

The Routines and Needs of Grandparents and Parents for Grandparent-Grandchild Conversations Over Distance

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ABSTRACT

A variety of systems have been designed to support communication between distance-separated grandparents and grandchildren. Yet there are few studies of the actual conversational routines of these groups as well as the social challenges that might arise as a result of technology usage. To address this gap, we conducted an interview and diary study that explores the conversational practices of distance-separated grandparents and young grandchildren (aged 3-10) from the perspective of the grandparents and parents of the children. Our results describe the focus of grandparent-grandchild conversations, and show that grandparent-grandchild communication is not without its challenges: grandparents sometimes feel self-conscious, perceive that parents or children will be annoyed if they ask too many questions, and do not want to interfere too much in their grandchildren's lives. The implication is that designs should attempt to support the conversation routines and needs of grandparents and grandchildren while attempting to mitigate the social challenges.

Author Keywords

Grandparent and grandchild communication; family communication; design;

ACM Classification Keywords

H.5.3. Group and Organization Interfaces: Computer-supported cooperative work.

INTRODUCTION

The grandparent-grandchild bond is an important emotional relationship in a human's life, often considered to be very similar to the parent-child bond [31]. Both grandparents and grandchildren benefit from a strong relationship [31]. Yet, in reality, many grandparents and grandchildren face challenges in building and maintaining their relationship. This is often because of social challenges such as divorce, or poor relationships between parents and grandparents, yet it can also be caused by geographical separation

[2,21]. Technology such as the phone or video chat can help mitigate issues of distance-separation, yet they bring with them their own challenges, such as parental scaffolding and child engagement [2,26]. Time zones and busy schedules also add to the challenges [21] as does cultural differences and language barriers.

There are several systems designed to support this demographic already where the focus is doing and sharing fun activities (e.g., [3,17,26]). While beneficial, these systems tend to not focus on direct conversation where grandparents and grandchildren might share their personal stories, achievements and experiences. We also see a gap in understanding how parents react to communication between grandparents and grandchildren and how they see such communication ideally working. Past research on grandparent-grandchild communication also does not focus on understanding social or cultural issues beyond scaffolding challenges for parents. Without this understanding, one may easily think that grandparent/child communication occurs with little social conflict.

Given this background, the goal of our research was to understand grandparent and grandchild communication over distance from the perspective of the grandparents and parents of the children. In particular, we were interested in families with children aged 3 to 10 years old and not yet at the pre-teen stage of life (where they want to talk less with grandparents [21]). We also wanted to understand the parent's role in facilitating this communication. For these reasons, we conducted a diary and interview study with grandparents or parents of children between the ages of 3 and 10. Both provided an understanding of how grandparents communicated with their grandchildren and how they engaged them for conversation. We also investigated what grandparents were already sharing or would like to share with their grandchildren as well as the challenges they faced in doing so.

Our results show that grandparents like to know nearly 'everything' about their grandchildren. Conversations focus on learning activities, unexpected happenings, storytelling (real life and fiction), sharing experiences, and cultural exchanges. Yet communication is not always an ideal situation. Grandparents face social challenges such as feeling self-conscious and overly inquisitive and often work hard to socially manage communication exchanges. Many parents desired additional social support from grandparents

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over distance. These findings show the value of conversational systems that focus on engaging children to share more details about their daily activities. They also suggest trying to mitigate the social pressures and challenges faced by grandparents and parents.

RELATED WORK

Studies of Family Communication

Family communication and the role of technology has been a widely studied topic in the fields of CSCW and HCI. In particular, there has been a large emphasis on how family members desire to connect with each other over distance to share stories about life, learn about the well-being of others, and coordinate times for visiting [22,23,27,28]. People prefer in-person communication, but when they cannot achieve this, they value synchronous systems like the phone or video chat to feel especially close to one another [5,14,15,16,23,28], and asynchronous systems to balance the time demands of communication [23,28].

More specifically focused on child-adult communication, Ballagas et al. [2] studied phone conversations between children and their remote family members. They found that children are easily distracted, not motivated to talk, and, depending on the age, have difficulties using the phone. They also show that phone conversations are not enough to build a close relationship with children. Other research has shown the value in adult-child conversations for healthy language development [33]; this motivated our own study.

