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Social networks of technology caregivers and caregivees

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Abstract

Literature has shown that social groups play an important role in the ways that individuals learn about and change behaviors related to privacy and security management on digital devices. The term tech caregiver has recently been used to describe individuals that offer direct support to friends and family in need of help managing digital devices. This thesis investigates the role of these tech caregivers to support privacy and security management in small groups. To do this, 112 individuals were surveyed across the United States of America. These 112 participants belonged to 20 small groups comprising of technology caregivers and the technology caregivees. The results show that technology caregivers tend to be younger adults (age 19-25). Technology caregivers reported significantly higher levels of self-efficacy for privacy and security and power usage than technology caregivees. Qualitative feedback shows that participants primarily used text messages and phone calls to communicate to receive support on the topics of troubleshooting and device setup and the explanation of a new device. This work helps to characterize the role of technology caregivers within small groups when it comes to social support for digital privacy and security and describes design implications for creating a mobile platform that supports the work of tech caregivers in their social groups.

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1 Social Networks of Technology Caregivers and Caregivees

1.1 Introduction

The continuing surge of mobile devices has placed computing technology in the hands of nearly every person in the United States [1]. Along with the burgeoning use of computing technologies, there is also a corresponding increase in security risks. Studies have found that insecure mobile applications, for instance, can lead to fatal information security and data privacy issues that can bring upon serious after-effects on users and organizations alike [19]. Technology users' unease appears to be increasing along with this risk, due to factors like user awareness, trust, and privacy concerns, which have had a significant effect on, for example, sharing personal data on social media [22]. It has also been observed that individuals often try to mitigate this risk and sense of unease by seeking technical support for their mobile devices outside the boundaries of formal tech support channels [30] – the individuals who provide this informal form of technical support have recently been termed *technology caregivers* in research by AT&T [2]. As for the individuals who seek tech support, they are referred to as *technology caregivees*.

The need for technology caregiving has been on the rise after Americans started using their devices more often for different tasks like online banking, gaming, shopping [2] and less technology savy users started reaching out to their community members for advice on technology functionalities. The increase in utilization of online social platforms have simultaneously increased the importance of a technology caregiver who is an individual with the expertise or knowledge of various subjects that the technology caregivee is less knowledgeable about. Technology caregivers have become a solace for technology caregivees who may not understand every aspect of technology. Ultimately the technology caregivees receive guidance to make decisions that also informs them about

practices that enable safeguarding privacy and security. Studies have talked about technology caregivers assisting older adults with their device related tasks that also involves security measures and tips for identifying theft and malpractice [2], but sources characterizing who technology caregives are in terms of demographics and their role in small groups are limited; this paper contributes to literature on collaborative management of digital devices through an understanding of this role.

This study seeks to uncover how technologically sound tech caregivers perceive themselves to be in terms of their (*degree of comfort with technology use, power user scale*, *self-efficacy*) along with how the technological soundness of their social networks (*community efficacy*, *community efficacy with privacy and security*) affect their perception of the aforementioned issues of privacy and security.

1.2 Background

The goal of this study is to explore technology caregiver's and caregivee's interactions in social networks, their final perception of privacy and security along with mobile usage in the context of the social networks in which they are embedded. The methods of information exchange between technology caregiver and caregivee will be discussed. An attempt will be made to shed light on how a social network's collectively perceived proficiencies in these technologies and how collective abilities influence individual abilities. The factors discussed are validated constructs which have been used in previous studies. These constructs are self-efficacy, self-efficacy with privacy and security, community efficacy, and community collective efficacy with privacy and security and power users. Each is further defined and opperationalized in subsection below.

