

## ABSTRACT

COLFIELD-POOLE, BRITTNEY MARIE. A Touch with Technology: Creating a Foundation for Meaningful Digital Inclusion through Local Government. (Under the direction of Dr. Craig C. Brookins).

The promotion of digital inclusion is quickly becoming a highly-prioritized initiative within social, economic, political, and educational forums. Conceptually, digital inclusion is a strengths-based approach that promotes technology equity for citizens through the creation of meaningful pathways to access skill building opportunities and resource innovation (Communities Connect Network, 2013). However, as technologies continue to evolve, not all citizens are able to keep up with these technological changes. Previous research on the topic has primarily focused on the factors that perpetuate this digital divide. As researchers begin to examine the strategies for facilitating meaningful technology use, it is important that they take into account the impact of the social, cultural, and political contexts (Gangadharian & Byrum, 2012) in which it occurs. This is particularly important for local municipalities seeking to assess the quality of their digital inclusion initiatives. Currently, the City of Raleigh Information Technology Department is interested in creating a database dedicated to capturing the spectrum of resident technology use.

The present study was conducted in two phases. First, in order to differentiate this study from previous research on digital inclusion, a participatory approach was incorporated through citizen engagement that included attending Citizen Advisory Council meetings and small focus groups with adult residents from the City of Raleigh. The qualitative findings from these pre-data collection interactions were used to adapt the *Community Digital Inclusion Survey (CDI)*. In the second phase, the CDI survey was administered to residents in the City of Raleigh via face-to-

face interactions, social media, project posters, snail mail, and email. Through these methods the researcher was able to achieve a sample of 983 respondents.

The quantitative data was analyzed utilizing Chi Square 2x2 Contingency Tables that examined between groups demographic differences in technology access via the number of digital devices residents reported owning. Findings indicated that all of the demographic factors included accepted the hypothesis that more affluent and white residents would report owning more digital devices with the exception of employment status, which reflected residents in the non-full time employment category as more likely to own more digital devices. A Moderation analysis was conducted to examine whether Brief Sense of Community, Attitudes toward Technology or SES strengthened the relationship between technology efficacy and technology relevancy. Findings indicated that only combined household income and education level positively and significantly moderated the relationship between technology efficacy and relevancy. Lastly a three-step hierarchical Multiple Regression was conducted and revealed that technology efficacy significantly and positively predicted the frequency of e-government activities. Findings from the Community Digital Inclusion survey expands on existing scholarship centered on meaningful technology adoption as well as creates an evidence-based foundation for increasing the capacity of government-sponsored digital inclusion initiatives. Findings from the present study suggest that the City of Raleigh focus resources towards longitudinal data collection that seeks to inform culturally-relevant strategies that promote city-wide digital equity.

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A Touch with Technology: Creating a Foundation for Meaningful Digital Inclusion  
through Local Government

by  
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## **BIOGRAPHY**

Brittney M. Cofield-Poole was born in San Antonio, Texas, at Lackland Air Force Base before moving to Cleveland, Ohio, where she spent the majority of her childhood raised by her supportive and inspirational mother Kelly A. Cofield. Personal and vicarious life experiences led her on the path toward an interest in psychology. Brittney received her Bachelors of Science in Psychology in 2001 from Loyola University Chicago where she first learned about the unique field of Community Psychology through an undergraduate fellowship with the Center for Urban Research and Learning (CURL). After a yearlong insightful break following graduation, she moved to North Carolina to pursue a PhD in the Applied Social and Community Psychology program at North Carolina State University. Civic engagement, internships, and serendipitous opportunities fine-tuned her development into an advocate for community centered digital inclusion.

Upon completion of her dissertation she seeks to become a digital story teller. Her goal is to curate and craft poignant and positive representations of progress. She seeks to tell stories that are born out of triumph (and not defeat). She wants to paint pictures of perseverance (instead of pain). She wants to capture voices that encourage creativity (not simply survival) while continuously bring light to the communities of the disconnected and under heard.