There are also a number of studies of grandparent-grandchild relationships and communication. Geurts et al. [10] found that more frequent contact with a grandchild during childhood helped strengthen their relationship throughout life. Kenner et al. [18] showed that learning was enhanced for both grandparents and grandchildren when they jointly participated in activities. We also see that grandparent-grandchild relationships often depend on parents to help establish the relationship and subsequent communication [4]. Studies have shown conversations between grandparents and adult grandchildren (college students) tend to focus on education, family, friends, leisure and current events [20]. Evjemo et al. [8] found that grandparent-grandchild conversations were typically about the concurrent activities that kids were doing while on the phone. Yet phones did not suffice for sharing the activity.

Systems for Communication Over Distance

There have also been a variety of systems designed to support family communication over distance. First, several systems are targeted at the family as a whole in an effort to support a variety of relationships. Judge et al. [15,16] explored the effect of always-on video connections on creating stronger feelings of connection and togetherness between distance-separated family members. They found children liked such systems because they could easily show their grandparents objects and even participate in shared activities. Experience2Go [13] was designed for family

members to share activities (e.g., school events, sports events, birthday parties) with remote loved ones such as grandparents regardless of where the activity happened. Other systems focus on child-child connections for school-aged children to support synchronous play dates over distance [17,32]. Here children can play together, show their toys and talk to each other [17,32]. We also see examples of asynchronous video communication systems for supporting intercultural communication between children [6] or connections amongst school friends [12]. Study results show the importance of allowing children to share objects, tell stories, and perform for friends [6,12].

Systems for Grandparents and Grandchildren

Several systems have also been proposed in order to engage children to stay in touch with their remote grandparents. First, some focus on supporting story telling. Family Story Play [24] is a tangible collaborative storytelling interface that uses a physical book coupled with video conferencing. A web-based version called Story Visit was also created [26] where grandparents and grandchildren can read an e-book together. People in Books [9] is a shared visual space for story reading, which immerses remote readers into online storybook illustrations, giving them an illusion that they are part of the magical world. Vutborg et al. [30] proposed an asynchronous system that combines different components including collage and storytelling features where these components mediate play and oral storytelling.

Second, some systems focus on games and tangible objects to stimulate communication. Take Me With You [21] is a shared adventure game that promotes social interactions between remote grandparents and grandchildren along with physical movements in the real world reflecting an illusion of exploring a virtual world and doing shared activities together. Magic Box [29] is a physical box, which carries gifts, toys, photos, and any other special things between grandparents and grandchildren. Raffles et al. [25] developed a messaging system for preschoolers using a jack-in-the box toy with an embedded mobile phone.

Third, there also exist systems focused on grandparents who may face challenges in communicating because of their age, technical literacy, or illness [21].

Taken together, we see a variety of research on family communication and support for connecting grandparents and grandchildren. Yet we see little on how grandparents might converse with their grandchildren to learn about their life and how designs can support this aspect of relationship building. Several of the systems described above can illicit and support conversation during other activities (e.g., play), however, we have yet to see studies focused on what that conversation might specifically be about, or how conversation happens (or could) without such activities. We also did not find any literature that describes the social or cultural challenges that exist as a result of grandparent-child communication over distance.

STUDY METHODOLOGY

We conducted a diary and interview study to explore grandparent-grandchild conversations over distance from the perspective of the grandparents and parents. Our goal was to reveal how grandparents and grandchildren conversed and what social challenges they faced from the adult perspective.

Participants

We recruited 20 participants through snowball sampling, emails to teachers and parents of a local elementary school, and ads on Facebook, Twitter, and Craigslist. Half of the participants were grandparents of children between 3 and 10 years old, while the other half were the parents of children in this age range. We recruited participants with diverse demographics and cultural backgrounds. Our study was largely focused in Vancouver, Canada but due to snowball sampling we had participants from several countries: 15 from Canada (although some migrated from countries, e.g., Italy, Albany, Iran, India, Ukraine, Brazil), 1 from the United States, 3 from Iran and 1 from Australia. All participants except two were female as women primarily contacted us about the study. However, this reflects past research that shows women are typically the most involved in family communication [11,23].

Some of our participants were living in different cities than their grandchildren and some were in different countries with different languages, cultures and time differences. We included participants with different family situations, such as single parents and step-grandparents. We also purposely recruited people with cultural differences in the family due to reasons such as marriage out of faith, or immigration to a new country. We wanted to investigate if this impacted the exchange of cultural knowledge between the grandparents and grandchildren. We did not include children as participants in our study because our focus was on an adult's perspective and topics related to such a perspective (e.g., family conflict, language, methods for engaging children). We suggest that future research explores children's needs as part of such communication.

