Lessons Learned: Engaging Older Adults in Generative Design Sessions for a Digital Messaging System

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Abstract. The global population continues to age within an increasingly digitally connected society. Because of the ubiquity of technology, the needs, experiences and values of older adults should be considered to ensure they are not excluded from any advantages the digital society may provide. Engaging in generative design research allows users to collaborate with designers to uncover those needs as well as discover creative solutions to design problems. This paper explores the results of three generative design sessions conducted with older adults to gain insight into the feasibility of a digital messaging system designed to foster their inclusion in the digital society. Immersion and card sort sessions revealed the value placed in face-to-face communication with peers, while the card sort and brainstorm sessions highlighted health as a possible theme to be further explored. Additionally, the brainstorm session concluded with the creation of a rudimentary prototype, reinforcing the creativity older adults can bring to the design process. While the feedback generated from the sessions may not have supported the initial idea, they showed that the contribution of older adults in the design research process should not be understated.

Keywords: Generative design · Older adults · Digital society

1 Introduction

Generative design research can help designers explore people's values and needs and uncover solutions to design problems which may not be initially evident [1]. This type of research can be especially insightful to address the design of digital products, systems or services for older adults. Although technology adoption is increasing among older adults, they continue to face hurdles, including lacking confidence in their abilities to perform tasks effectively and needing to be shown how to use new devices due to ineffective usability [2].

Because technology has become so pervasive, concrete steps should be taken to foster the inclusion of older adults into the digital society. To help overcome the aforementioned hurdles, older adults should be involved in all stages of technology design as a means of understanding their needs via insight into their social influences, experiences, preferences and usage patterns [3].

This paper discusses the results of three generative sessions used to explore the viability of a proposed solution to address the problem statement: "Design a product, system or service to foster inclusion of older adults in our digital society." After a brief review of the literature on the use of generative or participatory design methods with older adults, the paper will describe the methods employed in this study and the data collected. Finally, the paper closes with a discussion of the findings, including lessons learned, and offers conclusions.

1.1 Generative Design and Older Adults

In the generative design research process, the researcher becomes a facilitator of collective creativity, where designers and non-designers collaborate to explore problems and opportunities [1]. Gatsou [4] viewed designers and researchers as facilitators who helped users express their ideas and become creators of artifacts. Incorporating generative design methods can help designers identify themes they may not have previously considered; it also fosters user creativity and buy-in.

Lindsay, Jackson, Schofield, and Olivier [5] argued that older adults should be engaged in the design process from the beginning as partners and active participants, not as an afterthought. Though older adults' potential lack of experience with technology may result in technologically impossible designs, this should not preclude them from being involved in the creative design process [6]. In fact, Kristensson and Magnusson [7] found that everyday users have the ability to produce cutting-edge ideas. Accordingly, Ostlund [cited in 8] advised designers to capitalize on the older adult's capacity to learn new technologies because of their exposure to a multitude of technological changes.

1.2 Older Adults and Technology

In 2017, adults aged 60 and over made up 13% of the global population; the United Nations projects this number to increase to 21.5% by 2050 [9]. It should be noted that as the world's population ages, older adults are becoming increasingly more digitally interconnected. For example, in 2013, 23% of American seniors reported owning a smartphone; this number rose to 42% in 2017 [2]. This increase is not geographically limited; for example, in 2013, 36% of Russians and 43% of Chileans aged 50 and over reported accessing the internet or owning a smartphone [10]. The benefits of engaging older adults in the digital society are increasingly positive.

And they want to be included. Fifty-eight percent of adults aged 65 and older agreed that technology's impact on society has been mostly positive [2]. Lewis and Neider [11] and Satariano et al. [12] highlighted how technology can reduce social isolation by increasing the number of avenues older adults can use to connect with family and friends. Finally, the results of a 2016 study by Juárez et al. [13] showed that older adults who used technology had greater socialization and more intergenerational communication with their family and acquaintances.

1.3   Problem Statement and Proposed Solution

As part of the Design Theory and Methodology module for the M.Sc. in Interaction Design at Cyprus University of Technology/Tallinn University, students were tasked with tackling the problem statement: "Design a product, system or service to foster inclusion of older adults in our digital society."