Technology caregivers can be anyone who have knowledge about a technology related topic and lend their expert opinion to the people seeking their advice. These are the experts who have a grip on a specific area of technology and are comfortable sharing

their prowess with others. There has been a study[29] that has found that youth comprising of younger generation adults(ages 18 to 29) have a better knowledge and can answer more questions about the digital world than the older adults(ages 65 and more). It has also been reported in an article that although 70 percent of the technologically able population are happy to exchange advice on technology, 34 percent of them they need help as well [3].Online safety is another reason why people warm up to the idea of consulting the tech caregivers for advice.

This study will focus on the relationship between a technology caregiver and technology caregivee, their mode of communication, the influence of efficacies on their decisions and finally design implications that can be derived from this study suitable to build a platform for the purpose of technology advice exchange.

The next few sections will focus on the understanding of social constructs in the current scenario as well as what is happening in the category of design that is impacting the construction of the application platform to make it successful.

1.2.1 Self-Efficacy of Privacy and Security

Self-efficacy is defined as how well one perceives their ability to execute courses of action required to deal with prospective situations [4]. In his guide to creating self-efficacy scales, Albert Bandura describes how it can be extended to other domains and situations. In this study, I extend the self-efficacy scale to the domain of technological privacy and security to better understand individuals' capacity to manage these technology decisions on their own or otherwise. Examining individual capacity is an important first step to understanding how group capacity is influenced by the sentiments of the individuals within these groups. Self-efficacy has been found to be a factor in healthy aging practices among older adults[26] and a factor in participation in physical and social activities [23].I will examine how self-efficacy plays a role in technology sharing networks.

In this study, the participants were asked to answer specific questions from their perspective using Likert scale. The range of questions for the self efficacy construct are as seen in Appendix A.0.2.

1.2.2 Community Belongingness and Management of Privacy and Security

It is known that an individual's social network impacts his or her decision-making process[12, 16]. Researchers are understandably curious to learn how users' social networks inform their decision-making regarding digital privacy, but the existing literature demonstrates little knowledge of how this impacts small groups. Some studies show evidence that users' capacities to engage in privacy and security practices may be modulated through engagement with their community. It has been found, for instance, that users are more likely to make privacy and security decisions such as deleting an app or changing a password if they have observed others in their network having done so [11].Another study indicated that users will ask for advice when needed and tend to ask family or friends who they believe are more capable of understanding the topic [15]. Participants coordinated with these individuals to complete their tasks or increase their knowledge base as they perceived them to be knowledgeable in the subject matter In a study conducted on Facebook, users were prompted via announcements to check new security features available to them. The messages were presented to two sets of users: the first received the initial announcement, the second received an additional announcement indicating how many of their friends had also seen the initial prompt. They found that while the users who were exposed to the second notification were more likely to explore the new security features, there was no change in the actual setting[13].

In this study, the participants were asked to answer specific questions from their perspective using Likert scale. The range of questions for the Community Belongingness construct are as seen in Appendix A.0.4.

1.2.3 Community Collective Efficacy for Privacy and Security

Much of the literature regarding community efficacy focuses on neighborhood watch programs and how communities work together to accomplish a mutually beneficial goal [6]. It has been found, for instance, that individuals who perceived neighborhoods more positively and have strong social ties play an important role in collective efficacy [18]; researchers debate that if strategies can be implemented for communities to focus on building a greater collective efficacy, neighborhood violence and the crime rate would decrease [6]. These studies agree that community efficacy results in safer areas and better relationships between community members.

Community collective efficacy is a construct that was used to extend self-efficacy to organizations and groups, referring to beliefs about collective capacities in specific domains [8].Carroll et al.'s work on community collective efficacy scoped Bandura's scale of perceived self-efficacy to the group, rather than individual level that explains various aspects of the research presented in the paper.

In this study, the participants were asked to answer specific questions from their perspective using Likert scale. The range of questions for the community collective efficacy construct are as seen in Appendix A.0.1.

