Intergenerational Aid in the 21st Century

Exploring the role of digital support in the day-to-day lives of seniors and younger persons.

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INTERGENERATIONAL AID FOR DIGITAL INCLUSIVITY

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01

Abstract

As digital immigrants of the 21st century, the current elderly always seem to have difficulty catching up with today's technologies. When day-to-day services like banking, healthcare, travel, etc., become entirely digitized without giving seniors the required time, education, or support to get on board, it gradually chips at their independence, dignity, and agency. To keep afloat in this rapidly digitizing world, most seniors find themselves relying on assistance from the people around them, such as younger family members, neighbors, friends, and community volunteers. This research explores the various facets and multitudes of digital support that younger persons commonly provide seniors. **What factors influence this intergenerational digital support between seniors and younger generations? What is the role of technology and its design in this context?**

Through qualitative interviews and participatory workshops, this thesis delves into the perspectives and lived experiences of various stakeholders like seniors, younger generations, community volunteers, tech coaches, etc. The research is also fundamentally informed by my experience as a regular volunteer at the West End Seniors' Network, an NGO offering social and community support for seniors in Vancouver. After a thorough thematic analysis of the data gathered, the paper derives key insights about intergenerational digital support under the following themes - (1) A Generational Divide, (2) The 'Why,' (3) The 'How,' (4) Benefits, and (5) Barriers.

With these insights, the research attempts to situate the role of intergenerational aid in the broader picture of digital inclusivity for seniors. Intergenerational support is only a facet of this wicked problem; other stakeholders like family, community, government, private companies, etc., also share responsibility in keeping seniors apace with the digital world. This research is then applied to cohesively map out potential best practices for multiple stakeholders to improve digital literacy for seniors. However, while this is a more significant systemic change proposed for the long run, we could now take small steps and solutions to contribute towards the larger goal, like capitalizing on the benefits of this already widespread intergenerational digital support. In light of this, a mobile application is designed and prototyped to facilitate digital aid between seniors and younger persons with ease, efficiency, and warmth.

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03

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And to my family for being my biggest champions and unfailing pillars of emotional and mental support.

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Preface

A digital native myself, I write this paper from a place of compassion and sincerity. With two pairs of beloved grandparents and many elderly friends, I have heard such pleas one too many times - "Oh no, my video got switched off in the call. What do I do now?" "My email is suddenly asking me to update my storage. How should I do this?" While I enjoy helping my grandparents, I was taken aback by how day-to-day digital technologies were becoming increasingly difficult for seniors to understand and operate. Curiosity piqued, I began this research to understand the role and relevance of this digital support in the day to day of lives of both seniors and younger persons. Through participatory games, warm conversations, and new friendships made, I take you through my journey of exploring this distinctive commodity of care brought forth by the digital age. While I have tried my best to piece apart, understand and design for a minor facet like inclusive digitization for seniors, I hope this paper inspires you to actively think and contribute to the long-drawn battle of digital literacy for all.

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Key Definitions

Seniors : Often having multiple definitions, 'seniors' predominantly refers to elderly persons past their middle age, with the World Health Organization (2022) referring to those over 60 years and the Oxford Canadian Dictionary preferring 65 and above. (Turcotte & Schellenberg, 2007) For the sake of this report, I refer to seniors as people who are aging and above 60 years.

Aging : Aging is the process of people getting older, accompanied by the gradual decrease of physical and mental capacities. Aging is typically heralded by other life transitions such as retirement, relocation to more appropriate housing, and the death of friends and partners. (World Health Organization, 2022)

Intergenerational relationships : In this paper, intergenerational relationships refer to relationships between seniors (60+ years) and people younger than them (-60 years). These include parent-child, grandparent-grandkid, other familial relationships, friends, neighbors, volunteers, community members, etc.

Reciprocity : Reciprocity is the mutual exchange of various resources between individuals and groups. It is the 'give and take' of support within relationships; involving rights, responsibilities, credits, and debts. (Akiyama et al, 1997) Common resources exchanged include love; status; information; services; material goods, money, etc. (Goodman, 1985)

Digital technologies : These include all electronic products and services that generate, store, or process data like smartphones, laptops, websites, voice assistants, etc. ("Teach with Digital Technologies," n.d.)

Participatory research : This research methodology is rooted in engaging research subjects as active participants throughout the process. (Duea et al., 2022) Here, the research acknowledges the participants' knowledge and life experiences, allowing for an empowering and collaborative co-creation of knowledge. (Wright et al., 2013)

Digital literacy : Digital Literacy is the ability to be digitally competent, having the skill and capacity to confidently and critically use information and communication technologies (ICTs) for work, leisure, learning and, communication. (TVETipedia Glossary, n.d.)

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Context

6.1 A Global Ageing Crisis

While we live in an era with some of the best social and healthcare facilities that human history has ever seen, this longevity of life has resulted in a wicked problem[1] - an increase in global aging populations. Between 2015 and 2050, it is estimated that the proportion of the world's population aged above 60 years will nearly double from 12% to 22%. (World Health Organization, 2022)

When aging is viewed as a phase of human life marked by the gradual decrease of physical and mental capacities, it becomes easy to empathize with the amount of sensitivity, compassion, and support seniors need. And with an increasingly aging population, it is imperative that we rise to the occasion as a society - in the way we include, design, and provide care. The UN has rightfully declared this decade (2020-2030) as the UN Decade of Healthy Ageing, as a call to action from various tiers like governments, civil societies, professionals, academia, and the private sector to promote dignity, equality, and healthy aging for seniors. (World Health Organization, 2022)

6.2 Rapid Digitization & Seniors

Along with an increase in aging populations, the 21st century is marked by its reliance on digital technologies. Digitization is now ubiquitous, from healthcare, social services, and finances to everyday necessities, such as buying groceries or traveling. (Mullins, 2022) It has become an unsaid mandate that one must speak the digital language to participate and be included in today's society. (Martínez-Alcalá et al., 2018) And for marginalized populations like the elderly who cannot keep up with this digital race, such social exclusion takes a heavy toll on their health and quality of life. (Holwerda et al., 2012)

[1] Wicked Problem: Proposed by Rittel and Webber (1973), wicked problems refer to emerging social and environmental issues that are ambiguous and complex to solve; with multiple causes and interlinked dynamics.

To date, technology use among older adults is far less than that of younger generations, creating a **digital divide**.[2] According to Hanson (2009), this is due to a multitude of reasons like affordability, access, and usability caused by age-related afflictions, lack of experience, and disinterest. And this is more than just a temporary problem associated with a few generations of seniors born before the digital age. The pace at which technology changes and age-associated disabilities will always create an inevitable gap that future seniors must constantly try to bridge. (Hanson, 2009) (Coleman et al., 2010)

For a long time, to overcome this digital divide, the focus remained on improving access and infrastructure to ICTs.[3] However, for seniors, it became evident that without the necessary knowledge and skills to use these ICTs, we only create more disinterest and disengagement. (Kim & Kim, 2001) In their research, Marston et al. (2019) identified that the apprehension seniors feel when pressured into using new products they neither knew how to use nor learn is a crucial detractor of technology adoption. And with the most mundane of our daily activities rapidly digitizing, we must realize the importance of designing products with the understanding that a specific section of users will always need more support and onboarding.

It is also relevant in this context to note the benefits that digitization has brought in the lives of seniors; vastly improving self-confidence, independence, and aging in place. (Taipale, 2019) There are now a variety of gerontechnological products, like companion robots, healthcare monitors, fall prevention devices, sensory aids, etc., that are specifically designed for aging needs. However, while these services act as optional value additions in seniors' lives, day-to-day necessities like banking applications, vaccination websites, government forms, taxes, etc., continue to pose as stressors for seniors. With a global increase in aging populations, it is imperative for age-sensitive design to permeate even the simplest of our daily activities.

[2] Despite increasing technology adoption rates among seniors (from 14% in 2000 to 73% in 2021), it is still the younger persons who have the highest rates of internet usage, with 97% of them aged 18-29 and 96% aged 30-49. (Faverio, 2022)

[3] ICTs : Information Communication Technologies (ICTs) is an umbrella term for all technological tools that create, store, share, or exchange information. These include computers, smartphones, tablets, televisions, the Internet, ATMs, etc. (Information and Communication Technologies (ICT), 2020)

6.3 Warm Experts

Technology woes for the elderly are rarely an individualized problem.[4] At an age with significant dependency on their environment, a senior's predicament often spills onto those who care for them - family, friends, community, etc. And this is the case with digital needs; most seniors, first and foremost, ask the people around them for help when dealing with new technologies. A recent study identified that almost half the seniors need someone to help set up and show them how to use a new electronic device. (Anderson & Perrin, 2017)

Bakardjieva (2005) calls these near and dear ones' warm experts' - the informal and non-professional experts who help inexperienced users like seniors to make sense of the digital world. Most often belonging to the younger generation, these family members, friends, neighbors, and community members unconsciously take on the role of being warm experts. (Fernández-Ardèvol et al., 2020) With current trends of urbanization and globalization pushing families to adopt more long-distance methods of care, digital support is slowly transitioning into a key commodity of reciprocity. With warm experts playing such a crucial role in shaping how seniors perceive technology, it would be worthwhile to examine the social dynamics of this intergenerational exchange. (Olsson & Viscovi, 2018)

6.4 Warm Technology

It often becomes easy to view aging merely as a condition of functional decline that requires clinical support and assistance. This agist ideology is evident in many gerontechnological products, which are often designed purely to 'alleviate the burden of care.' (Greenhalgh et al. 2012; Fitzpatrick et al. 2015) With a global aging population at our doorsteps, we must adapt how we design technologies and better affirm aging as a phase of life with its own joys, wisdom, wants, and needs.[5]

[4] "It is not just enough to adopt user-centered approaches, but to acknowledge and empathize with the context in which they exist." (Brankaert & Kenning, 2020, p. 29)

[5] "Old age is not a distinct stage of life for everyone over 65 years as some developmental models suggest; instead, it is a rich, multiform, non-linear, culturally contextualized, and deeply personal process." (Brankaert & Kenning, 2020, p.33)

While technology has greatly benefitted humanity, bringing comfort, convenience, and much more, we must acknowledge that it has a reputation for being complex, impersonal, and uncaring. In response to this, Brankaert et al. (2020) proposed the idea of 'warm technology,' an alternative approach to designing technologies that improves quality of life in a wholesome and inclusive manner. Initially intended for dementia patients, warm technology focuses on technology's potential to look past its problem-solving nature and be more humane. It advocates for digital technologies to add value to the lives of individuals - fostering inclusivity, social connectedness, dignity, and self-reliance. Warm technology is a more mindful, minimal, and long-term approach to designing for wicked problems such as a rapidly aging world.

07

Space of Enquiry

Through qualitative research and human-centered design principles, this thesis attempts to address the following questions:

What factors influence this intergenerational digital support between seniors and younger generations? What is the role of technology and its design in this context?

