized below [16]:

> Participants valued the group settings. C4 proposed additional ways for participants to work collectively, new opportunities for social interaction, and the mutual benefit of collaboration. F1 likewise confirmed the positive role of collaboration, proposing *"more interactive group activities"* and *"teamwork"* for completing activities like quizzes. Facilitators explained how Tales & Travels, as a social program, helped build friendships and expand social circles, for both participants and caregivers.

4.3.4 Technological accommodations. Our facilitation experiences and reflections revealed helpful usability features and technological challenges in running social activities in the dementia community (summarized in Appendix). We reflected on how the facilitators handled these challenges and their emerging strategies, grouping them under three cross-cutting categories:

(1) Maintaining a virtual environment for individual and group needs. The facilitators successfully enhance the participant engagement through virtual features such as breakout rooms, screen sharing, spotlighting tools, various map views, and zooming in and out. However, technical difficulties like connectivity issues, combined with the participants' preferences, added to the challenges of balancing individual and group needs.

(2) Balancing ease of use with privacy and security concerns. The facilitators carefully configured meeting settings for barrier-free, autonomous participation while respecting participants' self-identification preferences and safeguarding their privacy and security.

(3) Navigating complex multitasking and communication. The facilitators' attention was divided between monitoring chats, sharing screen, engaging participants, as well as communication difficulties between breakout rooms. Extra care needed to aid participants in meeting controls (e.g., to join, leave, mute, and unmute) added to the facilitation burden and fatigue.

4.3.5 Theme summary. The third theme examined the virtual adaptation of social programs, especially compared with the previous in-person sessions. Our results highlighted the strengths of virtual activities in terms of more flexible and collaborative social space. Our analysis also revealed the challenges in virtual social sharing such as the changed physical connections and the necessary technological accommodations. These findings inspired design opportunities for enhancing community experiences in virtual settings for the dementia community.

5 DISCUSSION

Our findings paint a complex picture of virtual social engagements in the dementia community, uncovering the positive and negative roles of technologies. Our first-hand investigation of virtual programs like Tales & Travels provides opportunities for further examining physical and virtual community-based social sharing. Comparing the in-person and online Tales & Travels, we find underlying similarities in terms of mature and intellectual discussions, positive and inclusive topics, and person-centered approaches. The multisensory materials are heavily adapted for online activities, e.g., showing physical objects or clothes via webcam and using screen sharing for music, videos, images, and maps. However, the virtual group missed the physical ambiance and olfactory/gustatory elements (e.g., themed snacks) that were highly appreciated in the in-person sessions. As detailed below, we advance the nuanced understanding of physical and virtual social sharing and open new design avenues for the dementia community through holistic approaches.

5.1 Reimagining community social spaces

The recent shift to online social programs opens up opportunities for placemaking, deepens the understanding of physical and virtual environments, and reveals the tension between public and private spaces. These programs provide an extended social circle inclusive of people with dementia living at home and in residences, as well as their caregivers. As our findings show that families living with dementia faced less structured social lives and reduced social circles, virtual community programs help create more socializing opportunities while inevitably losing the benefits of changing physical surroundings, especially those of public venues.

Our previous on-site fieldwork illustrates that a public venue is especially helpful to create a normal-life environment in contrast to specialized, healthcare-related contexts. The physical attributes of a public library might be similar to hospital meeting rooms, but they offer different affordances [29]. People perceive these locations differently, and community environments foster distinctive associations and attachments, as reported by our participants regarding in-person programs. These normalized, community-based settings can help form a sense of attachment and belonging by extending sharing scenarios to the less explored group and public sessions [13].

In virtual environments, such normalized, familiar feelings of walking into the library are out of reach, but the atmosphere of social programs can remain welcoming and friendly, as created by the virtual Tales & Travels. The facilitators' strategies of leveraging physical objects and environments help bridge the transition from in-person to online activities, recognizing the importance of normalcy during transition states of adopting new tools and conversation channels [66]. Virtual programs can remove some physical barriers (e.g., mobility issues preventing visits to libraries or community centres), but logistical problems with participants' surroundings remain, including environmental distractions from their focus on the screen.