## ACKNOWLEDGEMENTS

Reverie (“a fantastic, visionary, or impractical idea”)

I impart my deepest gratitude to my mother Kelly A. Cofield and grandmother Alice A. Cofield. It is because of your confidence and support that I found light during the darkest days of this process. To my family, high school and college friends, your unwavering faith in me has been an essential part of driving my perseverance. To my advisor, Dr. Kwesi Brookins, I am eternally grateful for the patience, kindness, and humor you bestowed upon me during my growth as a scholar. To my North Carolina family, you illustrated for me the true meaning of the statement “brilliant and brown.” It is your diligence that reminded me that I, too, could lose myself in a dream and awaken in the midst of success. Finally, I would like to thank my mentors and colleagues that I found while working at the City of Raleigh Information Technology Department. I am greatly appreciative of how you invested ideas, time and support in me and into the success of this project.

According to Dr. Maya Angelou "There is no greater agony than bearing an untold story inside you.", and now I know the sweet release of sharing my own reverie!

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## **CHAPTER 1: INTRODUCTION**

### **Statement of the Problem**

The urgency surrounding the promotion of inclusive technology adoption is ever constant. Presently, access to education, socio-economic resources, employment and social networks are encompassed within a digital landscape. A corollary of this technical evolution is the present-day expectation that everyone should be technologically savvy (Imel, 2001). While the more recent generations of citizens have often assimilated to this standard of living early on, there is still a need to address those who may not be keeping up with the digital transformation of previously tangible spaces. Earlier research has revealed that within the United States over two-thirds of citizens are invested broadband adopters and proficient users of the internet (Pew, 2013a). Conversely, there exists a significant number of citizens that lack basic internet access and digital literacy skills, particularly in underserved and ethnic minority communities (Gant, Turner-Lee & Miller, 2010). This deficit in resources has led to increased interest in research, policy, and program development surrounding digital inclusion. Dialogue around digital inclusion is crucial because it has become a central component of institutions, global communication and is currently the driving force of our evolving economy. Basic computer skills such as internet navigation, email and word processing have become competencies that are an essential component of facilitating upward mobility. With regards to education, achievement gaps are broadening among students that attend institutions unequipped with up-to-date technical resources or that are not integrating technology-related activities into their curricula (Shapley et al., 2011; Warschauer, Knobel, & Stone, 2004).

In terms of formal institutions, government entities have begun to develop web-based systems of delivering services and provide information to citizens. However, these sophisticated means of communication may only further broaden the margin of access for those without reliable technology services in their homes or embedded within their communities. As the internet has become the primary hub for information regarding access to social services like housing, healthcare, food assistance, child care, and transportation (TLC, 2010), it is important to examine the impact of this access transition. Therefore, a large scale examination of the complexities of digital marginalization requires an ecological analysis of systemic influences and social policy as well as the role of socio-economic capital. Previous research regarding technology access has focused on factors that contribute to the “digital divide” (Selwyn, 2004) including the lack of access to technology, basic internet, broadband adoption, and the limited technical competencies of low wealth citizens. Nevertheless, there is room to expand scholarship to reframe this issue as a matter of promoting digital inclusion and to study how socio-economic factors contribute to successful broadband adoption, increased technical comprehension, and positive perceptions of technology. These are factors explored in the following study.

### **Civic-Centered Information Communication Technology**

Information communication technology refers to “technologies that provide access to information through telecommunications. . . .This includes the internet, wireless networks, cell phones and other communication mediums.” (Christensson, 2010). Presently, the role of information communication technology (ICT) is perceived within academia as a tool for bridging divisions and erasing inequalities by empowering and engaging citizens. Selwyn