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Methodology

One of the primary methodologies of this research is **health design thinking**, a novel approach to solving real-world healthcare problems and enhancing human well-being using design thinking. (Abookire et al., 2020). Public health problems, like digital inclusivity, are often ambiguous, involving multiple stakeholders and interdependent systems. Human-centered design is a holistic and mindful methodology for such contexts, valuing both qualitative insight and quantitative evidence.[6] By being human-centered and having a creative mindset, this research strives to put the needs and desires of people at the forefront while favoring collaboration, storytelling, and open-ended explorations. (Bon Ku & Lupton, 2020)

Interviews, participatory workshops, and service learning helped me empathize with the people's daily lives and learn from their expertise. A variety of research participants like seniors, younger persons, community volunteers, etc., were recruited to bring in diverse perspectives and lived experiences. This research also uses **participatory design**, a collaborative approach that allows for the participants not just to be objects of empathy but active participants in the research. Inclusive brainstorming and constant user testing throughout the design process grant democracy and agency for the end users, staying true to the idea of warm technology. (Bon Ku & Lupton, 2020)

[6] "Human-centered design is inclusive and collaborative, approaching community members as experts in their life challenges. Users are active participants and creators of knowledge, not passive subjects to be measured and manipulated." (Bon Ku & Lupton, 2020, p. 14)

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Research Participants

A total of 13 participants were recruited for this research, of which 6 were seniors (60+ yrs) and the rest 7 belonged to younger generations (60- yrs). Younger persons predominantly included graduate students, designers, doctors, etc., in their 20s, 30s, and 40s. They shared their personal experiences of digital support with aging parents, grandparents, partners, and colleagues. In their 60s and 70s, the senior participants were also asked to share their corresponding perspectives and experiences. Sometimes, participants from different generations came from the same family, revealing two sides of the same story. Many research participants belonged to the West End Seniors Network and shared valuable insights from their personal experiences as volunteers and tech coaches. This diversity among the participants helped me comprehend the social determinants and multidimensionality of the intergenerational support ecosystem.

Most interviews and workshops were conducted in Vancouver, based on the participants' preferences to be in person or online. They were recruited using word of mouth, posters, and social media. While factors like gender, socioeconomic status, cultural/ethnic backgrounds, etc., have a role to play in comprehending this subject matter, they were not the primary recruitment consideration, given the scope and timeframe of this research.

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Methods

10.1 Service Learning

Throughout this research, I have been a volunteer at the West End Seniors Network, an NGO that offers social and community support for seniors living in the West End, Vancouver. As an Information and Referral Desk Volunteer, my role involved helping any senior who walked in with a query and matching them to relevant programs, services, and resources. And these queries could encompass a variety of requirements, like applying for a bus pass, using ArriveCan, finding the nearest hairdresser, getting OAS/CPP forms, etc. These weekly volunteering sessions have helped add valuable nuance and depth to the research. Observing the impacts of digitization on the seniors' day-to-day lives while spending quality time with them has provided a qualitative backbone and purpose for this thesis.

10.2 Interviews

Semi-structured one-on-one interviews with the research participants were valuable gateways to understanding personal experiences and perspectives of these modern intergenerational relationships. Often mediated by a warm coffee, these casual conversations helped the participants open up about their intergenerational relationships, technology adoption, familiarity with digital products, etc.

10.3 Participatory Workshops

Following the interview, a hands-on workshop was conducted with 10 research participants to delve deeper into the topic at hand. Each workshop consisted of two activities that allowed the participants to “make” and “explore” while conversing, allowing for more unconscious thoughts and beliefs to surface.

The first activity was designed to explore the ecosystem of support as seniors age independently. It helped identify what they considered their key support systems and preferred means of accessing these in the near future. The second activity probed into the idea of reciprocity between generations in today's world. It gave a glimpse of what the current younger and older generations wish to 'give' and 'receive' from each other.

Figure 1. A participant playing Activity 1 in the participatory workshop

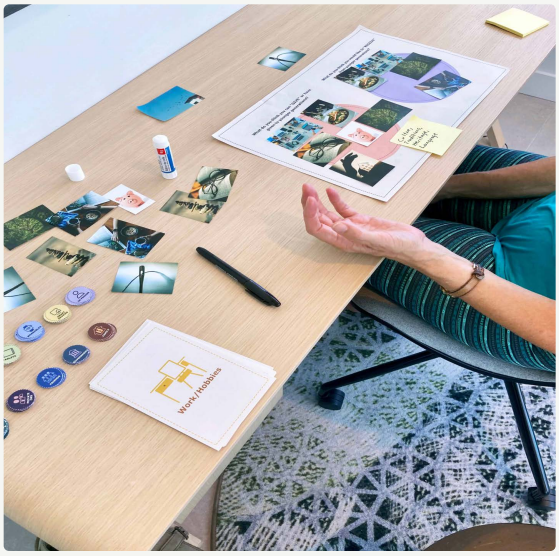

Figure 2. A participant in the midst of Activity 2 during the participatory workshop

10.4 Precedent study

A precedent study was conducted to understand existing products and services that aid seniors with digital technologies. Considering that many of these were paid products, most of the analysis was obtained from their websites; neither my research participants nor I have used these apps ourselves. This study provided a broad idea of the pros and practical concerns of using these support services. It became evident that barriers like affordability, access, awareness, etc., affected the large-scale adoption of these services.

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Data Analysis

Primary data gathered from the interviews and participatory workshops were initially organized into codes individual to each participant. A thematic analysis helped rearrange these codes based on similar themes and identify threads of compelling perspectives.[7] (Kolko, 2015)

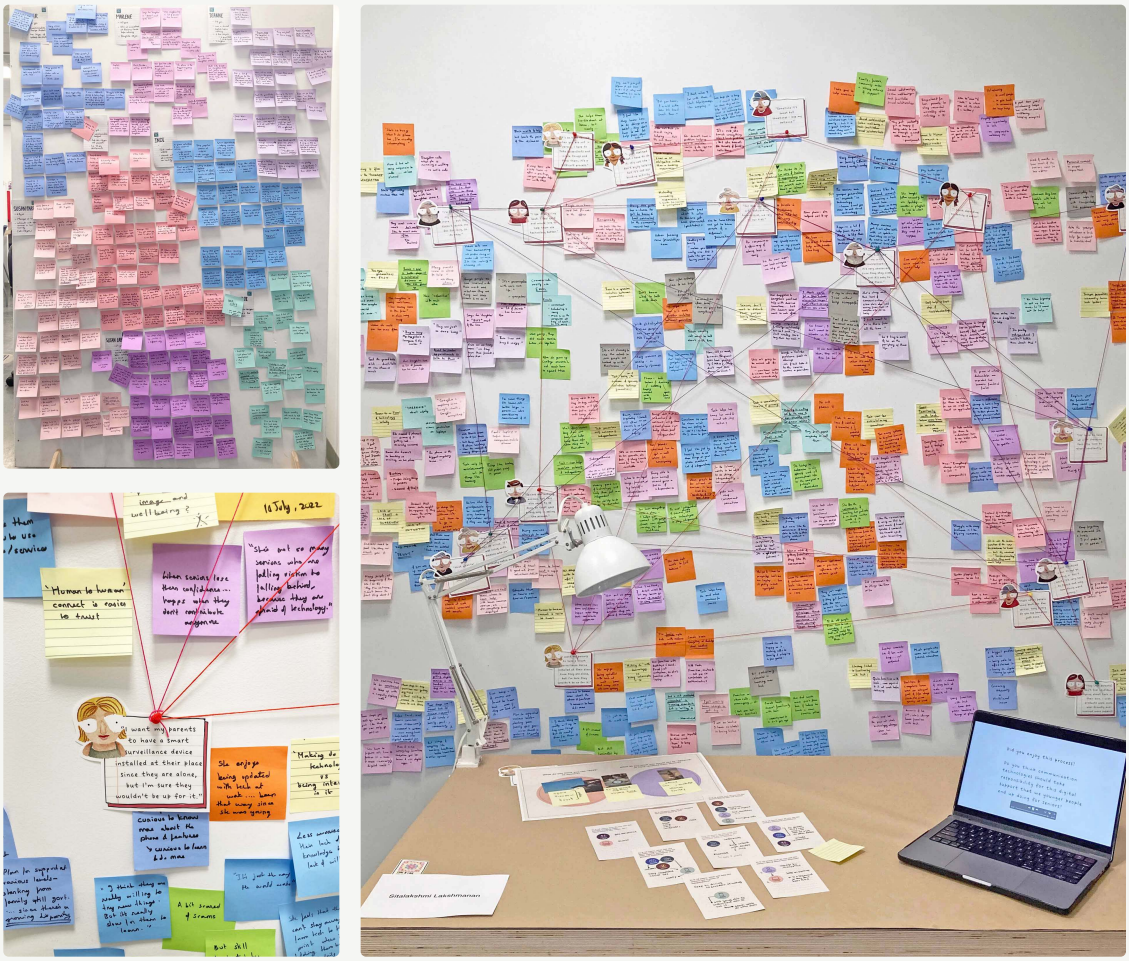

Figure 3 - 5. Various stages of the thematic analysis

[7] Thematic Analysis - This is a flexible method of qualitative data analysis that systematically identifies, organizes, and proposes insight into patterns of meaning across a data set. (Braun & Clarke, 2012)

12

Insights

Figure 6. This is a mapping of key insights derived after the thematic analysis. The following pages provide an in-depth analysis of each of these themes.

12.1 A Generational Divide

"You are like a person who has computer as your first language. And I'm like, somebody who has computer as my recently acquired second language." - Participant 1 (P1)(50-60yrs)

Many senior research participants feel that digital literacy is one of the fundamental causes of growing isolation between generations, along with increasing physical and emotional distances. While technology entrenches itself more and more deeply into the social lives of younger persons, this further isolates the seniors from any intergenerational exchange and bonding.

"I've met so many seniors who are falling victim to falling behind because they are afraid of technology...Sometimes seniors are invisible in society."- P2 (60-70yrs)

And it's not just the seniors who face the repercussions of this digital divide, but so do the younger generations. Some of the younger participants felt that with current trends of globalization and urban migration, 'Care' and 'Concern' for seniors have often started taking the form of introducing new technologies. But this process is time-consuming and arduous for both generations involved, owing to a combination of poorly designed technologies and inherent distrust in seniors.

12.2 The 'Why' of intergenerational support

12.2.1 Pace of Learning

Seniors take longer than most younger persons to gain confidence and familiarity with new technologies, owing to various factors like age-related slowdown, non-inclusive design of technology, etc. This slower pace of learning often translates into requiring support from younger family members, friends, or community volunteers when it comes to adopting a new digital service. While some seniors mention needing help setting up a new device or an online account, most require assistance post-setting up with troubleshooting, updates, etc. One of the WESN volunteer participants pointed out how much 'handholding' seniors typically require when introduced to a new process.

12.2.2 Design of technologies

The digital divide cannot solely be attributed to seniors' pace of learning; technology and its design are just as much responsible, if not more. Even essential day-to-day services like banking applications, tax platforms, government services, healthcare platforms, etc., are neither designed inclusively nor have senior-friendly versions. Inaccessible user interfaces, confusing jargon, inadequate onboarding instructions, vague troubleshooting options, the list goes on. For example, an FAQ page or a Chat Bot offered as support by most digital products these days hardly cuts it for seniors who are unfamiliar with digital services. There is an unfair presumption from the technologies side that all seniors already know how to operate these products or can find their own means to learn them.

12.2.3 Constant Relearning

"She's always saying, like, everything's always changing so fast." - P8 (20-30yrs)
"And there's this stress of having to constantly learn a new technology." -P3 (50-60yrs)

With the rapid rate at which technologies keep changing, it's demanding and tiring for seniors to keep pace with it. Many seniors feel that just when they feel confident operating a digital service, it has already evolved into a new update. There's a constant necessity to 'catch up,' making this a pivotal contributor to why intergenerational support is necessary. As seen in the precedent study, though there are support services for seniors to set up a new device or product from scratch, there are currently not enough services to receive help after the initial onboarding with evolving updates.