Moreover, our findings reveal layered attributes of virtual environments from varied perspectives of members of the dementia community. Families expressed the feelings of being trapped in their houses, and professionals reconfigured work-life balance during prolonged periods of working from home. Notably, minor dress code and profanity issues emerged in virtual sessions where participants joined from their homes rather than going to public spaces. In addition to the commonly reported issue of screen fatigue, the physical cues of being in virtual public events are difficult to interpret, and social signals appear abstract during communication through a screen.

With the loss or change of physical attributes and the blurring of public and private boundaries, more work is needed to unpack the affordance of virtual community environments. For programs like Tales & Travels, digital toolkits can be widely used in both private/public and physical/virtual settings, building upon the current suitcase kits on loan from the library. Such an approach echoes recent CSCW research that recommends designing for "complementing the ambiance of private spaces" and "in-a-box experiences for location-independent scenarios" [50]. Another relevant CSCW work on the psycho-social impact of the work-from-home experience identifies six types of boundary work (spatial, temporal, psychological, sensory, relational/social, and technological) that are enacted "to reconstruct the sense of place and attachment" and proposes "an emergent interplay among adapted work practice, reimagined physical (and virtual) spaces, and the establishment and continual re-negotiation of boundaries" [9]. Such discourses connecting physical and virtual interactions, as well as personal and work spaces, can be extended to dementia settings and inspire future HCI design to build virtual community social spaces. Recent reflections on virtual galleries or classrooms using commercially available platforms such as Gather.Town provide more inspirations for leveraging videoconferencing features (e.g., proximity chat, private spaces, spotlighting, and embedded objects) [39] and creating sense of place [38].

5.2 Rethinking agency in virtual social experiences

5.2.1 Affirming agency in people with dementia. Our findings demonstrate how social restrictions negatively affect the agency of people with dementia in virtual environments in addition to significantly decreasing their physical and mental health. Even though virtual programs are overall well received by participants and appreciated by caregivers, nuanced challenges surface when we compare the findings from our two studies. We explore opportunities for affirming agency through the lenses of group dynamics in virtual settings and active roles in sharing in the moment.

Group dynamics in virtual settings. As observed at the in-person Tales & Travels sessions, physical settings provide more opportunities for peer interaction and collaboration, such as helping each other get drinks and snacks and finding answers in a book or a globe together. In contrast, the online format requires the facilitators to take the control of the overall environment (e.g., arranging breakout rooms) and detailed activities (e.g., screen sharing materials). In most cases, the caregivers operate the meeting interface for their loved ones. The group dynamics are changed especially when some participants chose to position themselves further away from the screen than their caregivers, losing the effects of everyone sitting around the table in the previous physical setting. Thus, at virtual Tales & Travels, we observed fewer interactions among participants and fewer opportunities for collaboration and teamwork than in the in-person format. Sharing experiences and expertise were especially difficult for participants in more advanced stages of dementia. The scenarios for co-creating knowledge and experience among peers are more challenging and less supported than previous notable examples of in-person Tales & Travels and print media devices for quizzes in care homes [25].

More positively, the richer content and greater spontaneity of virtual Tales & Travels make it more open-ended than the in-person delivery. The facilitators explored more impromptu web searches on the spot, continuing the mutual learning tradition without adding to participants' cognitive or technological workload. The facilitators' screen sharing supports both generic and personal prompts, retaining both the person-centered and the inclusive approaches. We observed the facilitators' efforts to provide one-on-one attention and give flexibility and control to participants by offering choices and optional topics as they arise. However, it remains challenging to promote the agency of every participant as community programs require ongoing group participation, unlike more dedicated and controlled scenarios such as remote usability testing, which allows for modified methods to meet the unique needs of each participant with dementia [80].

More work is needed to create a distinctive group structure that signifies a collaborative dynamic among peers in virtual environments, drawing from *interdependence for assistive technology design* framework to emphasize interpersonal relationships and collective work [6]. Virtual settings bring new challenges and opportunities for building things together as a team or engaging in group activities to promote interaction and a sense of accomplishment. Prior work has mobilized technologies to negotiate barriers and support agency in virtual environments, e.g., expanding dementia-friendly and online community platforms [57]. The benefits of social collaboration can be extended to both virtual and physical spaces, as shown in videogame-based systems for dementia daycare centres [74]. Tangible and multisensory materials found effective in co-located activities can be incorporated into technology-mediated spaces, as shown in our two studies, but require careful integration and alignment among senses and media [55]. Future platforms can draw inspiration from research in related areas, such as compiling collective memories online to connect older and younger users [56], exploring a less linear narrative of personal histories within a timeline [72], and creatively adapting accessible communication to videoconferencing [62].