1.2.4 Power User Scale - Power Users of Technology

A power user scale defines an individual's style of technology use and comfort level using that technology keeping self-efficacy and their interest in usage as factors that are taken into consideration. In my work, I learned and deduced where the participants lie in the power user scale spectrum based on their answers to the questions in the well constructed survey. Five disciplines (psychology, information sciences, media effects, marketing, and consumer research) are drawn to define a power user with high usage in motivation, expertise, efficacy, and behavior with their technology. Technophile,

Indispensability, Mastery, Efficiency and Informed Use are the five levels on the power user scale [21].

In this study, the participants were asked to answer specific questions from their perspective using Likert scale. The range of questions for the power user construct are as seen in Appendix A.0.3

1.3 Research Question

RQ: What are the optimal platform design ideas that will support the tasks of technology caregivers involving privacy and security? By answering the research question, I am hoping to play a small part in paving a way to design better tools for supporting tech caregivers with their ability to support the small social networks that they engage with.

1.4 Methods

1.4.1 Recruitment and Demographics

Participants were recruited from all over United States of America by distributing and marketing a survey that has been created using Qualtrics online survey software.Marketing of the survey was done by word of mouth as well as on social media platforms. Flyers with details of the survey and QR code was distributed among social media groups in the initial stages of the process. Facebook, Linkedin, and Instagram were the social media platforms used for spreading the word about the study. The existing topography of users' social infrastructure that supports mobile privacy and security on a large scale is explored as well.

Twenty groups were recruited, each group containing at least 5-10 members who interact with each other and exchange technology advice. The group will have at least one technology caregiver. A 10 dollar Amazon gift card has been distributed to each participant on completion of the survey sent to them where details of the study is depicted.

An additional option was made available to the participants from Cincinnati wherein they can choose to donate the 10 dollar award to a local food bank. Data collection began in August 2019 and commenced in April 2020. By the end, there were 112 participants among 20 groups who completed the survey fully. There were 36 Tech caregivers and 71 Tech caregivees overall along with 5 participants who were equally known for giving and taking advice. This trend was interesting and showcased how driven each participant was in terms of learning and sharing through a platform.

Respondents answered questions designed to gather interactions among their group members that constitutes the tech caregiver and caregivees. It will focus on their exchange about technologies and relative topics along with thoughts about maintaining security and privacy on their mobile device.

1.4.2 Analysis of the collected data

The survey requested that participants describe individuals who they give technology advice to or take technology advice from. These questions help in understanding who they rely upon for maintaining digital privacy and security, in terms of the qualities of those relationships data (i.e. same/different gender, same/different age, level of information sharing, level of trust, etc.) and a description of the relationship itself (i.e. kinship, friendship, co-workers, etc.). Both the parties were also asked questions to determine what kind of technology advice is exchanged and what tools or medium is being used for the same. They were asked to give feedback or ideas on how they would like to discuss or share the mentioned technology advice. Transcribing the data (survey response), organizing the data, familiarization with the data, open coding and finally identifying themes are steps that were taken as a part of thematic analysi s[20] to understand both parties' responses. Data was analyzed using different tools like SPSS to calculate statistics

like Cronbach's alpha, composite scores, standard deviations and relative constructs (including mentioned efficacies) that help in shaping the data into sensible outcomes.

To understand how users perceived their own ability to make secure decisions, self-efficacy was measured as it applies to the domain of addressing privacy and security. Measuring individuals' self-efficacy on security and privacy helps to understand how users within a community view themselves and whether having a higher (or lower) overall score will relate to other variables of interest. The scale is used in relation to the composite score of the individual taking the survey compared to the composite score of their close contacts.

The community efficacy scale is used in our framework to measure participants' sense of belonging independent of privacy and security, it stands to reason that a participant with low community efficacy due to a lack of a sense of belonging to the community, would not feel strongly about the communities' collective capacity to address privacy and security together. I drew results from data analyses on power users to understand how the presence of power users within a community affect communities' overall community collective efficacy score. Sundar created a scale [27] which is used to describing proactive technology users who are more likely to explore all possible customisation with their technology,giving an outlook on the power user factor in the study.

