Preparing for Baby Boomer Retirement:

Improving the Video Chat Experience in Intergenerational Communication

by

Ai Shi

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Graduate Supervisory Committee:

Donald Herring, Chair
Fei Sun
John Takamura

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ABSTRACT

The purpose of the study is to gain a better understanding of baby boomers' attitudes toward video chat applications and software based on their user experiences through the measurement of the level of use, usefulness, usability and aesthetics preferences. 133 participants recruited at a local public library and at three senior centers took the survey and 14 respondents were interviewed. The results of the study indicate: (1) Baby boomers have diverse attitudes and experiences in video chatting, but their attitudes do not present a significant difference from those of older generations; (2) Baby boomers' preferences for interface design are influenced by their psychological characteristics rather than physical changes; (3) Family members and close friends are a great resource for assistance and motivation for boomers. The knowledge of motivational factors and barrier factors could help maintain the existing baby boomer users and encourage potential users by providing an improved video chat experience design for them to connect with younger generations. This research could also lead social services into the telehealth age by bridging the gap between a traditional intervention and modern instant video communication.

DEDICATION

This thesis is dedicated to my parents.

Without their love and support,

I would not be who I am today.

ACKNOWLEDGMENTS

I would like to thank my graduate committee for their support, guidance, and insights during this endeavor. Professor Donald Herring, I am very grateful for your help in the direction of my research and for being supportive. Without your help, I would not yet have my research completed. Professor John Takamura, thank you for your continual guidance of my academic studies during my entire MSD program. Being able to turn to you has been encouraging, and I am highly appreciative that you took the time to help me when I needed it. Professor Fei Sun, it was your teaching in gerontology that opened my mind to older adults. I treasure the background knowledge you have provided me.

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CHAPTER 1

INTRODUCTION

The Baby Boom generation was born between 1946 and 1964; this large birth cohort brought significant changes to American families. Beginning nearly two centuries ago, fertility rates began to drop in the Western world (Alwin, 2011). With the development and improvements in medical care and living standards, people's longevity intensifies the feelings of loneliness especially in their late years. Especially for the empty-nest retired persons, their adult children and grandchildren might not satisfy their need of companionship. In order to improve the life quality of baby boomers, of whom some have just retired and many are about to retire in the near future, sufficient social support should be provided, including satisfying the connections with younger generations.

1.1 Significance and Rationale

Baby boomers contributed to the society when they were young. Currently, these people have begun to retire, becoming a large part of the social welfare consumers. The medical costs, healthcare costs and other relevant costs will increase as they age. For social and individual benefits, it is necessary to improve the aging people's physical health as well as emotion health. Receiving more support over time would lead to improved health as a direct result (Cohen & Wills, 1985). Elder consumers can benefit from interacting with information technology (Hough & Kobylanski, 2009). Therefore, using information technology might be a positive and alternative solution to maintaining boomers' overall health, to reducing their personal costs for healthcare services, and to decreasing the social costs.

Although baby boomers begin to step into the "young-old" group, which is aged between 65 and 75 and is widely used in gerontology (McInnis-Dittrich, 2009), baby boomers are rejecting a view of themselves as old people (Smith, & Clurman, 2009). Higher percentages of baby boomers than their older counterparts access the Internet and are engaged with information technology (Fox, 2004). Research indicates that the baby boomer generation is a large and profitable market for information communication devices, software and mobile applications.

The development of technology and its affordable price enhances contact among people. However, most basic home-based technology appliances and emergency call systems were not often used, according to Matlabi, Parker, and McKee's (2011) study. Garattini, Wherton, and Prendergast's study (2012) demonstrates that the biggest challenge is to maintain aging users. In addition, older people are sometimes unwilling to face the changes that aging has brought about and thereby avoid products that highlight these changes (Bowe, 1988). So, clarification of these reasons will guide information technology design in the future.

This research is meant to test baby boomers' attitudes toward video chat applications and software and to explore how the elements in the applications and software affect the level of use and baby boomers' willingness to use it. The generations older than baby boomers were studied as well to examine boomers' distinctive characteristics from those of the other older populations.

1.2 Research Questions

Topic: Baby boomer user experiences of video chat applications and software.

RQ 1: What are baby boomers' attitudes and experiences of video chat applications/software?

Rationale: According to Technology Acceptance Model (TAM), perceived usefulness and perceived ease of use determine users acceptance of new technology (Davis, 1989). This research question aims at clarifying the baby boomers' perceived attitudes toward the usefulness of video chat applications/software based on their user experiences.

RQ 2: What are baby boomers' preferences for functions and interfaces in video chat applications/software?

Rationale: Previous research found that baby boomers have similar aesthetic preferences as Generation Y (born from 1977 to 1990) in the interface design (Djamasbi, Siegel, Skorinko, & Tullis, 2011). However, a study about the visual design of interactive software for older adults done by Strickler and Neafsey, (2002) contradicts the standards of aesthetic and stylistic orientation taught in the US educational programs. Thus, it is necessary to investigate baby boomers' preferences.

RQ 3: How can we encourage baby boomers to use video chat applications/software?

Rationale: Garattini, Wherton, and Prendergast's study (2012) found the potential for using Internet-based communication technology as a means for encouraging social interaction, but the biggest challenge is to maintain aging users. In addition, Bowe (1988) found that older people tend to avoid the products that highlight their aging. Therefore, it is crucial to explore non-users' preferences for contact methods, their use of technology, attitudes toward technology, willingness to learn, and learning strategies.

1.3 Statement of the Thesis

The purpose of this research project is to improve video chat applications/software by applying improvement to the design of the user experience. Due to the nature of this objective and a focus on perceptions and current experiences, surveys and interviews were conducted to collect the data. In the first phase of the study, three gerontology professors in the School of Social Work at Arizona State University Downtown Phoenix campus were interviewed by handpick strategy (O'Leary, 2009) to obtain the supplementary information as well as the communication strategy and data analysis strategy for conducting baby boomer interviews. In phase two, 133 participants were recruited using cluster sampling strategy (O'Leary, 2009) in a local public library and three local senior centers to take the survey. The third phase of the research employed the follow-up interviews for a deeper understanding of the older participants.

Data collected in the survey were coded and entered in SPSS. Except for two open-ended questions, the questions in the questionnaire were close-ended. The coding scheme applied was simply to provide nominal and ordinal numerical values assigned to the response. SPSS was employed to analyze the frequency, proportion, and mode of quantitative data, and Microsoft Excel was used to visualize the results. A thematic coding analysis strategy (Robson, 2011) was employed to analyze and to identify patterns in the qualitative data. Thematic coding analysis consists of five phases: 1. Familiarizing data; 2. Generating initial codes; 3. Identifying themes; 4. Constructing thematic networks; and 5. Integration and interpretation (Robson, 2011).

This research has indicated that baby boomers have diverse attitudes and experiences of video chat applications/software, but their attitudes do not present a great difference from those of the older generations. Boomer users' preferences for interface design are influenced by their

psychological characteristics rather than their physical changes. In addition, family members and close friends are a great resource for assistance and motivation, which could be used to enlarge the boomer user market of information communication technology.

1.4 Definitions

Video Chat, also referred to video telephony or video calls, is the new data “hog” in current cellular networks (Jana, Pande, Chan, & Mohapatra, 2013). Users can video chat with a single person or with multiple persons at the same time. Currently, there are many video chat applications and software available, such as Skype, FaceTime, and ooVoo.

User experience is "a person's perceptions and responses that result from the use or anticipated use of a product, system or service" (ISO 9241-210, 2009). Aesthetic design makes sure the element has an appealing shape and texture, and functional design makes sure it triggers the appropriate action, while the user experience design often deals with questions of context, like what the user is trying to accomplish (Garrett, 2011).

The Technology Acceptance Model (TAM) is a well-known theory that addresses why users will accept or reject technology. According to the TAM, perceived usefulness is a major determinant of people’s intentions to use technologies, and perceived ease of use is a significant secondary determinant (Davis, Bagozzi, & Warshaw, 1989).

Gerontology is “The study of processes of population and individual aging; this draws upon a wide range of perspectives, including disciplines such as biomedicine, the social sciences, and the humanities. Gerontology is typically concerned with understanding aging, first, as a biological and social process affecting individuals across the life-course; second, as a process influencing social change through the movement of birth cohorts; thirdly, as a significant issue for the development of health and social policy.” (Gerontology, 2006)

1.5 Scope and Limitations

This research investigated baby boomers living in the urban and suburban areas of Phoenix and Tempe, Arizona. Brookings Institution analysis (Brandon, 2009) indicates that Phoenix, Mesa and Scottsdale are among the top 20 cities that will experience senior growth with a growth rate of 21%, due to the aging of baby boomers. Family values prospectively predicted

the support provided by children, but this is only triggered when parents have poor functional health and widowhood (Silverstein, Gans, & Yang, 2006). Consequently, participants with poor health conditions are excluded in this study. The potential baby boomer participants should live without children's co-residence in this study because living alone is a risk for lack of social support.

The size of the sample is inadequate to generate a comprehensive picture of baby boomers' user experiences of video chat applications/software. In addition, the cluster sampling strategy engaged in this study cannot indicate full representativeness.

CHAPTER 2

LITERATURE REVIEW

Chapter 2 comprises two primary sections, namely the conceptual framework of this study and a review of literature explaining the background behind the topics. In regards to the conceptual frameworks, Figure 2.1 illustrates the relationship among different research fields regarding video chat user experience.

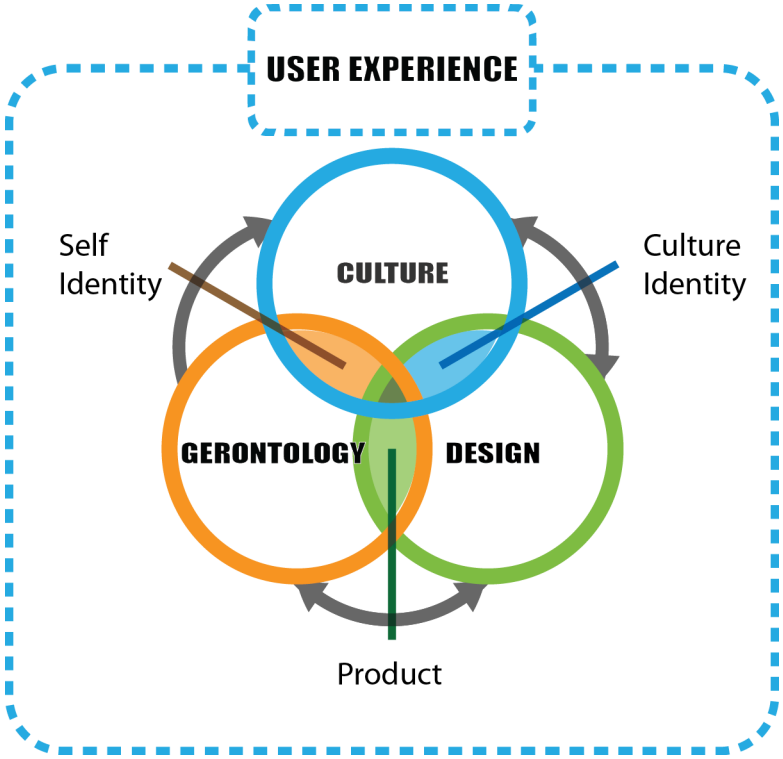


Figure 2.1 General Conceptual Framework

Figure 2.1 shows us that culture and gerontology intersect. According to Cambridge Dictionary of Sociology (2006), gerontology is defined as “The study of processes of population and individual aging. This draws upon a wide range of perspectives, including disciplines such as biomedicine, the social sciences, and the humanities” (Gerontology, 2006). This definition emphasizes on the interactions among the population, individual, and the society on the topic of aging. Thus, a discussion on gerontology is inseparable from culture. Furthermore, the figure above suggests that design and culture play a conjoint role. Moalosi, Popovic, and Hickling-Hudson (2010) reported that design is an important medium of communication, which reflects the cultural

situation and people's life. Moreover, design does shape the culture and lifestyle of modern society. Thus, the relationship between design and culture is interplay. On the basis of this statement, this study reviews the reasons why video chat as a culture identity could influence baby boomers' attitudes. Specifically, this study explores baby boomers' biological and psychological characteristics and self-identity regarding the value of youth, post-modern lifestyle, and their consumption habit of technology.

The relationship between designers and users is definitely also important. To help connect them, product serves as a medium. Product is indeed the only medium that designer can use to communicate with users because the product may contain one, two or three levels of design: Visceral design concerns the appearances from human nature; Behavioral design considers the pleasure and effectiveness of use; and Reflective design is about message, culture, and the meaning of a product or its use (Norman, 2004). Du Gay (1997) stated that a product is cultural if it can connect users' way of life. Therefore, users and the design only overlap through the product, and reflective design is where the user, design and culture overlap. All in all, the user experience is the comprehensive result of the influences from culture, user, and design.

This research project looks at the area where gerontology, culture and design overlap, to uncover baby boomer users' attitudes and experience of video chat applications/software, and explores the approaches to encourage baby boomers to use the applications/software. In Figure 2.2, the literature reviewed in this study is illustrated in details.

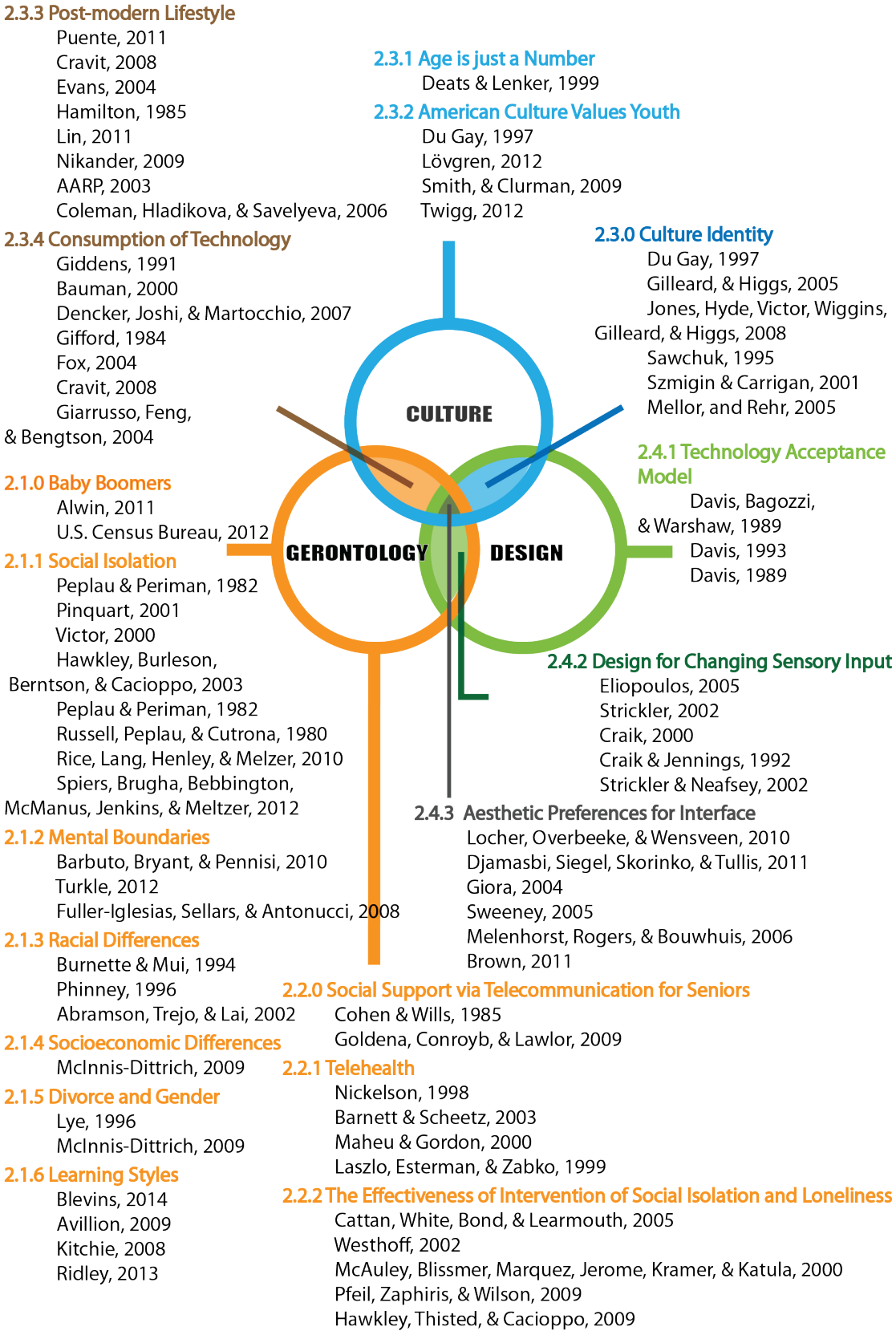


Figure 2.2 Specific Conceptual Framework

2.1.0 Baby Boomers

Beginning nearly two centuries ago, fertility rates began to drop in the Western world (Alwin, 2011). In the US, the birth rate reached its peak between 1946 and 1964. That is why the generation born during this period is called the baby boomer generation. Baby boomers numbered 76.4 million in 2012 and account for about one quarter of the population (U.S. Census Bureau, 2012). This large birth explosion brought significant changes to American families today. One of the most significant issues is the need to maintain the current level of social support.

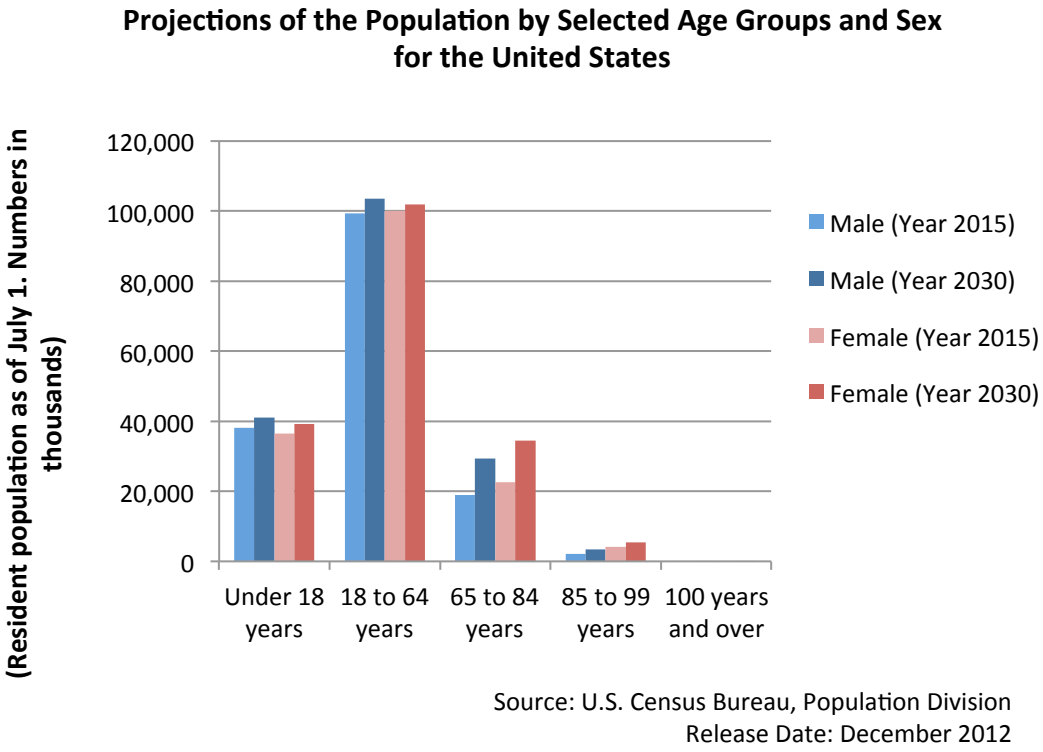


Figure 2.3 Projections of the Population by Selected Age Groups and Sex for the United States

Full retirement age (also called "normal retirement age") had been 65 for many years. However, beginning with people born in 1938 or later, the retirement age gradually increased until it reached 67 for people born after 1959 (Social Security Administration). Currently, baby boomers are beginning to retire and in ten years, many more baby boomers will be retired. As a result, spontaneous social isolation will presumably impact their psychological health. The breakdown of the traditional family structures and the increasing geographic distance between friends and family members indicate that retired aging people are more likely to live separately

from friends and family. Also, retired people can hardly maintain the frequency and quality of interaction and communication with the friends they made while working. So, retired people could be more isolated than ever before.

2.1.1 Social Isolation

Social isolation tends to trigger the feelings of loneliness, which can be defined as the distressing feeling that occurs when one's social relationships are perceived as less satisfying than desired (Peplau & Perlman, 1982). Loneliness and social isolation are often a consequence of mobility constraints, bereavement, declining social networks or physical relocation and have been proven to be closely associated with poor mental and physical health outcomes. International studies have estimated that between 5 and 16% of older adults experience loneliness (Pinquart, 2001; Victor, 2000). Moreover, loneliness is more closely related to qualitative than quantitative aspects of social relationships (Hawkley, Burleson, Berntson, & Cacioppo, 2003; Peplau & Periman, 1982; Russell, Peplau, & Cutrona, 1980).

Compared with former cohorts, baby boomers have improved cardiovascular health, but higher prevalence of mental illness diagnoses (Rice, Lang, Henley, & Melzer, 2010). A repeated cross-sectional survey of age and birth cohort differences in depression in England from 1993 to 2007 indicated the cohort born between 1950 and 1956 have the highest rates of depression than other cohorts (Spiers, Brugha, Bebbington, McManus, Jenkins, & Meltzer, 2012). With the development of medical care and living standards, people's longevity may prolong the feeling of loneliness especially in their late years. The empty-nest retired boomers, especially, cannot satisfy their needs of socializing at home. In order to improve retired baby boomers' life quality, enough social support should be provided, including the fulfillment of the needs of communication with the persons in distance.

2.1.2 Mental Boundaries

There are intergenerational differences in mental boundaries among aging people. Baby boomers appear to have significantly firmer boundary than the Post-War generations (born between 1930 and 1945), which means boomers tend to hold others at a distance, valuing privacy and personal space (Barbuto, Bryant, & Pennisi, 2010). Baby boomers can have better

control of their life with telecommunication technologies. Turkle (2012) mentioned The Goldilocks effect as “not too close, not too far, and just right.” People have psychological needs to hide from each other to some extent. If they have control of where to place attention, how much attention is focused on them, and what image to convey to others, people have a better sense of security. Older adults who feel the sense of control and mastery over their environment and life are less likely to become depressed (Fuller-Iglesias, Sellars, & Antonucci, 2008).

2.1.3 Racial Differences

Research has shown that racial and ethnic group members do not necessarily contribute to higher levels of depression, while being white is a strong predictor of depression than being a person of color (Burnette & Mui, 1994). Native American elders are treated with honor and respect, and their extended families are very close (Phinney, 1996); Hispanic/Latino elders are less likely to live alone because of their strong ties to family, “family values” and economic necessity; African American elders are likely to have support from extended families and intergenerational relationships (Abramson, Trejo, & Lai, 2002).

2.1.4 Socioeconomic Differences

Regarding the perspective of socioeconomic effect, higher rates of depression among older adults of colors are closely related to lower socioeconomic status and the corresponding worse physical health conditions (McInnis-Dittrich, 2009), white boomers are more likely to be depressed because of insufficient support from families, but they are more likely to benefit from telecommunication due to the higher socioeconomic status, which allows them access to telecommunication devices.