Active roles in sharing in the moment. Supporting agency in virtual environments poses nuanced challenges in terms of losing diversified roles and socializing in the moment. We find that in-person Tales & Travels affords greater flexibility in the roles of people with dementia. They can be storytellers and listeners, contributors and audiences, or peer collaborators, switching roles smoothly as the activities evolve [16]. Participants are heard and become equal conversation partners, contributing to meaningful communications [1]. Such dynamic roles can benefit group interactions as previously found in engaging people with dementia as performers or spectators in music sessions [59]. More active sharing invites more participants to become content producers, in line with the studies on improving older adults' self-expression and community-based care [77], as well as self-esteem and sense of usefulness [11]. In-person environments also aid participants in sharing their emerging reflections and personal stories, affirming the 'in-the-momentness' felt by people with dementia and establishing a visible, co-present audience, both found beneficial in prior work [13]. A similar "here and now" approach proved effective in a recent diary study, supporting people with dementia in sharing their emerging thoughts immediately via voice messages [42]. Recent work on virtual reality explored supporting participants' agency in selecting environments, with the following identified as preferable: animals and pets, art experiences, nature, personalized content and home environment, hobbies and sports, social interaction features, and travel [54].

Another potential approach to affirming agency is to solidify digital media and bridge the virtual and the physical. As byproducts of social sharing experiences, souvenirs can serve as a reminder of the event, as previous work has found it important for people with dementia to have a physical cue [25]. The in-person Tales & Travels participants often took home some printed materials, especially the large print maps and images they liked.

Yet, such opportunities for souvenirs are tentatively lost in the virtual format. Recent work on real-time usage of a communication system that integrates digital messages with printed postcards demonstrates a successful example to promote lasting social contact and inclusive social dynamics among participants [73].

5.2.2 Promoting agency in caregivers. Our virtual fieldwork highlights how the pandemic overshadows the caregivers' agency, particularly their reduced respite and social participation. In addition to complicating the families' abilities to remain socially active, the distancing restrictions force the caregivers to join events with their loved ones and play a bigger supporting role, thus losing the respite opportunities offered by in-person community programs. The prominent burden on caregivers to collect materials and set up systems has been evident in previous research to support storytelling and socializing, such as in the progress of creating portraits of people with dementia [78]. However, the shift to virtual interactions brings more profound and nuanced impacts, as uncovered by our findings. Home-bound situations heighten the conflicting attitudes towards outside assistance between caregivers and their loved ones (C1). A robot dog could keep her loved one busy and relieve C1 from time to time, but remote art therapy sessions and residences' virtual visits require considerable energy from C6 and C5 respectively. The caregivers appreciate reciprocal help within their neighbourhoods or the dementia network while pointing out the loss of spontaneity in their leisure activities with more planning burdens on them.

More encouragingly, the caregivers demonstrated their agency through individual resilience and new social engagements, adopting technological tools and joining online activities like courses and fitness programs. Notably, we uncover caregivers' extended collaborator roles in the new virtual contexts of social experiences. Caregivers collaborate more with professionals (e.g., providing technical and logistical support for art therapy sessions) and family members (e.g., during virtual visits with their loved ones in residences). At virtual Tales & Travels, caregivers' collaborative roles become more prominent through the experience of asking or answering questions, showing personal items related to the discussion, and selecting materials through facilitators' screen share.

These nuanced findings reveal the challenge of supporting caregivers' agency in virtual community settings. Prior HCI work has successfully provided support through a dedicated focus. For example, a pervasive social exergame designed for caregivers helped relieve stress and increase physical activity, promoting caregivers' time for themselves and connections with other caregivers [48]. In co-located contexts, design probes such as a musical interface can facilitate collaborative activities, towards equal partnership between caregivers and care recipients, promoting shared expression and reinforcing agency [34]. Tales & Travels has the long-standing benefit of being inclusive of caregivers, but the virtual format reveals the additional challenge of balancing the active participation of both parties. Future community-based work can draw from previous studies in home or residence settings, e.g., exploring embodied technologies to mediate the interactions between caregivers (relieving burdens and increasing confidence) and their loved ones (cultivating agency and a sense of normalcy) to support emotional wellbeing in care tasks [28]. A connected space can be created to set the ambiance across households to form a community by mobilizing commercially available physical components as an "intervention in a box" for optimized integration into daily responsibilities with the potential for expanded content [26]. Caregivers' agency can also be promoted through online communities for sharing care strategies as in the case of using music therapeutically at home [8].