Interview Method

We conducted semi-structured interviews with each participant individually. Interviews lasted between 45 and 60 minutes and occurred in person (at the participant's home or location of their choice), via Skype, or on the phone. Interviews contained questions in several categories:

1. Background: We asked about their cultural background and family situations, and reasons for distance-separation.

2. Communication Patterns: We asked participants to describe communication with their remote grandchildren or their children's communication with the remote grandparents. We focused on the methods, frequency, duration, and the existing and desired content of communication. We also asked several gender and age-specific questions for families who had both boys and girls.

3. Communication Needs: We also asked about communication needs that went beyond existing routines. This included questions about children's activities, daily routines, developmental stages, stories, and achievements. We asked those participants living in different countries with different cultures about concerns and issues that they might have faced due to cultural differences. On the parents side, we asked similar questions but from the parental perspective.

4. Barriers and Conflicts: We asked participants about communication challenges or issues. We specifically took a look at issues around speaking in different languages and living in different time zones. We wanted to explore how these issues influenced communication, if at all. Lastly, we asked about family conflicts that might occur as a result of communication either between parents and grandparents, parents and children or between siblings of the same family.

Online Diary

After our first two interviews with grandparents, we recognized that it was difficult for them to remember the specifics of how they communicated with their grandchildren, especially if the frequency of communication was low. For this reason, we asked our remaining 18 participants to keep an online diary of grandparent-grandchild communication over a period of three weeks before the interviews. An online form asked them about their recent communication, the content of the communication, and any issues or challenges they faced. Participants filled these in after communication episodes with their grandchildren or when they thought of things to note. We read all submitted diaries prior to the interview session and focused portions of the interview on getting more detailed information about communication episodes reported in the diaries. We found these participants were able to provide much more detailed responses during their interviews. However, we still used the data from our first two interviews in our analysis.

Data Collection and Analysis

We kept handwritten notes along with audio or video recordings for all interviews. Recordings were transcribed and then we performed an analysis using open, axial, and selective coding on our transcriptions and diary entries. The goal of our analysis was to document and understand the main themes in order to provide design implications for supporting this relationship. We did not find any gender differences aside from boys tending to talk about items normally associated with 'masculinity' (e.g., armies) and girls talking about more 'feminine' objects (e.g., Barbie).

We report on the most prominent findings focused on aspects of the communication routine and the use of technology and non-technology; conversational content during communication; and, social situations and challenges. Some of our results refer to a child's perspective, yet this is the interpretation through the grandparent or parent's eyes and not the actual child.

COMMUNICATION ROUTINES

Participants described a variety of communication routines with different technology preferences, methods for engaging children, and varied timing and frequency.

Technology and Non-Technology Preferences

Both the grandparents and parents in our study actively tried to build the relationship between the grandparents and grandchildren in a variety of ways. This included having phone calls, using video chat, exchanging email, and even sending post cards or other letters to the grandchildren. The most frequent mode of communication that we learned about was the use of phone calls between the grandparents and grandchildren. These calls were either deliberately targeted for the grandchildren, or were portions of calls between the parents and grandparents that then shifted focus to having the children converse.

Despite the prevalence of phone calls, 17 out of 20 participants actually preferred to use video chat instead because grandparents could actually see their grandchildren, their growth and looks, etc. and share the viewing of objects such as books and toys. Yet many grandparents in our study explained that they were not as familiar with video chat so it was often difficult to use it. Parents similarly described this as being an issue with the grandparents. As a result, video chat was most often used in situations when other family members were around to help set up a video chat session.

Communication Frequency and Timing

Our findings showed that grandparents typically tried to communicate with their grandchildren on a weekly basis, if possible, though many participants desired to talk with their grandchildren several times a week. Some grandparents only talked to their grandchildren once or twice a month. Weekends were the most popular time for communication because of busy work schedules during the week. Frequency was also dictated by the closeness between the parents and grandparents, as well as the occurrence of holidays, birthdays, and other special events or days. Those families that had relationship issues between the parents and grandparents caused grandparents and grandchildren to rarely communicate (once or twice a year). We found that children's communication with their remote grandparents usually depended on their parents' communication with the grandparents. Mother-daughter communication was typically more frequent, thus, children generally communicated more with their mother's parents. However, this was not the case in some divorced families when children stayed with their fathers. As one might expect, time zone differences made the communication between remote grandparents and grandchildren less frequent and often limited it to only weekends.