12.2.4 Awareness

"I'm not aware. I'm not made aware of things that you can do online…Like if I was living with somebody that was using it all the time, I'd probably catch on." - P4 (50-60yrs)

One of the participants with volunteering experience at WESN pointed out that seniors are often unaware of many existing digital services. This lack of exposure keeps them away from technologies that could potentially make life more convenient and easy. (Ex. Online grocery

buying service, taxi booking service, etc.) This ignorance may be caused by a multitude of factors like general distrust of technologies, slow pace of adoption, and lack of exposure to digital marketing campaigns. It often falls upon the younger generations to bring this awareness to seniors. From buying new gadgets to setting up online accounts, younger family members, friends, neighbors, and community volunteers play a vital role in introducing new technologies to seniors.

12.3 The 'How' of intergenerational support

Most seniors familiar with digital technologies before retirement attempt self-help first, like Googling or asking on YouTube. If that fails, they contact the company service center or seek assistance from local tech coaches. This is the case with most seniors who don't have family or feel comfortable asking family for such help. For those with more tight-knit families, it often is the status quo to ask the kids, grandkids, nephews, etc., for any help in the digital realm. Most senior participants value the convenience and ease of asking younger people they already know.

All the younger participants also share similar experiences of helping seniors they know with various digital tasks. These range from introducing Spotify, setting up online dating accounts, net banking, etc., to cleaning device storage, showing how to flip the camera in video calls, filling up travel forms, bus pass applications, etc. The frequency of this kind of digital support is relatively high, ranging from queries during dinner visits to everyday asks. The most common methods of asking for digital help include audio calls, video calls, etc. But this is a matter of conflicting emotions for youngsters, as we shall discuss in detail.

12.4 Benefits

12.4.1 Trust & Human-to-human connection

"I always prefer to call and get my answers." - P5 (50-60yrs)

With their lack of awareness, and the occasional stray news of digital scams, seniors are often wary of new technological services. The most effective way to overcome this has been through valuing trust and human relationships.

One of the participants (P10) (20-30 yrs) with tech coaching experience shares how seniors are typically anxious about sharing their passwords or SIN numbers online when creating new accounts. But when personal rapport and bonding are established, it becomes easier for them to open up to new digital experiences.

"People are initially anxious, but this also needs to be done, so trust goes a long way in easing the process." - P10 (20-30yrs)

Similarly, in my volunteering experience, I have noticed that some seniors often return for digital help only during my shifts because of the established trust and comfort. This personal rapport and bonding hugely benefit seniors when adopting new digital technologies.

12.4.2 Reciprocity & Filial Piety

Within families, this factor of trust and goodwill is even more pronounced, providing greater motivation for technology adoption in seniors. Most aged participants share anecdotes about how it feels safe and reliable to ask their kids if they need to learn something online. Within families or established relationships, younger persons also have greater motivation and affection for seniors than a more formal call support feature offered within digital products. These feelings of reciprocity and filial piety are often key motivators for younger persons to help seniors with digital support.

"I think that she just wants to rely on me; it's easier....Because they pay when I was in primary school, so I started learning how to use computer. So it's like, kind of a way, like to give them back what they do for me." -P8 (20-30yrs)

The participatory workshops also helped confirm that many youngsters consider digital technologies as one of the few things they can share with seniors, apart from time and conversations. And this goes vice versa; many seniors see technology as a generational giveback from youngsters.

"I like to help them to know how to use those devices or apps. It's, I feel good."- P11(40-50yrs)

There is hence a potential for this intergenerational digital support to be a mutually rewarding experience. Now that families are often split across distances, digital support is already seen as a potential giveback within reciprocal exchanges. This could allow families to bond over shared help and resources, allowing for more frequent conversations and positive bonding experiences.

For participants without families, the warmth and support offered by the volunteering and community centers are much appreciated. Tech coaching and digital outreach programs organized in societies have an aspect of community building, bringing generations together.

A volunteer participant (20-30 yrs) at WESN, when describing her experience so far, said, "I get to know and feel connected to my community."

12.5 Barriers

12.5.1 Time & agency

"Yeah, they asked me for help a lot...When I live with them, it comes up, like every day. Just because it's easy to ask me… I don't mind doing it when I have the time." - P8 (20-30yrs)

There is an imbalance in the power dynamic between seniors and younger persons in how each generation perceives time. Since they are retired and have more time, senior participants wish to spend more time with their families and friends. But there is an unspoken understanding that younger generations are busy in their lives, having careers, relationships, families, etc. Within the intergenerational relationship, this translates into more agency on the younger persons' part. For example, seniors gracefully allow their kids to initiate calls and visits as per their schedule and convenience. In the context of digital support, however, this creates conflicting emotions of dependency for many elderly participants. While seniors need the help, they also don't want to be burdensome and intrusive in the younger person's life.

"Sometimes she helps. I guess the one thing is she's so busy. And I got all the time in the world. Right?..... She doesn't ignore me for too long." - - P4 (50-60yrs)

Younger participants also have similar woes, expressing an interest in helping but not having the time for it. This is even more tiring for families and younger people staying apart in various places. Furthermore, many participants express a need for more efficient and supportive technologies to help seniors. Though there are products to take control of a senior's phone, this doesn't necessarily teach them how to learn and be independent. Some young participants feel that just audio or video calls are hardly helpful in handling the necessities of providing digital support. A younger participant (20-30 yrs) mentions how arduous it is to ask her grandma to show the screen of her phone through another phone when guiding her. As seen in the precedent study, while there are formal digital training services for seniors, there needs to be more technologies and tools that aid this popular system of informal digital support.

12.5.2 Motivation

"Sometimes it's sweet…sometimes I probably have lost my patience. Because it does take patience. But you know, I'd rather take the time and teach them than not have them know at all." - P8 (20-30yrs)

While some younger participants are happy to provide digital support to seniors, others find it inconvenient and burdensome. Some participants mentioned that while it feels nice to occasionally help aging family members with tech-related help, the frequency and quantity of digital support seniors need is too much to handle at times. Considering their busy schedule, participants feel they can't always spare the time, effort, and patience seniors need. Some participants even feel “obligated” to help, and if given a choice, would prefer to spend quality time with their families doing other activities.

With senior participants generally feeling wary of new technologies, it becomes annoying and frustrating for many younger persons to shoulder the burden of integrating these technologies into their lives.

"I don't mind helping them. I would say I probably worry about not their lack of knowledge, but their lack of willingness. It usually gives me more concern because it's one thing if you don't know something, but like, the fact that they're not willing to learn about it. That kind of frustrates me." - P8 (20-30yrs)

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What Next

By examining this widespread mode of informal digital support, we understand how complex the larger issue of digital literacy is for the elderly. Though seniors like relying on family/friends and younger persons want to help, on a practical scale, the quantity and frequency of support required is too much to bear by just the younger generations. Other stakeholders in this picture, like the governments and technology companies, must also acknowledge their responsibility and shoulder this burden. There needs to be collective action from each of these stakeholders to truly progress with regard to bridging this digital divide. A systemic change is the only long-term answer considering the scale of a global crisis such as this. The following page provides an idea of the kinds of strategies that multiple stakeholders can cohesively implement to start achieving inclusive digital literacy.

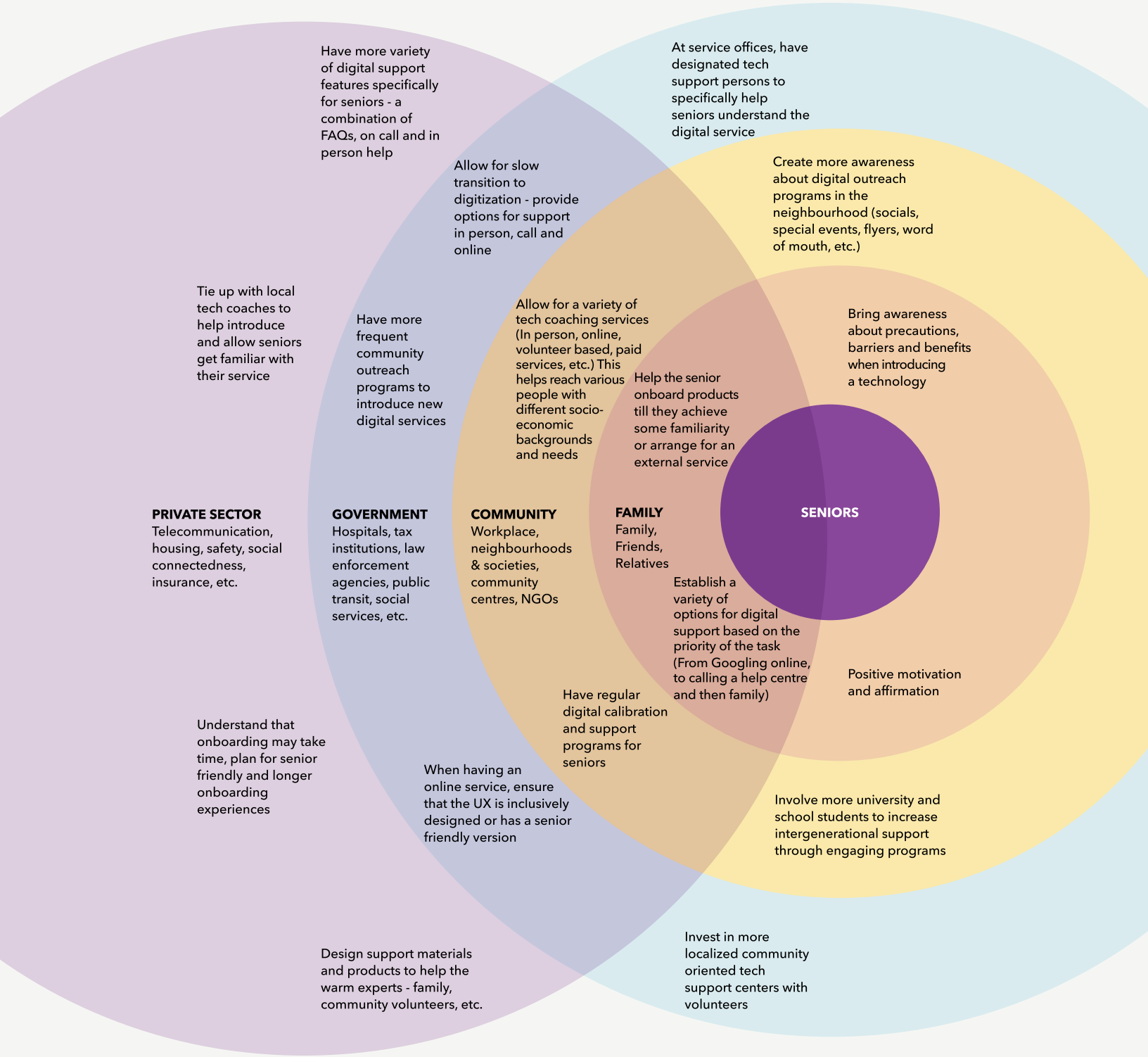


Figure 7. This is a map of strategies that various stakeholders can implement to improve digital literacy for seniors

14

Design Outcome

As seen in the map, it is evident that a systemic change of this scale would take a long time to come into effect fully. I wondered if there was a small step that I, as an interaction designer, could take meanwhile to contribute to this larger ecosystem of progress. This research so far helped me understand the magnitude of value seniors place on interpersonal trust and bonding. Informal digital support has the potential to create and maintain intergenerational relationships, a valuable asset in this age of widening generational isolation. While intergenerational digital support cannot remain a singular answer to the bigger crisis of digital literacy, it can remain an efficient, quick fix until we start seeing more systemic changes. And even then, it can continue being one of the more affectionate systems of support for a senior. If the process of digital support can be made less burdensome for the younger persons involved and focus more on its relationship-building capacities, this would highly benefit both seniors and younger generations. In this spirit, I prototyped Una, a mobile application to better facilitate this intergenerational digital support by overcoming its barriers and building on its opportunities.