Appendix A.0.1 - A.0.4 showcases the questions designed specifically to help participants answer questions reflecting the different constructs talked in length in this paper.

1.5 Results

This section has been divided into subsections that will best describe the results deduced from the data accumulated through the survey.

1.5.1 Demographics

It is imperative to note the composition and demographics of the participants in this study that encompasses their age groups, gender, education and income. This gives a clear perception of the group of people giving their take on technology and it's impact on their lives. I notice from the demographics how participants from the age groups 55 and above are majorly tech caregivees (individuals who rely on the tech advice given by a tech caregiver). Based on the same demographic of age groups, it can also be seen how participants aging from 18-25 are majorly tech caregivers (individuals who have a better reach in technology and it's various aspects and lend their knowledge to tech caregivees). Table 1.1 showcases the trends of demographics mentioned above.

1.5.2 Description of Participating Groups

Table 1.2 shows group characteristics derived from the survey analysis. There are altogether 20 groups that have taken part in the study. There are 8 groups that comprise of friends only, 3 groups that are family only and 5 groups include both friends and family. Among the four remaining groups,two are categorized as coworkers/team members and the other two groups as 'Other' section. The 'Other' section is for groups that comprise of people who are related to one another in different ways.

The largest group has 9 members in it and the smallest has 5. This study has opened our eyes to the ways in which people coordinate with each other and share tech advice. It has also shown how a person can be both a tech caregiver and caregivee because of this constant exchange of tech advice. The groups in the study have at least one tech caregiver amongst them that impact their decision making process.

Table 1.1: Sociodemographic Characteristics of Participants

N	36		5		71		112	
Role	Tech Caregiver		Equal		Tech Caregivee		Total	
	n	%	*n*	%	*n*	%	*n*	%
Gender								
Female	13	36.1	1	20	37	52.1	51	45.5
Male	23	63.9	4	80	33	46.5	60	53.6
Other	0	0.0	0	0	1	1.4	1	0.9
Age								
13-18	2	5.6	0	0	8	11.3	10	8.9
19-25	25	69.4	5	100	39	54.9	69	61.6
26-35	7	19.4	0	0	3	4.2	10	8.9
36-45	0	0	0	0	3	4.2	3	2.7
46-55	2	5.6	0	0	9	12.7	11	9.8
56-64	0	0.0	0	0	1	1.4	1	0.9
65+	0	0.0	0	0	8	11.3	8	7.1
Education								
Primary School	0	0.0	0	0	2	2.8	2	1.8
High School	16	44.4	3	60	29	40.8	48	42.9
College	12	33.3	2	40	23	32.4	37	33.0
Masters	8	22.2	0	0	14	19.7	22	19.6
Doctoral/Professional	0	0.0	0	0	3	4.2	3	2.7
Annual Household Income								
Less than $24,999	12	33.3	2	40	8	11.3	22	19.6
$25,000-49,999	2	5.6	0	0	12	16.9	14	12.5
$50,000-74,999	5	13.9	0	0	16	22.5	21	18.8
$75,000-$100,000	11	30.6	1	20	14	19.7	26	23.2
More than $100,000	6	16.7	2	40	21	29.6	29	25.9

1.5.3 Survey Constructs

Thematic analysis of the answers given for the open ended questions in the survey resulted in the finding of definite themes. Participant's perception of a mobile application paved way for several design ideas that may be deemed fit for the purpose of knowledge exchange through a social platform. We need to make sure that the scales that we are calculating to make the deductions that we mention are reliable using Cronbach's alpha. Cronbach's alpha is essentially a measure to calculate internal consistencies of a survey