2.1.5 Divorce and Gender

Divorced parents and their children report fewer visits, telephone calls, and letters. The children tend to live further away from their parents, and are less likely to be involved in the exchanges of practical support, especially with fathers. They are less likely to be involved in the exchange of emotional support. Parental divorce is shown to have negative effects of child-parent relationship quality among fathers but there is no effect with mothers. Compared with mothers, fathers are less likely to get sufficient support from adult children (Lye, 1996). According to

McInnis-Dittrich (2009), higher levels of depression among females are more likely due to the result of bio-psychosocial factors rather than gender. When conducting interventions for divorced baby boomers, involving adult children and grandchildren living at a distance via telecommunication technology can help alleviate intergenerational conflicts and increase support exchange between the two generations. For designers, effective interface design that meets the needs of several generations would be necessary for both health care and entertainment purposes.

2.1.6 Learning Styles

According to Blevins (2014), adult learners need more focus on the entire learning process rather than specific content, based on six assumptions:"

1. Need to know. Adults must understand why they need to learn new information.

2. Self-concept. Adults are responsible for their own lives and are self-directed.

3. Role of the learners' experiences. Adults draw upon the learners' experience as it relates to new education.

4. Readiness to learn. Adults learn concepts they need to use.

5. Orientation to learning. Adults are life-centered or problem-centered.

6. Motivation. Internal pressures (self-esteem, quality of life) are higher motivators to learning than external motivators (job, salary)."

Although adults may learn by a variety of methods, one learning style dominates (Avillion, 2009). Visual learners prefer a quiet environment that allows them to use written information from books or the Internet with graphics or illustrations to reinforce the information. Auditory learners prefer listening to the information and read it aloud to understand it. Kinesthetic learners prefer to learn new information by hands-on demonstrations, role-playing, and manipulating the equipment (Avillion, 2009; Kitchie, 2008).

Video chat has become the latest holiday tradition to connect family and friends at a distance ("ooVoo", 2008), and even in the same house, 9% of families opt to use video calls instead of talking face-to-face (Ridley, 2013), which means video chat applications and software users cover a wide age group in families, therefore a general look at all learning styles of these

cohorts is necessary. Blevins (2014) believes that learning styles of different age groups should be considered in planning education and training to maximize learning results. Avillion (2009) and Kitchie (2008) claim that learning styles vary across four generational groups. With regards to baby boomers, they need explanations of how new information will be valid and useful in their lives, so teamwork, discussions, icebreakers, and the use of life experiences are effective teaching strategies (Avillion, 2009; Kitchie, 2008).

2.2 Social Support via Telecommunication for Seniors

Traditional aging-related products include the assistive equipment, various monitors and first aid devices. However, the aging generation with healthy physical functions also requires support to maintain mental health. Receiving more social and emotional support over time leads to improved health (Cohen & Wills, 1985). Social support is not a traditional industrial product that can be mass-produced and provided. Therefore communication content varies for different individuals, and social support for aging people is highly customized.

Goldena, Conroyb, and Lawlor (2009) indicated that both the frequency of attending social events and the frequency of social contact with friends and neighbors were associated with depression. Physical disability was associated with less attendance at community events, but do not impact the frequency of contact with friends and neighbors. Consequently, the loss of significant others – a spouse, partner, sibling, or friends – is strongly associated with the incidences of depression in older adults, and is more serious for physically disabled persons. Thus, telecommunication is one method to help older adults build a new network to regain sufficient social support.

2.2.1 Telehealth

Nickelson (1998) defined telehealth as “the use of telecommunications and information technology to provide access to health assessment, intervention, consultation, supervision, education, and information across distance”. This may include the interventions via media, such as telephone, email, audio and video real-time satellite communications (Barnett & Scheetz, 2003).

Barnett and Scheetz (2003) reported that the *telephone* provides a wide range of services to include referrals (91%), emergency care (79%), consultation and education (71%), individual psychotherapy (69%), and clinical supervision (58%). Accepted standards of telephone intervention may include (a) the use of a comprehensive informed consent procedure that addresses the relative risks and benefits of this treatment modality, (b) the reasonable alternatives that are available, (c) how confidentiality is preserved and the legal limits to confidentiality that exist in the patient's state of residence, (d) how emergency situations are handled, (e) how to contact the practitioner when in crisis, (f) how termination is planned for and handled, (g) the documentation procedures, and (h) the specifics of fees and financial arrangements (Barnett & Scheetz, 2003).

Email can be used as the sole medium for providing professional services. Both patients and professionals can write, read, and reply to emails at their available schedule, but it cannot guarantee the access to the server due to the protective software on the Internet (Barnett & Scheetz, 2003). Maheu and Gordon (2000) claimed that there is no clear understanding of the effectiveness or appropriate use of e-mail as a therapeutic medium.

Interactive televideo and related technologies are a greater step forward than other telecommunication media. It provides more auditory and visual cues as real person interactions. Laszlo, Esterman, and Zabko (1999) suggested that it might be best suited for cognitive-behavioral interventions. Yet, this approach requires access to the Internet, high tech devices and good illuminations.

2.2.2 The Effectiveness of Intervention of Social Isolation and Loneliness

A systematic review of health promotion interventions conducted by Cattan, White, Bond, and Learmouth (2005) reflects that group interventions with an educational input, group interventions providing social support, home visits to provide assessment, information or provision of services, and social support in one-to-one interventions demonstrated a significant reduction in loneliness. Physical activities reduced the level of loneliness among the participants in two studies done by Westhoff (2002) and McAuley, Blissmer, Marquez, Jerome, Kramer, and Katula (2000). *Group interventions providing social support* helped the participants who were

initially most pessimistic; those with internal locus of control have the greatest decrease of loneliness (Cattan, White, Bond, and Learmouth, 2005).

However, *home visits or telephone contact to provide directed support or problem solving* is not effective in reducing loneliness and only partially effective in reducing social isolation (Cattan, White, Bond, & Learmouth, 2005). Physical presence and body language is crucial when supporting somebody emotionally in an offline setting (Pfeil, Zaphiris, & Wilson, 2009). The lack of physical presence, body language, eye contact and the limited voice quality make it less effective for emotional and social support on the telephone. So visual information should be included in telecommunication if physical presence cannot be guaranteed.

Improving physical activity engagement can be considered as an important component in the intervention, because lack of physical activities is a risk factor for loneliness, and loneliness among middle and older adults is an independent risk factor for physical inactivity (Hawkley, Thisted, & Cacioppo, 2009).

2.3 Cultural Identity

Cultural identity is defined in Encyclopedia of geography terms, themes, and concepts (2010) as the elements of culture that can distinguish a member of a group from others, including physical characteristics such as skin color or gender, or criteria such as shared attitudes, rituals, language, religion, and values. According to du Gay (1997), a product is “cultural” if it can connect people’s way of life, can be associated with certain kinds of people, with certain places, and frequently appears in visual languages and media of communication. Because video chatting connects people’s way of life and acquires a social identity, the applications and software could represent cultural elements.

As Norman (2004) mentioned a person’s self-identity is located within the reflective level which is vulnerable to variability through culture, experience, education and individual differences. At this level, users’ attitudes toward ownership or use are a result of the interaction between the product and their self-identity. Baby boomers are the generation born and raised in a consumer society, sharing similar attitudes, values, and life style, as well as a conviction that they will not age in the way former generations have (Gilleard, & Higgs, 2005; Jones, Hyde, Victor, Wiggins,

Gilleard, & Higgs, 2008; Sawchuk, 1995; Szmigin & Carrigan, 2001). They will live longer, better, and healthier than their parents, and they tend to use the Internet and media to become informed about any symptoms they may have without professional consultation (Mellor & Rehr, 2005).

In consequence, users' attitudes toward the ownership and use are influenced by the relationship between video chat applications/software (as a reflection of users' culture identity) and users' self-identity (not age in the same way former generations have).

2.3.1 Age is just a Number

Although we all age, "old" does not begin at a certain age that differs from our current life stage. As Deats and Lenker (1999) reported, people only apply the label "old" to those who are older than themselves. Official identifications of aging gave different boundaries to certify United States citizens as "senior". For membership in AARP, age fifty qualifies as senior, while it takes until age sixty-two to get airline and entertainment discounts, and until sixty-five to enjoy social security benefits.

Historically, Western culture mainly focused on aging in terms of physical deterioration. However, gerontologists are increasingly aware of the multi-aspects of age: chronological age (the numerical total of years lived), biological age (the strength, health, vigor, and elasticity of body, which frequently have little relationship to chronological age), social age (the culturally constructed, often prescriptive behaviors arbitrarily linked to a chronological numeral), and individual age (our own self-image, which is often at variance with all the other markers of age) (Deats, & Lenker, 1999). On the basis of Deats and Lenker's (1999) statement, in the development of a new product, age as a number should not be used as the only criterion in categorizing target users because the definitions of "old" changes and users' self-images vary among individuals. The developers should also incorporate users' functional and emotional needs when designing applications/software.

2.3.2 American Culture Values Youth

American culture values youth. This value is constantly communicated by mass media to audiences of all ages. Advertisement is cultural practice because it creates identification between the customers and the products to get the target users to see themselves as the typical users.

The image built in the advertisements should be the ideal image of the target customers (du Gay, 1997). Since youth is valued in American culture, younger models are preferred in advertisements, magazines and TV programs. Even though some advertisements are aimed at older consumers, they still use mature models with younger images than the consumers' ages to unconsciously present their preference of youth. It seems to be a taboo to address a consumer as an old or senior person. Instead, both mass media and audiences begin to deny the aging of consumers by replacing "old" with the "forever young", "young at heart", and "young regardless of age" (Lövgren, 2012). "Old age is more connected with negative images, such as antiquated, obsolete, out-of-date, old-fashioned and past one's prime. Despite the physical changes, baby boomers are rejecting a self-image as old people (Smith, & Clurman, 2009).

Being fashionable and staying young are not only about appearance. They also represent that an individual is still a part of the social world, still being valued, and worth being noticed (Twigg, 2012). Thus, older women are taught to dress appropriately by fashion magazines and convince themselves that they are still linked to mainstream consumption, actively engaged in the social world, and assured of their "youth" (Twigg, 2012).

Unfortunately, some senior mobile device advertisements convey the wrong image. In Figure 2.4, the advertisement communicates the warm intergenerational connection with the help of a senior phone, whereas, the person represented in the advertisement does not represent the target consumers' ideal self-image – although the older model looks vigorous and healthy, she is not young enough to be the ideal image of baby boomers.

Figure 2.4 Senior Phone Advertisement

From http://clarityproducts.com

2.3.3 Post-modern Lifestyle

Different from other generations, baby boomers have distinct characteristics formed by life experiences in the late modern and post-modern culture. “The Boomers…. were the first generation to be raised on TV, to be influenced by TV ads, to have their own record players, transistor radios and so on.” (Puente, 2011). They were the yuppies of the 1970s, not only tech-savvy, but tech-driven (Cravit, 2008).

They have experienced planned obsolescence, which is bluntly defined as "a marketing practice that capitalizes on short-run material that wears out, style changes, and functional product changes" (Evans, 2004). Many of these short-lived products were inspired by the Pop movement, since pop was explained as "popular, transient, expendable, low cost, mass produced, young, witty, sexy, gimmicky, glamorous, and Big Business" (Hamilton, 1985). Having enjoyed youth and fashion style for decades, baby boomers have a younger lifestyle and attitudes than the former cohorts. According to Lin (2011), “Youth and appearance value” and “fashion and foreignism worshiping concept” have many postmodernist tendencies.

“Post-modernism produces cultural analyses of aging identities and replaces the modern homogenizing grand narratives on the effects of age, race and gender with an upbeat appreciation of malleability and fluidity” (Nikander, 2009). As there are increasing similarities among different generations in lifestyle, values, self-expression, and activities, aging is becoming a blurring concept from post-modern culture.

Nevertheless, boomers are better educated and more economically secure, making them a more powerful consumer and economic force contributing to productivity and economic growth. Unlike older retirees, baby boomers regard retirement as a transition of lifestyle rather than the end of a job. Nearly 70% of boomers reported that they expect to continue working in their retirement years (AARP, 2003) to improve their financial conditions, and, thanks to the abolishment of mandatory retirement for most professions (Coleman, Hladikova, & Savelyeva, 2006). In addition, Lövgren (2012) believes that baby boomers see themselves as young.

2.3.4 Consumption of Technology

Consumption is the core concept of post-modernism. The patterns of consumption integrate an individual's cultural-identity, and link individuals together within a common culture of lifestyle (Giddens, 1991; Bauman, 2000). Dencker, Joshi, and Martocchio (2007) indicated that the baby boomers born between 1946 and 1955 tend to be self-authored and value personal development. Gifford (1984) stated that baby boomers born between 1956 and 1965 tend to value competition and material success.

As a result of individualism and self-improvement, baby boomers will continue to consume new technology products to define their cultural identity. The "traditional elderly" are described as those who avoid the Internet and only use the telephone to fulfill their telecommunication needs, regardless of the better interaction methods brought by the highly developed information communication technology. However, 58% of the adults aged between 50 and 64 access the Internet and are engaged with IT at much higher percentages than their older counterparts (Fox, 2004). Cravit (2008) claimed, "The boomers had to have the newest toys, whatever those toys were. And there is no sign of this changing now." Meanwhile, other research indicated that baby boomers typically value relationships with their grown children more than relationships with their parents (Giarrusso, Feng, & Bengtson, 2004). The eagerness to contact grown children may also motivate baby boomers to consume communication devices and applications/software.

2.4 Interface Design for Baby Boomers

Younger generations grew up with the Internet and computers; they have less difficulty using technical communication devices. Baby boomers must begin learning to use these technologies in their middle age. Since users have to remember the functions name, its location on the menu and the hierarchy structure, it is hard for aging users to complete a targeted new action because of their cognitive characteristics.

2.4.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) is a well-known theory that addresses why users will accept or reject technology. According to the TAM, perceived usefulness is a major

determinant or people's intentions to use a computer, and perceived ease of use is a significant secondary determinant (Davis, Bagozzi, & Warshaw, 1989). Perceived usefulness has a positive relationship with use-performance, while perceived ease of use relates to the degree of freedom of effort to use a particular system. Both determine how much a person currently uses technology and his or her future use, although usefulness had a significantly greater correlation with use behavior than ease of use. In addition, perceived ease of use has been found to be a causal antecedent to perceived usefulness, as an interface helps with a system's functionality (Davis, 1993).

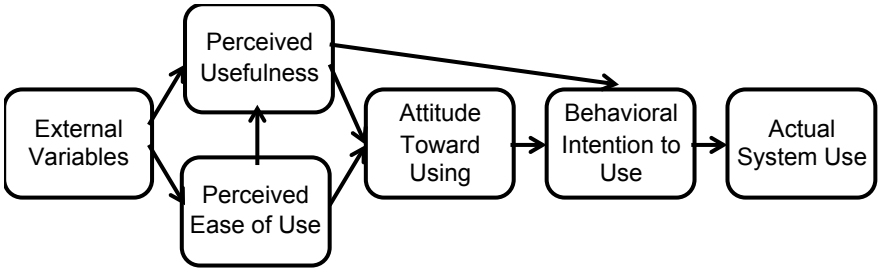


Figure 2.5 Technology Acceptance Model (TAM) (Davis, 1989)

2.4.2 Design for Changing Sensory Input

The physical senses, in addition to memory, strongly influence older adults' ability to learn. If older adults have difficulty seeing clearly, they will have difficultly learning. As the lens of the eye yellows, older adults' color sensitivity decreases. Blue, violets, and greens become more difficult to distinguish, but aging eyes are still sensitive to red, yellow, and orange (Eliopoulos, 2005). Light warm blue is helpful as a background color, because other visual elements and cues can be better distinguished (Strickler, 2002). All learning derives from perceptions coming from environment perceived through the senses (Craik, 2000; Craik & Jennings, 1992). Psychologists found that learning occurs most rapidly when information is received through more than one sense. Many senior product interfaces provide some visual and acoustical clues to help users remember the operation. A study done by Strickler and Neafsey (2002) about visual design of interactive software for older adults found that seniors older than sixty need 18 point or larger characters, bold type, strong contrast for type value, and glare-reducing backgrounds. Their study also indicated that information overload, pressure, and distraction would impact the process of

memory. Information overload can occur when a product has a multifunction, multi-hierarchy menu, several buttons, etc. Distraction includes background music or noise and fancy decorations in interface design, especially for aging users. Older adults are more easily distracted by background sound. Visual tracking diminishes with age. Animated components in interface design operation need to slow down more than the speed preferred by younger generations. Strong visual cueing and clear navigation functions are especially important (Strickler, & Neafsey, 2002). Their study also stated that some of the preferences expressed by participants contradict standards of aesthetics and stylistic orientations commonly taught in design education programs in the US. However, participants in this study were at least sixty years old by self-report in 2002, which means the findings of this study cannot guarantee representativeness for the baby boomers.

2.4.3 Aesthetic Preferences for Interface

The difference of aesthetic values and lifestyle between baby boomers and younger generation is not as significant as before. A user's aesthetic interaction with an artifact is influenced by their experiences such as education and the information they have received (Locher, Overbeeke, & Wensveen, 2010). A recent study on websites done by Djamasbi, Siegel, Skorinko, and Tullis (2011) found that baby boomers and Generation Y (born from 1977 to 1990) have similar aesthetic preferences, and they both prefer pages that have images and little text on websites.

However, boomers have different reactions from the younger generation when interpreting the same stimuli because baby boomers' aesthetic experience is different from that of younger generations. Baby boomers have a higher tolerance for more information on a web page, which means they are less likely to miss important information on a page (Djamasbi, Siegel, Skorinko, & Tullis, 2011). Baby boomers do not tend to avoid reading text-based information (Djamasbi, Siegel, Skorinko, & Tullis, 2011), since they read books both for entertainment and information when growing up (Giora, 2004; Sweeney, 2005), moreover they are willing to reread the text if there is a need to do so (Melenhorst, Rogers, & Bouwhuis, 2006). The younger generation has less patience to finish reading text (Giora, 2004; Sweeney, 2005) because they

grew up with technology that provides rich and interactive communication, and in a society that values a fast pace and high efficiency. Older adults are more likely to turn to manuals to learn a new program, rather than assuming that the program itself will teach them to use it (Brown, 2011).

2.5 Summary

The large cohort of baby boomers is rapidly approaching retirement and will bring significant challenges to society. Previous research focused on telecommunication applications/software was concentrated on health-related interventions, but rarely looked at the entertainment activities, such as contacting family members. Recent studies have delved into baby boomers' perception toward communication technologies and devices, such as cellphones, but rarely look at video chat applications and software. Other research projects clarified how baby boomers are influenced by cultural identity to be able to use or not use technologies as younger generations do, but they failed to show the user experiences. There is a need for the current research to look at video chat applications/software' usability and baby boomers' aesthetic preferences to eliminate the barriers with design approaches and ultimately extend the baby boomer market.

CHAPTER 3

METHODOLOGY

The purpose of this research is to improve video chat applications/software by applying improvements of user-experience design. Due to the nature of this objective and a focus on perceptions and current experiences, surveys and interviews were conducted to collect the data. SPSS and Microsoft Excel were employed in quantitative data analysis and thematic analysis was used in the qualitative data analysis. This chapter outlines the methods used in this study, including the hypotheses, the sampling strategy, the procedure for data collection, and data analysis methods.

3.1 Hypotheses

Previous studies (Djamasbi et al, 2011) suggested a positive relationship among Internet use for baby boomers, a similar aesthetic preference for mobile phones for older users as for younger adults, and a unique requirement for interaction software design for older users. Based on previous studies, the following hypotheses were tested in this research project:

H1: There is dramatic diversity among baby boomers' attitudes and experiences in Video Chat Software/Applications.

Overall attitude can help predict the possibility to maintain the existing users and to extend the baby boomer market. Users' satisfaction influences the continuity of using video chat applications/software, while the reviews from non-users might affect their willingness to try these applications/software.

- Some baby boomers are familiar with video chat applications and have no difficulty in using these applications. For these baby boomers, the requirement of improving video chat applications/software may not be very urgent.

- Some baby boomers have some experience in using video chat applications, but they have a few difficulties in using these applications. This group of baby boomers might need video chat applications/software redesign to improve their satisfaction of the user experience. Some barriers for them are:

· Words are too small to see without presbyopia glasses, buttons are too small for their fingers, which may require easy-access enlarge functions.

· Some colors are hard to distinguish, which may require new color design to improve clarity.

· Some animations are distracting, complex, or overwhelming, which may require developers to remove animations.

· They face information overload, which may require designers to redistribute the information onto several pages

· The hierarchy structure of menus/operations is hard to remember, which may require clear instructions, visual clues, or easy access to help on every page.

- Other boomers do not have any experience with these applications and they do not want to try video chat applications. It might be hard to encourage this group to use video chat applications, but clarifying why they hold negative attitudes are essential to eliminating the avoidance of video chat applications/software.

This hypothesis was tested using the subject's responses to questions regarding video chat applications/software use and how useful the video chat applications/software is. Non-users' responses toward technology and technological devices were discussed as well.

H2: Baby boomers' aesthetic preferences for interface are similar to the younger users, but they have specific requirements due to their physical changes.

Software and mobile applications are developed by generations younger than baby boomers, thus the cultural and physical differences between younger developers and older users might influence baby boomers' user experience. The aesthetics for interface design refer to "ease of learning", "ease of use", "user friendliness", "readability", and "quality of video", This study tested this hypothesis through descriptive statistics in response to the usability questions in the interview and questionnaires, i.e. Can you describe your first impression of the video chat applications/software before you used it? A. What were your impressions of the user interface design? What did you like? Dislike? What stands out? B. Impressions of its function? What functions did you think about using?

H3: Children and grandchildren are an effective stimulus for baby boomers to learn new technology.

In order to extend the market, designers need to find out how to stimulate baby boomers to use technology, and make the using process consistent with their learning strategy, so that the baby boomers will be willing to use and find it easy to learn.

This hypothesis will be tested by their responses to questions regarding baby boomers: 1. Willingness to learn to use video chat applications/software if their peers, children and grandchildren are using it, and 2. Willingness to learn if their peers, children and grandchildren want to contact them with it, and 3. Baby boomers' learning strategy.

3.2 Sampling Strategy and Procedure

Data for this research were gathered in phase two and phase three.

Phase one: The first phase included three interviews with gerontology professors at the School of Social Work, Arizona State University Downtown Phoenix campus, by using the handpick strategy (O'Leary, 2009). The researcher referred to the faculty members' information from the School of Social Work website, and identified the faculty members whose research interests and professional areas include gerontology, and are also located at the Arizona State University Downtown Phoenix campus. The expert interviews consisted of four parts, including 1. Warm up questions about the expert, 2. Baby boomers' characteristics, 3. Baby boomers' perception of technology, and 4. Tips for the interview process. Responses obtained from questions about baby boomers' characteristics and baby boomers' perception of technology is supplementary information for this research, while tips for interviewing served as a communication strategy and as a data analysis strategy for the baby boomer interviews.

Phase two: A six-part questionnaire (O'Leary, 2009) was administered to 133 participants recruited by using a cluster sampling strategy (O'Leary, 2009) at one public library and three senior centers in urban and suburban areas in Tempe and Phoenix, Arizona.

Since there is no available sampling framework, in the sense of an existing directory of baby boomers, a bit of detective work was required to find them. Some educational and entertainment activities are posted on the Tempe government website for adults older than fifty

(http://www.tempe.gov/index.aspx?page=2535). To broaden the sampling framework to include older generations who are not baby boomers, all accessible individuals in local activities who are 50 years and older and were willing to take part in the research could complete the questionnaire. The non-baby boomer's data were compared to the baby boomer participants' data. The researchers assumed that nearly all of the respondents would identify their ages correctly.