Figure 8. Screens of Una

Una allows seniors to call and share their screens with known younger persons to receive digital assistance. The warm experts are provided with a variety of visual guides like masks, pointers, gestures, etc., while screen sharing to efficiently guide and support the seniors. Una focuses on bringing ease, efficiency, and warmth to the existing process of digital support within established relationships. The convenience and speed that Una provides with digital support would save time and energy, which are precious commodities for younger persons. The variety of visual guides also makes the overall learning process more inclusive, comfortable, and easier for seniors. Through Una's curation of warm gifs and stickers, seniors can also reciprocate their gratitude to younger persons, allowing relationships to build and grow positively. With intergenerational digital support already being a widespread and preferred option, Una can ease the experience for all generations involved until other stakeholders, like technology companies and governments, share the burden of digital inclusivity for seniors. Una intends for seniors and younger generations to rely positively on each other for digital support as an opportunity to grow and mutually benefit from their intergenerational relationships.

14.1 Design Process

Initially, I set out to create a digital product that facilitates this intergenerational digital support more smoothly for seniors and younger persons involved. I chose to start with a mobile version, considering that many seniors at least own a smartphone, if not a tablet or laptop. Using insights generated in the research, I pinned down key pain points and opportunities for seniors and younger persons regarding digital support. This analysis helped brainstorm potential needs and requirements for the product. Translating these into features in a mid-fidelity wireframe, I tested this with 4 of my research participants (two above 60 years and two below 60 years). Their feedback helped shape the final product and its key features.

	Seniors	Younger persons
Pain Points	• They don't want to be burdensome and intrusive on the younger generation. • They are to slow to understand the way younger persons explain things. • They have trouble keeping up with verbal instructions. • Many seniors have a lesser motivation and trust to try new digital experiences by themselves.	• They are busy and can't necessarily dedicate too much time for digital support. • Using a simple audio/video call is challenging to explain instructions for digital support. • They often have to repeat many things for seniors. • This requires more patience and effort than they can provide on most days.
Opportunities	• They often want to express gratitude when they receive this kind of help. • They feel confident and independent when they can navigate technologies on their own. • As seniors slowly familiarize themselves with the digital world and its affordances, they will rely less on the younger generations in the future.	• They express a 'want' to help. • They like the feeling of being able to give back to their seniors.

Figure 9. Initial mapping of key pain points and opportunities with respect to informal digital support

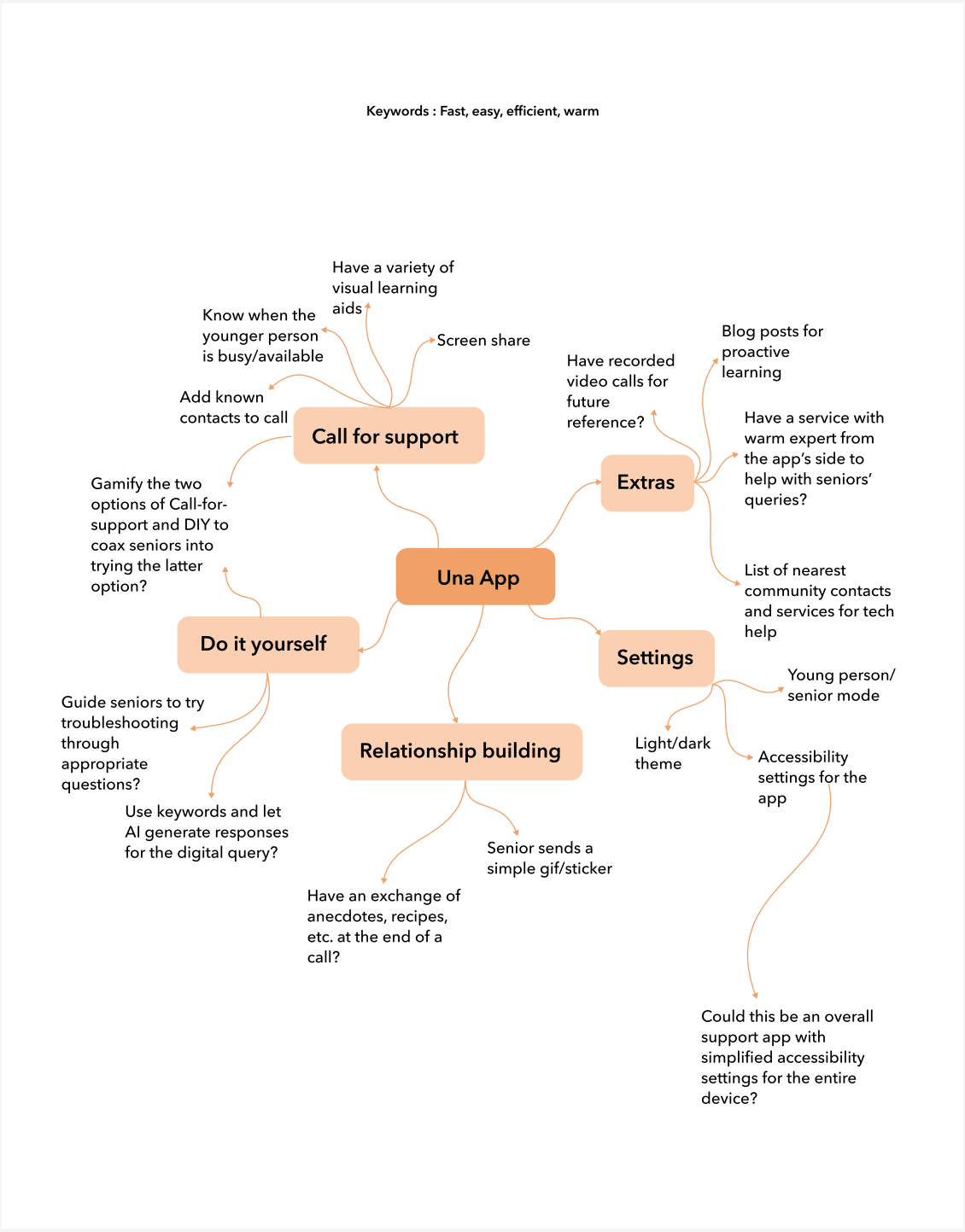


Figure 10. Initial brainstorming of features for Una

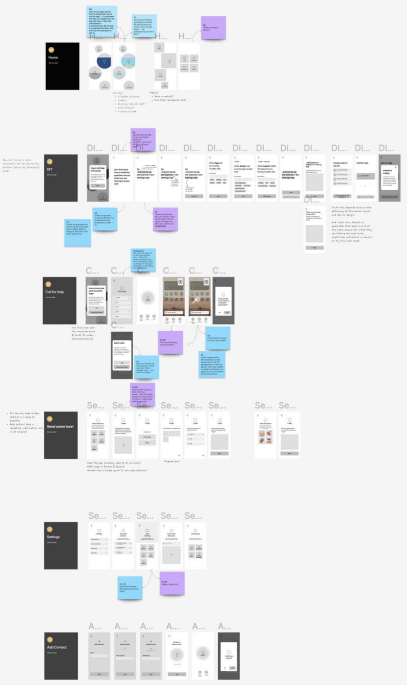


Figure 11. Mid-fidelity wireframes with the coloured post-it notes indicating feedback from user testing

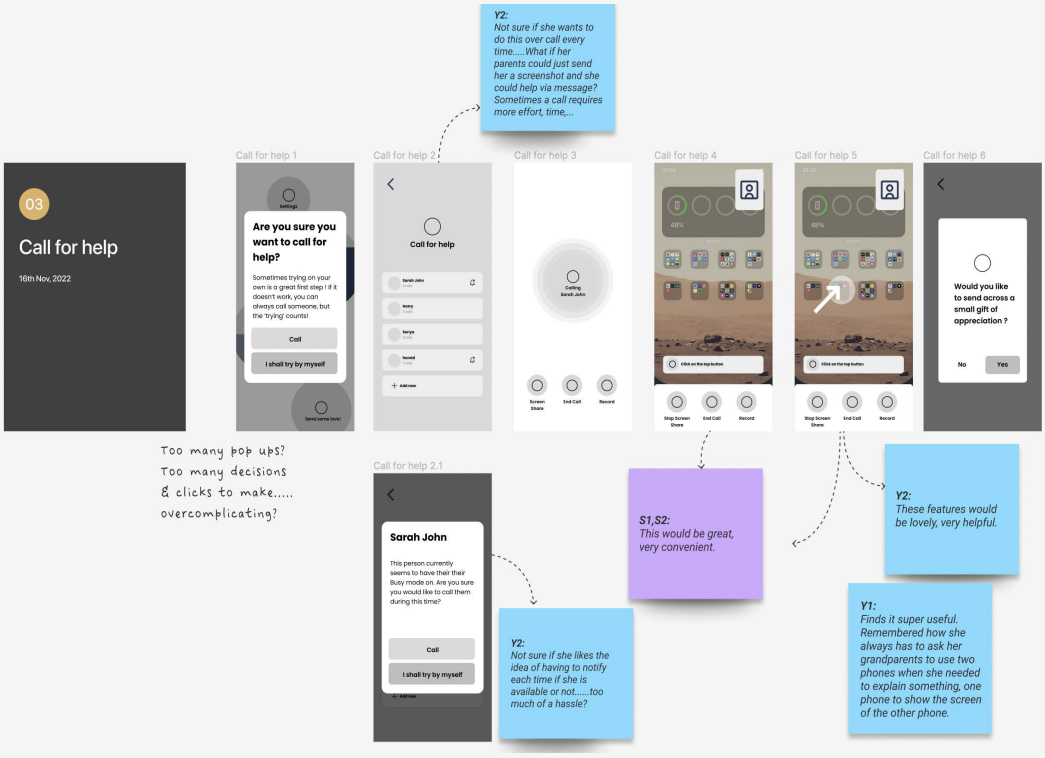


Figure 12. A section of the mid-fidelity wireframes with user feedback

14.2 User Scenario

Using a simple use case scenario of a daughter teaching her aging parent how to buy a product on Amazon, the following section explains the key features of Una.

Description:

Lisa is a 70-year-old retired senior living by herself in Vancouver. She was a high school teacher back in the day and is survived by her 35-year-old daughter Diane, who currently lives in Victoria. Though they share a close relationship, Diane can't visit that often because of her busy schedule at her corporate job. But they do stay connected over frequent calls.

Lisa has an iPhone and an old desktop, preferring to use the iPhone more frequently to call family, send emails and view photos. Her daughter Diane was the biggest support when it came to helping set up the devices and teaching her how to use them. Though Lisa took a while to warm up to the smartphone, she now enjoys its convenience and being able to stay connected with her family. Recently, Diane installed Una for both of them, and they have been using it to slowly explore more functions like tracking health, listening to music, etc.