The results of ethnographic and observational research guided the features of the proposed solution targeted in this paper: it would offer a non-intimidating interface, take advantage of existing community structures and provide prompts for users to engage with others within a social network. Tentatively titled RAPP Connections (Responsive Application for Peer to Peer Connections), the tablet-based digital messaging system would allow the older adults living within a retirement community to connect directly with each other. The objective of the system would be to integrate messaging technologies into everyday living, foster the creation and nurturing of social networks, and reduce social isolation. It would also facilitate both online and face-to-face social interactions via calendars on the interface detailing upcoming activities within the community, along with prompts for residents to invite friends who have similar interests.

2   Methods

The generative sessions focused on informing the viability of the digital messaging system by observing older adults' day to day living and exploring what is valuable to them.

2.1   Participants

Three participants were recruited through family members and acquaintances. The only screen for inclusion was age.

P1 is a 71-year old retired female living in an independent living retirement community. She is comfortable using her laptop, Smart TV and cell phone.

P2 is a 77-year old male, who is semi-retired and lives alone. He has worked in electronics for over 30 years and is very comfortable with personal computers and laptops. He is comfortable using basic functions on his cell phone.

The final participant, P3, is a 66-year old male, who is also semi-retired and lives alone. He is comfortable using a laptop and cell phone and is a judicious user of mobile communications applications such as WhatsApp.

2.2   Procedure

The generative design sessions were guided by the methods outlined in IDEO's Field Guide to Human-Centered Design [14]. The first author acted as facilitator, conducting and recording all sessions.

Immersion. The immersion technique requires spending time observing and listening to the intended user of the design, essentially gaining a view of their everyday life [14].

The method was chosen for two reasons: the environment was a direct match for the scope of the digital messaging system and the data gathered could directly inform whether it would satisfy an actual or perceived need.

P1 was observed both within her home and in the common area of her independent retirement living complex, allowing for physical details and routines to be observed. Upon entering the building, photographs of the common areas were taken; photos were also taken of the main living area in her home. The next 60 min were spent visiting and talking about her life.

Card Sort. Card sorts can provide insight into what is important to a user [14]. This session focused on discovering the participants' top personal values and exploring why their choices resonated most with them. A secondary goal was to see if their values aligned with the words best describing the perceived benefits of the digital messaging system.

P2 and P3 were given 50 cards from the Personal Values Card Sort [15]. A sampling of the cards is shown in Fig. 1. They were asked to sort them into three categories: Not Important to Me, Important to Me and Very Important to Me, as displayed in Figs. 2 and 3. If more than 10 cards were placed in the Very Important to Me category, participants were asked to narrow down their choices. Once each sort was completed, the results were photographed and the top three common choices in each category were identified. The participants then discussed the reasoning behind their final selections.

Fig. 1. Sampling of cards for card sort session

Brainstorm. Brainstorms stimulate creativity from collaboration and are fueled by the goal of generating a multitude of unfettered ideas and solutions [14]. The focus of this sixty minute session was to generate as many ideas as possible related to the design problem and to gain insight into the problem statement from the perspective of the users. Participants had access to a number of tools to encourage creativity, including paper, pens, pencils and markers. They were also given Post-It notes on which to record their ideas. The problem statement was written on a poster board and placed in the middle of the table. We began with a review of the basic rules (i.e., there are no right or wrong answers; judgement should be reserved until the end of the session) [14],
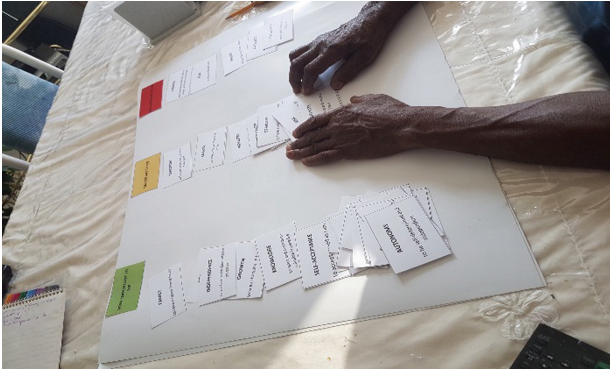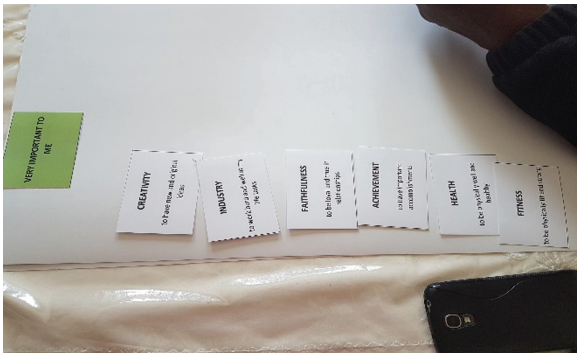
Fig. 2. P2 completing the card sort

Fig. 3. P3 completing the card sort

and participants were instructed to write down their ideas on the Post-It notes and stick them on the poster board. The facilitator took audio and video recordings, as well as photographs, of the session.