Regardless of the technology being used for grandparents and grandchildren to communicate, grandchildren did not want to be distracted while already playing or engaged in an activity. Communication that was a part of a routine (e.g.,

the same time each week) was more likely to be received well by grandchildren than a random phone call or video chat session that interrupted existing playtime. Children would routinely get bored after short durations of conversation with grandparents (e.g., 5 to 15 minutes) with video chat calls typically holding the child's attention longer. Some children would come and go from the room as parents conversed with grandparents where they would move into and out of the conversation.

We also found that the call duration of parents and grandparents often dictated how much time the grandparents talked with the grandchildren. Grandparents who talked more with the parents (their children) tended to talk longer with the grandchildren. This was because they had 'more to talk about.' Thus, parent-grandparent conversations can act as a catalyst for grandparent-grandchild conversations.

Engagement and Awareness

In order to engage grandchildren to talk, remote grandparents actively tried to learn about their interests and then focus on these during conversations. This may come from visits to see the child in person, or discussions with the child's parent or siblings. For example, P12's mother (the grandma) always learned a lot of information about her remote grandson from her. When the grandmother talked with her grandson, she already knew who his friends were, what activities they did together and, consequently, what to talk about. This allowed her to engage her grandson on the phone for a long time. Related to this, we also found that an awareness of a grandchild's life also helped grandparents to simply feel close to their grandchildren.

"Sometimes it is nice to know if the child is sick. Some kids like a phone call from Grandma when they do not feel well. Grandma would just like to say I love you! When their grandson or grand daughter are sick, it is important for the child to know Grandma and Grandpa care also." - P1, Grandmother, Diary

Grandparents also creatively did activities with their grandchildren over both the phone and video chat. For example, P2 whose grandson was interested in armies, camouflage, and going out hunting, made a blanket with camouflage to build a closer relationship with him. They spent large amounts of time talking about the blanket and making a story around it whenever they talked.

In addition to the above, grandparents also had particular topics or themes that they tried to focus conversations around in order to engage their grandchildren. We describe these in the next section.

CONVERSATIONAL CONTENT

All conversational content tended to favor recent activities as this was what the grandchildren would most often bring up. Children younger than five years tended to focus on describing the immediate or recent past (e.g., the past hour), even if the activities were short in duration and of everyday

mundane things that might have little significance to the grandparents; prior research has also showed conversational focus on current activities [8]. Children older than five years discussed recent events but would go further back in time to talk about the current day or past week. Their descriptions were also of longer-term activities.

“My grandson told me that while they were at their farm, he was towed behind the tractor on ski and then he tried to drive the tractor.” – P2, Grandparent, Grandchild Aged 6

Our analysis revealed that conversations between the grandparents and grandchildren focused around several main themes: learning, unexpected ‘stuff,’ storytelling, sharing experiences, and cultural exchanges. Some of the examples that we learned about fell into multiple categories; thus, they are not mutually exclusive groupings.

Learning Activities

We found that grandchildren often talked with their grandparents about what they learned, given the frequency of this activity at school, pre-school, through home activities with parents, or at extracurricular activities like sports. They liked to talk about or show their abilities, in particular, new ones, such as singing a song, reading a book, or showing their artwork and drawings.

“My daughter reads books for [her grandparents] in English although she knows that they cannot understand English at all but the way that the remote grandparents enjoy her reading encourages her to read for them.” – P10, Parent, Children Aged 3 and 7

“We talk a lot about synchronized swimming when I talk with her because that’s the focus of her life right now” – P7, Grandparent, Grandchildren Aged 4 & 6

“She had told me that she wanted to tell her grandmother that she had swam in the shallow end of the pool from one side to the other without help.” - P18, Father, Diary

In many cases, video chat worked better for sharing learning activities because grandparents could actually see the child showing them the new skill or book they were reading. However, sports activities were routinely difficult to share over video chat because they occurred away from the home.

Unexpected ‘Stuff’

Grandchildren also liked to follow and talk about unexpected happenings in their grandparents’ lives. Thus, while children were keen to share everyday mundane things about their own life, their interest in their grandparents lives was more ‘high level’ where they talked about unexpected things. For example, one grandchild was surprised to learn that his grandparents lived in a different time zone (12 hours difference) and had different notions of day/night:

“My 6 year old grandson asks me whether it is day or night at my side and sometimes reminds me that he knows that

although its night for him it is my daytime.” – P4, Grandparent

P7 had a similar situation that revolved around different weather patterns. She lived in the same country as her grandchildren but with a different climate:

“They think it’s very cool that we have snow and I think it’s very cool that they don’t.” – P7, Grandparent Grandchildren Aged 4 & 6

Storytelling

As expected, children loved when grandparents told them stories. This included bedtime stories, fairy tales, and also real family stories. Grandchildren were also particularly interested in stories about their parents when they were kids, what it was like for the parent to be a child, or what the grandchildren were like when they were born.