Lately, Lisa has been having bad knee pain, and now that driving is painful, she has reduced her runs to the supermarket. Diane has been urging her to try buying things online and even set up an Amazon account during her last visit. But Lisa doesn't feel confident purchasing something on the app; she can't remember how to search for a product, add it to the cart and pay for it. She is plagued with worries like buying the wrong product, overpaying, sending it to an incorrect address, etc. For a while, Lisa's been wanting to buy a steamer for her friend's birthday, and considering that Diane is not scheduled to visit anytime soon, her only option is to try buying it on Amazon. So she uses Una to check if Diane can teach her how to buy the steamer.

1. Lisa opens the Una app on her phone and clicks Diane's profile.

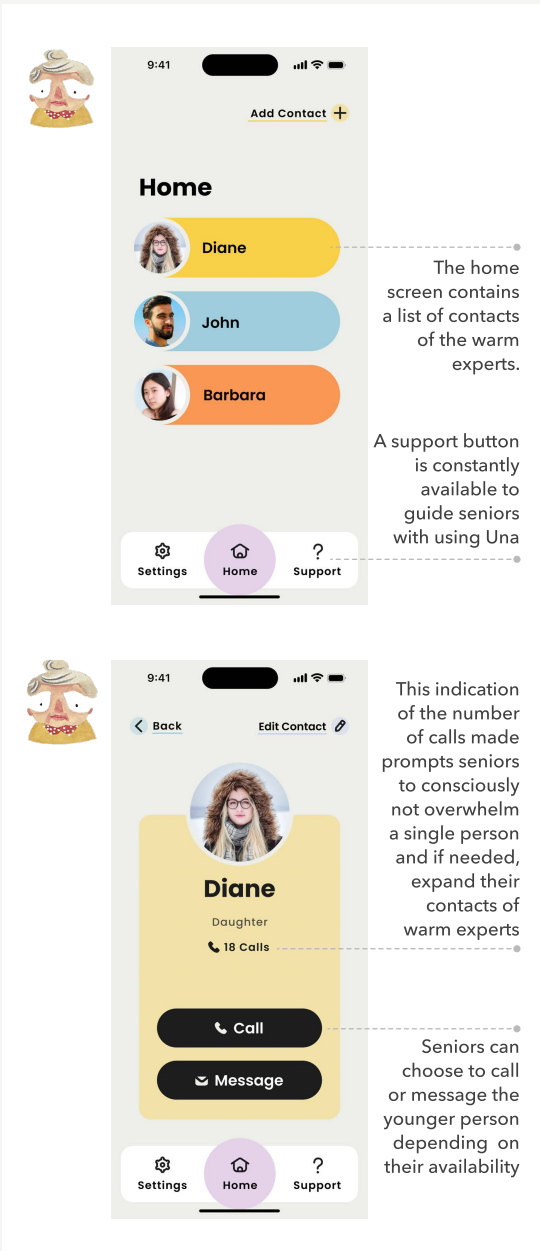


Figure 13. Lisa's screens (Home and Contacts)

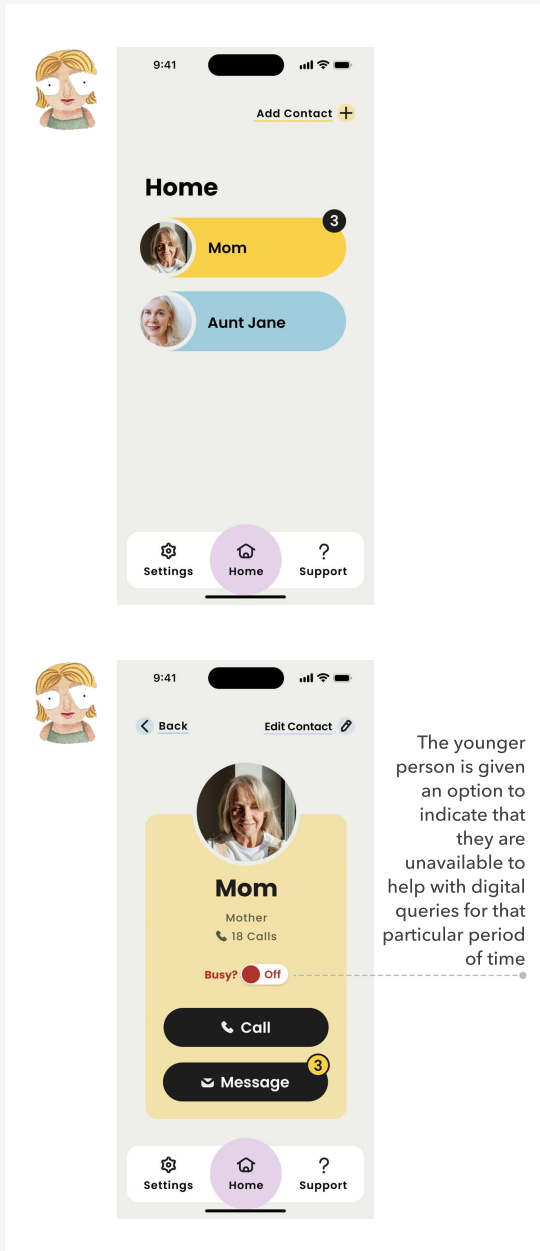
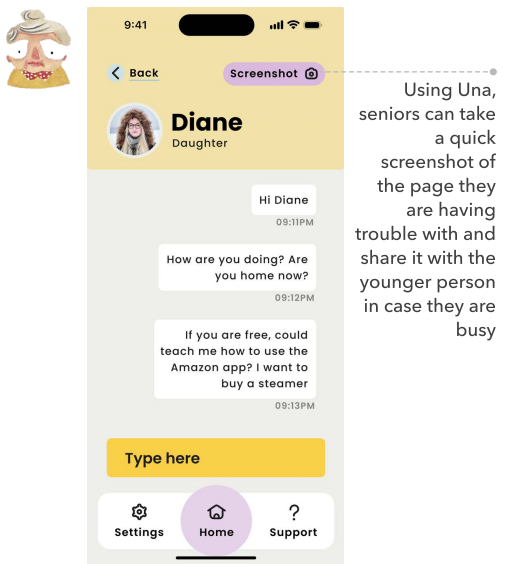


Figure 14. Diane's screens (Home and Contacts)

Please refer to the left for Lisa's screens and to the right for Diane's screens.
Una has two versions, one for the warm expert and the other for the senior, to suit their varying needs. Users typically make this choice during onboarding and can choose to change their versions in the Settings.

2. **Lisa messages Diane to check if she is free for a call and when she confirms this, Lisa calls her. After quickly catching up, Lisa updates Diane about wanting to buy a steamer on Amazon.**



Using Una, seniors can take a quick screenshot of the page they are having trouble with and share it with the younger person in case they are busy

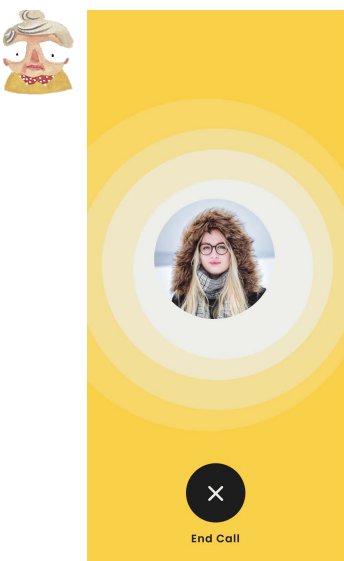
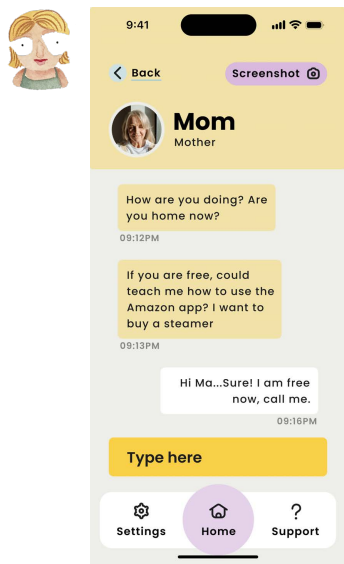
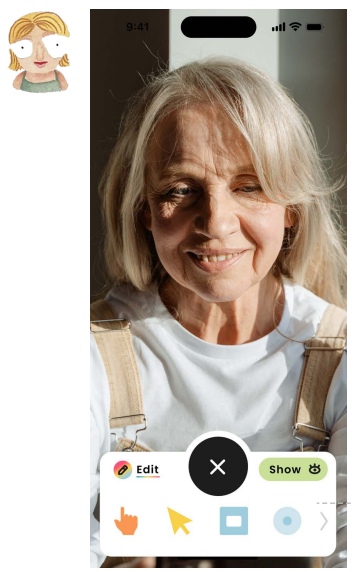


Figure 15. Lisa's screens (Message and Call)





These are some of the visual tools and learning guides that can be used by a younger person during screen-share to guide the senior.

Figure 16. Diane's screens (Message and Call)

3. **Diane asks Lisa to open the Amazon app and share her screen while on call. Now Diane uses a combination of visual guides like masks, pointers, and floating commands to instruct her mom on how to buy the steamer. By using these tools, she is able to teach her mum not just basic know-how but also nuances like checking for product ratings, confirming the number of products in the cart, sending as a gift, etc.**

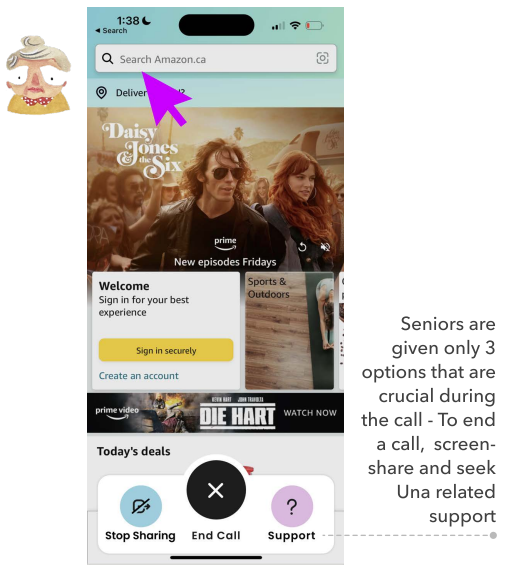


Figure 17. Lisa's screens (Screen-share)

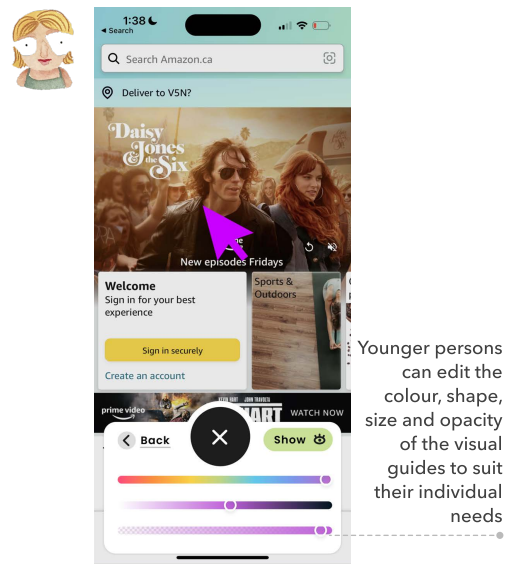


Figure 18. Diane's screens (Screen-share)

4. **With the help of Diane's verbal instructions and visual guides, Lisa quickly finishes ordering her steamer, and they say their goodbyes. Feeling grateful for the help, Lisa selects a sticker from the curation provided by Una when the call ends and sends it to Diane. Later, when Diane checks her messages and sees this sticker, she feels the warmth and affection her mum wanted to share through this simple act.**