3   Results and Discussion

The main observations of each session and key findings are discussed.

3.1   Immersion

Observations. P1 lives in a one-bedroom apartment within a managed building for independent seniors. The common areas within the building include, among other dedicated spaces, a large TV room and Arts & Crafts room. The bulletin board near the main entrance featured flyers advertising upcoming events within the building and messages outlining rules and safety.

After entering P1's home, the facilitator observed a smartphone, laptop, printer, and Smart TV. P1 immigrated to Canada 20 years ago and remains connected to her country of origin via family members and online. During the observation, she turned on the television and Apple TV and searched YouTube for news from "back home". We watched news stories and discussed current events. She prepared a traditional snack for the facilitator and we continued to discuss her experience living in the retirement community.

Findings. The immersion session helped inform thoughts around social interaction within the environment. In spite of P1's comfort with technology, communicating digitally within a closed environment did not appear to be important or useful to her. When asked how she connected with her neighbors, she stated that she would go to their apartments to see them in person to chat or see them around the building in the common areas. Accordingly, she preferred face-to-face interactions with her friends in the city as well. And when asked about the building's organized activities, she stated that she enjoyed participating in them and checked the bulletin board every week to plan her time. For P1, the value of the features of the digital messaging system may be minimal. A product, system or service which would enhance communication with loved ones who are far away may be more beneficial.

Ideally, the session should have been conducted over the course of several hours to a day, but time constraints did not allow for that to occur. In the future, it is also recommended that more immersion sessions be completed with other residents within that same community or residents living in other, similar environments.

3.2 Card Sort

Observations. As shown in Fig. 4, Health, Faithfulness and Achievement were the top three shared choices in the Very Important to Me category. Table 1 features the participants' explanations of why these particular values are very important to them.
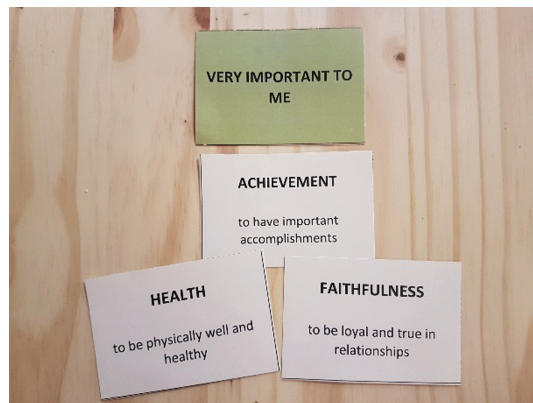

Fig. 4. Top three selections common to both participants

Table 1. Reasoning for card sort selections

Very important values	P2	P3
Health - To be physically well and healthy	"My back and knees hurt when I don't exercise. I do 10–15 min of weights every day. I want to live as long as my mother!"	"I have friends who take meds for every little thing. I don't want that."
Faithfulness - To be loyal and true in relationships	"I have some good friends. (Name redacted) took me for lunch this week and paid - I paid last week."	"I hang out with my buddies all the time. Some of these guys I've known for years and years."
Achievement - To have important accomplishments	"I've done a lot in my life…but I still have another 20 years left in me!"	"I have all these business ideas…so many. I had that one cool business that made a lot of money. I need to do that again."

Findings. Words in the card sort aligning most closely with the proposed solution included: Family, Autonomy, Communication, Friendship, and Commitment. While P2 categorized family as being Very Important, P3 viewed it as Important. None of the other words were deemed very important by either participant. Research has shown that the personal values someone adopts or finds significant can reveal insight into their consumer behavior [16].