Some grandparents were also very creative when telling stories to their grandchildren and would turn it in to an interactive game. For example:

“I’ll start the story and then they continue it, and I’ll continue it, that sort of thing, alternating. So, we make it up.” – P7, Grandparent, Grandchildren Aged 4 & 6

Another grandparent leveraged artifacts from her travels to create special stories:

“One thing we do – my husband and I, often go on trips. one way we have communicated, and that has been quite fun, is to collect a number of postcards from everywhere we went, and then create a story and write one line of one sentence of the story on each of the postcards and mail it from a different city so that when we got home, they might have got 30 different postcards and a complete story. You know, that has been fun.” – P2, Grandparent, Grandchild Aged 6, Step-grandchildren Aged 4,5, & 6

Sharing Experiences

Grandparents and grandchildren also shared their experiences with each other. This related to either grandparents or grandchildren talking about their travels to new places or talking about shared interests and passions, or the grandparent’s occupation.

“Whenever I’m in exotic places, I send them post cards, ..., and they know that grandma travels, so when I go to visit, or sometimes they’d tell me... we talk about different places I’ve been, and they say, “grandma, have you been to blah, blah, blah?” – P5, Grandparent, Grandchildren 5 & 7

P13 described how her daughter (aged 8) had read a book about endangered animals and wanted to have a website created so she could write about it. Her ‘granny’ had a blog and so they had a long and interesting conversation where granny talked about blogs, webpages, and the difference between the two. They also talked about what kind of animals the granddaughter wanted to write about and how she was going to research and read about them for her blog.

Participants also described talking and reminding grandchildren about physical and shared experiences that they used to have with each other. For example, P2 used to make cookies and biscuits with her step-granddaughter (aged 5) whenever they visited each other and they usually talked about this when they were on the phone.

Cultural Exchange

Some grandparents and grandchildren also talked about big cultural events like Christmas, Thanksgiving, Easter, Halloween, and New Year celebrations. Both parents and grandparents liked the grandparents to talk about cultural events and heritage with remote grandchildren. This included simple conversations such as asking what gifts children received for a holiday, and also more detailed descriptions such as the meanings behind holidays. The extent to which this happened depended on the children's age, their interest, and family background. For example, grandparents that had different cultural backgrounds than their grandchildren sometimes talked about their own cultural celebrations.

"I think ritual and tradition also help to give people a sense of their place in the world and their history and their roots, a sense of belonging, and it's really important." – P6, Grandparent, Grandchild Aged 7 & 9

While beneficial for some, we elaborate on the challenges with cultural exchanges in subsequent sections.

SOCIAL SITUATIONS AND CHALLENGES

We also found additional social situations and challenges emerge as a result of communication between grandparents and grandchildren. These related to being recently separated by distance; parental support; self-consciousness and perceived annoyance; or, being of a different culture.

Becoming Separated by Distance

We found that communication between grandparents and grandchildren was often especially challenging right after separation. For example, several participants described how their grandchildren refused to talk on the phone or use video chat with the grandparents for the first few months after one of the parties moved away. This happened for all four families in our study where grandparents and grandchildren lived close by and then one party immigrated to a country far away. The grandchildren wondered why they had to move apart and felt resentment towards the situation. Once communication resumed, the grandchildren would remind the grandparents about emotional moments that they had with them to make sure that the remote grandparents still loved them despite the distance separation. For example, P3 said her grandson frequently asked her: *"Granny, did you remember that you used to tell me a story and I used to sleep in your arms when you were here? Would you do it again when you visit?"*

Parental Support

Our results also showed that some parents liked to have remote grandparents support them and become more

involved in their children's activities from a parenting perspective. This most often occurred in households with single parents or parents with busy schedules, or when the grandparent's profession related to the support needed (e.g., a school teacher). For example, P10, who is a single mom and working full time said:

"I like my parents to read books for my children over Skype while they want to sleep or help my daughter in her math problems and homework." – P10, Parent, Children Aged 3 & 7

Grandparents also offered parental support for situations where they may know more about a topic than one of the parents. For example, one parent talked about how 'grandpa,' a dentist, was especially valuable to have talk to her son because of his occupational experience:

"Few months ago my son had some tooth problem and went to dentist. As my father is a dentist too, my son told the story for him and I asked my dad to remind hygienic routine to my son. My son enjoyed this practice and showed his teeth and the way he was brushing in a video chat to my dad. My father keeps looking at his teeth and pretends that he is checking up his teeth. My son encouraged taking care of his hygienic routine more." – P5, Parent, Child Aged 5

In addition, we also found that remote grandparents can become more involved in activities or topics where there is a lack of support or interest from the parents. For example, P2 described how she talked with her grandchildren about things that were not of interest to the children's parents:

"Animals. That's a huge, huge thing for one of [my step-grandchildren]. It might be more important to another if mom and dad were into animals, but they were not." – P2, Grandparent, Grandchildren Aged 6, Step-Grandchildren Aged 4, 5, & 6

While parental support by grandparents was certainly valuable, some grandparents described how they did not want to overstep their bounds and infringe on the parenting styles of their children.

"I deliberately behave like a grandparent, not like a parent. We would resist interfering with their discipline because it feels then like you're criticizing the parent." – P7, Grandparent, Grandchildren Aged 4 & 6

Similarly, some parents talked about how they did not want the grandparents to influence certain child behaviors.

"Some of the language from my father-in-law could be toned down. You can't just tell kids that 'if I were you, I'd just go and tell them I'm gonna kill you.' You can't say that in front of kids." – P13, Parent, Children Aged 5 & 8

Self-Consciousness and Perceived Annoyances

All grandparents in our study felt that being separated by distance from their grandchildren weakened their emotional bond with their grandchildren. This made some grandparents apprehensive or self-conscious when

communicating with their grandchildren because they did not want to provide unneeded advice or annoy them by asking them about their unpleasant experiences.

For example, P2 described how she wanted to talk about her grandchildren's passions but this could easily change and she did not want to be embarrassed by asking about the wrong thing. She also did not know if her grandchildren were having bad experiences with their activities and did not want their short amount of conversational time to focus on negative thoughts:

"I would like to talk about whatever their passions are. One of them is hugely interested in animals; one is interested in language, stars, geography and history. One of them is going to a French and Russian school and not really enjoying it, so he doesn't want to talk about or talk in French at this stage. I'm just trying to build relationship with them wherever they are." – P2, Grandparent, Grandchild Aged 6, Step-Grandchildren Aged 4, 5 & 6

Similarly, P5 described wanting to know about a potentially unpleasant topic:

"You want to find out a little bit about the kind of people they are and also to watch their development... My grandson just last week was writing a test to get into a school in his area. So, I was very interested in how he did in the test. Was he anxious? Did he feel comfortable? And it will be interesting to see if he does get chosen." – P5, Grandparent, Grandchild Aged 7

Interestingly, we found out that while grandparents were interested to know about almost every detail of their grandchildren's lives, they did not want to bother them by asking 'too many' questions. Grandparents expressed a similar sentiment about asking parents too much information about their grandchildren. Thus, they perceived that the other parties might be annoyed with their questions. Because of this, nearly all of the grandparents we talked to did not push their grandchildren to talk about things. Instead, they preferred that their remote grandchildren directed the conversation and talked about what they wanted. This is surprising given the age and (lack of) conversational abilities of young children.

In cases where grandparents were part of divorced families or were step-grandparents, grandparents were additionally concerned about the focus of conversations with their grandchildren and 'saying the wrong thing'. This was despite having 'good' relationships with the parents and grandchildren. As one might imagine, situations like these were even worse when there *were* relationship issues between grandparents and either or both parents.

Cultural Differences

As mentioned, some grandparents really liked to share cultural knowledge with their grandchildren (e.g., traditional cultural holidays). This was especially the case for grandchildren who had moved away from one's native

country (e.g., grandchildren living in Canada after moving from India). However, this also raised challenges. First, language was often an obvious barrier. Some grandchildren simply did not speak the same language as their grandparents, or their grandparents did not know how to say words associated with cultural events in the language that grandchildren understood. Second, in some cases, grandparents told us they would prefer not to overwhelm children with knowledge about their original roots because they felt that remote grandchildren had a lot of other things to deal with already. Instead, grandparents wanted to talk about the new culture of the grandchildren, despite a longing to share their native roots and traditions.