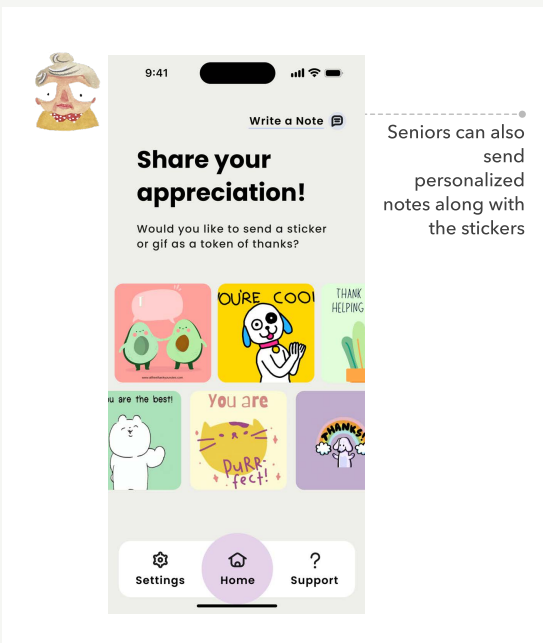


Figure 19. Lisa's screens (Share Appreciation)

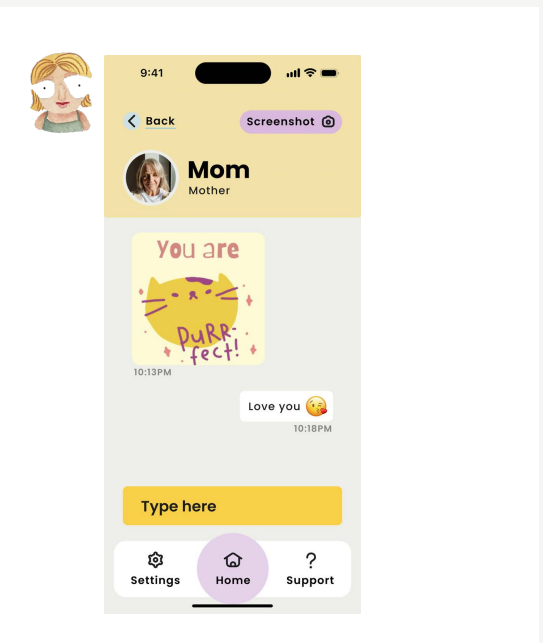


Figure 20. Diane's screens (Share Appreciation)

A Note on the UI Design : The graphical user interfaces of Una have been designed after carefully considering the WCAG AAA guidelines. (Eggert, 2019) Bold sans serif fonts and explicit visual hierarchy allow for an accessible and approachable usage experience. Each actionable button has an icon paired with text to avoid confusion for seniors. With a warm colour palette and contrasting buttons, Una has been designed for a fun yet inclusive experience for all generations using it.

Some of the additional features of Una can be seen in the following screens.

Seniors can add a new contact to the application by confirming with a video call to that particular person.

This ensures that only known contacts are added for a safer experience. The agency to add a contact also lies entirely with the senior.

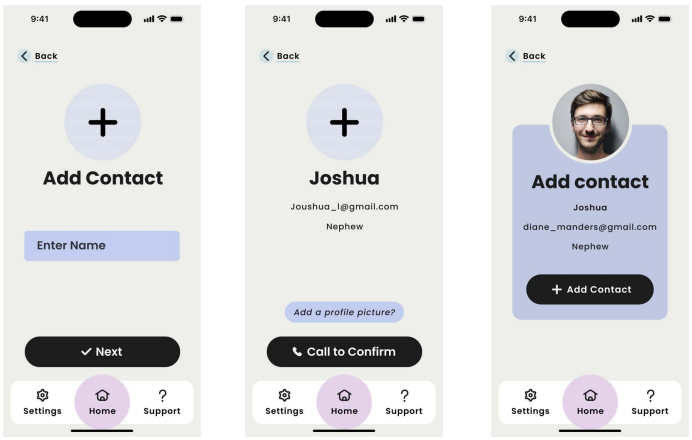


Figure 21. Additional Screens (Add Contact)

Una allows seniors to click screenshots via the app and send it to the younger person, considering that the action of clicking a screenshot is difficult for many seniors.

All the visual aids and guides are available as filters for the screenshots. This way, in case younger persons are busy and don't have time for a call, they can still help the senior by exchanging screenshots.

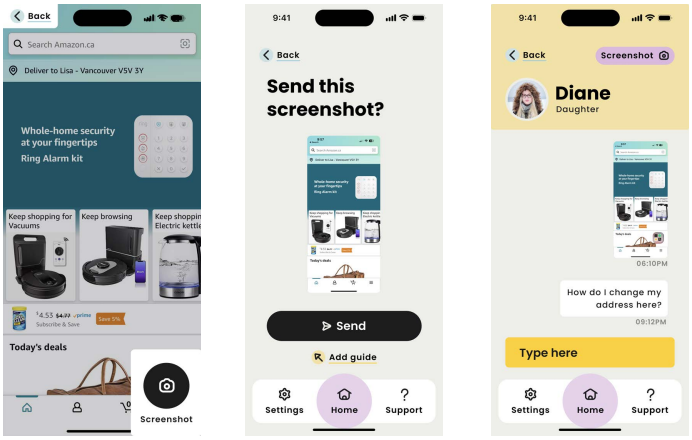


Figure 22. Additional Screens (Screenshot)

A support feature is available on every screen, explaining the workings of that particular screen. This is to help seniors slowly acclimate themselves to Una till they achieve a certain level of familiarity.

If seniors have a query that is beyond this tutorial, they are given an option to reach out to customer support.

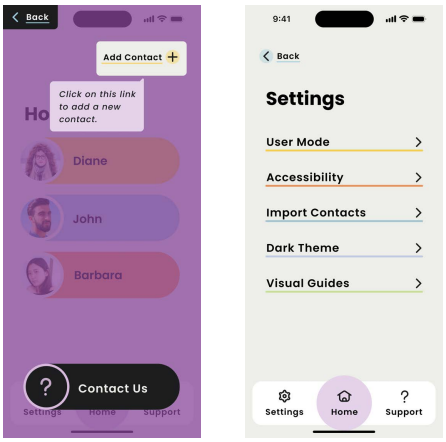


Figure 23. Additional Screens (Support and Settings)

14.3 Future Steps

On a micro level, an immediate next step for Una would be to conduct extensive user testing and further refine its curation of visual aids to best suit the needs of diverse seniors and younger persons. Intergenerational digital support has many complexities unique to individual relationships, many of which could be addressed as additional features in Una. For example, some younger persons may want to record calls for seniors with poor memory. Some seniors may want to try tutorials, community learning sessions, etc., proactively. Some may also want the option for an entire screen takeover, but it is crucial for further research to inform whether seniors would feel safe using Una if such a feature existed. While these make great value additions, it is essential to remember that the strength of Una lies in creating a warm, accessible, and unintimidating experience for seniors. Una's simplicity and minimal user experience allow it to be adopted by multiple generations and populations. With this intention, another next step for Una lies in creating an accessible onboarding experience that successfully introduces the app to seniors without the help of a warm expert. Apart from the mobile version, Una could also highly benefit from a laptop and tablet version.

While it is easy to imagine Una within the boundaries of established relationships, we must also consider seniors who are alone or don't know any warm experts to help them.

Could Una provide contacts of digital support resources that seniors can reach out to, or could it have a service of its own, with a team of warm experts at the backend to help such seniors? Una could also explore a potential feature to answer seniors' queries through artificial intelligence before contacting friends and family.

On a macro level, Una has the flexibility to be absorbed within various existing support ecosystems. It can be integrated into the generalized support options offered by operating systems, making daily use phones, laptops, etc., more accessible and inclusive of seniors. Una can transcend beyond known relationships and act as a bridge between seniors and communities, governments, private services, etc. This reduces the burden on family members and creates multiple tiers of support for a senior.

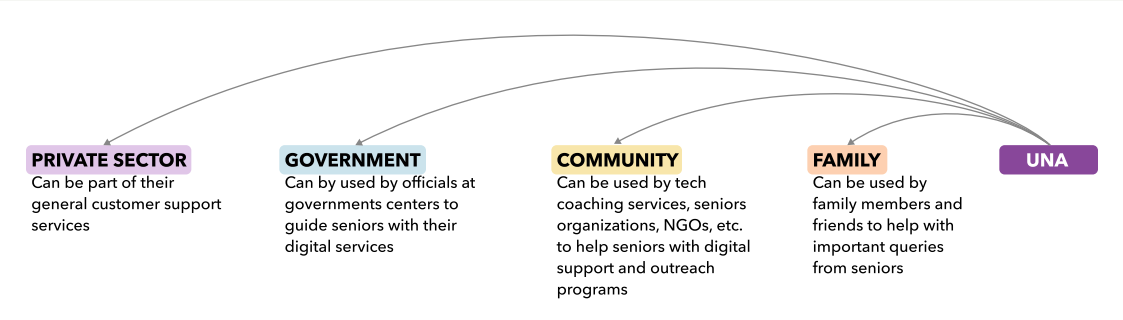


Figure 24. Potential uses cases for Una by multiple stakeholders

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Conclusion

As we see in this research, intergenerational digital support is a widely popular system of support for seniors with a myriad of complexities. Ranging from feelings of filial piety and gratitude to feelings of dependency and burden, the support system is not without its strengths and weaknesses. But the research did help identify hidden values in the ecosystem - the trust and reliability within relationships that motivate seniors to adopt technologies, the reciprocal wish to share technology within generations, and so forth. If technology and design can work in tandem with seniors and younger generations to capitalize on these benefits and overcome the barriers, digital support would be a wonderful addition to the language of love and care within relationships. Children helping parents, grandkids helping grandparents, volunteers helping community neighbors, there is a potential for warm tech interactions everywhere around us. In this spirit, "Uno" was designed as a mobile application to facilitate this digital support between seniors and younger generations, focussing on efficiency, ease and warmth. With seniors already relying on younger persons for their digital woes, Una eases the barriers in this process, making it a more convenient and pleasurable experience for all generations involved.

But this research also acknowledges that while intergenerational support is one of the more popular and affectionate resources of support, it cannot be a singular solution to bring digital literacy to seniors. With increasing aging populations worldwide, the truth remains that younger persons alone cannot bear the burden of familiarizing seniors with digital technologies. As seen in the map of strategies, we need cohesive action from private technologies, communities, governments, etc., to provide various levels of support that a senior can rely on. For example, an app like Una could act as a bridge between seniors and each of these stakeholders, creating varied tiers of support for seniors. Also, further research initiatives must continue trying to understand the social and contextual impacts of technology to make it inclusive and accessible for various generations of users. As fellow humans who will face aging at some point or the other, I hope that with empathy and compassion we can work towards making the lives of seniors more inclusive, confident, and joyous.