The questionnaire used for the survey includes 1. Consent notices, 2. General instructions, 3. Background information, 4. A section asking questions about video chat applications/software users, 5. A section asking questions about non-users, and 6. Contact information for the follow-up interview (see Appendix A). The questions about users' attitudes toward video chat applications/software and non-users' impression of technology and stimuli were evaluated in a range of five Likert-scale (Likert, 1932) responses.

Phase three: The third phase of the research employed a more qualitative approach for a deeper understanding of baby boomers. At the end of the previously noted questionnaires, respondents were asked whether they would consent to a follow-up interview to provide more details about video chat applications/software use and experiences. There are three types of interview options, including 1. Face-to-face interviews, 2. Computer FaceTime interviews and 3. Computer Skype interviews. A total of 14 respondents older than 50 were interviewed, including seven baby boomers. These interviews comprised a relatively small sample (n) on which to interpret results, but their verbal anecdotes of their video chat applications/software use and experiences will help to inform quantitative data gathered through survey research. A semi-structured (O'Leary, 2009) interview schedule was used, including the many suggested probes (see Appendix B). The order and wordings were changed slightly to allow conversation flow, and not all questions were explicitly asked if the participant had already answered them. First, the participant was provided time to go over the Participant Information Sheet and given a chance to ask any questions. Second, the researcher asked for the participant's permission to audio record the interview. Third, the researcher continued to ask questions on video chat applications/software use and experiences. If the interview was being done in person and the participant revealed that they do not use video chat applications/software, the researcher

provided them with a sample application to interact with for 10 minutes before continuing the interview.

The surveys and interviews (O'Leary, 2009) were employed to collect data for three research questions. The surveys were used because they can reach a large number of respondents, representing the baby boomer population, while interviews and open-ended questions are expected to result in some rich descriptions for details that cannot be represented through quantitative data.

3.3 Data Analysis Method

3.3.1 Quantitative Data

Data collected in the survey were coded and entered in SPSS. Except for two open-ended questions, questions in the questionnaire are close-ended. The coding scheme applied was simply to provide nominal and ordinal numerical values assigned to the responses. SPSS was employed to analyze frequency, proportion, and mode of quantitative data; Microsoft Excel was used to visualize the results.

3.3.2 Qualitative Data

A thematic coding analysis strategy (Robson, 2011) was employed to identify patterns in the qualitative data. Thematic coding analysis consists of five phases: 1. Familiarizing data; 2. Generating initial codes; 3. Identifying themes; 4. Constructing thematic networks; and 5. Integration and interpretation (Robson, 2011). However, the researcher may need to return to a previous stage reanalyze the prior data and recode it to reflect more appropriate categorization.

In the first phrase, familiarizing data is time consuming. All interviews recordings were transcribed and read thoroughly by the researcher.

The second phase involved the generation of initial codes. The process of coding is part of organizing data into meaningful groups. The researcher needs to identify interesting aspects, which may form the basis of themes within the dataset (Robson, 2011). Short extracts and sentences were created by highlighting the original sentences in the transcript. The researcher created a profile for each of the respondents.

Phase three required the search for themes in the data. Ryan and Bernard (2003) mentioned eight techniques for identifying themes, including: 1. Repetitions; 2. Indigenous categories; 3. Metaphors and analogies, with which people represent their thoughts; 4. Transitions; 5. Similarities and differences; 6. Linguistic connections; 7. Missing data; and 8. Theory-related material. As seen in Figure 3.1, the researcher used theory-related material in the research to identify themes. Except for the themes mentioned in research questions, additional themes were created to explore the data, such as external factors to explore the objective reasons, and negative factors to uncover the objective barriers.

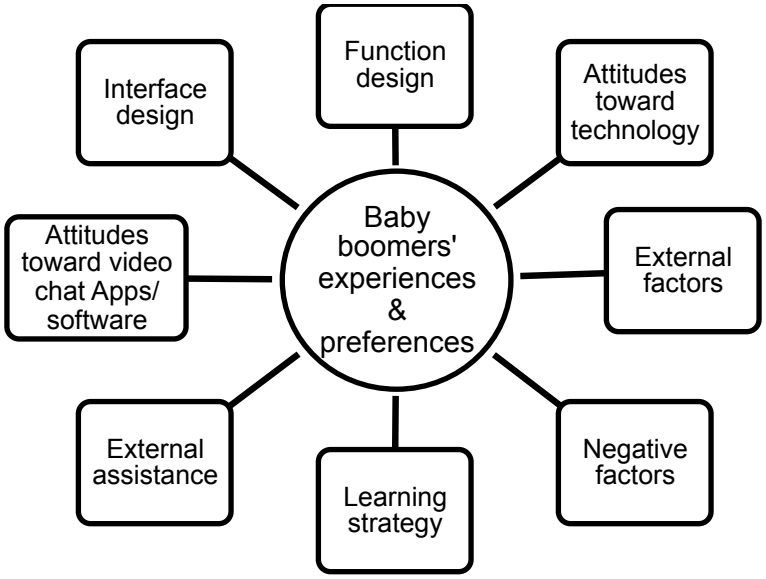


Figure 3.1 Thematic Network

Phase five was to interpret the meanings within and across the themes. The thematic codes developed in this research were both theory driven and data driven. The detailed analysis was produced in the form of a table to clearly demonstrate the themes, codes, and findings. Table 3.1 consists of lists of each major heading and reminders for topics of discussion in the study.

Theme	Experience	Findings
Attitudes toward technology	- Used to keep up with it - Try to use it if it is useful - Don't do it anymore - It's too much.	- Positive attitude to technology - Usefulness is motivation
Attitudes toward video chat applications	- Fun - It's good to see my father and let him see his great-grandchildren	- Family is essential motivation

External factors	- My father lives far away. - My father is tech savvy. - Children and employees response with text more than phone. - Full-time employed - Master's degree in Public Administration	- Family member lives far away - Positive feedback from other person - Learn new things from people she wants to get connected with.
Learning strategy	- Trying out by myself	- Independence - Confidence - Not afraid of making mistakes - Has related experience
External Assistance	- Teacher demonstrated to me. - Took a class about Skype	- Demonstration & introduction
Negative factors	- My computer needs separate camera and microphone. - If you don't think about it or don't know about it, then you don't use it.	- Limitations from devices - Visibility is premise of use
Interface design	- Couldn't get the picture to come up - Frustrated with error. - Don't know what to do with the error. - It didn't work the way it was supposed to as I thought	- No error information. - No instructions for recovering error. - Different thoughts between users and developers
Function	- Don't know all the functions. - Too complicated.	- No instructions about all other functions.

Table 3.1 Theme Examples

CHAPTER 4

RESULTS

This chapter reviews the data collected in the survey and interviews. It is begins with a discussion of the demographics of the sample. This data helped to develop basic information about the sample. Next, analyses are organized based on three research questions. The quantitative data are demonstrated using bar charts and the qualitative data are generalized into eight themes.

4.1 Demographics

Over time a total of 133 participants took the questionnaire. Characteristics of the sample in the survey are presented in Table 4.1. Fourteen participants took part in the follow-up interview, including seven baby boomers and seven respondents older than baby boomers.

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
Age				
54 and below	2	1.5	1.5	1.5
55 – 64	21	15.8	15.8	17.3
65 – 74	57	42.9	42.9	60.2
75 – 84	41	30.8	30.8	91.0
85 and up	12	9.0	9.0	100.0
Sex				
Male	36	27.1	27.1	27.1
Female	97	72.9	72.9	100.0
Marital Status				
Single	13	9.8	10.0	10.0
Married	58	43.6	44.6	54.6
Divorced/Separated	29	21.8	22.3	76.9
Widowed	30	22.6	23.1	100.0
Health				
Excellent	50	37.6	38.2	38.2
Good	59	44.4	45.0	83.2
Fair	20	15.0	15.3	98.5
Poor	2	1.5	1.5	100.0
Living Status				
Living with spouse/partner	60	45.2	45.2	45.2
Living with children/grandchildren	7	5.3	5.3	50.4
Living individually	63	47.4	47.4	97.8
Assisted living community	3	2.3	2.3	100.0
Driving				
Yes	111	83.5	84.1	84.1
No	21	15.8	15.9	100.0
Retired				
Yes	122	91.7	92.4	92.4
No	10	7.5	7.6	100.0
Work status				

Do not work at all	60	45.1	45.8	45.8
Work as a volunteer	46	34.6	35.1	80.9
Part-time employment for pay	12	9.0	9.2	90.1
Full-time employment for pay	2	1.5	1.5	91.6
Other	11	8.3	8.4	100.0
Education				
1 – 6 grade	1	.8	.8	.8
7 – 8 grade	2	1.5	1.5	2.3
9 – 12 grade, no diploma	5	3.8	3.8	6.0
High school graduate – diploma	13	9.8	9.8	15.8
Some college but no degree	19	14.3	14.3	30.1
Associates Degree or Trade School Certificate	5	3.8	3.8	33.8
Bachelor's Degree	45	33.8	33.8	67.7
Master's Degree	37	27.8	27.8	95.5
Doctorate Degree	6	4.5	4.5	100.0
Use Video Chat Applications/software				
Yes	34	25.6	25.6	25.6
No	99	74.4	74.4	100.0

Table 4.1 Demographics of the Sample

4.1.1 Age

Gerontologists classify older adults into three groups. The young-old, aged from 65 to 74, don't consider themselves to be old. They normally have few health problems, and remain actively engaged in the social activities of life. The middle-old, aged from 75 to 84, begin to experience health problems, may face some mobility restrictions and are more likely to openly identify as older adults. They usually need some type of assistance to live independently. And the oldest-old, aged 85 and older, have the greatest needs. They typically have serious health problems and need assistance in more than one personal care area (McInnis-Dittrich, 2009).

The sample was grouped into 10-year intervals, because gerontology names three sets of 10-year intervals of the elderly, and baby boomers span into into the young old interval.

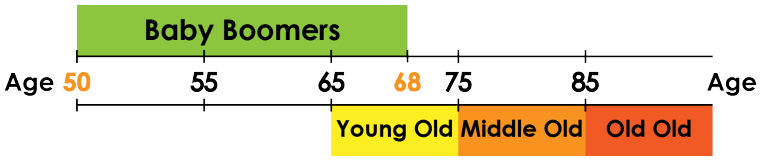


Figure 4.1 Age Groups

This sample includes two participants (1.5%) younger than 55, 78 participants (58.7%) aged between 55 and 74, and 53 participants (39.8%) older than 75. As defined in social science, adults aged between 65 and 75 are the young-old (McInnis-Dittrich, 2009), baby boomers born

between 1946 and 1964 consisted of the young old population and the middle-aged population when the study was conducted in 2014.

4.1.2 Gender, Health and Living Status

This sample was mostly female (72.9%) and had good and excellent health status (83.2%). The higher percentage of women may be a reflection of the types of activities in the senior centers and public library from which the sample was drawn. Almost half of the sample is living individually (47.4%), and a predominant number in the sample are still driving (84.1%).

4.1.3 Work and Education

Participants are predominately retired (91.7%), but 54.2% of participants work as volunteers or for pay. Meanwhile 81.2 % of this sample is older than the retirement age (65 years old), which confirms the previous studies of postponed retirement in the older population. The majority of participants are well educated, approximately 66% reporting a bachelor's degree or higher.

4.2 Data Analysis

Eight themes were generated from the interview data analysis, including 1.Attitude toward video chat applications/software, 2.Interface Design, 3.Function design, 4.Attitude toward technology, 5.External context, 6.Negative factors, 7.Learning strategies, and 8.External assistance. Theme 1 is related to Research Question One, Theme 2 and Theme 3 are related to Research Question Two, and Theme 4 to 8 are related to Research Question Three. Themes will be presented at the end of each related section.

4.2.1 Research Question One

RQ 1: What are baby boomers' attitudes and experiences of video chat applications/software?

Based on the responses, the majority of the participants (approximately 75%) have no experience of using video chat applications/software. Since not enough (N = 2) participants aged 54 and younger, the data for this age group cannot represent the characteristics for this cohort. In Figure 4.2, the trend of using video chat applications/software drops down with the increasing age from 55 to 84, and rises up after 85 years old.

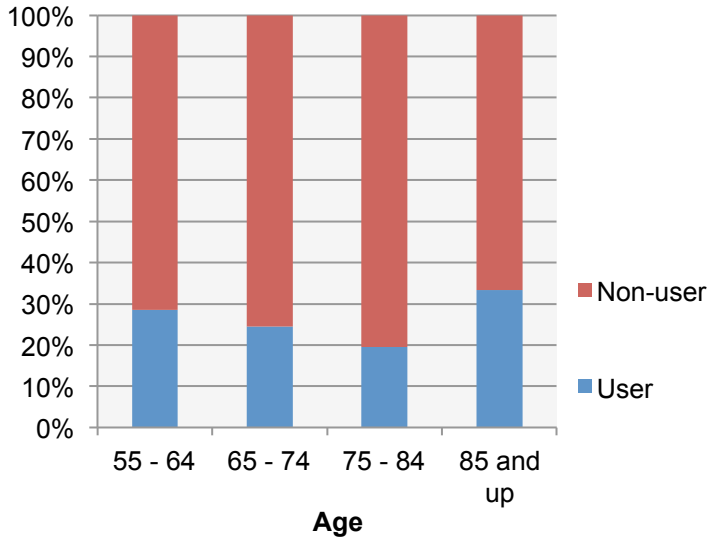


Figure 4.2 Use of Video Chat Applications/Software

4.2.1.1. Use of Video Chat Applications/Software

The resources of receiving video chat applications are summarized in Figure 4.3a and Figure 4.3b. Users downloaded and installed the applications/software by themselves, followed by 10 responses for which it was downloaded by one or more children, while only one participant stated that he/she received the application/software with the new machine from child(ren). Users aged between 55 and 64, and aged between 75 and 84, chose to download and install the applications/software by themselves, whereas the respondents aged between 65 and 74 preferred to seek assistance from children. It is clear that downloading to the existing machines is more popular for older adults. In another perspective, a higher level of compatibility of video chat applications/software is required for different systems and models. It is necessary to match the design style and operating flowchart with different operating systems, so it can reduce the requirement of learning new skills when using video chat applications/software.

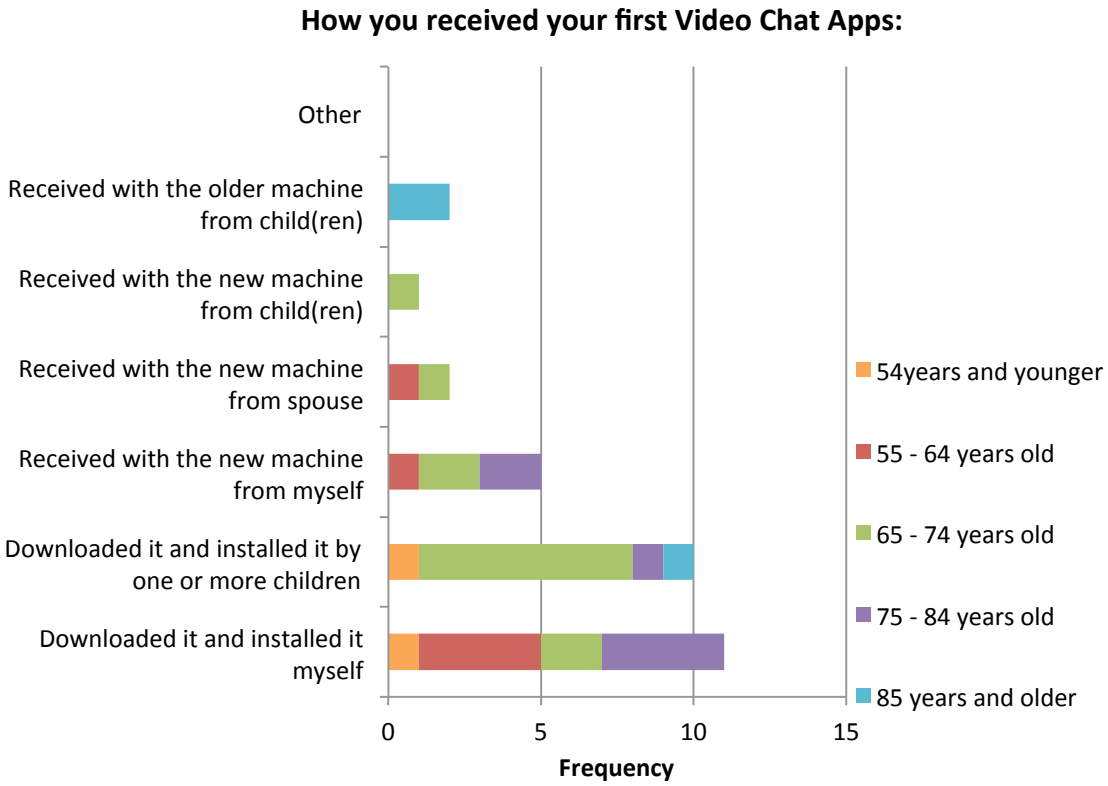


Figure 4.3a The Resource to Receive the First Video Chat Applications/Software

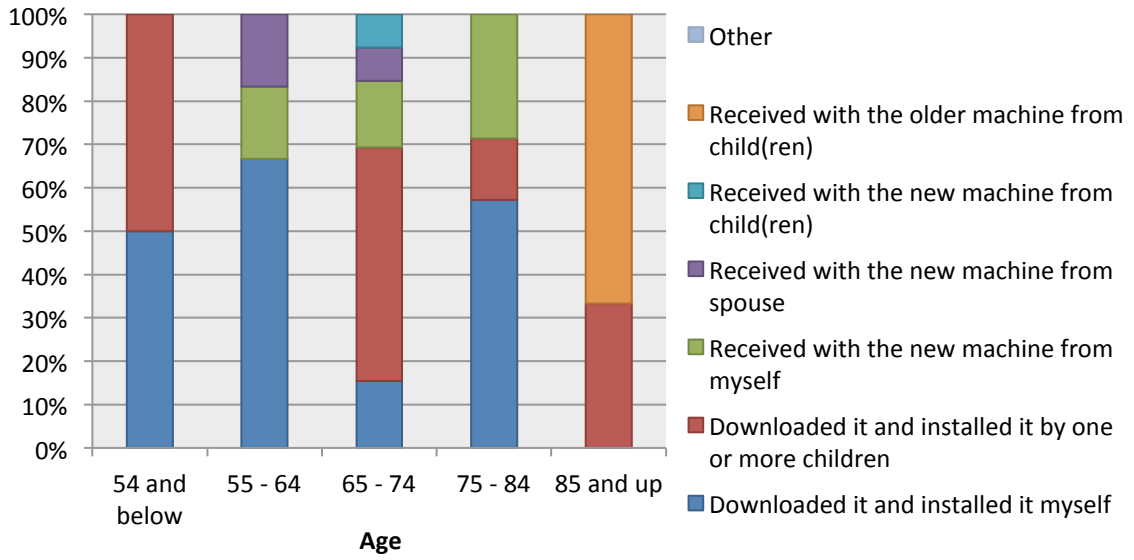


Figure 4.3b The Resource to Receive the First Video Chat Applications/Software

In Figure 4.4a, laptop computer (n = 15), iPad/Tablet (n = 13) and desktop computer (n = 12) are the three major devices on which respondents use video chat applications/software. In

addition, in Figure 4.4b no respondents older than 75 use video chat applications/software on the cellphone. Three baby boomer interviewee respondents stated that they have to buy a separate camera to attach to the computer. One respondent reported that it was troublesome to install the camera and this preparation work scared her sister away from using video chat applications/software.

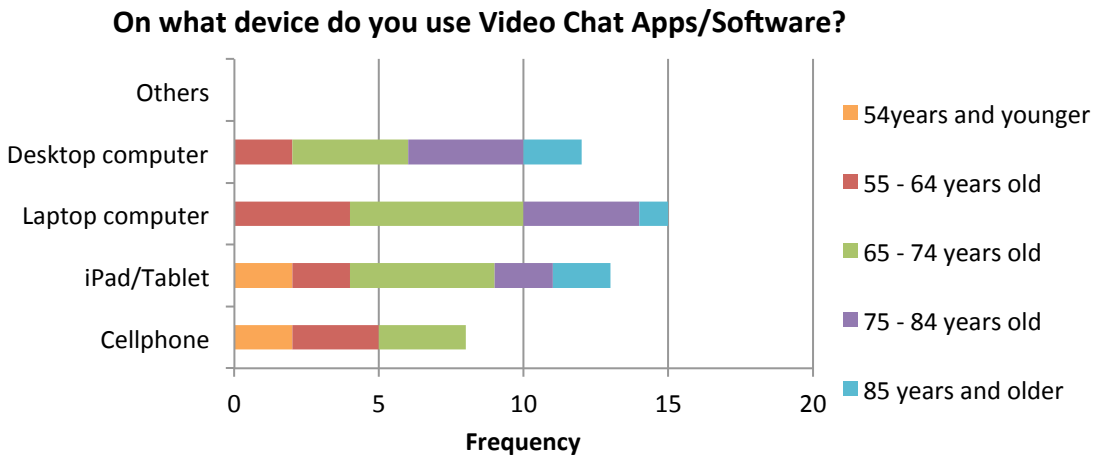


Figure 4.4a The Device to Use Video Chat Applications/Software

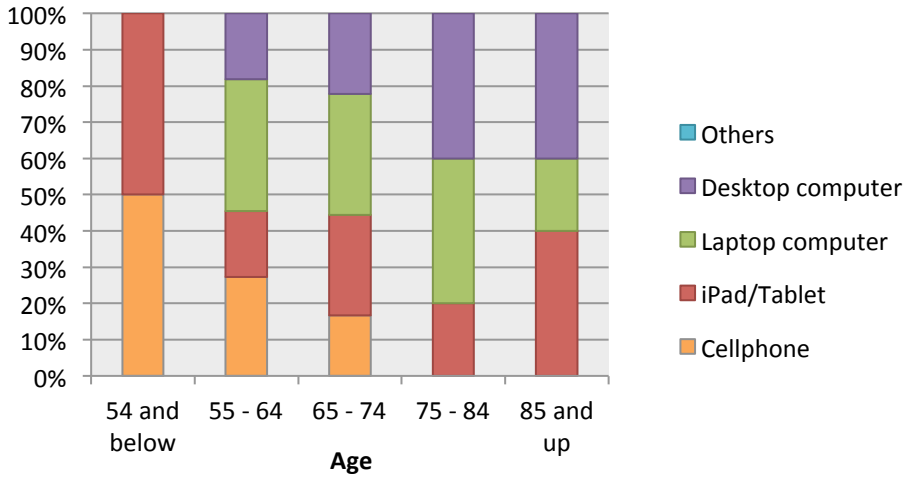


Figure 4.4b The Device to Use Video Chat Applications/Software

In Figure 4.5a, the bar chart shows that the length of time using video chat applications/software is not very long compared to the history of Skype, which is a popular video chat software first released in August 2003. Eleven participants reported that they have used video chat applications/software no more than one year, but still three respondents have used it

for more than five years. One respondent mentioned in the interview that he has used Skype since it first came out because he and his friend are always interested in new technology, which is related to his education and career background – electrical engineering.