(2004) suggests that since ICT is transformative and readily-available, it has the potential to remedy existing social disparities. The overwhelming spread of “techno-enthusiasm” (Selwyn) has been a driving force behind the development of both private and public pushes to increase technology adoption. Although ICT is becoming a common method of communication, it can still be unintentionally divisive in nature, specifically regarding “issues of inequalities of access to both technology and information have begun to prompt concern about emerging ‘digital divides’ between social groups” (Selwyn, p. 342). A lack of access, interest, or skills around ICT can inadvertently marginalize groups in ways that permeate the digital sphere and manifest as tangible deficits. Questions surrounding ICT are currently concerned with who is connected, how they are connected, and determining the spectrum of use. Uncovering the answers to those questions could lead to nuanced strategies for directly informing policy focused on community level information technology experiences. The primary issue is that through the evolution of addressing this issue, technology-centered policy speaks to the divide in a simplified manner that does not incorporate the varying nature of environments, resources, or social networks as they relate to obtaining access (Selwyn).

The author (Selwyn, 2004) also presents a theoretical examination of the digital divide and notes four primary theoretical and conceptual limitations related to traditional dichotomous understandings and finally offers research themes and questions regarding inequality around access and use of ICT. Traditionally, political and popular definitions of the digital divide conceptualize the solution to this two-sided issue with a bridge metaphor. There have been two trends that are seen consistently in social science research with one

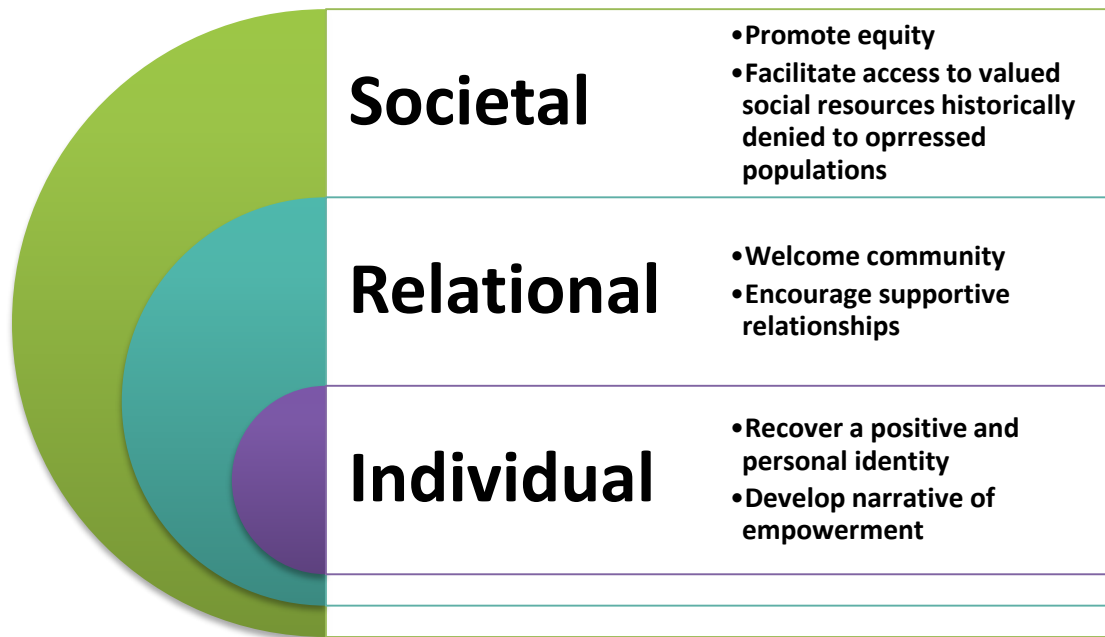
defining ICT too narrowly (i.e. online or offline) and the other endorsing homogeneity (i.e. general underserved citizens) (Selwyn). Definitions of ICT have been limited to computer hardware/software as well as internet access to what Selwyn refers to as “contemporary techno-culture” (p. 346). However, the author offers a more in depth definition that suggests that ICT “is best seen as an umbrella term for a range of technological applications such as computer hardware and software, digital broadcast technologies, telecommunications technologies such as mobile phones, as well as electronic information resources such as the world wide web” (Selwyn, pp. 346-347); moreover, the author defines the digital divide as inclusive of the inconsistency in access to services, information, resources and applications through technology. Conceptualizing ICT also encompasses an understanding that not all technologies, information and resources are analogous to one another. Instead, the author advises scholars to reconsider how access is defined since the spectrum of technological disparities can be overlooked if material access is the sole focus: “Although in theory the formal provision of ICT facilities in community sites means that all individuals living locally have physical access to that technology, such access is meaningless unless people actually feel able to make use of such opportunities” (Selwyn, p. 347). Research scholars should, therefore, consider that digital inclusion also encompasses social context, attitudes, and person-institution relationships.