Table 1.2: Characteristics of groups

	N	*%*
Total no. of groups	*20*	*100*
Composition		
Friends Only	8	40
Family Only	3	15
Friends and Family	5	25
Coworkers/Team members	2	10
Other	2	10
Size of Group		
5 members	13	65
6 members	5	25
7 members	0	0
8 members	1	5
9 members	1	5
No. of Tech Caregivers		
1 Caregiver	6	30
2 Caregivers	11	55
3 Caregivers	1	5
4 Caregivers	2	10

scale. Internal consistency will go on to show how tight knit or closely related the items of a group are. In simple terms, we are using Cronbach's alpha, a coefficient of reliability to test if the efficacy and power user values we obtained through the survey are reliable to make deductions or otherwise. Cronbach's Alpha reported in Table 1.3 showcases the internal consistencies using social constructs like Community collective efficacy, self efficacy, community belonging and power usage. The no of items in the table depict the number of questions in the survey under the specific social construct category. For each social construct, the Cronbach's alpha reported is above 0.80, which proves the reliability aspect.

1.5.4 Communication among groups

The study throws light on the various communication methods used by the groups. Mode of communication and the type of advice being shared through different platforms

Table 1.3: Internal Consistency (Cronbach's Alpha) and descriptive statistics of key constructs

Construct	No. items	α	*M*	*SD*
Community Collective Efficacy	8	0.89	4.29	0.40
Self Efficacy	5	0.95	4.2	0.71
Community Belonging	7	0.89	4.63	0.62
Power Usage	22	0.88	3.64	0.39

of communication are discussed. Thematic analysis was used to characterize each answer into distinct categories. Based on that Table 1.4 has been curated.

Table 1.4: Communication Among Groups.

N	98		87	
Characteristics	Getting Advice		Giving Advice	
	n	%	*n*	%
Mode of Communication				
Text Message	47	47.9592	43	49.4253
Phone	46	46.9388	38	43.6782
Face-to-Face	22	22.4490	25	28.7356
Messaging apps	15	15.3061	13	14.9425
Video/Video share	11	11.2245	12	13.7931
Email	9	9.1837	7	8.0460
Types of Advice				
Troubleshooting	45	45.9184	36	41.3793
Device Setup/New Device Explanation	40	40.8163	31	35.6322
Settings	17	17.3469	19	21.8391
Suggestions	16	16.3265	16	18.3908
New Application Setup and Explanation	14	14.2857	14	16.0920
Security	6	6.1224	2	2.2989
Other	7	7.1429	6	6.8966

It is to be noted that quantitative analysis has been used to show the characteristics of getting advice vs giving advice amongst the group of participants. The percentages calculated signify what mode of communication or type of advice has been needed the most and vice versa.

1.5.5 Differences between caregivers and caregivees

Among the four social constructs,namely community collective efficacy, self efficacy, community belonging and power usage there was a slight difference seen between mean scores of each construct as depicted in Table 1.6. The social community reported mean scores that ranges between 3 to 4.5 on a 5-point Likert scale on each of the constructs, with the lowest value being for power usage (M=3.87) amongst the tech caregivees. In contrast, across constructs, the tech caregivers also reported the lowest mean value for power usage (M=3.87) and the highest scores for community belonging for privacy and security(M=4.60) amongst the Tech caregivers. This indicates that the an individual with comparatively less technological knowledge amongst the Tech caregivees lean on to the ones with great technological knowledge amongst the Tech caregivers that in turn increases the community belonging that has a direct impact on managing privacy and security.

Table 1.5: T-Test: Two-Sample Assuming Unequal Variances

	Tech Caregiver	*Tech Caregivee*
Mean	4.125	3.576824584
Variance	0.145616883	0.301156526
Observations	36	71
Hypothesized Mean Difference	0	
df	95	
t Stat	6.021886366	
P(T<=t) one-tail	1.61919E-08	
t Critical one-tail	1.661051817	
P(T<=t) two-tail	3.23837E-08	
t Critical two-tail	1.985251004	

Table 1.6: T-Test of Caregiver and Caregivee Responses to Key Constructs.