Exchanging cultural knowledge was also challenging when cultures clashed, such as when people were married 'out of faith' or with a person of another nationality or religion. For example, P5 described religious issues around holidays:

"I would like to talk more of our religious holidays but it's difficult because they celebrate more of the Christian, because of their father's family." – P5, Grandparent, Grandchildren Aged 5 & 7

Because of situations like these, many grandparents in our studied simply tried to avoid such conflicting topics:

"I think you have to be very careful as a grandparent to recognize the boundaries, recognize the limits." – P7, Grandparent, Grandchildren Aged 4 & 6

On the other hand, parents' opinion about grandparents talking with the grandchildren about culture, religion, and heritage varied depending on personal attitudes, family backgrounds, or personal preferences. Several parents said that they did not like grandparents to talk about 'religious stuff' with their children, while others were okay with it.

DISCUSSION AND DESIGN IMPLICATIONS

We now summarize our results, compare them to the related work, and describe the implications for technology design.

Communication Routines

Our results described the communication routines of grandparents and grandchildren, which mostly focused on phone and video chat conversations. Previous work primarily focuses on understanding how children can be engaged through shared activities such as reading books or playing board games [3,26]. However, we have found that grandparents are also able to engage children with direct conversation. Thus, feelings of closeness and togetherness are also coming from shared awareness through conversation. For grandchildren, this comes from a high level understanding of major events in the grandparents' lives. For grandparents, this comes from low-level detailed knowledge about the grandchildren.

Overall, this suggests that, in addition to the systems we see in the related work that already focus on storytelling and activities, grandparents and grandchildren would also find value in systems focused on shared conversation. These

systems should certainly be easy to use such that even grandparents and young grandchildren who have minimal knowledge of computers can use them without extra help. We also recognize that children have limited attention spans and may value conversing intermittently in more of an asynchronous manner; in general, grandparents like to ‘talk more’ and children like to ‘talk less.’ This suggests grandparent-grandchild conversations may best be supported through a mixture of asynchronous and synchronous technologies. If children are interested in talking for longer periods of time, they can use tools such as video chat. Yet those with more limited attention span in the current moment may benefit from the ability to record and send messages back and forth with grandparents. One may also consider video chat with multiple cameras or displays that allow children to migrate between rooms.

Conversational Content

Our results also showed that the content of conversations between grandparents and grandchildren is focused around new ideas and skills that children have learned, unexpected ‘stuff’ and interesting situations in both parties’ lives, storytelling of both a fictional and real life nature, sharing experiences, and cultural exchanges. Each of these presents design opportunities for new communication technologies for grandparents and grandchildren where the majority are not described in the prior research. The related work has shown the large interest that children have in reading and listening to stories over distance [3,26]. We build on this understanding to show children would also love to hear stories about their parents when they were children or themselves when they were born. Thus, our work highlights the importance of personal stories, in addition to fictional stories from books.

This suggests that designers of communication technologies for grandparents and grandchildren could focus on enabling them with storytelling tools or features in an interactive and engaging way that can allow them to talk about their experiences such as traveling to new places with their remote grandchildren or telling them real stories where grandchildren or their parents are the main characters. This can even go beyond the idea of seeing ‘talking heads’ tell stories to incorporate real world visuals, pictures, and media that (e.g., [21]). This avenue may also allow grandparents to share cultural knowledge, if desired by the parents, where cultural stories could be embedded within communication technologies.

Beyond storytelling, we also see design opportunities for communication technologies to allow grandparents to support grandchildren in showing them the things they have learned to do, as well as the experiences they have in-the-moment (e.g., sports events [13]). This is a rich new area which has a high potential for technological improvement.

Social Situations and Challenges

Our results also described the social situations and challenges that can emerge for grandparent-grandchild

communication over distance. These are not reported in the prior literature and present many interesting design challenges. Most importantly, they show that grandchild-grandparent communication is not always the ideal situation that much of the related work paints a picture of; conflict and difficult situations can easily emerge.

Becoming Separated by Distance

First, it can be especially challenging for grandparents and grandchildren to communicate when distance separation first arises. Thus, even the best-created design solutions (e.g., systems proposed in the related work [3,15,16,21,26]) may not be used by grandparents and grandchildren in real situations where separation has only recently occurred. Technology designs for cases of recent separation may best be focused on reminiscing about the mutual memories that grandparents and grandchildren hold. There may also be great value in using technology to show that grandparents still love their grandchildren (e.g., a huggable teddy or doll that ‘transmits’ such emotion). Then, when grandchildren are ‘ready,’ designs that allow them to share aspects of their new life with their grandparents may be beneficial.

Parental Support and Scaffolding

Second, we also found that some parents valued grandparents providing parental support during communication with their children. This was more desirable in divorced families where only one parent was taking care of the children, new immigrant families where parents were struggling with day-to-day responsibilities, or situations where parents did not have the necessary knowledge.