### **Ecology of Inclusion**

In the field of Community Psychology, the theoretical conceptualization of inclusion concerns engaging populations that have historically been subject to circumstances of oppression based on demographic, cultural, and identity related characteristics (Nelson &

Prilleltensky, 2005). Those individuals have also experienced social exclusion in ways that often prohibit their ability to thrive. The authors propose that inclusion can serve as an ecological solution to this marginalization (See Figure 1). The foundational principles within this framework underline the driving force behind the digital inclusion movement. Digital inclusion combats narratives of technical oppression by instead promoting potential and identifying methods of encouraging meaningful technology adoption. Gangadharian and Byrum (2012) suggest utilizing a framework that examines “an ecology of support,” which acknowledges that there is a diverse set of factors that contribute to the promotion of digital inclusion and can work synergistically to create avenues of access. An analysis of this systemic impact could uncover unknown factors contributing to gaps in inclusion. This approach could also provide substantial evidence-based information that contributes to policy reform and the widespread provision of community technology services. An in depth examination of this process involves an analysis of inclusion criteria defined by community need (Gangadharian & Byrum).





*Figure 1.* Ecology of Inclusion Conceptual Model (Nelson & Prilleltensky, 2005)

The iterative and complex process of technological innovation has progressed society into an environment where traditional methods of networking, communication, and industry development now occur through digital pathways. There are three major perspectives that significantly influence the innovation process inclusive of technical, political, and social contexts in which technological necessity is determined by the strengths of social relationships (House, 1981). This foundational perspective is quite relevant for contemporary research aimed at closely examining the impact of technology access on both collective and individual progress. In addition to social ties, power dynamics and competing interests are also influential factors related to how people gain access to technology (House). In other words, the person-technology relationship is highly influenced by social context in addition

to material means. DiMaggio et al. (2001) supported this notion and predicted that the social impact of the internet would be influenced by how citizens were provided access, the balance between private and public interests, and the governance of intellectual property created through the use of the internet. Collectively, these theoretical frameworks have yielded the groundwork justification for psycho-social research that utilizes a nuanced lens through which individual worldview, capital, culture, and socio-political systems are equally likely to encourage digital inclusion.

Identifying factors that impact efficacy and relevancy are important as well. A pragmatic approach requires that researchers take into account the potential for collective practices and processes that facilitate non-adopters in becoming more comfortable with technology and expand their perspectives on technology relevancy within their everyday lives (Gangadharian & Byrum, 2012). A lack of focus on solutions-oriented research examining a “divide” can inadvertently contribute to sustaining it. Other researchers have suggested that ICT can serve as a platform for assuaging the challenges that are often associated with this issue. Digital inclusion should be centered on the provision of support and development of programs and services dedicated to the needs of communities susceptible to exclusion (“Open Road,” 2013). Therefore, progressive research methods should seek to actively identify factors that contribute to the acquisition and development of digital literacy skills.

### **Defining Digital Inclusion**

The concept of *digital inclusion* refocuses the discussion from a “digital divide” into one that considers access potential. Evaluating the gaps in access involves a dissection of

pedagogical discourse surrounding technology policy. Historically, the conceptualization of the *digital divide* began in the 1990s during a political shift toward more socially-inclusive policy reform (Selwyn, 2004), which led to debates regarding the prevalence of global technological disparities between and within nations. By the year 2000, national concern regarding the dichotomization of access was illustrated by a perspective that separated American citizens into “connected” versus “disconnected” groups. It was during this time that the US Department of Commerce officially coined this divisive phenomenon known as “The Digital Divide” (Selwyn). A consequence of this defining moment in politics has led to subsequent research that disproportionately frames this issue from a position of deficit.