Both participants mentioned friends when discussing faithfulness and when asked to elaborate stated they valued face-to-face communication with their network when possible. If he could not communicate in person, P2 preferred phone calls, followed by email. P3 also preferred phone calls as a second means of communication, followed by texting. Therefore, if within close proximity to their networks, they would take the time to travel and meet in person.

Though these two participants currently live independently, their input regarding preferred communication methods was valuable. One could surmise that even if their living arrangements change as they age, faithfulness as a personal value will remain very important to them - as will the significance they place on face-to-face communication - and they would continue to seek out in-person interactions for as long as they could.

With only two participants, the captured data were clearly limited. However, it would be relatively easy to expand the reach of this session (for example, by offering the card sort online) to increase the number of participants and collect more data.

3.3 Brainstorm

Observations. P2 and P3 participated in this session. They did not follow the convention of writing their ideas and thoughts down on the Post-It notes, and instead expressed their ideas in a stream-of-consciousness manner. The facilitator ended up recording the main ideas on Post-It notes and posting them on the poster board while

simultaneously taking photos and videos. Audio was continuously recorded throughout the entire session.

After visually defining the problem statement, P3 kicked off the session by discussing the computerized version of the Solitaire game:

> P3: You know the games that are on computers? Have you looked at them? They had games like solitaire and different kinds…FreeCell…do you know why they had those games on there? Lots of people know how to play those games just using ordinary cards, you know. But they were trying to teach people how to drag and drop. In the process, these guys thought they were playing a game…
>
> P2: But they were actually learning a skill…
>
> P3: They were learning a skill…and also some of these things were to make them not afraid of the computer. But actually, that's the whole idea behind solitaire and FreeCell.
>
> P2: Because then you're masking it under something else.
>
> P3: You know this thing - castor oil? It was nasty. My mom used to give it to us in… ginger [ale] or whatever so it would go down easily. But then someone came up with a brilliant idea - put it into a capsule. You just swallow the darn thing and you don't taste it. They drink water and it does its job.
>
> P2: Same with garlic.
>
> P3: If you're trying to create a product…if they find it intimidating - but something that they're doing without even knowing that they're doing it. So, what do seniors do now…?

The participants continued to discuss instances where friends came up with creative solutions to problems. The highlight of the brainstorm session occurred near the end.

> P3: One thing might be to think of a difficulty they are having and come up with something for them.
>
> P3: What happens [when we age]? Sometimes the memory goes. Generally, as you get older you take more meds…sometimes people forget so they have those dishes for pills for days of the week. So, on Sunday you fill the whole thing and every day you take one. But you're also thinking digital world. You could come up with something like…Yes, we're going to build the product.

He proceeded to pick up nearby objects and build the rudimentary prototype shown in Fig. 5.

> P3: So, these holes are the days of the week. Say they have to take it at 12 but if it's after 12, and they don't take the pills - if they don't take it, an alarm goes off. If this is filled, the alarm goes on. As soon as the pill's out, it goes off.
>
> P2: A medicine cabinet alarm…yeah - it can have a light too for people who don't hear well.
>
> P3: Exactly. And to go even further, maybe it can send a text message to my phone if I forget to take my pill.
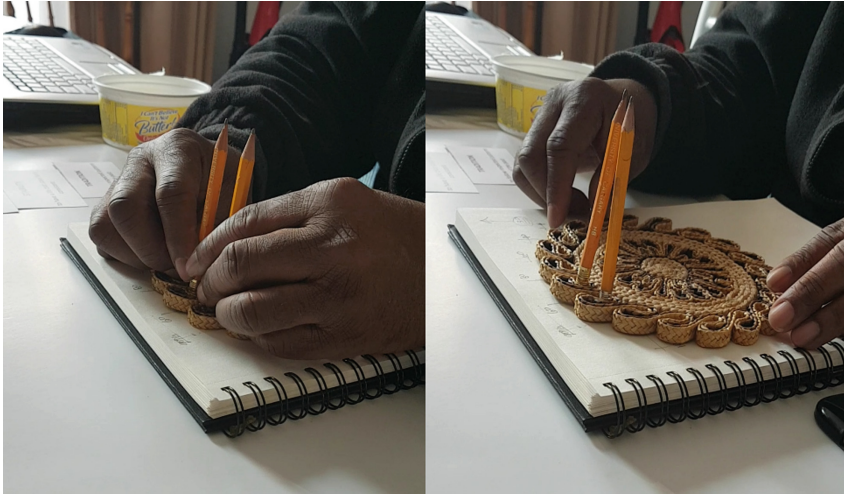
Fig. 5. P3 making a rudimentary prototype from everyday objects

Findings. The brainstorm session became a "making, telling, enacting" session [1], with P3 making a prototype and using it to tell a story about how it might solve the design problem. Ultimately, the session concluded with a creative solution which capitalized on a schema, or existing behavior or thought pattern, to create the digitized version of a familiar product.