5.3 Diversifying HCI support across communities and stakeholders

Our findings illustrate the heightened need for a diversified toolbox for varied social and technological characteristics across communities and stakeholders. In the ever-changing social and healthcare contexts, some communities might be able to retain in-person activities to a certain degree while others could be restricted to virtual ones for prolonged periods. Likewise, the overall technology adoption among participants tends to vary across communities, e.g., some people with dementia might be comfortable with videoconferencing or joining other virtual engagements independently as in [80]. The community in which our studies are situated shows minimal technology use among participants with dementia and some of their caregivers (many of whom are older adults themselves). Remote social programs would have been deemed unsuitable for this community before the pandemic, which has undoubtedly been a catalyst for virtual interactions. As reported by caregivers and observed at virtual Tales & Travels, participants with dementia adapt well to enjoying the new virtual format with the help of caregivers and professionals. However, we find that virtual social programs pose significant demands on the technical skills of caregivers and professionals. The nuanced barriers to community space and agency as discussed above can motivate the expansion of HCI support for all stakeholders.

Collaborative approaches. As our findings highlight the interdependence among members of the dementia community, collaborative approaches to supporting various stakeholders can open up design space. The dementia community can be better served with expanded space for individual interests and mutual support, including opportunities for streamlining the technological process to support the spontaneity that the caregivers are missing in their social lives. Virtual programs like Tales & Travels can benefit from more flexible platforms to accommodate personal and group needs and mediate conflicts (e.g., managing several breakout rooms with participants trickling in and accommodating those participants who rely on text communication without audio or video). Similarly, the technological considerations revealed in our findings call for increased system design efforts to help facilitators manage divided attention during complex multitasking, streamline their communication, and handle emerging problems (e.g., external disruptions and facilitation fatigue).

Future work can continue to build upon the previous direct focus on practitioner approaches to meaningful engagement while tracing epistemological understandings of dementia to different configurations of technology [22]. Opportunities for interdisciplinary research arise in collaboration with community-based establishments and related academic fields, e.g., our prior examination of in-person Tales & Travels through the lens of library and information science [15]. The HCI community has developed awareness and advanced collaborative approaches, illuminating potential tensions with community partners such as the relative power and position of researchers and computing environments [12].

Usability, security, and privacy. Our findings identify some positive virtual experiences such as spontaneous sharing of multimedia materials (e.g., listening to national anthems, reading folklore, and exploring landmarks with various map views and interactive features). Future design can enhance such experiences by leveraging helpful features of existing commercially available platforms to construct social experiences for the dementia community. Meanwhile, extra care is needed to balance ease of use and privacy and security concerns (e.g., creating an inviting, barrier-free environment while considering the effects of lowered inhibition in home settings). The usability and security/privacy trade-offs have been echoed in recent work on online conferencing tools for older adults, with extended attention to contextual trust across various scenarios from social events to medical and financial appointments [66].

Prompting systems. As dementia care and broader accessibility settings increasingly adopt videoconferencing, future work can better support people with complex communication needs when independently using such platforms, e.g, through specialized prompting systems. Such prompts can aid participants in meeting controls (including but not limited to joining, leaving, muting, and unmuting), drawing from recent dementia work leveraging mixed reality. For example, physical gestural actions and audio prompts in human voice, complemented by visual prompts such as text, have been found effective in directing people with dementia towards physical or virtual worlds [18]. Sound has been recommended to be incorporated in assistive mixed reality technologies, forming an augmentative platform with other modalities (such as visual prompts), to improve the independence of people with dementia [19]. Additionally, recent work on video-mediated collaboration can provide more inspiration such as a "What-You-See-Is-What-I-See" videoconferencing system by blending, repositioning, and resizing mirrors that "denote shared video feeds of people and screens" [27].