Characteristics	Tech Caregiver		Tech Caregivee		t-test	Sig
	M	*SD*	*M*	*SD*		
Community Collective Efficacy	4.17	0.33	4.14	0.58	0.21	0.42
Self Efficacy	4.17	1.12	3.82	1.00	1.65	0.05
Community Belonging	4.60	0.26	4.43	0.35	1.51	0.07
Power Usage	3.87	0.13	3.52	0.28	4.05	0.00

*p<.05; **p<.01;***p <.001

1.6 Discussion

The results in Table 1.1 show how 63.9% of tech caregivers are male whereas the rest are female (36.1%). Amongst the tech caregivees, 46.5% are male and rest are female (52.1%). This indicates a trend in this sample towards men acting in the role of tech caregivers within their group.

Most of the groups recruited consist of friends and family members. This may indicate that they are able to communicate easier with individuals they know well and exchange necessary inputs about privacy, security, tech issues and build their overall knowledge base. This shows the influence of community efficacy. The advice they receive helps them gain knowledge which may move them up the power usage scale, meaning up a level in power user scale.

Among all the participating groups, the range of tech caregivers in each group ranges from 1 to 4, maximum being 4. This goes on to show how every group has members who are open to sharing valuable technology related inputs. Text messaging and phone calls are the most used mode of communication. Troubleshooting and assistance with devices are found to be in demand under the type of advice taken category that is both given and taken by tech caregiver and tech caregivees respectfully. This leads to the deduction that the platform that will be suitable for the exchange of advice would be a mobile application platform. Mobile application platform supports supports all the modes of communication

(Table 1.4) that has been mentioned by the participants, especially text messaging and phone calls that have the maximum percentage of usage. In the next section, the current design trends will be discussed that can be kept in mind for a successful mobile application platform or otherwise.

1.6.1 Current design trends

”At the heart of information revolution is the belief that technology can significantly improve existing standards,procedures and processes, thereby increasing efficiency and effectiveness while reducing resource expenditures. Technology should enable us to work smarter, not harder” [17]. This statement has an impact on the reasoning for designing a platform for information exchange and making it optimized, for the sole purpose of usage and making technology exchange easier. The success of mobile application is measured according to three metrics: Business transformation, efficiency and effectiveness [24]. Choosing the interactive features for mobile application is imperative for this study, based on existing research it can be done by adjusting collaboration style, communication style, control style or structuring the mobile interactions [24]. Connectivity requirements, access requirements, content type, data size, location information and device management requirements are some key technology components to be kept in mind for designing mobile in the current scenario [7]. Research has taken into account the guidelines for designing mobile applications and has put them into three broad classes, these classes are defined as mobility guidelines, organizational guidelines, and general UI guidelines for mobile applications [5, 28]. Why is this important to note here? It is because I am pointing towards a mobile application platform for the purpose of technology advice exchange between technology caregivers and technology caregivees, which means I have to mention the guidelines that will make this platform work best in the current scenario basing on current trends and my study results.

Continuing on that note, we have to talk about YouTube and the reason why we can inculcate it in the platform that I mention several times. YouTube has become a bigger platform for the purpose of learning and creating. Via exchange of YouTube videos through mobile applications, there is more scope for learning and teaching. According to studies, YouTube's success is credited towards its use of Adobe's Flash Video (FLV) format for video delivery. Users may upload content in a variety of media formats, YouTube converts them to Flash Video before posting them. This enables users to watch the videos without downloading any additional browser plug-ins provided [24]. This is important to note in the study since we know that exchange of tech advice through exchanging video links in prevalent, please refer to Table 1.4 to find the video/video share characteristic. Without the headache of downloading additional plug ins for sharing video links, it makes the process easier.

There are some ways of optimizing current design trends that can be based on five building blocks for device and network APIs - application identity, application reputation index, network-based OpenID, device and application privacy, and policy storage and enforcement [9, 24].