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Appendix

A. TCPCS Certificate

PANEL ON RESEARCH ETHICS

Navigating the ethics of human research

TCPS 2: CORE 2022

Certificate of Completion

This document certifies that

Sitalakshmi Lakshmanan

successfully completed the Course on Research Ethics based on the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2: CORE 2022)

Certificate # 0000791047 **22 January, 2022**

Figure A1. TCPCS Certificate

B. REB Approval Certificate

Emily Carr University Research Ethics Board (ECU-REB)
Research + Industry Office
520 East 1st Avenue
Vancouver, BC V5T0H2

+1 604 844 3800 ext 2848
ethics@ecuad.ca

CERTIFICATE OF RESEARCH ETHICS APPROVAL

The Emily Carr University Research Ethics Board approves the following project:

File #	Title	Principle Investigator:	Other Investigators
100473	Intergenerational Aid in the 21st Century	C. Raber	N. Beyzaei, S. Lakshmanan

The current approval dates are:

Approval Date	Expiration Date
April 26, 2022	December 31, 2022

The nature of the approval is as follows:

Type of Event	Type of Review	Approved Documents
New Approval Process	Delegated Review	Invitation form Interview questions Consent forms

It is the researchers' responsibility to meet all research ethics requirements in the jurisdictions in which the research takes place. The procedures and protocols described in this certification must be followed closely. Note the following conditions associated with this approval:

- For multi-site or partnered research, researchers are required to comply with all research ethics requirements that apply. Researchers are expected to share notice of this approval with partners, sites of research, or other research ethics review boards, as applicable.
- If changes to the approved application and documents are required by new partners, sites of research or other research ethics boards, researchers are required to inform the ECU-REB of these changes.

Researchers are required to report anticipated changes, adverse incidents, and project completion for further research ethics review. All reporting is managed through the research portal on the Research Management System Process Pathways Romeo - https://ecuad.researchservicesoffice.com/. Login and complete "event" reports for changes, adverse conditions, renewals, and the completion of this research ethics file.

This research ethics approval is in compliance with Tri-Council guidelines (TCSP2 2018) and Emily Carr University policies and procedures.

Nick Conbere
Chair, Emily Carr University Research Ethics Board
Emily Carr University of Art + Design

Cc. Research Finance Office, Emily Carr University

Figure B1. REB Approval Certificate

C. Recruitment process

The following materials were created to invite research participants.

Figure C1. Poster

Figure C2. Social Media Post

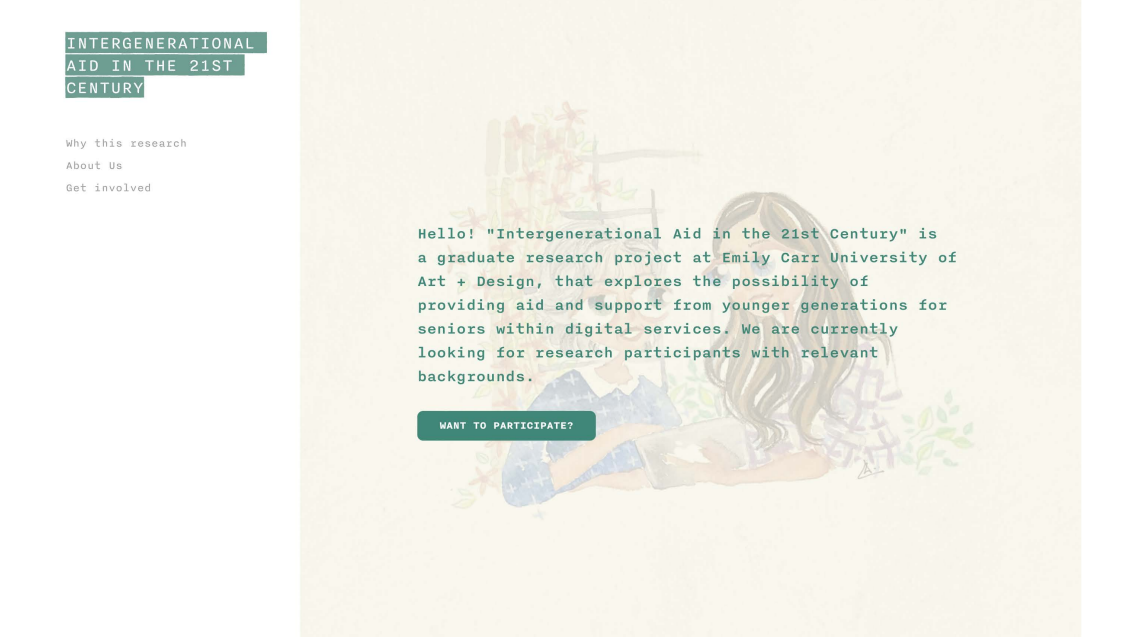

Figure C3. Website
Link : https://intergenerationalaid.myportfolio.com

Figure C4. Gifts for participation

D. Interview Questions

The following are some of the questions asked to all the research participants during the interviews.

1. What kind of intergenerational relationships do you have?
2. How do you feel about these current intergenerational relationships?
3. What do you most appreciate about these younger generation friends/family?
4. What do wish was better in these relationships?
5. Do you own any digital devices? What do you use them for?
6. What is your current proficiency with these devices? Do you want to improve this?
7. How do you do your day-to-day activities like finances, taxes, healthcare etc.? Do you do them online?
8. Do ever use technology to interact with the younger generations?
9. Have these digital technologies ever permeated your conversations with the younger generations?

E. Participatory Workshop : Activity 1

Activity 1 explores the theme of ‘support’ as you independently age. Some of the key questions that this activity addresses are “What do you see as your key support systems in your everyday life in the near future?” “What is your preferred means of accessing these support systems?”

Time : 30-40min

Participants : Both seniors and younger generations (The activity has 2 versions)

How to play?

1. You are given a set of 11 cards, each representing a particular theme from your day-to-day life. Eg. Healthcare, home, independence, etc.
2. You are also provided with two rows of stickers - The first row depicts various support systems like family, government, friends, community, self, etc. The second row has stickers of the means of accessing these support systems like in person, mobile, laptop, etc.
3. Now start with the top most card. Flip it to see a question addressed to you, about your preference in the near future.
4. Eg. Healthcare - Senior: “In 5-10 years, how do you see yourself managing your healthcare?” Younger person: “In 5-10 years, how do you see the senior managing their healthcare?”
5. Using the stickers as aids, try answering the question in the space provided. You are also invited to talk through your answers.
6. Move through each card similarly until all the cards are done.

Figure E1. Cards with Questions
(2 versions for seniors and younger persons)

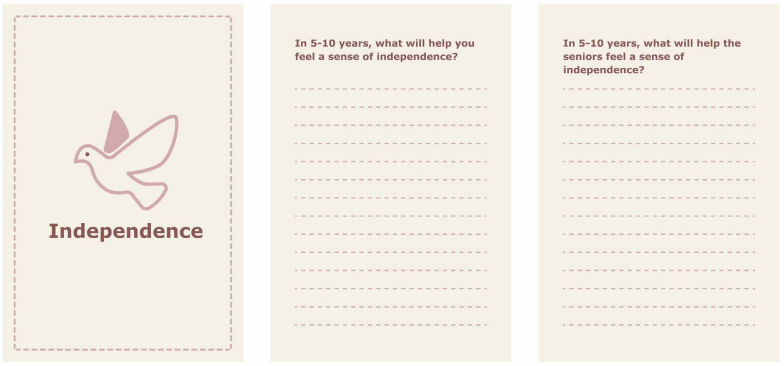

Figure E2. A sample card

Figure E3. Two categories of stickers

F. Participatory Workshop : Activity 2

The second activity probes into the idea of 'reciprocity' between generations in today's age. Here we get a glimpse of what the younger and older generations wish to give and receive from each other, in the 21st century.

Time :15-20min

Participants : Both seniors and younger persons (The activity has 2 versions)

How to play?

1. You are initially given a big sheet with two questions on it.
2. For seniors: "What would you like to receive from younger generations?" "What have you given to the younger generations? "
3. For younger persons: "What have you received from seniors generations?" "What would you like to give to the seniors?"
4. You are then given a variety of images, post it notes, markers and glue.
5. Some examples of the images include a house, piggybank, forest, etc.
6. Using these, try answering the questions in the space provided. Feel free to interpret the images as you see fit and collage. You are also invited to talk through your answers.