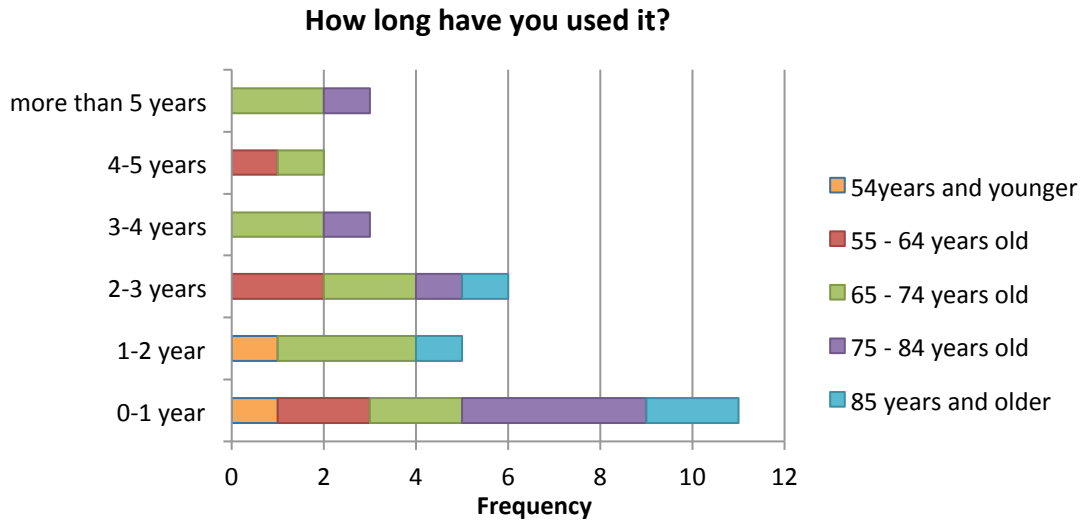


Figure 4.5a The Length of Time Using Video Chat Applications/Software

Figure 4.5b indicates that participants aged between 65 and 74 have the longest history of using video chat applications of all other age groups. More than 40% of this group have used it for longer than three years.

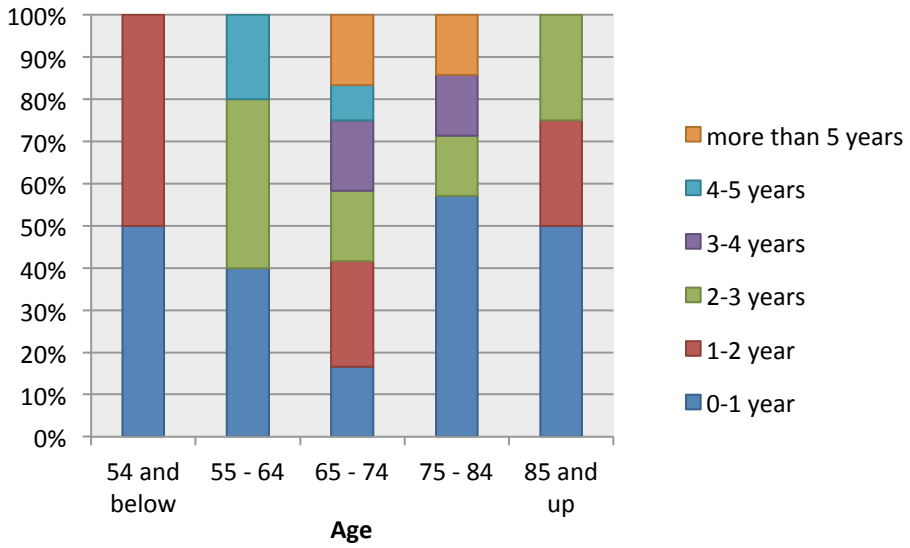


Figure 4.5b The Length of Time Using Video Chat Applications/Software

From Figure 4.6a, it is obvious to see that Skype is the most widely used video chat software (n = 22), while FaceTime (a video chat software developed by Apple Inc.) has 11 users. Skype has the dominant share in four age groups except for the group aged between 55 and 64 (see Figure 4.6b). An equal number of respondents (n = 4) in this group use FaceTime and Skype. Two respondents reported in the interview that FaceTime is much easier than Skype. However, FaceTime is limited only to Apple product users. A FaceTime user mentioned in the interview that she turned to FaceTime when she got an iPhone, and another interviewee reported his niece now has an iPad and an iPhone, so they communicated using FaceTime.

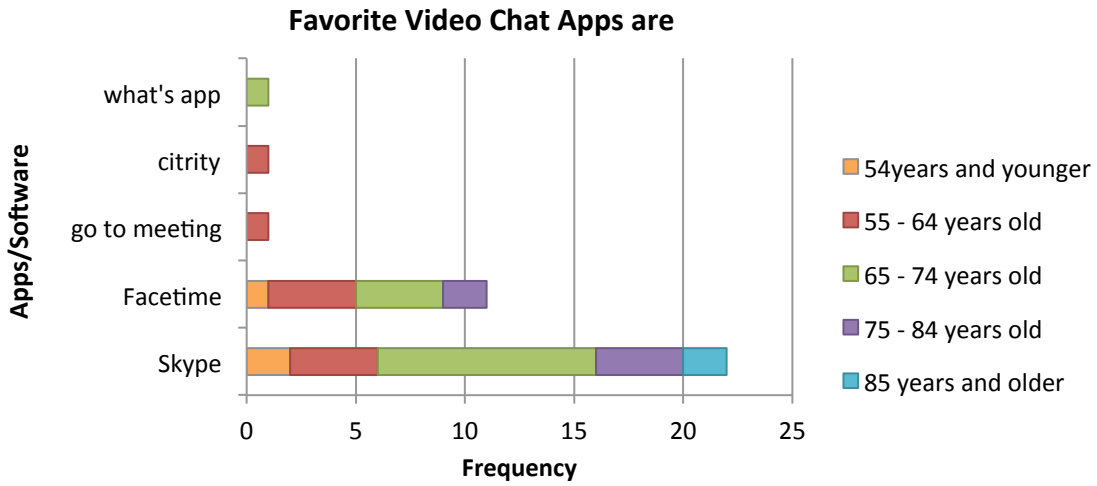


Figure 4.6a Users' Favorite Video Chat Applications/Software

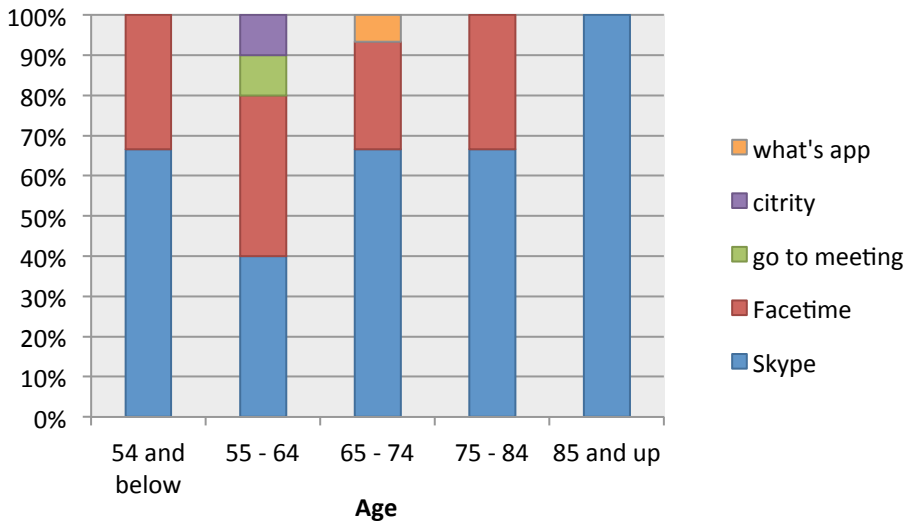


Figure 4.6b Users' Favorite Video Chat Applications/Software

In Figure 4.7, although most of the video chat applications/software users have never reconnected with a friend or relative with home he or she has not met face-to-face for a long time, video chat applications/software have helped 10 users to contact with old friends or relatives.

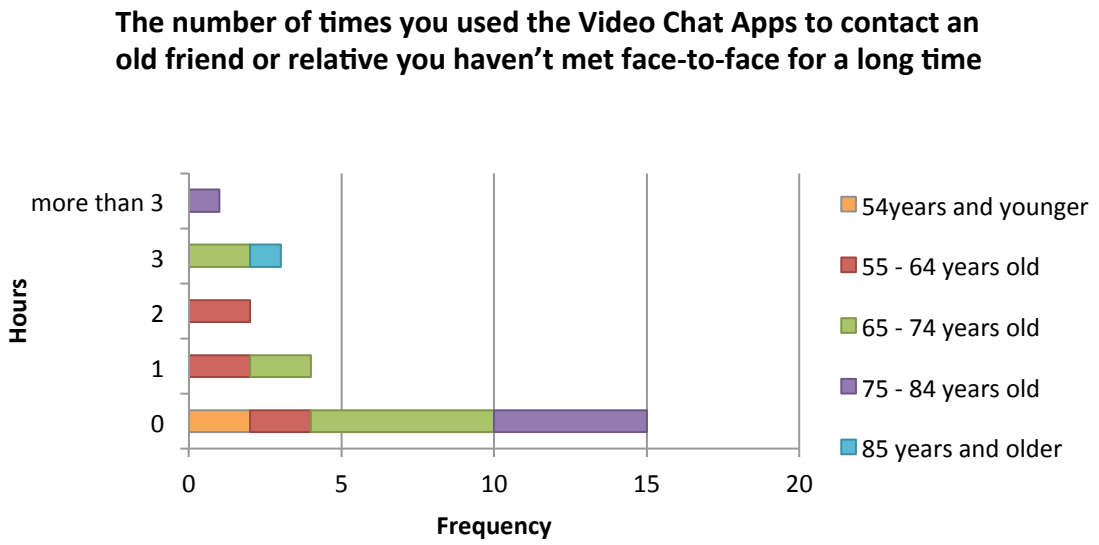


Figure 4.7 Reconnection with Video Chat Applications/Software

The majority of respondents use video chat applications/software less than one hour per week (see Figure 4.8). Several participants reported they used it once a month or less. Respondents reported that the use depends on the schedule of the person they want to video chat with, such as more family chat during holidays, and less chat during grandchildren's summer vacation. For the respondents who use video chat applications to contact family members overseas and in the military, the time is limited because of the time difference and everyday work schedule.

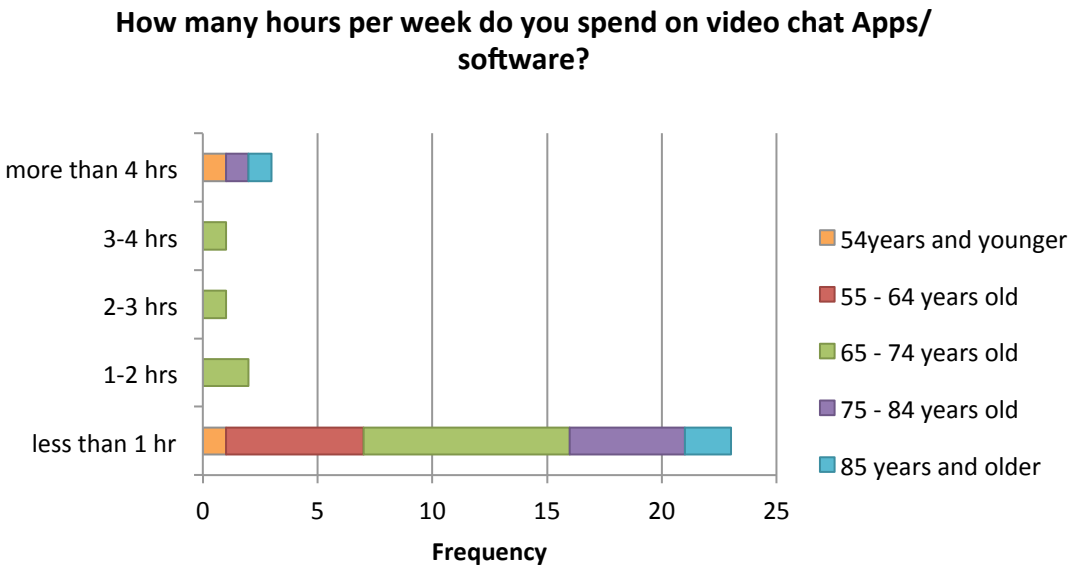
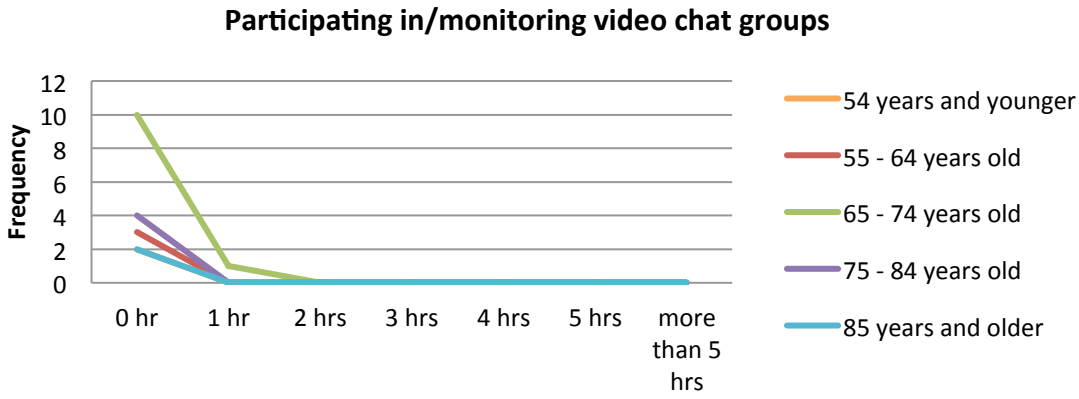
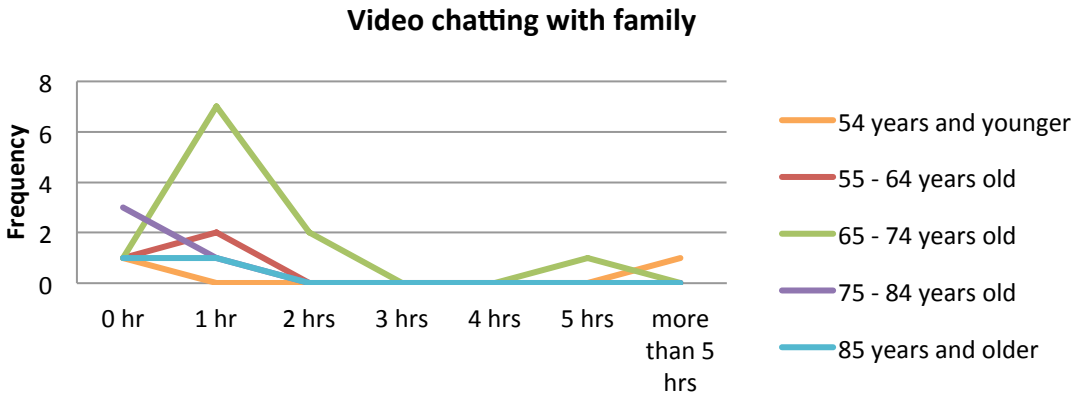
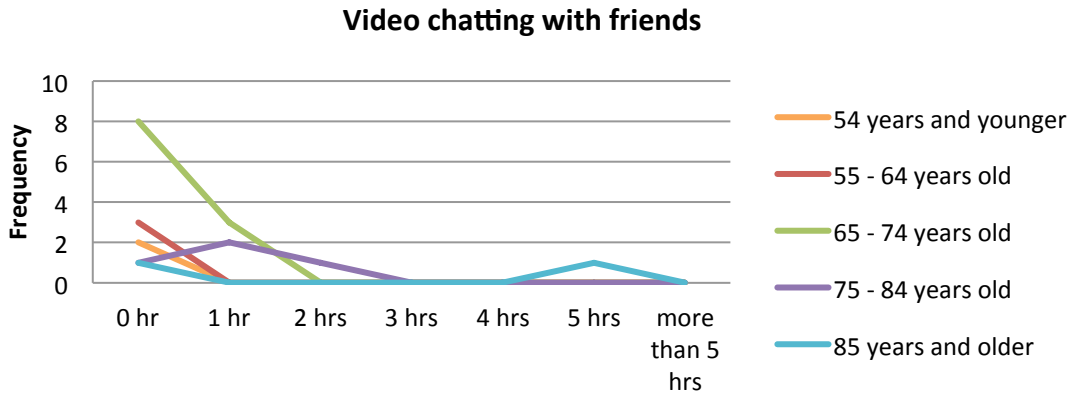


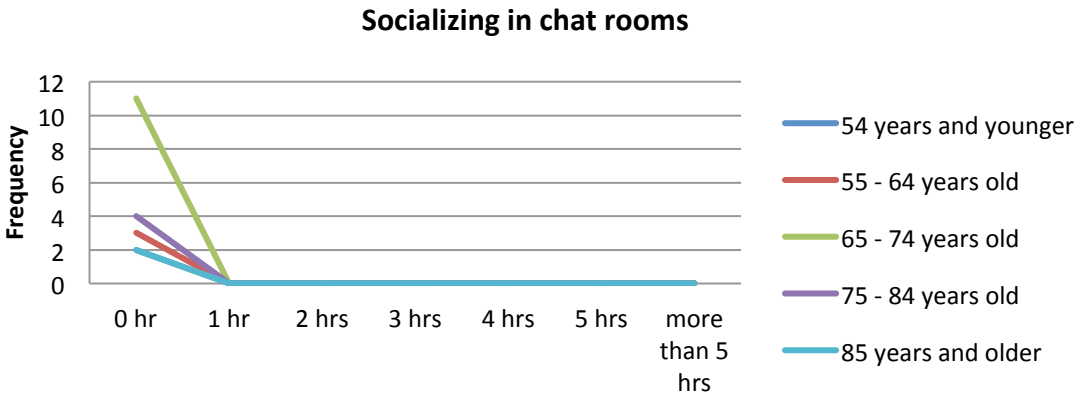
Figure 4.8 The Amount of Time Using Video Chat Applications/Software Per Week

Figure 4.9 demonstrates that video chatting with family, friends, and taking photos were the most used forms of activities in comparison with other activities like participating/monitoring video chat groups, socializing in chat rooms and sending text messages. Participants aged between 65 and 74 spent the most time video chatting with family than friends, but the group aged between 75 and 84 spent the least. Interview participants mentioned that video chatting is so private that they only want to use it with family and close friends. Almost all respondents claimed that they do not know the functions other than the one-to-one video chat.




Video chatting with family
Frequency
8
6
4
2
0
0 hr
1 hr
2 hrs
3 hrs
4 hrs
5 hrs
more than 5 hrs
54 years and younger
55 - 64 years old
65 - 74 years old
75 - 84 years old
85 years and older


Video chatting with friends
Frequency
10
8
6
4
2
0
0 hr
1 hr
2 hrs
3 hrs
4 hrs
5 hrs
more than 5 hrs
54 years and younger
55 - 64 years old
65 - 74 years old
75 - 84 years old
85 years and older


Socializing in chat rooms
Frequency
12
10
8
6
4
2
0
0 hr
1 hr
2 hrs
3 hrs
4 hrs
5 hrs
more than 5 hrs
54 years and younger
55 - 64 years old
65 - 74 years old
75 - 84 years old
85 years and older

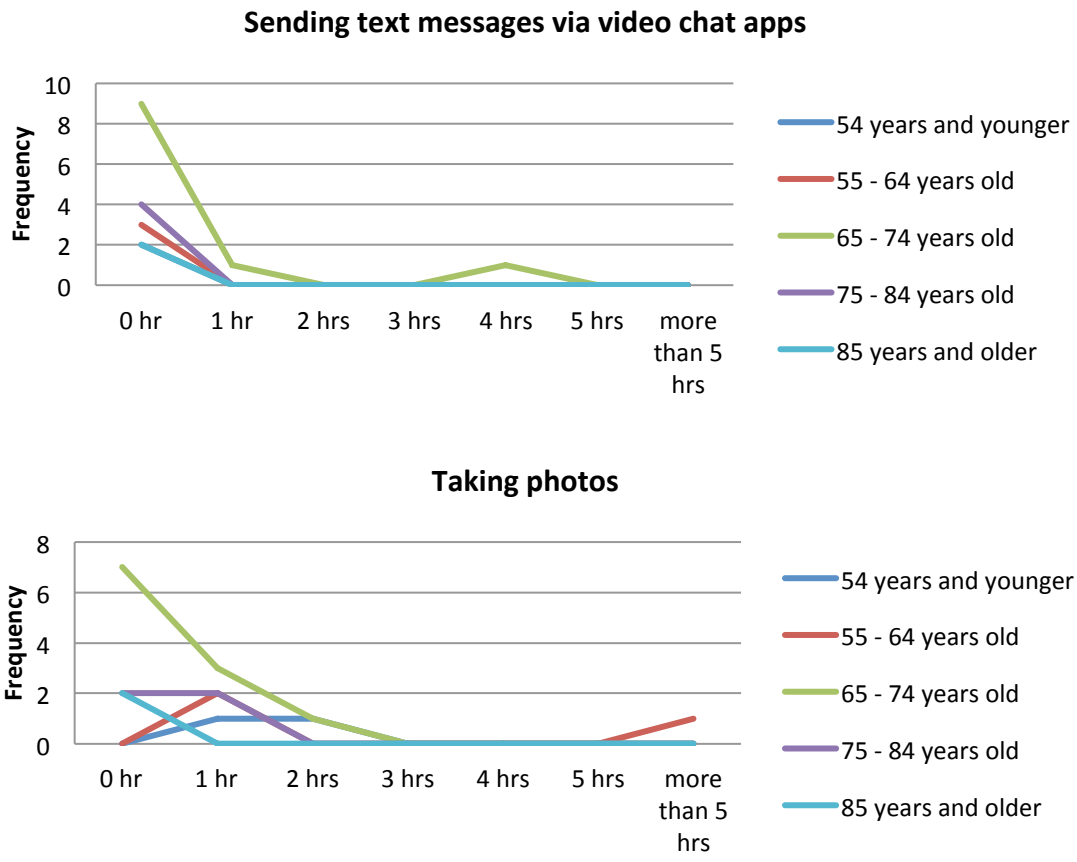


Figure 4.9 The Use of Functions in Video Chat Applications/Software

4.2.1.2 Usefulness of Video Chat Applications/Software

User respondents were asked to evaluate the usefulness in four aspects through grading four statements, including 1. I find video chat applications/software useful in my life, 2. Video chat applications/software has the functions and capabilities I expected, 3. Video chatting is like having a face-to-face conversation, and 4. Video chat applications/software helps me be closer to family and friends. Figure 4.10a shows that more than half of the responses are positive about the usefulness of video chat applications/software, and keeping in touch was rated the highest among the four statements. Meanwhile, statements three and four had approximately a 13% negative review.

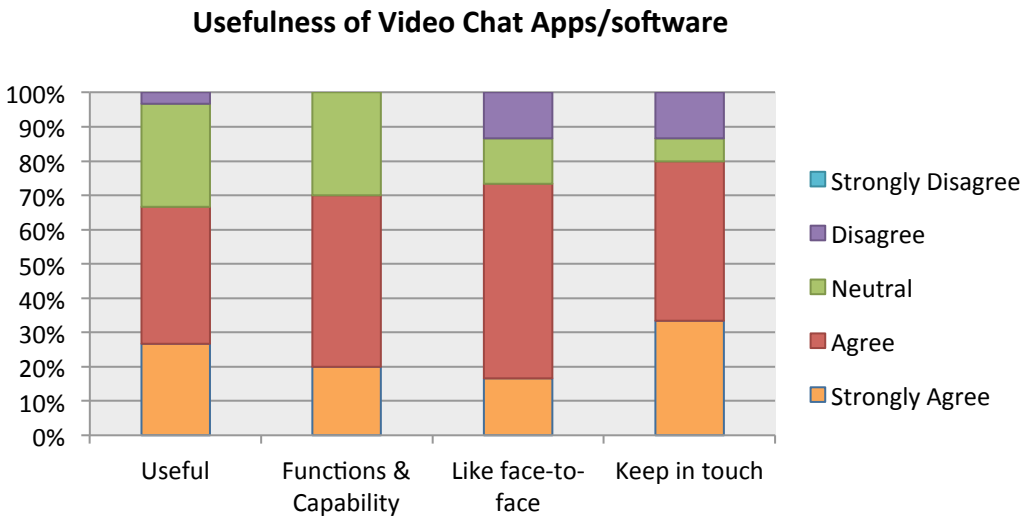


Figure 4.10a Usefulness of Video Chat Applications/Software

In Figure 4.10b, out of the four age groups, a majority of the respondents provided positive reviews, excluding the age group from 75 to 84, where only approximately 50% of the respondents gave positive answers. Although only about 72% of users aged between 65 and 74 gave positive evaluations, more than 35% of them strongly agreed with the usefulness of video chat applications/software.