1.6.2 Design Implications

Given the results, I propose the following four design implications for tools to support tech caregivers in their interactions with caregivees. Specifically, that younger age groups may be able to offer support to older populations; platforms to support tech caregiving should incorporate text and phone calls rather than in-app interactions alone; leveraging videos and screen sharing may be a useful proxy for in-person interactions; and creating space for communities of trusted otheres may be a good environment to support collaborative privacy and security management.

1.6.2.1 Younger age groups support older populations

The study covers various demographic trends such as gender, age, education and annual household income Table 1.1. One trend in this data was that tech caregivers tend to be a part of younger age demographics with lower incomes, while older populations with higher incomes were often tech caregivees. This is consistent with previous research that has suspected that older adults may have the most to gain from tech caregiving. The implication of this finding is that online support networks would can better support these older populations if small groups are diversified by age and income demographics. Extended family groups may be an ideal example of groups that will know and trust one another, but represented the expanse of age demographics.

1.6.2.2 Facilitate caregiving through text and phone calls

Owing to the findings in Table 1.4, it can be deduced that text messaging and phone calls in general have been primarily used as a mode of communication between the technology caregivers and caregivees in our sample. This supports our proposition to design a smartphone application that leverages these features to support caregiving. Rather than rely on message boards or inboxes, providing in-app features to support text messaging and phone calls may be natural modes of communication. It can be an application with a friendly and easy user interface for all age groups that can serve its purpose and taking these features into account will support aforementioned access requirements [7].

1.6.2.3 Leveraging videos and screen sharing

Caregivers anecdotally mentioned that in-person support when possible, but more often used texts and phone. Given the availability of video and screen sharing through a smartphone platform, caregivers may be able to leverage interactions that are more similar

to in-person support. According to our results, some participants already use these tools Table 1.4. A user interface that allows screen sharing and video calling for collective work front (tech caregiver and tech caregivee) in solving an issue can also increase community belonging and understanding of technology amongst both parties (tech caregiver and caregivee). The data analysis also picked up on the fact that all age groups (above 13 years) have used a mobile platform to exchange tech device.

Existing design methods use Internet video which is dominant by the low-quality, user-generated content sites, such as YouTube. Studies have talked about providers of such over-the-top (OTT) video services who are able to use constant interaction and view profiling capabilities of IP networks to their advantage without having to make heavy investments associated with traditional telecommunications or cable TV [24].

1.6.2.4 Engaging trusted others in collaborative privacy and security management

Previous studies have pointed towards individuals relying on their loved and trusted ones to make decisions relating to privacy and security [10, 14, 25], but there has been little research that has been looked into social environments that support increases in a personal capacity to address these issue. It has been deduced how a higher sense of belonging to a community is related to that groups perception of their ability to work together as a community towards privacy and security management This means if the same community takes part in active discussions as a part of an online group in an application, there can be a rise in awareness of privacy and security issues which will only entail to better decision making mechanism.

1.7 Limitations and Future research

The study encapsulates many factors such as group demographics of participants, mode of communication and types of advice shared between both parties of tech caregivers and tech caregivees, the characteristics of the groups that have participated but

it has to be kept in mind that the number of participants is 112 and they have been limited to the population of the United States. Although the findings bring a lot of issues into perspective and proposes many solutions for the issues, it is only based on the answers received by the population in one country. There is scope to broaden the study and get more data from all over the world to showcase the differences in opinion and lack of awareness of privacy and security in some cases.

Information technology can become a mediating factor between tech caregiver and tech caregivee from all over the world through a mobile application platform to enlighten both the parties about the importance of existing cybersecurity frameworks along with improving decision making processes. The goal is to make all individuals a level of a power user only to increase their knowledge and ascend the ladder of technology.