Figure F1. Seniors' version

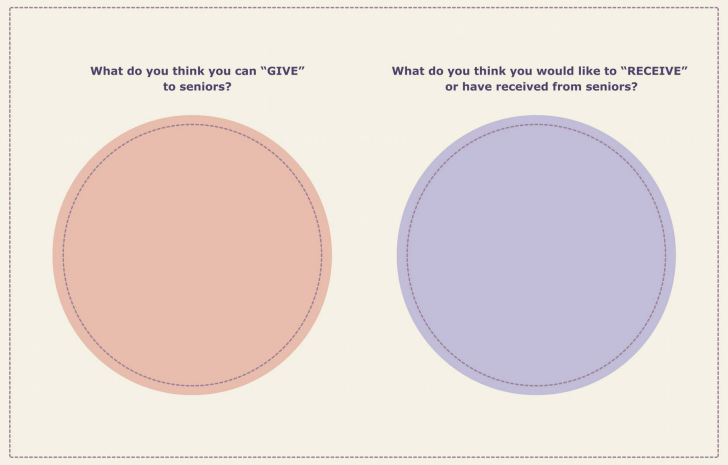

Figure F2. Younger persons' version

Figure F3. Images provided

G. Precedent Study

Product	About	Key Features	Pros	Cons
GetSetUp	Online learning community for seniors over 55 to learn new skills, connect with others	· 1-on-1 custom-tailored online session with a technology expert · Have community course material for online health, finance, job search etc. · Slides presented through video calls, published tutorials, articles, etc.	· Nice to have tutorial packages based on the user's intent - if you want to search for a job, understanding Amazon Prime sale, etc. · 1-1 sessions have the value of human to human connect	· Unsure of how these slides and presentations are designed - would it be interactive or a simple singular taught class? · Verbal walkthroughs could be inefficient and confusing at times · Paid service, not many seniors may be aware/want to invest in this
Candoo Tech	Remote tech support and training service to help older adults feel more comfortable with with phones, computers, tablets, etc.	· They work not just with senior users but also with enterprises including senior living facilities, healthcare, etc. · Offer remote lessons, support, device set up and management, resources (guides and videos) · Video calls with verbal walkthroughs, screen sharing and remote access · Online tutorials and guides	· Helpful to offer tailored solutions for various stakeholders involved like senior living facilities, care takers, etc. · Screen sharing offers a bit more scope for visual learning	· Wonder if they have tailored screen sharing tools to better aid the teaching process · Entirely dependent on the Candoo Tech support volunteers, not sure if there's added benefits like relationship building · Paid service, not many seniors may be aware/want to invest in this
Generations on Line	A free public charity to help seniors increase their digital literacy.	· Teaches seniors the basics of using new devices, hunting for jobs online, digital newspapers, healthcare, using q r codes, etc. · Allows family members access · Uses step by step instructions on a ready made app	· Free service · Good service for people who are entirely new to computers, tablets, phones, etc.	· Static method of teaching using just instructions and images may or may not help all seniors in learning efficiently · No opportunity to ask doubts/ troubleshoot · Lacks relationship building capacities
WESN's Tech Help	Tech help service for seniors in West End, Vancouver, that allows you to book sessions with young volunteer technology coaches, who try to help with your technology woes	· Help is available in person or via Zoom/phone calls · Tech help volunteers will try their best to help you with any digital queries you have · Community volunteering based service	· Good opportunity to get to know people in the community · You can pick the volunteer you want · Relies on trust and relationships · Personal one-on-one learning can help tailor the session to suit each senior's needs · Free service	· Requires a WESN membership · You may have to wait till your assigned slot of time to receive help, no opportunity to ask for help immediately when you need it · No advanced learning tools to aid in teaching
Carevocacy	Helps seniors learn about technology through live online classes.	· Offers both group sessions and one on one personal training with a private tech tutor (Carevocate) · You are paired with the Carevocate based on a questionnaire to match compatibility · Intend to help seniors stay social, connected, and learn new skills.	· All the Carevocates are specifically trained for this and go through background checks, making it safer considering that this is entirely online. · From setting up online banking to using Amazon's Alexa, a variety of trending topics are touched upon.	· Paid service · Wonder if they have advanced teaching tools and visual guides to better aid the teaching process
Cyber Seniors	NGO providing senior citizens with online tech-training using an intergenerational, volunteer model	· High school and university/college students are provided with lessons and learning activities to train them to act as digital mentors · Senior citizens gain access to effective technology training · Apart from one on one phone calls, they provide access to multiple tech-training resources and self-led tutorials along with one-on-one support · Programs for individual seniors and senior organizations	· Free service · Intergenerational communities keep seniors socially connected and engaged · Allows for seniors to participate and share in Cybercommunity events, creating a platform for community bonding · Lot of new and relevant updates in tech are covered under their courses. Eg. How to use iPhone's new built Medical ID and Emergency SOS App	· While they do they have their own secure technology and teaching tools, I wonder how advanced they are in including multiple learning methodologies, etc. Would these include efficient senior friendly learning aids? · Seniors don't have a choice on whom they receive as a volunteer
Senior Planet	Provides older adults the opportunity to learn and engage digitally in one or more areas of their lives: financial security, social engagement, creative expression, health and wellness, and civic participation.	· Structured, multi-week courses, lectures, workshops, special events, online content, and affinity groups · In-person centers act as technology-themed community spaces for older adults · One-on-one tech tutoring also available	· Free service · In person centers provide great community building opportunities · Themes covered by courses are relevant and functional	· Do their courses and one-on-one sessions accommodate for varied learning styles ?
Oasis Connections	Provides high-quality technology education to senior centers and residences, faith-based organizations, job help centers, YMCAs, libraries and other partners to teach their community of seniors	· The material can be used for group, staff or individual coaching · Online Courses	· Free service · Great resource for community centres, care homes, etc. to introduce seniors to new aspects of digital functioning	· Just videos and instructions may not be efficient or engaging teaching methodologies for seniors
Gentle Tech Help	Offers personal, patient, private help with digital devices	· Offers one on one troubleshooting, in-home assistance · They can clean up/organize your devices for you · A personal "tech companion" option offers you customized assistance at your own pace · Expert aid in digital transitioning in areas like Family, Estate, Divorce, etc. · Offers digital clean up services when someone passes away	· Interesting variety of services like helping you enable accessibility settings customized to your needs · Offer to teach online safety principles and other nuances when teaching a new digital feature	· Paid service · Do their courses and one-on-one sessions accommodate for varied learning styles ?

Figure G1. Precedent Study

H. Mid Fidelity Wireframes

The following are some of the mid fidelity wireframes explored with notes from user testing.

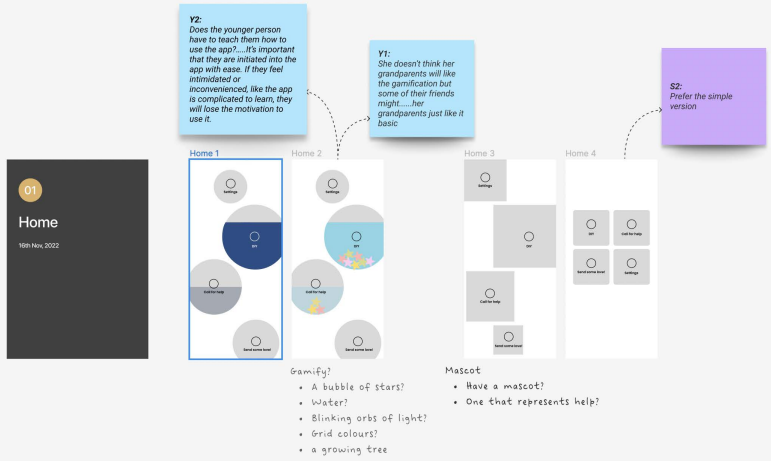

Figure H1. "Home" Screens

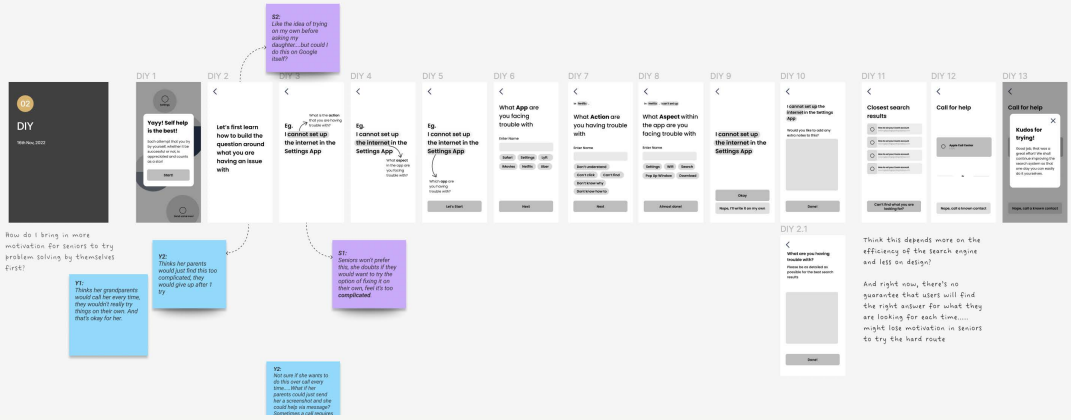

Figure H2. "Do It Yourself" Screens

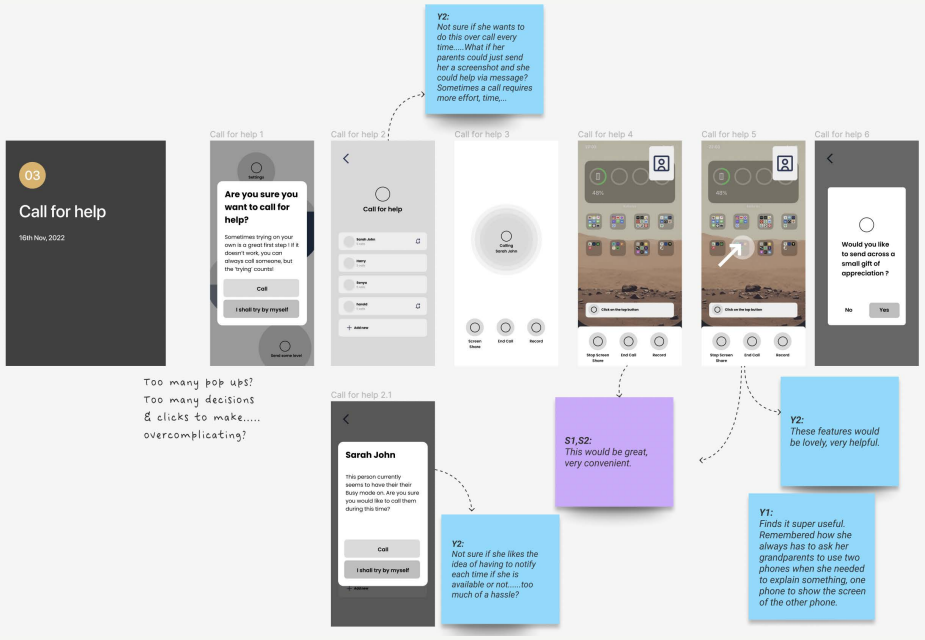

Figure H3. “Call for help” Screens

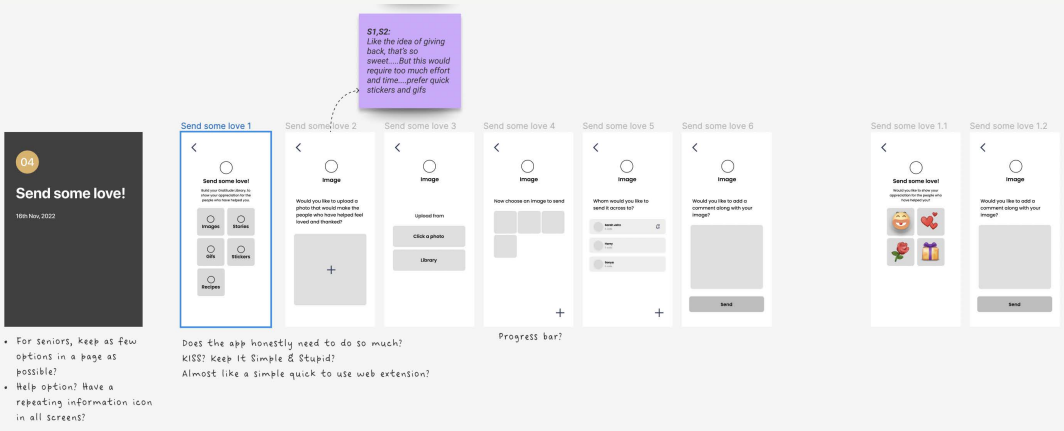

Figure H4. “Share appreciation” Screens

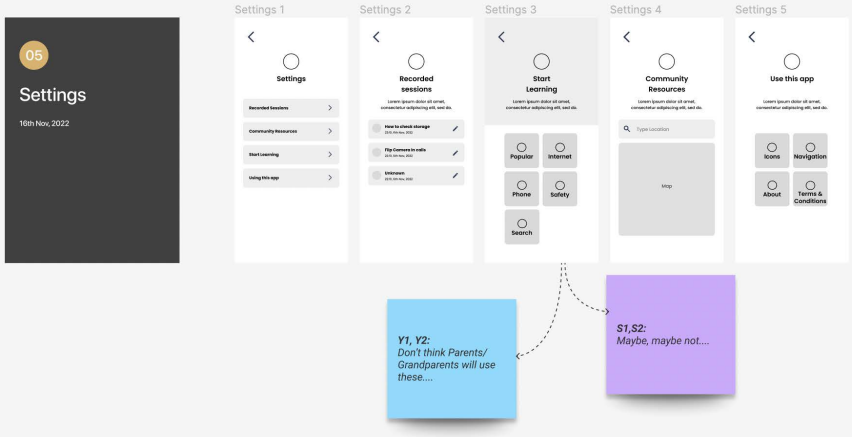

Figure H5. "Settings" Screens

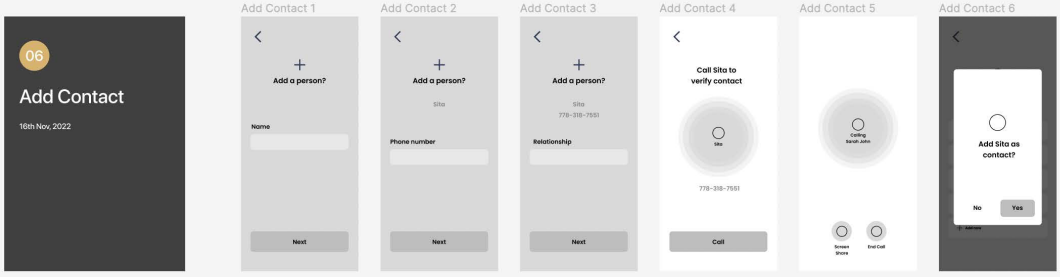

Figure H6. "Add Contact" Screens