The entire exchange also reinforced the importance of patience in facilitation: the facilitator sat back and did not interject and judgment was reserved until the session reached its natural conclusion. It would have been interesting to see what other ideas could have transpired from a larger, more heterogeneous group.

4   Lessons Learned

A number of salient points emerged from the generative sessions. First, the proposed solution was based solely on the results of ethnographic/observational studies and a literature review. However, it became apparent that further exploration was needed to determine whether enhancing digital communication between older adults was truly a problem to be addressed. For instance, these three participants all valued face-to-face communication more than communicating digitally. In addition, they were comfortable and satisfied with existing technological tools. Even for P1, who is living within the environment in which the digital messaging system would be used, the perceived usefulness could be considered low. Perceived usefulness is one of the key variables related to pre-implementation technology acceptance, or a person's intention to use a technology that has yet to be used [17]. The results of the generative design sessions demonstrated that the messaging system may not be as useful as was assumed.

Second, the characteristics of the target audience could have been more clearly defined beyond the age demographic. During the brainstorm session, P3 reflected on the phrase "inclusion in digital society":

> P3: How would a person be classified as being already included? For example, if an older adult plays a lot of video games, does that include them? If a person owns a computer and goes on the Internet, are they already included?

Narrowing down the scope at the beginning would have provided more guidance to the project, including outlining more specific criteria for participant inclusion in the generative sessions.

Finally, although the results of the sessions did not appear to support the proposed solution, the experience was not unsuccessful. The sessions ultimately identified a new theme for further exploration: health. Health featured prominently in both the card sort and brainstorm sessions. Moreover, in the card sort, the word Fitness was deemed Very Important to P3 and as Important to P2, reinforcing the theme. Based on the feedback from these sessions, a solution encompassing this concept could be more suitable. Figure 6 summarizes the process starting with the proposed solution, incorporating the design sessions, highlighting the common preferred mode of communication and culminating with the shared theme of health.
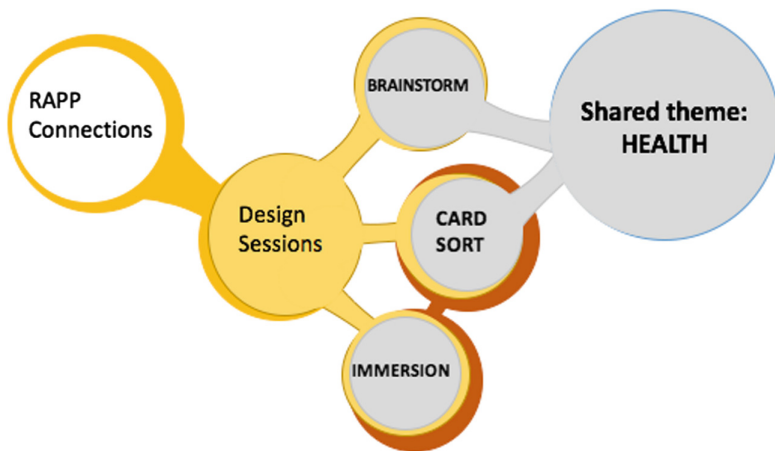

Fig. 6. Big picture summary of the generative design sessions

5   Conclusion

The feedback from the generative design sessions with older adults reinforced the importance of engaging users in the design process. The sessions generated valuable information about experiences, preferences and influences which could not have been gleaned from observational studies, leading to greater insight into the problem statement and the proposed solution of a closed digital messaging system. A number of themes materialized, including the value placed on face-to-face communication, which

could potentially invalidate the proposed solution. However, another theme emerged – health – which the facilitator concluded warrants further exploration. The findings also triggered the consideration of complementary factors such as technology acceptance and cognitive schemas, both pertinent to design research.

Overall, the sessions tapped into the older adults' wisdom and creativity [18], yielding imaginative ideas and artifacts that would not have been generated without their participation.

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