As a result, communication systems that allow grandparents to remotely help grandchildren with certain activities would be valuable for some people. Activities may include homework, extra-curricular planning, teaching a native language, or learning hygiene practices (e.g., brushing one’s teeth). In such situations, careful and creative design is needed in order to provide a shared space for both parties to interact in where objects can be seen and gestured at. One must also consider real world privacy issues that might arise from the natural locations for such activities (e.g., a bathroom for teaching hygiene practices), as well as the social issues that could emerge where some parents may not want grandparents to ‘interfere’ past a certain threshold or introduce particular behaviors.

The related work has shown the need for parental scaffolding for grandparent-grandchild conversations over video chat because of technical challenges [1,19]. Because of this, one may naively try to design video chat systems that removed the need for such scaffolding. However, this could easily create additional social tensions as some parents may, again, be concerned about grandparent interference in daily life, especially if they are not present during grandparent-child interactions. In turn, grandparents may be concerned about over-stepping their bounds if parents are not around. While cumbersome, parental scaffolding allows parents to observe grandparent and

grandchild interactions to ensure they are desirable. Removing such scaffolding completely may introduce new problems. This suggests designs should attempt to mitigate parental scaffolding challenges, while still encouraging parental supervision during communication sessions.

Self-Consciousness and Perceived Annoyances

Third, despite being the older, experienced person in life, grandparents were sometimes self-conscious during conversations with their grandchildren. They did not always know what to talk about, did not want to make grandchildren upset, and did not want to feel like they knew little about their grandchild and exacerbate the feelings of a lack of connection. Moreover, even though they wanted to know lots of low level details about their grandchildren, they did not always want to ask because they perceived that the grandchildren or their parents may become easily annoyed. This is a social challenge that technology cannot solve alone. Yet one could think about focusing new designs on trying to foster confidence in grandparents by providing them with more information about their grandchildren without forcing them to ask or be told.

For example, one might imagine awareness systems, such as a shared family calendar, as providing an awareness of a grandchild's life to the grandparent. These systems can update grandparents in the background about topics that children are not interested in talking about. Designing applications that encourage children to provide information offline about their daily life, friends, and school activities in the form of paintings or other media could be also useful. This information could be used to increase the grandparent's true knowledge of the child and act as seeds for conversation. Grandparents may then feel more confident that they know information about their grandchildren, which could in turn reduce feelings of perceived annoyance since they may have to ask less in order to learn all of the details they are interested in knowing about their grandchildren.

Exchanging Cultural Information

Lastly, we learned that exchanging cultural information between grandparents and grandchildren was valued, yet it was sometimes difficult because of language barriers and other clashes of culture. This suggests design opportunities for cultural exchange between grandparents and grandchildren. Here it would be important that designers consider the effects of different languages on shared information and, possibly, even provide support for language learning for grandparents, grandchildren, or both. Designs could leverage existing storytelling systems (e.g., [3,24]) and couple them with stories focused on cultural knowledge exchange or the use of visual content as opposed to language-specific text. Of course, we also saw tensions about when and how to share cultural knowledge with children and this would need to be carefully thought through such that designs were targeted at appropriate ages.

Study Limitations

While valuable, our research also had several limitations. Our methods were largely retrospective and we did not observe any communication in practice because of concerns about behavior change during such observations. Results may have also been stronger if we had interviewed dyads of grandparents/parents. This would have allowed us to hear both sides of the story to understand social challenges, issues, conflicts, etc. Unfortunately we faced many real world challenges in finding study participants that fit our demographics. There were also sometimes language barriers which meant it would not have been possible to interview some dyads. We also suggest that future research explore children's perspectives on grandparent-grandchild communication to complement our study.

CONCLUSION

Our paper contributes a study of the routines and needs of grandparents and parents for grandparent-grandchild conversations over distance. Through a diary and interview study we found that distance-separated grandparents and grandchildren usually communicate around several main themes, including recent learning, unexpected 'stuff', storytelling, sharing experiences, and cultural exchange. Parents also desire parental support to varying degrees. While grandparent-grandchild communication is highly valued, it is not without its challenges. Both parents and grandparents must deal with social issues that arise from potential interference, a lack of truly knowing one's grandchild (leading to self-consciousness and feelings of perceived annoyance), and cultural differences. This suggests a new perspective for the design of grandparent-grandchild communication systems that attempt to balance the need for information exchange and support with solutions to the social issues being faced.

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