5.4 Limitations and Future Work

As both studies are set in a populous municipality in Canada, some findings might have inherent social and demographic limitations when applied to other communities. Although the participants with dementia and their caregivers come from various cultural, educational, and professional backgrounds, most of them have higher education and comfortable socioeconomic status, which may have pre-conditioned their active involvement in social events and research. To expand the insights from our case studies, future work can diversify perspectives across various communities and programs. Due to the temporal nature of our two studies, over the span of our on-site (2019) and virtual (2020–2021) fieldwork, participant dropout from Tales & Travels was common and inevitable as people with dementia experience the progression of the disease. In addition, participation in virtual sessions might depend on family members' logistical and technological support. While we triangulated our interview data with our reflections on virtual Tales & Travels, we recognize that as pandemic restrictions are lifted, it would be reasonable to interview people with dementia directly about their virtual social experiences to address the limitations of our virtual fieldwork. Direct interviewing and observing on participants' end (e.g., specific challenges in operating videoconferencing interfaces) can extend our previous methodological self-reflections on in-person research [17] to surface the voices of people with dementia in remote and hybrid research engagements.

6 CONCLUSION

The changing social and technological landscapes highlight the need for broadening the HCI toolbox to support in-person and remote social scenarios for the dementia community. Building upon our on-site fieldwork focusing on community-based social sharing, our virtual fieldwork delves deeper into the remote interactions, in particular contrasting the in-person and the virtual formats of Tales & Travels. Through thematic analysis on interview transcripts and reflective facilitation notes, we propose to reimagine community social spaces, deepening the understanding of placemaking in physical/virtual and public/private environments. We suggest affirming agency in people with dementia by creating collaborative group dynamics and supporting active in-the-moment sharing, as well as ways to promote agency in caregivers. We further discuss diversifying HCI support across communities and stakeholders by developing collaborative approaches, attending to usability, security, and privacy, and building specialized prompting systems.

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A SUMMARY OF TECHNOLOGICAL CHALLENGES AND CONSIDERATIONS AT VIRTUAL TALES & TRAVELS

Table 3. Summary of technological challenges and considerations at virtual Tales & Travels

Categories	Technological accommodations & usability features	Current strategies & challenges
Maintaining a virtual environment for individual and group needs	Engaged participants when sharing screen. Read fun facts and folklore together. Brought up the map spontaneously. Different views on Google maps to show the proximity of the city and the pyramids. Video captions read better than in-person, on everyone's screen instead of the big screen in the library.	Incorporated spotlight tools to highlight scenic spots and tourist attractions, coastline, borders, as well as World Tour 360. Zoomed in/out on the maps/pictures. Spotlighted a facilitator/participant if they were wearing themed clothing or showing objects to get everyone's attention. Encountered audio connection problems, screen share lagging, and choppy videos.
	Made judgement call on choosing between one big room and two to three breakout rooms	Arranged the rooms according to the participants in each session. Encountered difficulties in managing the room size with participants trickling in.
	One pair of participant and caregiver mostly chose not to turn on their microphone nor camera but relied on text messages in the chat.	Opened up chat function for everyone and allowed copy paste. Encountered difficulties to weave async messages into ongoing conversations.
Balancing ease of use and privacy and security concerns	Considered meeting configuration: Participants entering on mute or not? With or without video? Breakout room options like entering/leaving and mute upon re-entering the main room or not? Allowed attendees change their name display.	Tried to make it hands-free for all. Remained mindful of being inviting but raised privacy/security concerns. Acted cautiously when unnamed device asked to join the meeting. Addressed everyone by their first name.
Navigating complex multitasking and communication	Faced challenges of divided attention in multitasking facilitation (e.g., monitoring chats, sharing screen, explaining materials, keep track of time, etc. Encountered difficulties in communication between facilitators in different breakout rooms. Encountered facilitation fatigue. Missed some social cues.	Prepared materials more thoughtfully, e.g., making filenames more informative to depict the content for easier access when viewing through screen share. Tried texting which might not work as cellphones might be on mute. Tried to address each participant directly and clearly by first name, still with misunderstanding/confusion.
	Encountered disruptions or distractions from participants' surroundings. Encountered background noise on participants' end. Some might talk loudly during video time.	Coordinated with caregivers and residence staff in advance. Reminded everyone to turn off their TV or radio. Muted the participants, risking them being unable to unmute due to cognitive/fine motor skill impairments.
	Participants might not know how to leave the meeting.	Said goodbye and removed them from the meeting one by one.