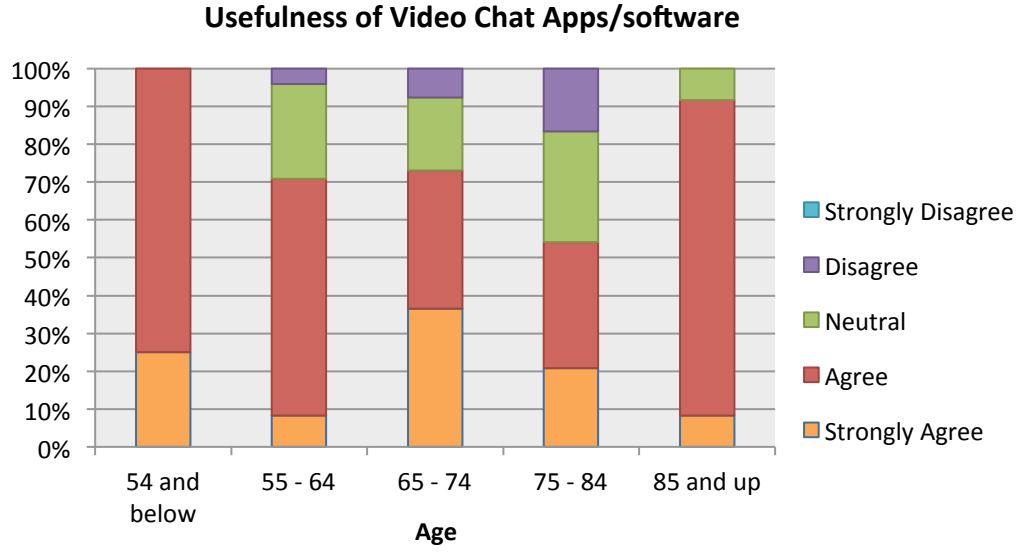


Figure 4.10b Usefulness of Video Chat Applications/Software

Interview respondents reported that being able to see someone who lives far away is the major reason why older adults use video chat applications, because video chat can deliver visual

information that other forms of contact, such as phone calls, cannot. In addition, two respondents mentioned they used video chat software to contact older people who experienced a lack of mobility due to severe illness. On the other hand, two respondents reported that they do not want to do the preparation work such as dress up and clean up the room before contacting others. Although the majority of respondents have a positive attitude toward video chat applications/software, they reported that it is difficult to set up at the first time use.

Theme 1: Overall positive attitude toward video chat applications/software

In regards to video chat applications/software, baby boomers showed a higher likelihood of holding a positive attitude as opposed to their counterparts. Contacting long-distance family members and friends is an essential motivator due to the value they place on private and close relationships, whereas the use of video chat applications/software for work purpose is a less important motivator. Boomer users mentioned the requirement of compatibility among different software is important, which reflects a higher level of technology acceptance in boomer generations.

4.2.2 Research Question Two

RQ 2: What are baby boomers' preferences for functions and interfaces in video chat applications/software?

4.2.2.1 Usability of Video Chat Applications/Software

Twelve questions were asked in the questionnaire about usability of video chat applications/software. Figure 4.11a shows that more than 70% of the respondents thought it was easy to learn and use video chat applications/software, and were satisfied with the quality of the sound and image. However, the data includes the users who only use it when others have done the installation and setting up. Two baby boomer respondents and almost all older respondents mentioned it's easy to use as long as it has been setup. On the contrary, error messages and user manuals were rated most negatively. There were no participants who found the error message could clearly demonstrate how to fix the problem easily and quickly, and only about 12% of respondents agreed that supplemental reference materials (such as user manual) are easy to

understand. Navigation is also a serious issue for users; only 46% of users found it easy to navigate the menus.

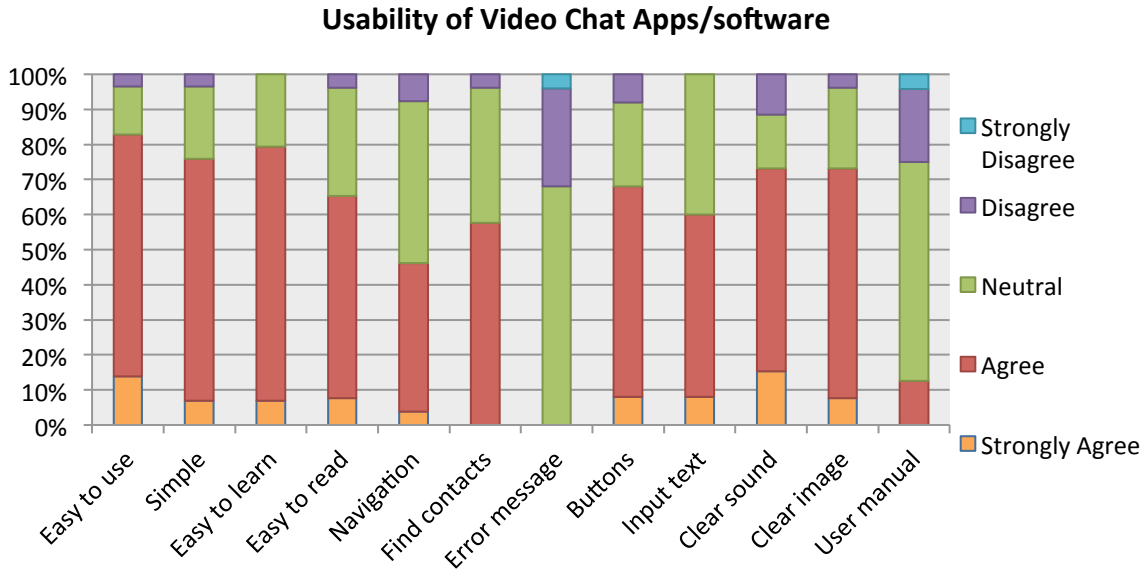


Figure 4.11a Usability of Video Chat Applications/Software

One respondent, who formerly worked as a software tester, reported that video chat applications have a good design of the error messages when problems happened:

> "… I basically kept trying… And I looked up in the error messages, and I used to be testing software, so I basically try to see how it's reacting and responding to what I'm doing, and then figure out the way to make the connection and see what's missing or what's lacking…so I don't have problems with doing something over and over again till I get through." (Interview 9)

Another respondent who has work experience in a related industry reported satisfaction with the error message design.

For users without related work experience or rich experience in using computers, error messages are not clear or helpful. One respondent reported difficulty in fixing problems:

> "We couldn't get the picture to come up, like he could hear me, but he couldn't see me, and same for me. So we had to fiddle around with it quite a bit to get both the camera going and the video going as well as the sound. It was probably all user error, but that was kind of frustrating." (Interview 3)

Step-by-step instructions are preferred by respondents who were interviewed. Some of the respondents took step-by-step notes in their own words when someone was demonstrating how to use applications, so they could refer to the notes when they got confused. Some of the respondents searched online instruction videos and followed the instructions step by step. Two respondents stated that the users must have some technology background to understand the instruction offered by developer or online. Older adults and app developers use different words to describe the same function, such as one respondent mentioned the cartoon-like thing in the map app, which is called the Lite Mode according to Google Help (https://support.google.com/maps/answer/3031966)

One respondent reported that older people do not want to take the time to read the written instructions or watch the video instruction online. Instead, they generally just turn to their younger relatives to explain the instruction to them. Even so, they often just give it up. The difficulties in understanding written or visual instructions might be attributed to the gender imbalance in the industry. Indeed, the tools available are not geared toward an audience of women:

> "I went to YouTube, got a lot of little bits of pieces because you got to get more women in the field. Oh, believe me. God, you got to get more women. We think different…Men do not talk the same way nor did they think the same ways woman does…" (Interview 10)

The data showed that only one respondent knew all the features of the video chat software he was using, and only two respondents knew the capacity of group video calling. One respondent reported group video chatting is good for students who need to do group projects, but not necessary for elderly people like her to use.

Respondents who have relatives overseas complained that they have to calculate the time difference. Furthermore, many respondents reported they have to make an appointment via phone with the person with whom they want to chat before the actual video chatting. One respondent stated she would prefer an icon to indicate whether someone is free to video chat on the contact list.

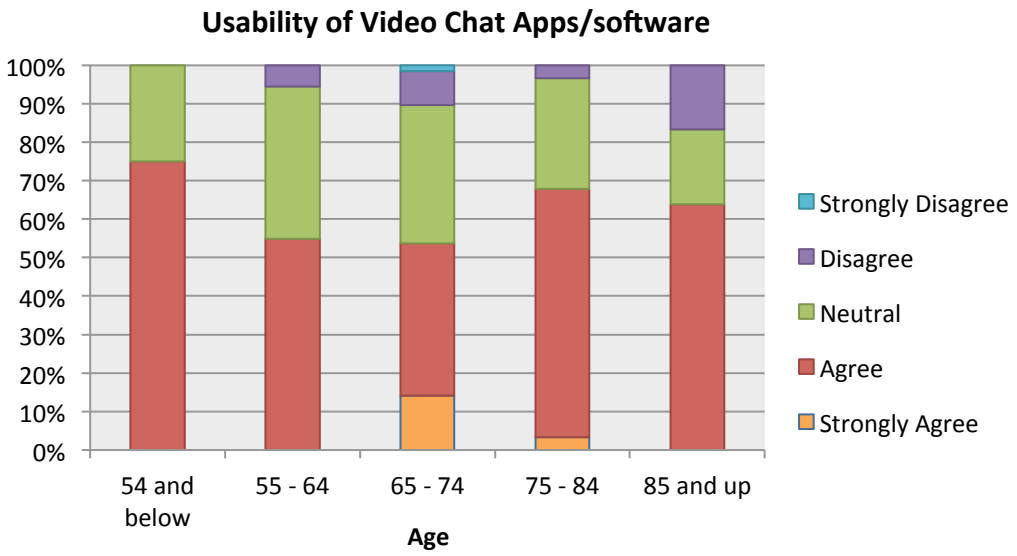


Figure 4.11b Usability of Video Chat Applications/Software

Figure 4.11b depicts that users aged 65 to 74 have the most diverse evaluation of usability of video chat applications/software. They are overall the least satisfied group but the ones who most strongly agree about the positive aspects of the usability; there were 10% negative reviews, 40% agreement, and 14% strong agreements.

Theme 2: Usability is more important and troublesome than aesthetics in interface design

Aesthetics of the interface do not have great influence in the use of video chat applications. Larger print and color are preferred by older generations but not by baby boomers. Both baby boomers and non-baby boomers mentioned the preference for simplicity in information design and similarity with their familiar interface design. Moreover, they both reported failures in error message design, which made users very confused when an error occurred. Mistake operations happen when the visual clue or cue is not obvious on cellphone screens. Older generations have more difficulty in preparation work, such as installation and setting up, and require step-by-step instructions. This difficulty indicates they are less familiar with these types of interfaces than the baby boomers. In addition, information overload is an increasingly important problem as thw users age.

Theme 3: Most functions are idle but time calculation and scheduling are required in the functional design

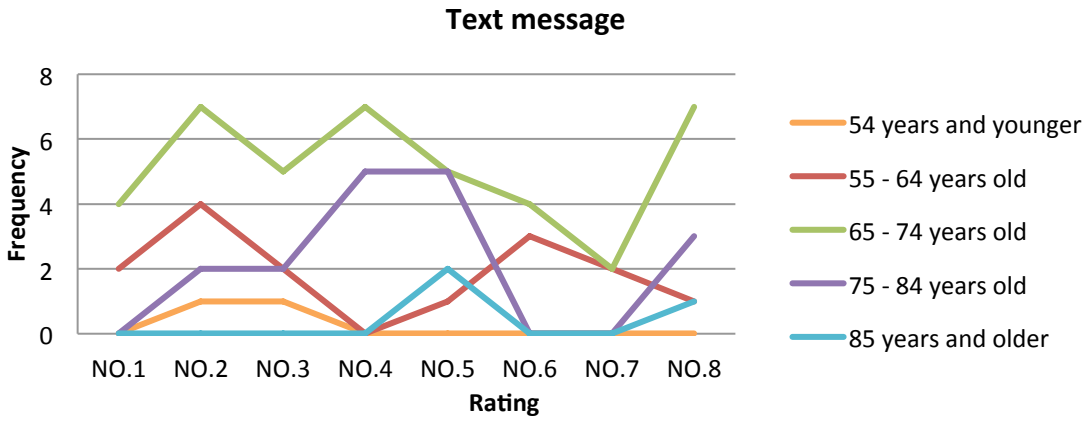
Being able to see someone is an essential reason for using video chat applications/software because visual information is delivered in video. So, portable devices are required when showing the surrounding environment. However, the majority of the users do not know the full functions of video chat applications/software and seldom use all of them, which indicates the lack of usefulness and lack of introduction. Other apparent problems are that after setting up the programs, two tasks are required, including calculating the time difference, and scheduling a video chat appointment with the contacts offline.

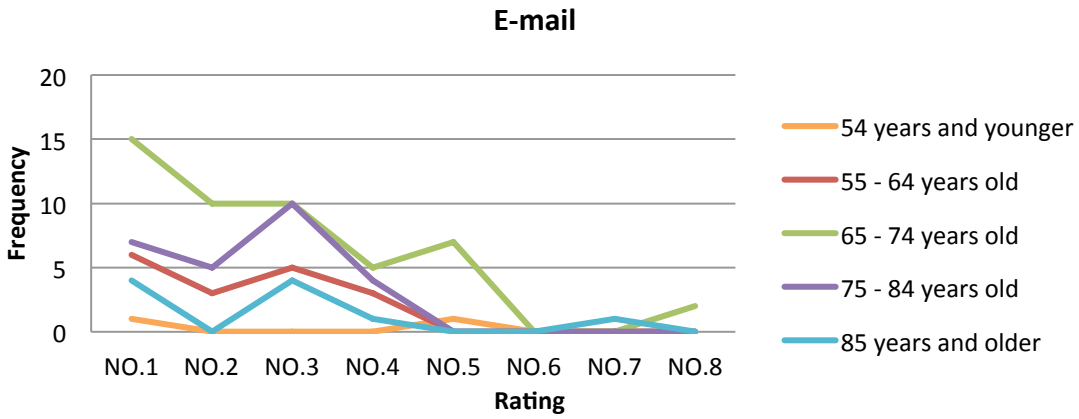
4.2.3 Research Question Three

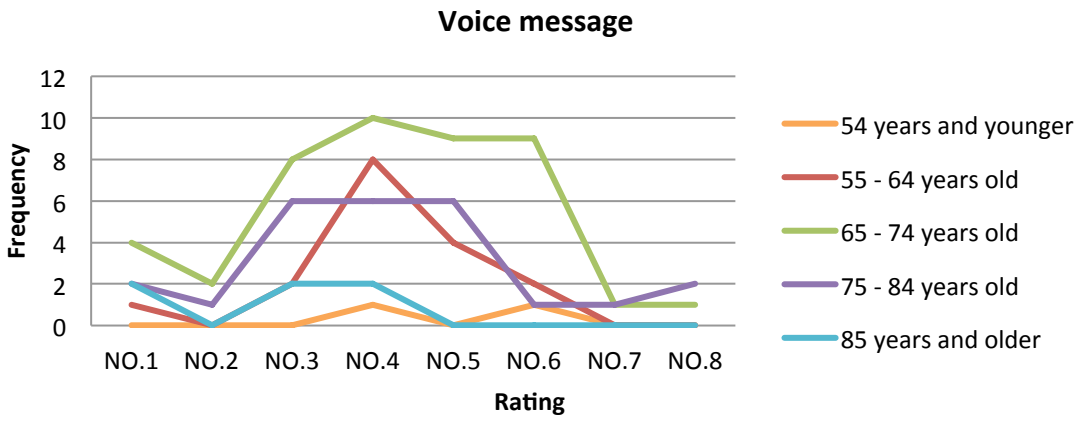
RQ 3: How can we encourage baby boomers to use video chat applications/software?

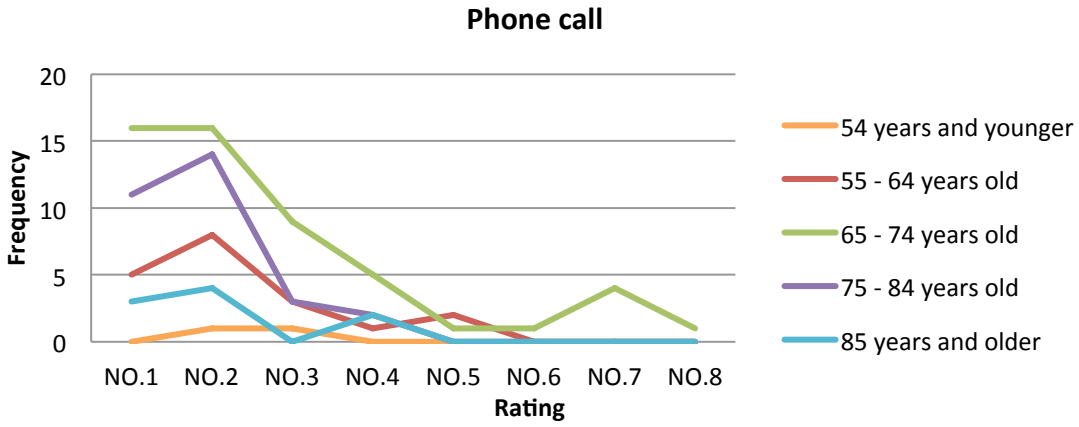
4.2.3.1 Preferences for Contact Methods

Survey participants were asked to rate the eight contact methods from 1 to 8, 1 being the most preferred and 8 being the least preferred, including: 1.Text message, 2.E-mail, 3.Voice message, 4.Phone call, 5.Video Chat, 6.Social Networks (e.g., Facebook, Twitter), 7.Face-to-face conversation, and 8.Others. The following seven tables demonstrated the result of baby boomers preferences. The X-axis stands for the rate from 1 to 8 (from the most preferred to the least preferred), and the Y-axis represents frequency.




E-mail
20
15
10
5
0
Frequency
NO.1
NO.2
NO.3
NO.4
NO.5
NO.6
NO.7
NO.8
Rating
54 years and younger
55 - 64 years old
65 - 74 years old
75 - 84 years old
85 years and older


Voice message
12
10
8
6
4
2
0
Frequency
NO.1
NO.2
NO.3
NO.4
NO.5
NO.6
NO.7
NO.8
Rating
54 years and younger
55 - 64 years old
65 - 74 years old
75 - 84 years old
85 years and older


Phone call
20
15
10
5
0
Frequency
NO.1
NO.2
NO.3
NO.4
NO.5
NO.6
NO.7
NO.8
Rating
54 years and younger
55 - 64 years old
65 - 74 years old
75 - 84 years old
85 years and older

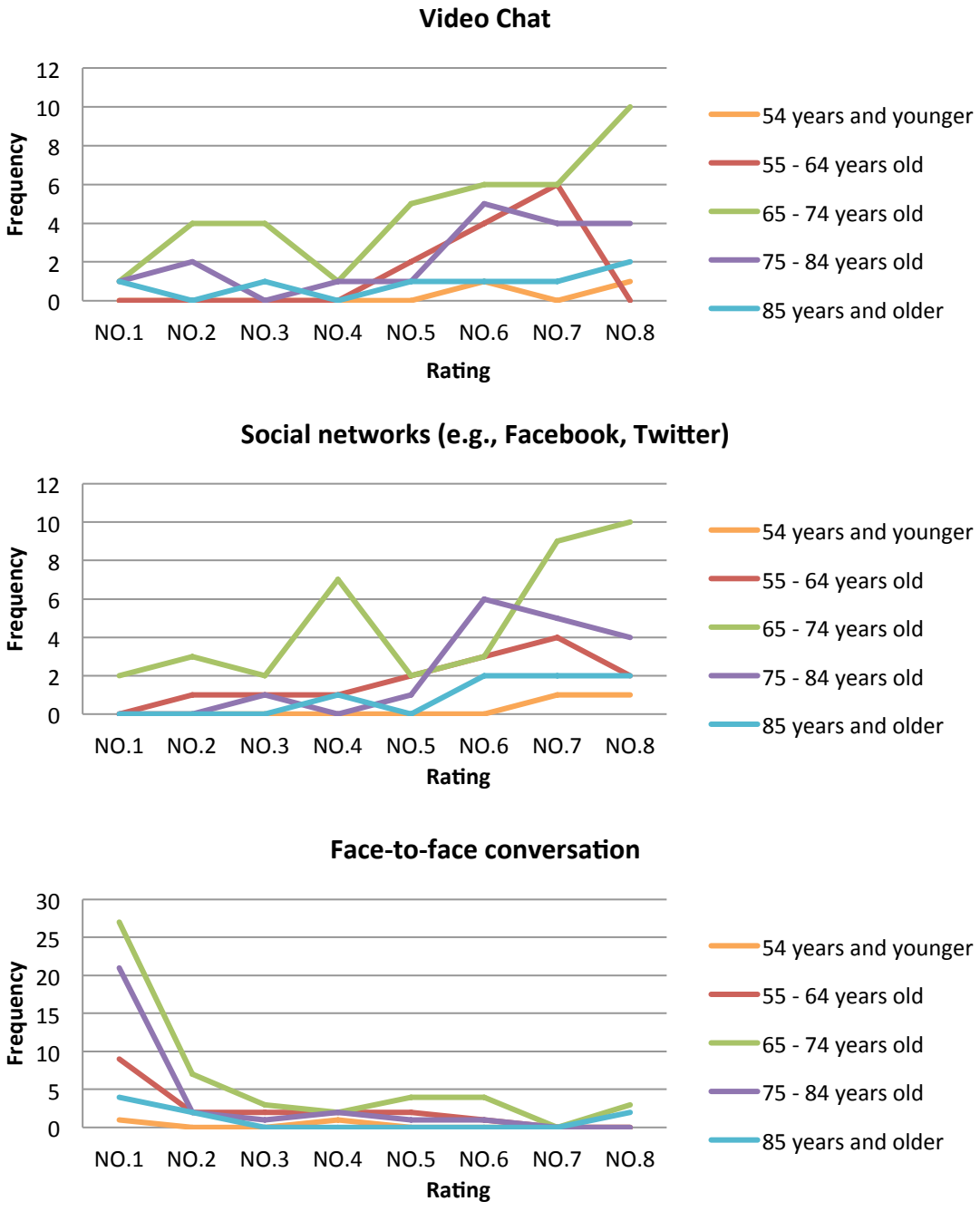


Figure 4.12 Preferences for Contact Methods

Based on the responses (see Figure 4.12), text messaging got the most deviated preference among all seven provided contact methods. The sample size of Group 54 and below was too small. Group 55 – 64 and Group 65 – 74 held the least neutral answers while Group 75 – 84 and Group 85 and up are more likely to be a normal curve. When comparing five age groups,

it is clear that there is a trend that the older the groups are, the less they prefer text messaging. One interviewee mentioned that she learned how to text because her children would seldom answer the phone, but they were prompt replying to text messages. Another participant reported in the interview that texting is an efficient way to keep in touch with her grandchildren.