1.8 Conclusion

Tech caregivers and Tech caregivees have a close correspondence to each other and through the study it can be deduced that the decision making process has been impacted by a certain degree due to the views and knowledge shared by the tech caregiver.All the survey responses along with the discussed concepts in the paper can be taken into account to design a mobile application in the future for knowledge exchange that will serve as a helping tool for guidance. The survey responses have shown how texting and calling through a mobile phone has been used the most for exchange of information. This makes it a major reason for choosing a mobile platform as a mode for communicating the tech advice between tech caregiver and tech caregivee.

I am interested in understanding the dynamics of social networks that can benefit from community oversight to explore the design ideas curated as a viable solution to organize transparency, awareness, and participation in these networks. Evolution in this area for the purpose of exchange of tech advice and knowledge of privacy and security

practices will have a positive impact on all the social networks as a whole and will hopefully serve as a medium to eradicate any wrong doings that may occur to all the age groups due to lack of understanding.

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Appendix: Appendix of Survey Scales

Survey items appear below in the order they appear in survey. All measures were adapted from pre-validated scales noted in text. Scales were measured on a 5-point Likert scale from 1 – Strongly Disagree. 2 – Somewhat Disagree. 3 – Neither Agree nor Disagree. 4 – Somewhat Agree. 5 – Strongly Agree.

A.0.1 Community Collective Efficacy for Privacy and Security

- Our community can cooperate to improve the quality of our decisions about online privacy and security.
- Despite other obligations, I can find time to discuss our decisions about online privacy and security.
- As a community, we can handle the mistakes and setbacks resulting from our decisions about online privacy and security without getting discouraged.
- I am confident that we can be united in the decisions we make about online privacy and security that we present to outsiders.
- As a community we provide care and help for one another regarding our online privacy and security decisions.
- Our community can leverage outside resources and services for our members to ensure the quality of online privacy and security decisions.
- Our community can provide information for people with different interests and needs when it comes to online privacy and security decision-making.

A.0.2 Self-Efficacy in Privacy and Security

- I know that if I worked hard to learn about online privacy and security, I could make good decisions.
- Online privacy and security decision-making is not too complicated for me to understand.
- I think I am the kind of person who would learn to use best practices for good online privacy and security decision-making.
- I think I am capable of learning to help others make good online privacy and security decisions.
- Given a little time and training, I know I could learn about best practices for good online privacy and security decision-making for myself and my community.

A.0.3 Power Usage

- I love to use most technological gadgets like computers, smartphones, and other internet-enabled devices.
- I think most technological gadgets are complicated to use.
- I make good use of most of the features available in any technological device.
- I have to have the latest available upgrades of the technological devices that I use.
- Use of information technology has almost replaced my used of paper.
- I love exploring all the features that any technological gadget has to offer.
- I often find myself using many technological devices simultaneously (multitasking).

- I prefer to ask friends how to use any new technological gadget instead of trying to figure it out myself.
- In interfaces that I'm familiar with, I get frustrated each time I have to go through basic steps designed for new users.
- Using any technological devices comes easy to me.
- I feel like information technology is part of my daily life.
- I think smartphones that have multiple features like a camera, email, and apps are terrific.
- Using information technology improves my productivity.
- Using information technology gives me greater control over my work environment.
- Using information technology makes it easier to do my work.
- I like to challenge myself in figuring out how to use any new technology.
- A little bit of intuition is all that is needed to figure out how to use any new technology.
- I would feel lost without information technology.
- I need very detailed instructions when using any technological interface for the first time.
- On devices that I use often, I'm able to go to the particular area or link that is likely to provide me with relevant information without using the help feature.
- I like to learn new software or use new technological devices on my own.
- Many of my friends come to me to get help related to technological gadgets.

A.0.4 Community Belonging

- I can get what I need in this community.
- This community helps me fulfill my needs.
- I feel like a member of this community.
- I belong in this community.
- I have a say about what goes on in this community.
- People in this community are good at influencing each another.
- I feel connected to this community.
- I have a good bond with others in this community.