Respondents provided great preference for E-mail in all age groups – the major of the ratings are positive - from No.1 to No.4. Most of the participants thought neutrally of voice messages and the lines are similar to a normal curve. Most of the respondents rated phone calls as their second preferred contact methods in all age groups. Interestingly, six participants aged from 65 to 74 rated it as the least preferred (from No.6 to No.8). The majority of the respondents rated video chat as the less preferred way to contact other persons; however, 14 participants still thought video chats are among their top three favorites. Most of the participants reported social networks, such as Facebook and Twitter, are not preferred. One interviewee mentioned that too much personal information on Facebook is not safe since it is accessible to the public online. Not surprisingly, face-to-face conversations are the most preferred method to interact with other persons among all participants.

4.2.3.2 Use of Technology of App Non-users

99 participants with no experience at video chat applications took the survey (see Table 4.1). In Figure 4.13a, cellphone and home phone are the most popular devices to contact others among non-users, while many respondents mentioned their cellphones are not smartphones. One interviewee mentioned that he loves having video chats on his smartphone because it does not have to rely on Wi-Fi or the Internet as computers and iPads do. They can just use their data plan on their mobile phone. The iPad and tablets are the least used to contact other persons. Computers were mentioned as a device to send and receive emails in open ended questions and interviews.

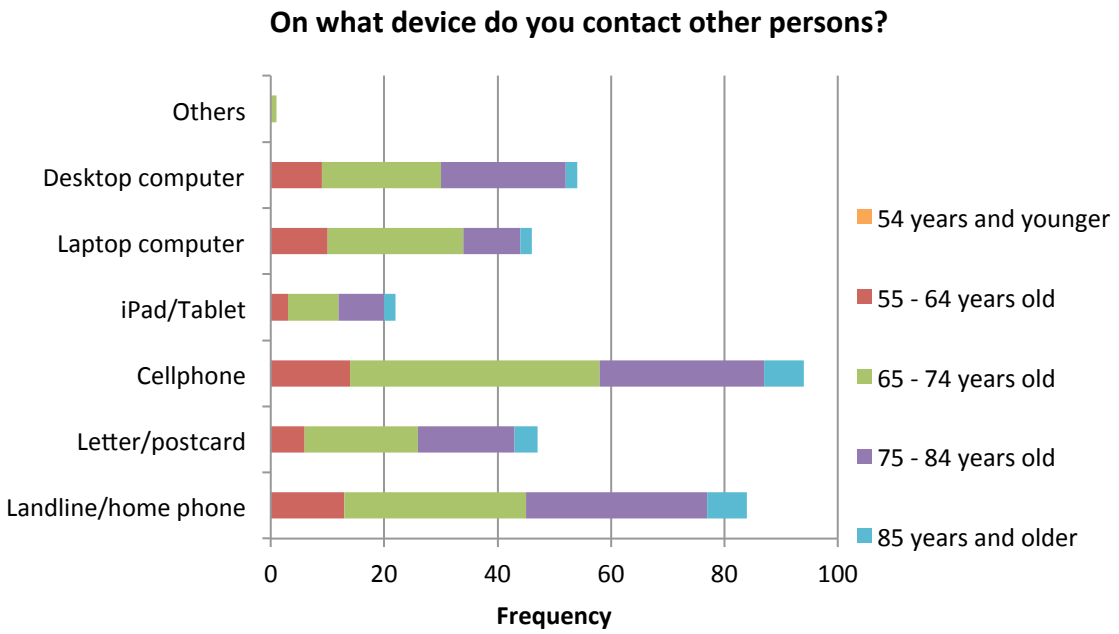


Figure 4.13a The Device for Non-Users to contact other persons

When comparing contact devices among different age groups (see Figure 4.13b), participants older than 75 use traditional contact methods more than younger respondents, such as writing letters (14% of Group 75 – 84, 17% of Group 85 and up), and using home phones (27% of Group 75 – 84, 29% of Group 85 and up). On the other hand, they use iPad/tablet for contact purposes more than other age groups (7% of Group 75 – 84, 8% of Group 85 and up). Participants younger than 74 use the laptop computer more often.

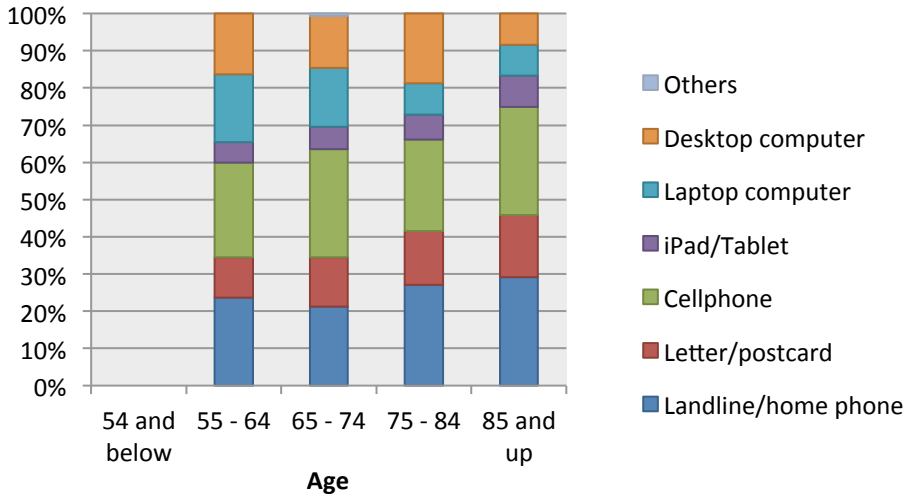


Figure 4.13b The Device for Non-Users to contact other persons

In Figure 4.14a, when asked about the high tech devices they are using, the cellphone (n = 96) has a high share among non-users, and the iPad and other tablets have the least users (n = 32). The use of Bank Automated Teller Machine (ATM) reflects an individual's ability to follow instructions independently. Therefore, it was used as an obscure hint to test participants' attitude and ability to follow the instructions on the ATM to complete an operation.

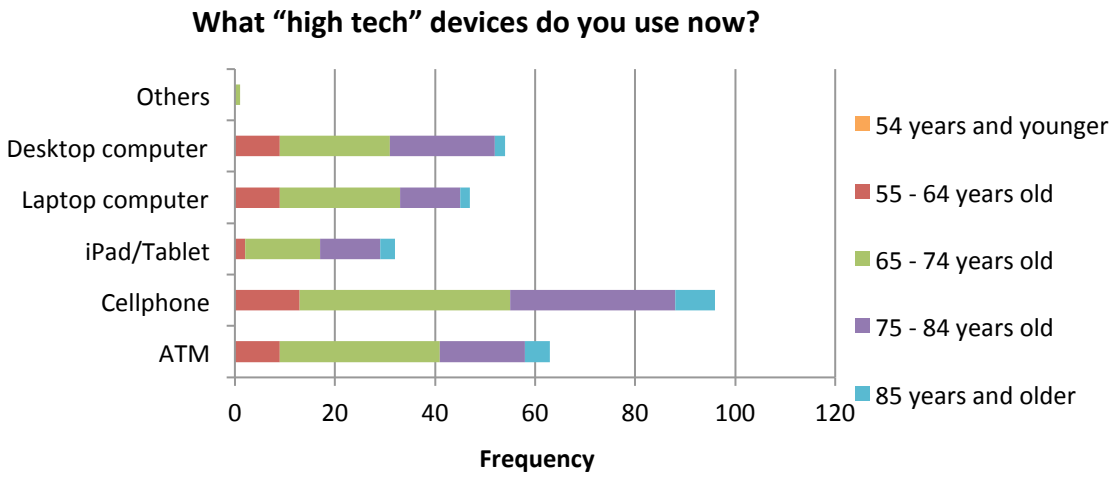


Figure 4.14a The High Tech Device That Non-Users Use

It is clearly demonstrated in Figure 4.14b that participants aged between 75 and 84 use ATMs less than other age groups, but have a higher proportion of using desktop computers. The share of laptop computers decreases with the increasing age. On the contrary, respondents reported increasing use of iPad/tablets as their age increases.

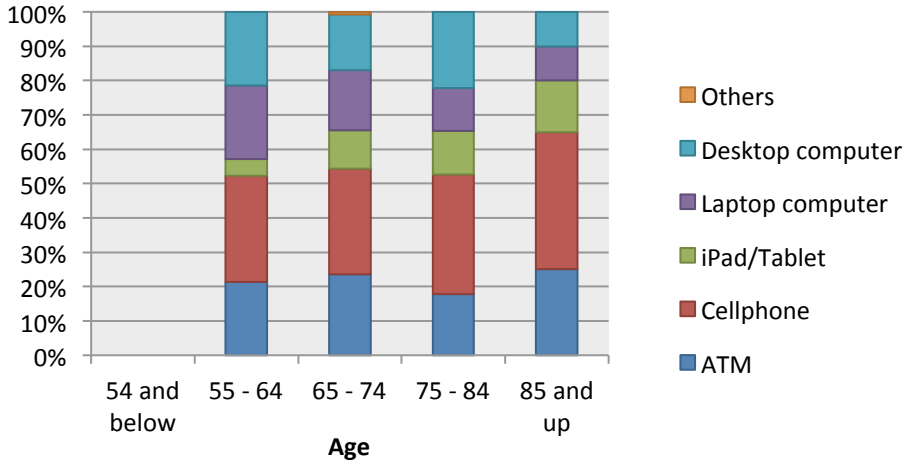


Figure 4.14b The High Tech Device That Non-Users Use

Figure 4.15a illustrates that being satisfied with current contact methods is the major reason for not using video chat applications/software (n = 65), followed by the statement that persons I want to contact don't use it (n = 42). The Internet is not a strong limitation among older adults (n = 12).

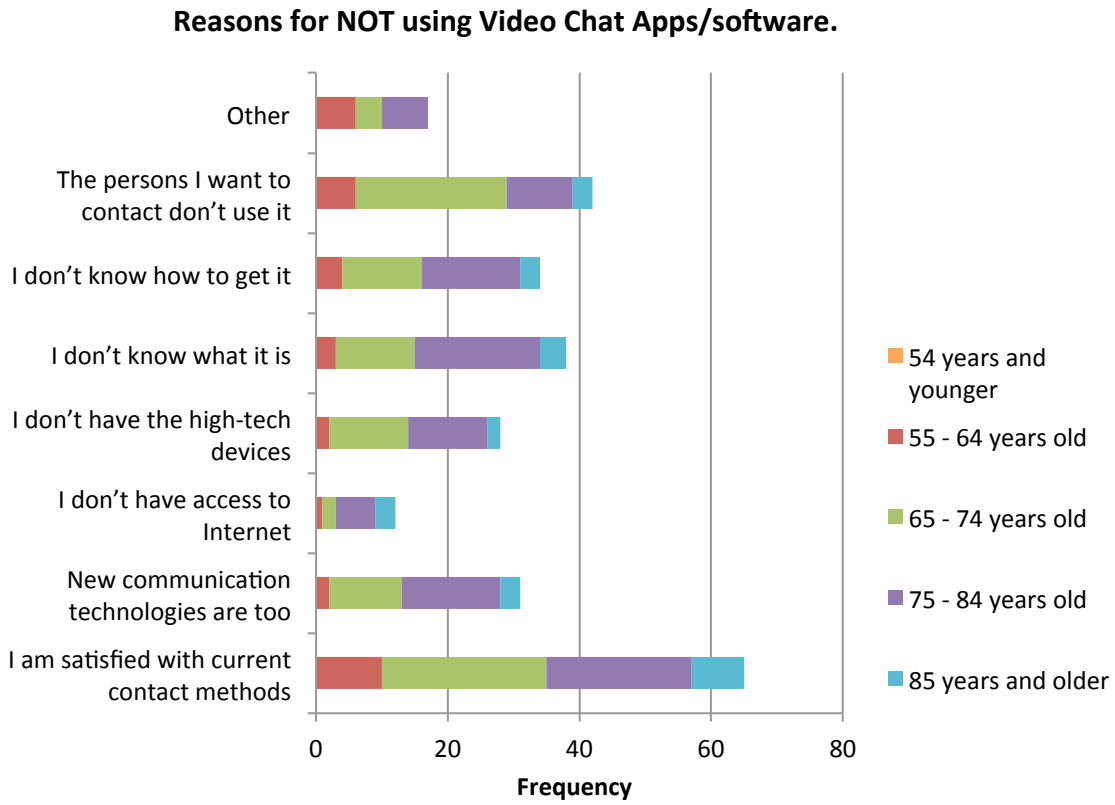


Figure 4.15a The Reasons for Not Using Video Chat Applications/Software

In Figure 4.15b, being satisfied with current contact methods is the greatest reason for all age groups for not using video chat applications/software, meanwhile the satisfactory rate decreases with increasing age before 85, and rises again after getting older than 85. On the contrary, the concept of complication of technology, lack of resource of knowledge of what video chat applications/software is and where to get it peaks at the group aged from 75 to 84.

For Group 55 – 64, "the person I want to contact don't use it" and reasons other than provided are equally important (17.6%), followed by "don't know how to get it" (11.8%) and "don't know what it is" (8.8%). "The persons I want to contact don't use it" is the second important reason for Group 65 – 74. Avoidance of new technology, lack of high tech devices, don't know

what it is and where to get it, are of the same importance to this age group. Of the respondents aged between 75 and 84, 17.9% do not know what video chat applications/software is. “New technology is complicated”, and “I don’t know where to get it” are equally important reasons (14.2%), followed by lack of high tech devices (11.3%) and “the persons I want to contact don’t use it” (9.4%).

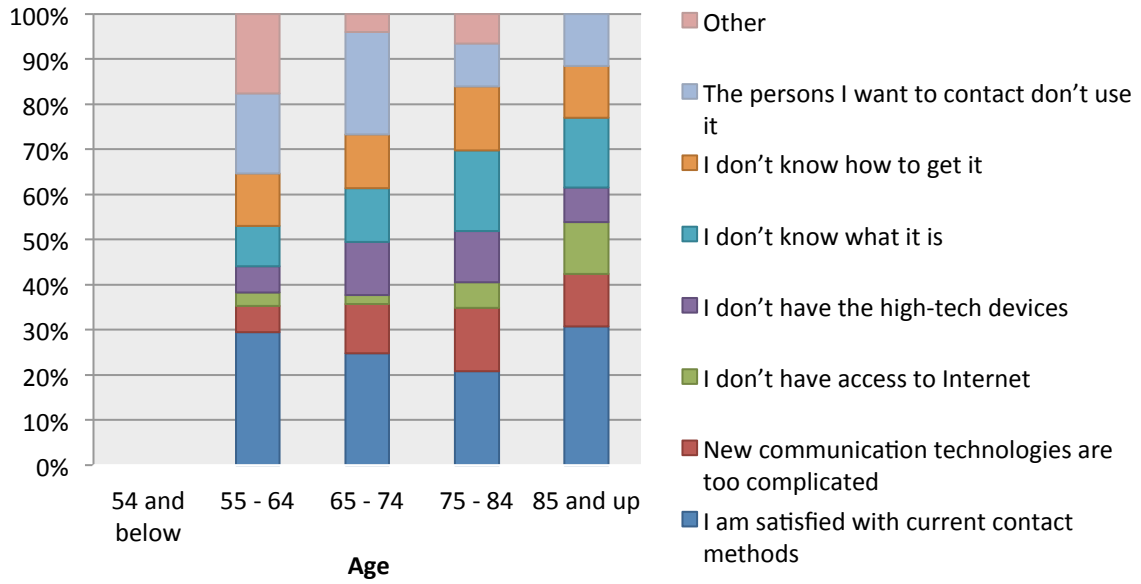


Figure 4.15b The Reasons for Not Using Video Chat Applications/Software

4.2.3.3 Attitudes Toward Technology

In Figure 4.16a, 82.4% of non-users agreed with technology’s positive influence on intellect, including the overwhelming 35.2% who strongly agreed with this statement. 43.8% of the respondents who did not agree with the statement “new technology is overrated”; however, 33.3% of participants hold the opposite opinion. More than half of the non-users stated that they feel comfortable with technology. One interviewee reported that she feels comfortable with technology only if she knows how to use it; therefore, the large portion of agreement cannot guarantee the comfortableness with the unfamiliar technologies. Of older adults, 45.7% would like to see the image when talking to the person, while 15.2% do not agree with the opinion. One respondent reported in the interview that she does not want to dress up just for a phone call. Another respondent reported that she hates to see her senile image in the video, so she always turns her camera away sow no one can see her image when video chatting with her family.

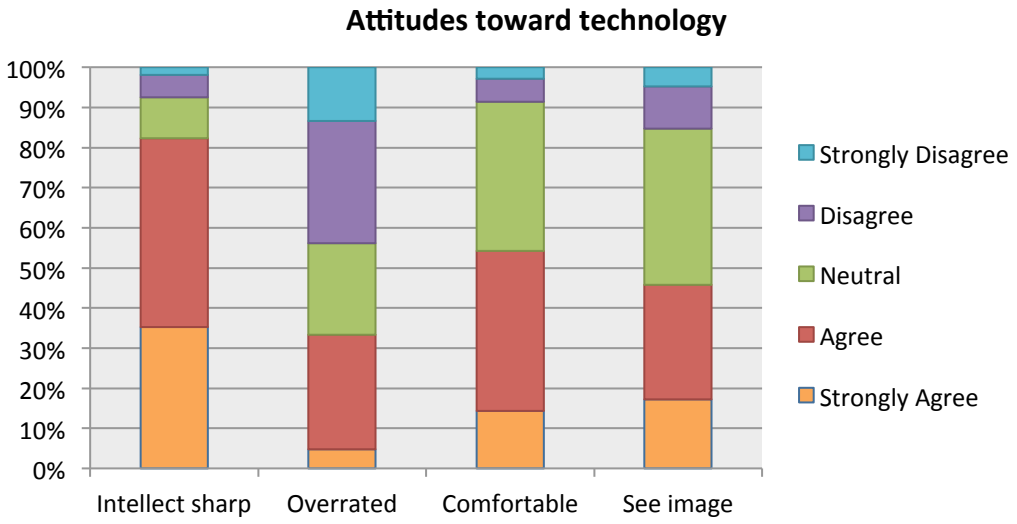


Figure 4.16a Non-Users' Attitudes toward Technology

Since all the three statements but the second one are positive, the data of the second statement was inverted to a positive approach in order to better demonstrate the attitude toward technology in Figure 4.16b. It is clear that the positive attitude peaks at the age of 75 to 84, and this age group has the least negative attitudes toward technology, whereas adults older than 85 hold the most negative attitudes. In addition, the baby boomer group (aged between 55 and 64) expressed the most diverse opinions of technology, which is consistent with the hypothesis about the great diversity among this cohort.

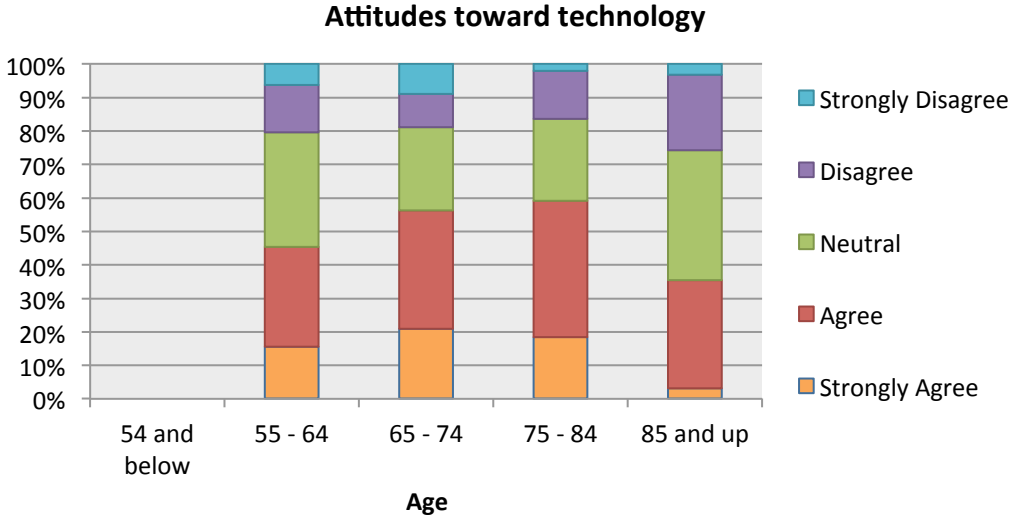


Figure 4.16b Non-Users' Attitudes toward Technology

Theme 4: Baby boomers have more positive attitudes than non-boomers toward technology and usefulness and the ease of use is essential for non-boomers.

The interviews showed that baby boomers are more likely than non-baby boomers to hold positive attitudes toward technology. Their motivation relies heavily on the usefulness of the technology. Simplicity, privacy, security and accessibility are important to baby boomers.

Non-baby boomers have a higher tendency to avoid new technology unless the benefits are obvious, such as in the case of an emergency. They reported concerns about privacy, Internet security, and the need to simplify the technology, as well as the desire for instructions on very basic information, such as where to download the software.

Compared with older generations, baby boomers are more positive about and familiar with technology. Boomers have expressed their interest in technology more so than older generations. Usefulness and the ease of use have stronger influence on older generations' acceptance of technology.

4.2.3.4 Willingness to Learn

Baby boomers are reported to value their relationship with their adult children more than their relationship with their parents (Giarrusso, Feng, & Bengtson, 2004). For this reason, six questions were asked in the questionnaire to test whether peers, children and grandchildren are an effective stimulus for learning video chat applications/software, including older adults' active and passive learning motivation. Active learning motivation means they are actively seeking to keep up with their peers, children, and grandchildren if their peers, children, or grandchildren are using video chat applications/software, and probably initiate a video chat with their peers, children, or grandchildren. Passive learning motivation is interpreted as the willingness to use video chat applications/software if these elderly people are requested by their peers, children, or grandchildren to learn the technology.

It can be seen from Figure 4.17a that approximately 50% of the respondents are willing to learn video chat applications (strongly agree and agree) in all cases, ranging from 44.6% of participants are willing to learn if their grandchildren have it to 51.7% of participants have the willingness to learn in order to contact their grandchildren. In addition, respondents are more

willing to learn if they are requested to do so by other persons (passive learning motivation) than if they actively want to use the applications (active learning motivation). This means that passive learning motivation is stronger than the active motivation for all respondents in the survey. At the same time, the proportions of strongly agreement in all six questions indicate that grandchildren have the greatest influence on older adults, and peers have the least impact. However, there are still 24.0% (peers have the applications) to 31.5% (grandchildren want to contact them with the app) of participants who disagree and strongly disagree with the statement. The strongly disagreement varies around 10% at all ages. One respondent stated in the interview that she would contact her grandchildren instead of her children for assistance with technology related subjects, because her children are always too busy to offer help and her grandchildren are more familiar with technology than her children. In this way, grandchildren and peers are more accessible than children. Also, grandchildren are high-efficient assistants in new technology.

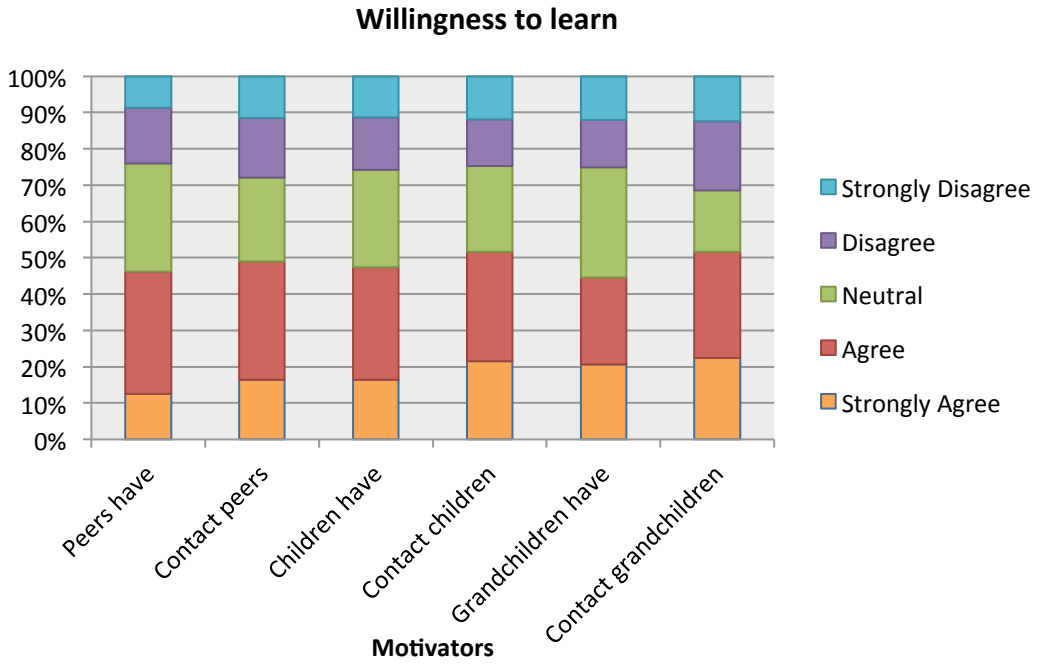


Figure 4.17a Non-Users' Willingness to Learn Video Chat Applications/Software

In Figure 4.17b, strong willingness to learn dropped from 28.6% to 0% with increasing age. Nevertheless the proportion remains at the same level from the 65 years old to the 84 years old. Participants aged from 55 to 64 have the least strong disagreement of all age groups. This

verifies the statement that baby boomers value their families, and they are the largest potential consumers of communication technology.

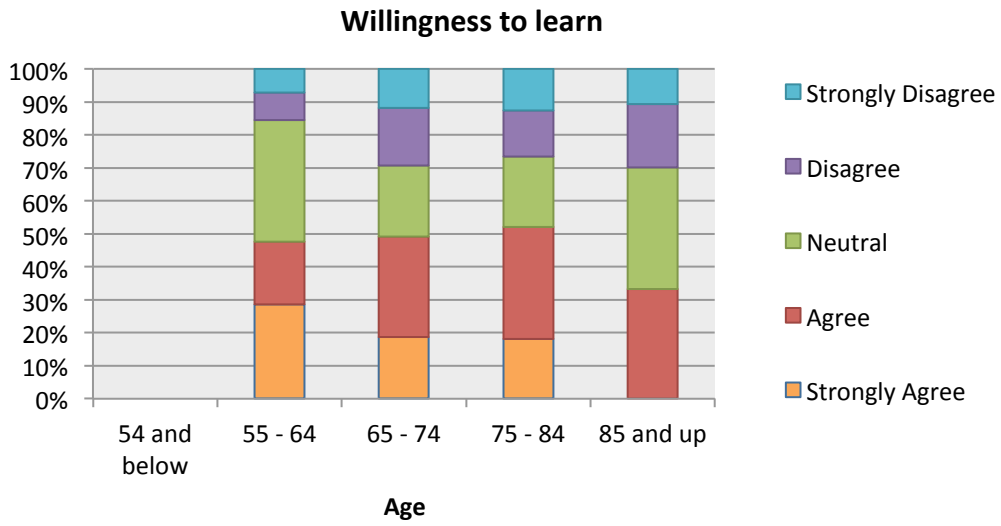


Figure 4.17b Non-Users' Willingness to Learn Video Chat Applications/Software

Theme 5: External context effects perceived usefulness

For both boomers and non-boomers, family members living far away is an essential element in increasing perceived usefulness, but older generations require more assistance from younger family members. Baby boomers have more high tech devices than older generations, which reflects a higher level of technology acceptance, a higher level of familiarity with technology, and a lower level for demand for assistance. Notably, influence from surrounding people is also a motivator perhaps due to the other person's successful user-experience giving the perception of easy accessibility.

Theme 6: Limitations of devices, relatives living nearby and busy in real life are the negative factors

Both groups mentioned limitations of the devices, including the requirements of a separate camera and microphone for certain computers. The devices can also lack portability, and present the further need for an Internet connection. Users are therefore confined to certain spaces. Moreover, usefulness is decreased if family members are living nearby, and being busy in "real-life" can hinder the use of virtual communication, even for applications and software that are perceived useful and accessible.

4.2.3.5 Learning Strategies

As demonstrated in Figure 4.18a, when learning how to use new applications/software, (n = 15) users with previous experience responded that they would “ask family or friends for assistance”, and (n = 15) said they would “try it out myself”. Consistent with the hypothesis, reading manuals is the least preferred way of learning for current applications/software users.

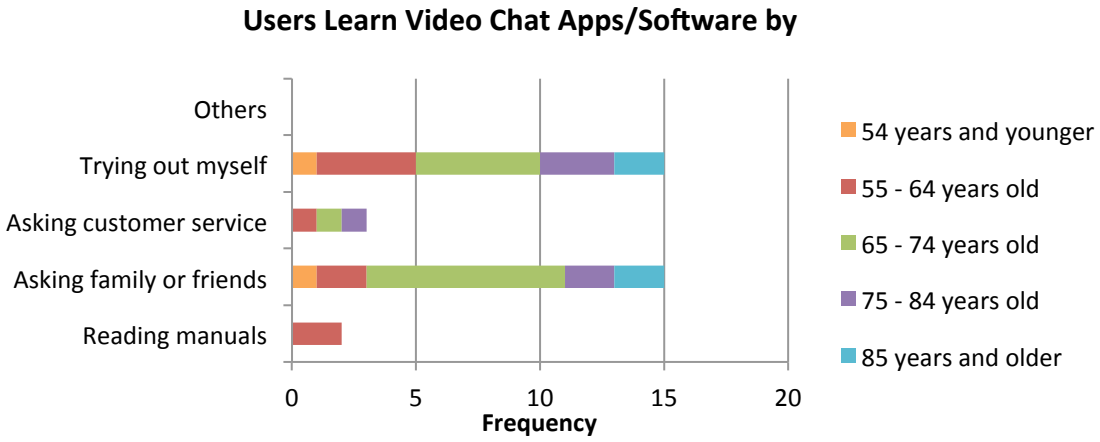


Figure 4.18a Users Learning Strategy

A similar question was asked among respondents who have no experience with video chat applications/software (see Figure 4.18b). These participants prefer to ask family and friends to help them learn how to use high tech devices (n = 73), followed by trying them themselves (n = 59). When compared to video chat applications/software users, non-users are more likely to seek assistance from customer service and product manuals.

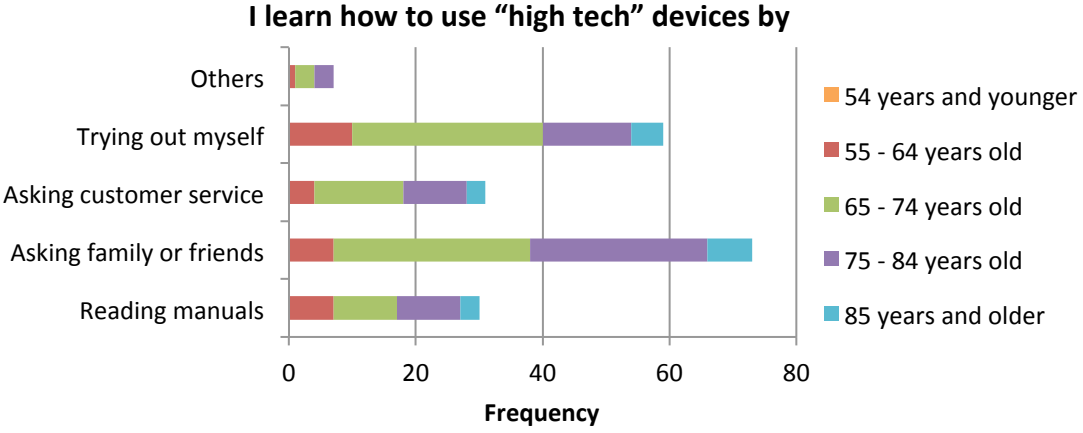


Figure 4.18b Non-Users Learning Strategy

In the interview, respondents who learn video chat software by trying it out themselves have an inner interest in the software, knowledge of the technology, including its operation and language, as well as confidence when dealing with unfamiliar situations. Applications/software user respondents are more likely to learn new things by trying it out than non-users in all age groups, especially when they are older than 75. More than 10% of non-users would ask customer services in all age groups, whereas only the 65-74 age group had more than a 10% customer service use among users with experience of using video chat applications/software. Reading manuals is at the same level of acceptability for both app users and non-users between 55 and 64 years old (leading edge baby boomers), but only non-users tend to refer to manuals if they are older than 65. Thus, users are less likely to ask customer service or read a manual, which may reflect their familiarity with similar technology. Two interviewees reported that they wrote down the step-by-step instructions to help them understand what to do. Visual learners require someone to demonstrate the actual operation so that they can follow the instructions. One video chat app user reported the relationship between her career and her way of learning Skype. She used to work as a software tester, so she would keep trying until she figured out what was going on and what should be done about it. Her working experience made her more patient than other users when the video chat software did not work well. She is not afraid to make mistakes when trying new software, nor is she when using video chat applications. However, not all users can benefit from their work experience.

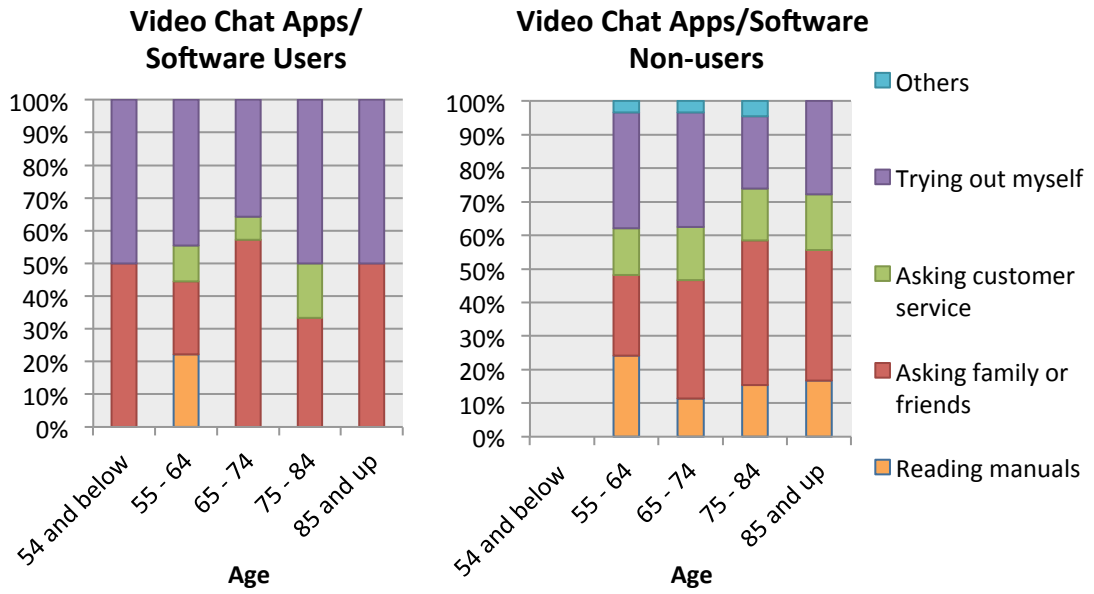


Figure 4.19 Users Vs. Non-Users Learning Strategy

Theme 7: Baby boomers are more kinesthetic learners

Baby boomer users are more kinesthetic. They prefer to learn by manipulating equipment versus the older generations who require demonstrations and written materials from younger family members. As mentioned in Chapter 2, visual learners prefer written information from books or the Internet with graphics or illustrations, and older generations are more likely to be visual learners.

Theme 8: External assistance from family members

Younger family members are the main source of assistance. In-person demonstrations are the preferred assistance for older generations, followed by having the preparation work done by someone else.

CHAPTER 5

DISCUSSION AND CONCLUSION

This section interprets the results of the data analysis that relate to hypotheses. Chapter 5 also explains the implications of the findings for the field of design and gerontology. This chapter also discusses the limitations of this research project and provides suggestions for future research.

5.1 Interpretation of Results as They Relate to Hypotheses

H1: There is dramatic diversity among baby boomers' attitudes and experiences with video chat applications/software.

As indicated by the statistics supported by analysis of the answers from questionnaires and the interview transcripts, baby boomer users endorse the usefulness of video chat applications/software in its improved long distance communication with relatives and friends, especially two boomers who reported no difficulty in using it. Being able to see the person without extra cost is the main reason for video chatting. However, this application/software is difficult to set up during the first time use and not necessary to use when families are living nearby. Therefore, there is ambivalence here. On the one hand, they agree that video chat applications/software are useful. On the other hand, the difficulties in setting it up make them reluctant to use it. Thus, on the surface these findings may be interpreted to support H1. Baby boomer users have diverse attitudes and experiences in video chat applications/software. However, when comparing all older users in the age groups, baby boomers do not present a strong difference from other groups, whereas the age group 65 to 74 and age group 85 and up demonstrate the reverse, probably because of the influence from retirement and continuing loss of relatives and friends, respectively.

H2: Baby boomers' aesthetic preferences for interface are similar to the younger users, but they have specific requirements due to their physical changes.

In the survey, participants provided positive reviews on interface and functions, except for the recovery of errors and reference material. In interviews, some of the respondents pointed out that these applications are easy to use as long as someone has set it up for them, since some

respondents mentioned the setup is the most difficult part. Older adults are less familiar with the languages in the software industry if they do not have related work experience or a frequent use of technology, which leads to confusion in understanding instructions and operations, resulting in the avoidance of trying new technology independently. Colors, simple interfaces, and step-by-step visual instructions are preferred by older users. In summary, data are mixed regarding whether baby boomers and older users' physical changes influence their preference and satisfaction of interfaces and functional design. Since it is not physical changes but the psychological difference that affects the result, H2 cannot be conclusively supported or annulled.

H3: Children and grandchildren are an effective stimulus for baby boomers to learn new technology.

As reported above, baby boomers have similar preference of contact methods to the older adults. They prefer face-to-face conversations the most, as with other age groups, while the younger baby boomers have more inclinations toward high tech devices and consider communication technology to be less complicated. Consistent with H3, baby boomers are the most willing to learn video chat applications/software in all age groups, but the influence of children and grandchildren is not strikingly different with that of peers. That is, the influence of children and grandchildren is almost equally the same as that of their peers.

Meanwhile passive learning motivation is stronger than active learning motivation in all age groups. The survey and interview indicated that baby boomers are the most independent learners. Moreover, participants from all groups who are video chat applications users are more independent than non-users. Baby boomers have the best external factors and internal motivation for using video chat applications/software. Barriers could be eliminated by simplifying the introduction with jargon-free language and easier access to family members and close friends since they are best resources of encouragement and assistance. Therefore H3 is partially supported that children and grandchildren are not the only effective stimulus for baby boomers to learn new technology, since some of the participants do not have young relatives.

5.2 Discussion

This study overturned the statement from previous researches about baby boomers' attitudes toward technology (James, 2000; Roberts 2010). Baby boomers in this study did not report the most positive opinions, whereas participants aged between 75 and 84 were the greatest supporters. But the baby boomer group illustrated the most diverse opinion of technology, which is consistence with the hypothesis about the great diversity among this cohort.

The sample was collected in a local public library and three senior centers so participants are generally active, well educated and in good health. Higher education level represents greater learning ability and payment level. This means that they might be more likely to purchase the device and applications, and find it less difficult to learn when compared to other populations. At the same time, less healthy persons may be less likely to be present in those locations and participate in those activities, and thus, less likely to take part in the study. The classes and activities offered by the settings can meet older adults' emotional needs to some extent, thus it might influence their needs of contacting other persons. People younger than 65 are more likely to work, so they are less likely to participate in this study. In addition, this population may feel that it is less urgent to learn or to use video chat applications/software because their needs of interaction with other persons and their emotional needs can be fulfilled in the workplace or at home where their children still live with them.

People aged between 65 and 75 are the young old, who are healthy, financially satisfied, and less isolated, so they are more likely to purchase new technology, and have other people teach them. In contrast, people older than 75 maybe more isolated, such as living without the younger generation, and having fewer surviving peers, so they might have to learn new things by themselves, and are forced to try new things out by themselves. At the same time, some of these isolated older people might have a stronger willingness to build new ways to connect with other people, like their children, grandchildren and new friends.

This study found the difference between applications/software designers' and older user's mental models. As Figure 5.1 illustrates, designers can communicate with users only through the system image of a product (Norman, 2004). Norman also mentioned: "For someone to use a

product successfully, they must have the same mental model (the user's model) as that of the designer (the designer's model) (p.76)"

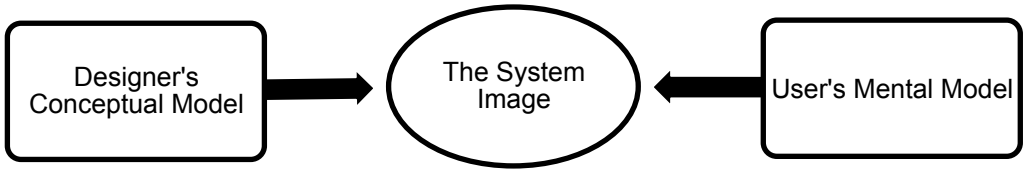


Figure 5.1 Conceptual Model (Norman, 2004, p.76)

However, software developers' conceptual model is different from baby boomers' mental model. Usually, software and app developers are much younger than the baby boomers, so it is difficult for older users to understand the interface designed by younger application developers. One example is that one respondent used a cartoon-like thing to describe the function that is called "Lite Mode" according to Google Map. This means that designing for older users must not only be using simple words, but using the language and interfaces that could convey the older population's mental model. Norman (2004, p.75) stated that the only way to find the proper mental model is through testing: develop early prototypes, then watch as people try to use them. On the other hand, the investigator believes the interdisciplinary collaborations among design, linguistics, communication, and gerontology are crucial as well.

5.3 Future Implication

5.3.1 Video Chat Applications/Software Design

In order to improve the user experience design, existing users and the potential users were classified into four categories comprising the criteria of their attitude toward video chat applications/software and their learning process. Based on the data, users and non-users' attitude toward video chat applications/software varies from resistant to adaptive, which indicates their perceived usefulness of the applications/software varies from useless to useful. In Figure 5.2, the vertical axis illustrates two types of learning processes – exploring independently and seeking assistance from others. From the data, explorative learning includes visual learning, auditory learning, and kinesthetic learning independently. Assisted learning represents in-person

demonstrations, written materials, and all other types of assistance from other persons. The most mentioned difficulties in using video chat applications are downloading, installing and setting up.

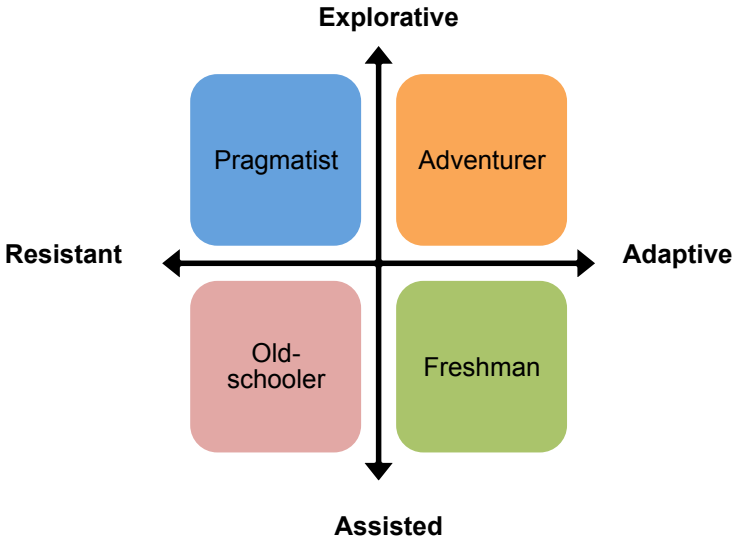


Figure 5.2 Biaxial Map

As shown in Figure 5.2, the "*Adventurer*" stands for the most adaptive and explorative users and potential users, who are interested in video chat applications/software, and found it very useful. They usually learn new technology by manipulating equipment or searching the instructions independently. This type of user might have some related user experience or is highly motivated, such as wanting to contact family members living overseas. This category is where the majority of baby boomer interviewees are located. When designing for the Adventurers, video chat applications/software should be fun, and provide immediate feedback such as clear instructions to deal with errors to maintain their interest and trust in the app.

The *Pragmatist* would not use video chat applications/software when they find it unnecessary to contact others, like family members living nearby, or if none of the close friends and family members use it. However, they have the ability to learn new technologies by themselves, so all they need is a trigger. The passive learning motivation has a stronger influence than active learning motivation, which means users are more likely to use video chat applications/software if they are required by peers, children or grandchildren rather than actively desiring to use it to contact other persons. Thus, close friends and family members are effective

motivators to this type of user. Future design could focus on developing a user-targeted platform outside of a social network website (e.g. Facebook) and app stores (e.g. Apple store) that only family members and close friends can access, which would guarantee Internet privacy and security and maximize the influence. In addition, advertisements facing younger generations might encourage young people to actively contact older generations, which is also an effective motivator for older baby boomers to use video chat applications/software.

The *Old-Schoolers* represent those who tend to avoid using new technology, and require assistance if they would like to learn it because these users have the lowest level of perceived usefulness and perceived ease of use in Technology Acceptance Model (TAM). Since perceived usefulness is the primary motivator, it might be beneficial to combine healthcare related functions into video chat applications/software, such as personal security and emergency aid. In addition, to increase the perceived ease of use, designers could make the following changes:

1. Reduce the amount of information on each page,

2. Redesign the interfaces with features with which older generations are familiar, for example imitating the design of the TV remote or using the design element from the older versions of the software.

3. Use the baby boomer's language on interface design, which requires collaboration with users in the design process,

4. Make contracts with device companies to have the app built-in,

5. Use visual step-by-step illustrations in addition to the written instructions and provide video instructions online,

6. Add a function in which developers, customer service, and the users in the contact list could remotely control the app in order to do some operations that are too hard for certain older users, but this function can only be activated with the user's approval.

There are so many possible solutions for this type of user.

Freshman users have a high acceptance level of technology, strong motivation to use video chat applications, but have some difficulty in using it. The majority of non-baby boomer interview respondents are in this category. Failures in interface design could impact their user

experience and satisfaction, thus they might give up using it when assistance is not available. The solutions to improve perceived ease of use are similar to the previous paragraph.

5.3.2 Video Chat in Gerontology

Older adults can benefit from online social support, especially those who have difficulties talking about their problems and emotions offline. Online settings offer the possibility for them to disclose their thoughts and feelings (Pfeil, Zaphiris, & Wilson, 2009). Often more than 90% of the information is delivered via non-verbal methods, like facial expressions, in messages conveying feelings and attitudes (Mehrabian, 1981). The lack of physical presence, body language, eye contact, and voice limit the quality of telephone contact intervention and make it less effective for emotional and social support (Pfeil, Zaphiris, & Wilson, 2009). Video chat can deliver the non-verbal portion of the communication as well as the actual words spoken, which could increase the effectiveness of social support, emotional support, even education offered via telecommunication systems.

Information and Communication Technology (ITC) is already being used in hospital-based rehabilitation facilities, medical therapies, and surgical therapies. For instance, the Mayo Clinic uses mobile applications on iPhone and iPad to improve patient care (Apple Inc., n.d.). In the future, these services can be delivered cost-effectively from a distance so patients with limited mobility do not have to attend the facilities for consulting services.

However, telecommunication cannot take the place of the face-to-face communication since humans need real social contact with other real persons (Turkel, 2012). It also has many restrictions, such as the access of ICT devices, which requires a certain economic status. Furthermore, fear of technology can impact older adults' willingness to approach telecommunication devices. Fortunately, baby boomers are better educated, more economically secure, and have more experience with technology than former cohorts (Coughlin, 1999), and their self-identity – young and fashionable (Smith, & Clurman, 2009) - can stimulate learning high-tech devices. Depressed adults with severe memory problems or cognitive impairment may not be appropriate for using telecommunication.

The community and society should assist older baby boomers to minimize the economic obstacle of telecommunicate interventions. Social workers should learn to use telecommunication technology and assist older baby boomers to use it to extend social networks, obtain support, and acquire health education.

5.4 Limitations

First of all, due to the limitation of time, the size of the sample is inadequate to represent a comprehensive picture of the baby boomer and older adult's user experience of video chat applications/software. Although 133 participants took part in this survey and 14 respondents were interviewed, the sample size of each age group is too small that the differences reported in this study could not show a statistical significance. Therefore, it is difficult to generalize the conclusion.

Secondly, the distributions of the sample by gender and age are not consistent with those of the older populations in the United States. In addition, race and socioeconomic background were not considered in this study.

Thirdly, the location of the data collected might have influenced the result of the study. As mentioned before, the majority of baby boomers are still of working age, thus senior centers would not be an ideal location to recruit boomer participants. Furthermore, the retired baby boomers and older adults who took the class offered in a local public library and participated in the activities in three senior centers might have higher education levels and better financial situations, which would not reflect the characteristics of all boomer generations.

Fourth, the data was collected in the summer in Tempe and Phoenix, Arizona when the daytime temperatures were around 100°F. Some participants told the researcher about the "Snowbird" phenomena in Phoenix that many retirees come to spend winter in Arizona and travel out of state to avoid the hot weather. Thus, it was more difficult to invited retired baby boomers to participate in the research.

This research could be designed to have a bigger sample size and distribute the questionnaires purposely according to the distribution of populations in the U.S. by gender, age, race and socioeconomic status. Additionally, the study could include more work place participation. Moreover, winter might be a more ideal time for data collection of retirees in Arizona.

5.5 Future Research

This research verified the different language used between younger app developers and older boomer users. Hawthorn (2007) proposed to involve older users as design participants, so future research should examine baby boomers' learning and using process of video chat applications/software to clarify baby boomers' mental models with the help of interdisciplinary collaborations among design, communications, linguistics, gerontology and baby boomer users.

Hypothesis 2 could not be conclusively supported or annulled in this study because of the difficulties in use predominately affecting the satisfaction of the video chat experience, and aesthetic preferences cannot be measured in the survey or the interviews. As a result, baby boomers' process of using video chat applications/software could be video recorded and analyzed in future research, which could provide more details about their habits and challenges in using video chat applications/software. In addition, a visual aesthetics test could be conducted to measure baby boomers' preferences for video chat applications/software interface design. Follow-up interviews could be applied immediately with the subjects after the tests to discuss and explore the reasons for the operations.

5.6 Conclusion

5.6.1 Design Implications

This research project only looked into a small sample of the older adult populations living in urban and suburban areas in Phoenix and Tempe, Arizona, while current baby boomers are more likely to be present at a workplace. Thus, this study can serve as a pilot study for future research on baby boomer user experience of video chat applications and software. Future research can be conducted in more diverse locations across the US. This study proposed a strategy to collect data on this topic, including video recording of the using process, aesthetic preference test and a follow-up interview.

This study classified older adults into four categories, including Adventurers, Pragmatists, Older-schoolers and Freshmen, by the criteria of their attitudes toward video chat applications/software and their learning process. Moreover, the results concluded the characteristics and provided the suggestions of designing for each type of older adult. Future

design studies should focus more on each category. In addition, this project confirmed that the perceived usefulness is the major determinant of technology acceptance model (TAM) for older adults, which indicates that it is better to focus on users' perceived usefulness instead of paying too much attention to aesthetics at the beginning.

This study was focused on the retiring baby boomer generation and their attitudes, preferences and perception of technology. Although there are design research projects aimed at the usability of products and software design for older adults, and aesthetic preferences of older adults on interface design, few target products to the older adults' learning strategies and motivations. Moreover, current research seldom looks at the baby boomer generation's video chat experience even though companies all know that the large cohort will bring significant change to the society and bring a huge retiree market. Designers need to step up and pave the way for more research because the baby boomer generation is a large and profitable market for information communication devices, software and mobile applications. In addition, designers and software developers should not only focus on the healthy population, but also on the seniors with declining physical and mental functions.

This study discussed the implications of video chat technology in improving the effectiveness of intervention of social isolation and loneliness. Future studies should pay more attention to the needs of isolated retirees. This phenomenon reflects the urgent need for interdisciplinary collaboration among design, gerontology, communication and linguistics.

Moreover, this study created an opportunity for older adults to express their opinions on technology. Because in current society, American culture values youth, while old age is usually more associated with notions of antiquated, obsolete, out-of-date, old-fashioned and past one's prime. Through this project, older adults have an approach to have their voice heard and attract more attention to their experiences. Thus, this project could promote senior users' opinions.

Furthermore, improving baby boomer users video chat experience can be considered a trial to implement the universal design for all users. The center for Universal Design at North Carolina State University defined Universal Design (1997) as "the design of products and

environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design". The principles of Universal Design includes:

"1. Equitable Use: The design is useful and marketable to people with diverse abilities.

2. Flexible in Use: The design accommodates a wide range of individual preferences and abilities.

3. Simple and Intuitive Use: Use of design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

4. Perceptible Information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

5. Tolerance for Error: The design minimizes hazards and the adverse consequences of accidental or unintended actions.

6. Low Physical Effort: The design can be used efficiently and comfortably and with a minimum of fatigue.

7. Size and Space for Approach and Use: Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility." (The Center for Universal Design, 1997)

By promoting elder/baby boomer users video chat experiences, universal design could promote all users' experiences.

Design is believed more than functions and aesthetics of a product, but an integral improvement of experience should be based on the research on ergonomic, cultural, market and sociology, and expressed as visual design, information architecture, and interaction design. All elements are inseparable in design. The researcher believes that through design research and practice, users could improve life quality, companies and industries could thrive, and social issues could be settled.

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APPENDIX A

QUESTIONNAIRE

Preparing for Baby Boomer Retirement: Improve Video Chat Experience In Intergenerational Communication

PLEASE READ BEFORE DOING THE QUESTIONNAIRE

I am a graduate student under the direction of Professor Donald Herring in the Design School of Herberger Institute for Design and the Arts at Arizona State University. I am conducting a research study to investigate video chat apps' usability and aesthetic features, and baby boomer users' perception and expectation of video chat apps.

I am inviting the participation of baby boomers (ages 50-68), which will involve completing a survey, which should take no more than about 10 minutes.

Your responses will be **confidential**. The results of this study may be used in reports, presentations, or publications but your name will not be used. Your participation in this study is **voluntary**. You have the right not to answer any question, and to stop participation at any time. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

If you have any questions concerning the research study, please contact the research team at: Donald.Herring@asu.edu at (480)727-7338 or Ai.Shi@asu.edu at (480)359-9948.

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Completion of this survey will be considered your agreement to participate in this study.

There is important information on page 8.

GENERAL INSTRUCTIONS

Some of the questions in this booklet ask you to write in a response. There will be a blank where you can write your response.

Some other questions will require you to answer by checking off to the left of the short list of answers.

BACKGROUND INFORMATION

1. **What is your age? (It is very important for this research.)**
   □ 54 and below □ 55-64 □ 65-74 □ 75-85 □ 85 and up

2. **What is your gender?**
   □ Male □ Female

3. **What is your marital status?**
   □ Single □ Married □ Divorced/Separated □ Widowed

4. **Compared to other persons the same age, would you say that your health is excellent, good, fair, or poor?**
   □ Excellent □ Good □ Fair □ Poor

5. **Where do you live?**
   □ Living with spouse/partner
   □ Living with children/grandchildren
   □ Living individually
   □ Assisted Living Community

6. **Do you drive an automobile?**
   □ Yes □ No

7. **Are you retired?**
   □ Yes □ No

8. **Do you work?**
   □ Do not work at all
   □ Work as a volunteer
   □ Part-time employment for pay
   □ Full-time employment for pay
   □ Other (Please specify): _____

There is important information on page 8.

9. **What is the highest degree you have received?**

□ 1st - 6th grade
□ 7th - 8th grade
□ 9th -12th grade, no diploma
□ High school graduate - diploma or equivalent (e.g., GED)
□ Some college but no degree
□ Associates Degree or Trade School Certificate
□ Bachelor's Degree
□ Master's Degree
□ Doctorate Degree

10. **Please rate the following contact methods from 1-8, 1 being the MOST preferred to 8 being the LEAST preferred.**

__ Text message
__ E-mail
__ Voice message
__ Phone call
__ Video Chat
__ Social Networks (e.g., Facebook, Twitter)
__ Face-to-face conversation
__ Others: (Please describe:)

11. **Do you use Video Chat Apps/Software (e.g., Skype, Facetime)?**

□ Yes
□ No..... if you answer no, please skip to question **37**.

VIDEO CHAT APPS/SOFTWARE USAGE

12. **Approximately how long have you used Video Chat Apps/Software?**

_____ months

13. **Favorite Video Chat Apps are**_____

14. **On what device do you use Video Chat Apps/Software? (Please check all that apply.)**

□ Cellphone □ iPad/Tablet □ Laptop Computer
□ Desktop Computer □ Others (describe)_____

There is important information on page 8.

15. **Describe how you received your first Video Chat Apps:**

□ Downloaded it and installed it myself
□ Downloaded it and installed it by one or more children
□ Received with the new machine from myself
□ Received with the new machine from spouse
□ Received with the new machine from child(ren)
□ Received with the older machine from child(ren)
□ Other (describe)_____

16. **I learn how to use Video Chat Apps/Software by**

□ Reading manuals
□ Asking family or friends
□ Asking customer service
□ Trying out myself
□ Others (please describe:)

17. **Within this "typical" week, approximately how many hours will you spend talking on Video Chat Apps/Software?** _____ hours per week

18. **Have you used the Video Chat Apps to contact an old friend or relative you haven't met face-to-face for a long time (please specify number of times)?** _____

19. **Please estimate average hours per week spent on the following Internet activities:**

Participating in/monitoring video chat groups____
Video Chatting with family____
Video Chatting with fiends____
Socializing in chat rooms____
Sending Text messages via Video Chat Apps____
Taking photos____
Other (please specify)____

Usefulness of Video Chat Apps/Software

20. **I find Video Chat Apps/Software useful in my life.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

21. **Video Chat Apps/Software have the functions and capabilities I expected.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

There is important information on page 8.

22. **Video Chatting is like having a face-to-face conversation.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

23. **Video Chat Apps/Software help me keep closer touch with family and friends.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

Usability of the Video Chat Apps/Software

24. **Overall, I am satisfied with how easy it is to use Video Chat Apps/Software.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

25. **It is simple to use Video Chat Apps/Software.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

26. **It was easy to learn to use Video Chat Apps/Software.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

27. **It is easy to read texts on the screen.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

28. **It is easy to navigate the menu of the Video Chat Apps/Software.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

29. **It is easy to find contact information.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

30. **Video Chat Apps/Software gives error messages that clearly tell me how to fix problems. Whenever I make a mistake using the Video Chat Apps/Software, I recover easily and quickly.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

31. **It is easy to read labels on buttons. It is easy to press buttons.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

32. **It is easy to input text.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

33. **The sound of conversation is clear.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

There is important information on page 8.

34. **The video image is clear.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

35. **Supplemental reference materials (such as user manual) provided with the Video Chat Apps/Software are easy to understand.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

36. **What do you want to change regarding your experience with video chatting? (Please describe)**

_____

_____

_____

_____

If you DON'T use Video Chat Apps/software, please answer questions from 37 to 54.

37. **On what device do you contact other persons? (Please check all that apply.)**

□ Landline/home phone □ Letter/postcard □ Cellphone
□ iPad/Tablet □ Laptop Computer □ Desktop Computer
□ Others (describe)_____

38. **Within this "typical" week, approximately how many hours will you spend to contact other persons?** _____ hours per week

39. **What "high tech" devices do you use now? (Please check all that apply.)**

□ Bank ATM □ Cellphone □ iPad/Tablet □ Laptop Computer
□ Desktop Computer □ Others (describe)_____

40. **I learn how to use "high tech" devices mostly by**

□ Reading manuals
□ Asking family or friends
□ Asking customer service
□ Trying out myself
□ Others (please describe:)

There is important information on page 8.

41. **What is the latest high tech device you use? (Please describe.)**

_____

42. **Approximately how long have you used it?**

_____

43. **Describe the reasons of NOT using Video Chat Apps/software: (Please check all that apply.)**

□ I am satisfied with my current contact methods
□ I think new communication technologies are too complicated
□ I don't have access to Internet
□ I don't have the high-tech devices
□ I don't know what Video Chat Apps/software is
□ I don't know how to get Video Chat Apps/software
□ The persons I want to contact don't use Video Chat Apps/software
□ Other (describe)_____

44. **I am willing to learn to use Video Chat Apps/software if my peers are using it (even though they do not always contact me with it).**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

45. **I am willing to learn to use Video Chat Apps/software if my peers always want to contact me with it.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

46. **I am willing to learn to use Video Chat Apps/software if my children are using it (even though they do not always contact me with it).**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

47. **I am willing to learn to use Video Chat Apps/software if my children always want to contact me with it.**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

48. **I am willing to learn to use Video Chat Apps/software if my grandchildren are using it (even though they do not always contact me with it).**
□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

There is important information on page 8.

49. **I am willing to learn to use Video Chat Apps/software if my grandchildren always want to contact me with it.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

50. **New technology can keep people intellect sharp.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

51. **New technology is overrated.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

52. **I am comfortable with technology.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

53. **I think it's good to see another person's image during conversation.**

□ Strongly Agree □ Agree □ Neutral □ Disagree □ Strongly Disagree

54. **What do you expect of video chatting? (Please describe)**

_____

_____

_____

_____

I would like to invite you to participate in a follow-up interview with the project director to enter into more detail about your Video Chat Apps/software use and experiences. The interview will take no more than 20 minutes. The interviews will be confidential, but with your permission, I would like to record the interview.

If you would like to participate in an interview, please indicate your preference below, and provide your contact information in the space provided:

Yes ( ) **Skype interview: Skype User name** or **email address** _____;

Yes ( ) **Facetime interview** : **Facetime User email address** _____;

Yes ( ) **Face-to-face interview: Phone number** or **email address**_____;

Thank you for completing this questionnaire! Please return it to the researcher. To ensure confidentiality, do not write your name anywhere on the questionnaire.

There is important information on page 8.

8

APPENDIX B

INTERVIEW QUESTIONS

Interview Schedule

A semi-structured interview schedule will be used, including the many suggested probes. The order and wordings may change slightly to allow conversation flow. All questions may not be explicitly asked if the participant has already answered them.

First, provide the participant time to go over the Consent Form and a chance to ask any questions.

Second, ask the participant if it is OK to start recording. Upon receiving interviewee approval, begin recording.

Third, begin asking questions on video chat applications/software use. If the interview is being done in person and the participant reveals that they do not use video chat applications/software, provide them with one to interact with for a bit before continuing the interview.

1. First, I'd like to ask you for a bit of information about yourself:
    a. Age
    b. Marital Status
    c. Do you have child(ren)/grandchild(ren) or other younger people you are closed to?
    d. What is the highest level of education you have completed?
    e. Current Work Status
    f. How would you rate your current health? (Below average, Average, Above average)
2. Do you or have you used a video chat application/software?
        i. If yes: What is its name?
        ii. If No: (Continue with Non-App Users schedule)

<u>Interview Schedule: Video Chat Applications/Software Users</u>

For video chat applications/software users

3. How did you come to use video chat applications/software?
    a. If downloaded by yourself: What were the main reasons that persuaded you to get it?
    b. If downloaded by child(ren) or grandchild(ren): Why do you think they thought it would be good for you?
    c. How did you feel about it?
4. Before we go any further, may I ask: What is your perception of technology? Good/Bad?

    Do you feel yourself to be a technology savvy person? Why or why not?

    Do you feel comfortable using technology? Why or why not?
5. What other "high tech" devices do you use now?

(e.g. Computers, eBook readers, tablets, etc.)

    a. (Clarification) So would you say you're pretty "tech savvy" or not?

6. How long have you used the video chat applications/software?

7. Can you describe your first impressions of the video chat applications/software *before* you had used it?

8. What do you think about the types of people that use video chat applications/software? How would you generalize them?

    a. Does this apply to you? Did this have any bearing on using it?

9. How frequently do you use video chat applications/software?

10. What are you usually doing when you use video chat applications/software?

    a. What do you *mostly* use your video chat applications/software for? (To video chat, text, take photos, leaving messages, etc.)

    b. To whom do you usually make video chat calls? From whom do you usually get video calls? How often?

11. Would you say it is easy or difficult to use video chat applications/software? How easy/difficult?

12. How long do you estimate it actually took for you to get used to using it?

    a. Before you had owned one, did you expect that this time would have been more or less?

13. What techniques did you use to learn how to use the Video Chat Applications/software?

14. What would you say are the costs and benefits of video chatting? Do you believe one outweighs the other?

15. How do you think your lifestyle would be different without it?

16. What is your overall opinion about the video chat applications/software? (Positive or negative)

    a. If Negative: What is your reason to keep using it?

    b. How does the video chat applications/software compare to other contact methods in your opinions?

    c. So to sum up, what are the main reasons you feel that you will keep using the app/software?

17. How would you change or improve your current video chat applications or software?

Interview Schedule: Non-Users

The following schedule is for users who do not use video chat applications/software. Some questions will be changed slightly or omitted depending on of the contact patterns. Before starting this section, users interviewed in person will be provided a device with video chat applications/software to interact with for about 10 minutes.

3. (Now that you had some time to interact with one…) Had you seen one before today or have you gotten to play around with one?

    a. Can you tell me if you've ever thought about getting one? Why or why not?

4. Before we go any further, can I ask: What is your perception of technology? Good/Bad?

Do you feel comfortable using technology? Why or why not?

5. What other “high tech” or communication devices do you use now? (i.e. Computers, eBook readers, tablets, etc.)
    a. (Clarification) So would you say you’re pretty “tech-savvy” or not?
6. How long have you used current contact methods?
7. Can you describe your first impressions of the video chat applications/software when you first heard about it?
8. What do you think about the types of people who use video chat applications/software? How would you generalize them?
    a. Did this have any bearing on not video chatting?
9. What are you usually doing when you use your cellphone?
10. What are you usually doing when you use your computer?
11. Would you say it is easy or difficult to use new software or applications? How easy/difficult?
12. How long do you estimate it actually took for you to get used to using it?
13. What techniques did you use to learn how to use the new software or applications?
    a. Did you have any help in learning how to use it? What helped you?
14. Do you feel there is any cost/benefit to video chatting? Why or why not?
    a. Do you believe video chatting can improve your relationship with children/grandchildren? Do you think it can take the place of traditional contact methods?
15. How do you think your lifestyle would be different with video chatting?
16. What is your overall opinion about the video chatting? (Positive or negative)
    a. If negative: What is stopping you from using the Video Chat App/software?
    b. How does video chatting compare to other contact methods in your opinion?
    c. So to sum up, what do you feel are the main factors that would persuade you to use video chat application/software?
17. Are there other thoughts you would like to add on this topic?

APPENDIX C

INTERVIEW CONSENT FORM

Preparing for Baby Boomer Retirement: Improving the Video Chat Experience In Intergenerational Communication

I am a graduate student under the direction of Professor Donald Herring in the Design School of Herberger Institute for Design and the Arts at Arizona State University. I am conducting a research study to investigate video chat applications' usability and aesthetic features, and baby boomer users' perception and expectations of video chat applications.

I am inviting your participation, which will involve an interview that would take 20 minutes. This interview is to better understand the pattern of the video chat app use and the ownership of video chat applications. You have the right not to answer any question, and to stop participation at any time.

In order to participate, you must be between the ages of 50 and 68. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

Although there is no benefit to you, possible benefits of your participation are that design of video chat applications for baby boomer users might be improved in the future based on your input. There are no foreseeable risks or discomforts to your participation.

Your responses will be confidential. The results of this study may be used in reports, presentations, or publications but your name will not be used. Your contact information will be erased upon completion of the study.

I would like to audio record only the online interview and video record only the face-to-face interview. The interview will not be recorded without your permission. The tape might be used in the presentation. The tape will be kept in a locked box during the study, and will be erased upon the completion of the study. Please let me know if you do not want the interview to be recorded; you also can change your mind after the interview starts. Just let me know.

If you have any questions concerning the research study, please contact the research team at: Donald Herring, Donald.Herring@asu.edu at (480)727-7338 or Ai Shi, Ai.Shi@asu.edu at (480)359-9948. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

If you wish to participate in the interview, please sign below or email Ai.Shi@asu.edu with a message stating you agree to participate in this study.

Name:

Signature: Date:

APPENDIX D

RECRUITMENT SCRIPT

Dear Sir or Madam,

I am a graduate student under the direction of Professor Donald Herring in the Design School of Herberger Institute for Design and the Arts at Arizona State University.

I am writing to request permission to conduct a study in _____(the name of the library or adult recreation center) to investigate video chat applications' usability and aesthetic features, and baby boomer users' perception and expectation of video chat applications. We anticipate an enrollment of the church members, volunteers, and staff in _____(the name of the church or adult recreation center) to fill out a survey and participate in interviews for this study. The questionnaire will take about 10 minutes to complete, and each interview will take about 20 minutes.

The responses will be confidential. The results of this study may be used in reports, presentations, or publications but participants' names will not be used. I would like to audio record the online interviews and video record on my iPhone the face-to-face interviews. The interviews will not be recorded without the participants' permission. Questionnaires and participants' contact information will be stored in a locked box during the study. Videotapes and audiotapes will be stored on a private laptop during the study. The participants' contact information, videotapes and audiotapes will be destroyed upon completion of the study.

Your participation in this study is voluntary. If you have any questions concerning the research study, please contact the research team at: Donald Herring, Donald.Herring@asu.edu at (602) 692-8126 or Ai Shi, Ai.Shi@asu.edu at (480)359-9948. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

Very truly yours,

Professor Donald Herring & Graduate student Ai Shi

APPENDIX E

IRB CERTIFICATE

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Donald Herring
The Design School
480/727-7338
Donald.Herring@asu.edu

Dear Donald Herring:

On 5/5/2014 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Preparing for Baby Boomer Retirement: Improve Video Chat Experience In Intergenerational Communication
Investigator:	Donald Herring
IRB ID:	STUDY00001022
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Appendix I_Questionnaire_Ai Shi (tracked changes) May_5.docx, Category: Consent Form; • Appendix III_Interview Consent Form_Ai Shi_May_5.pdf, Category: Consent Form; • HRP-503a-TEMPLATE PROTOCOLSOCIAL BEHAVIORAL_May 5.docx, Category: IRB Protocol; • Appendix II_Interview Schedule_Ai Shi_May_5.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Methodology, Category: Other (to reflect anything not captured above); • RECRUITMENT SCRIPT_May_5.pdf, Category: Recruitment Materials;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 5/5/2014.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc:
Ai Shi
Donald Herring