The general belief that simply having access to technology is enough to address disparity lacks the understanding that for some, technical fluency occurs when they recognize the relevance of how technology fits within their lived experience. Selwyn (2004) also suggests that the digital divide is a hierarchical as opposed to a dichotomous concept. Apart from simply focusing on the connected vs. disconnected, research should also take into account deficiencies within the quality of access. Merely owning a computer does not ensure that an individual has a reliable internet connection, and, furthermore, having a connection does not guarantee that an individual can navigate online in a productive manner (Selwyn). In other words, material access does not equate competency, knowledge, or skill. Simply put, purchasing power and physical resources are not the only factors defining the divide (Selwyn).

Therefore, another crucial barrier to address is a lack of *digital literacy*. Comparable to the notion of traditional literacy, a deficiency in digital literacy skills can also perpetuate

the prevalence of socio-economic marginalization. According to the American Library Association, digital literacy is “the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills” (ALA, 2014). For some citizens, the acquisition of these skills is the foothold that they need for socio-economic mobility toward digital inclusion. The Technology Literacy Collaborative (TLC) defines digital inclusion as “the process of providing the necessary skills and access that all individuals must have to participate in the economic, educational, civic, and social activities of a technology based society” (TLC, 2010). TLC also posits that key factors needed to holistically address digital inclusion are access, basic training, and content. Having personal access to sophisticated devices in addition to reliable connectivity can ensure that citizens have consistent opportunities to retrieve pertinent information. However, without the ability to confidently navigate these tools to access resources, some individuals are still often left at a disadvantage. One solution to a collective lack of skill is community-based digital literacy initiatives which can serve as a foundation for addressing limited personal access. Additionally, culturally-relevant content available to underserved citizens is another important variable in bridging the connection gap (Gangadharian & Byrum, 2012). In other words, the creation of inclusive curricula that scaffolds skills and mirrors activities relevant to a citizens’ complex lived experience is needed.

### **Meaningful Broadband Adoption**

The majority of broadband adoption models take on approaches that lack strategies that are inclusive, instead focusing “on demographic predictors of low adoption, the

mechanics of access (e.g., ‘if-we-build-it-they-will-come’ strategies), and models of economic and community development” (Gangadharian & Byrum, 2012, pp. 2601-2602). Affordable “service delivery models” address economic need, but they do not always take into consideration the need for educational resources in the form of sustainable digital literacy training that is accessible and embedded within the communities being served.

Gangadharian & Byrum (2012) explain:

Unfortunately, the existing collection of public, public-private, and private regulatory solutions—and the broader mainstream discourse of “what works” in digital inclusion—tend to overlook the social dimensions of broadband adoption, including how social factors interact with specific technological solutions or economic remedies. (p. 2602)

The authors then suggest factors that need to express attention when analyzing digital inclusion include social contexts, community history and access policies, all of which shed light on the complex interaction between economics and technology with regards to shaping broadband policy.

Failure to acknowledge social support factors that interact with efforts to bridge the divide policy focused on broadband become less effective and instead become shrouded in idealism (Gangadharian & Byrum, 2012). As previously discussed, a community technology perspective should involve an ecological (Bronfenbrenner, 1977) evaluation of formal institutions and organizations (i.e. government) that manage the digital environment.

Included in this framework should also be an examination of informal groups that promote digital literacy and are also an integral piece of moving digital inclusion forward (i.e. non-

profits/community organizations). Next, systemic and cultural factors such as shared social norms, standardized practices, and processes that are related to technology use are important. Additional considerations are socio-technical needs of the citizens as they relate to perceived technology efficacy and autonomy.

According to Gangadharian & Byrum (2012) “a research framework focused on meaningful broadband adoption seeks to understand the relevance of different broadband activities within their social context, not as evaluated according to external values” (p. 2603). The authors cite previous research that illustrated the diversity in conception around broadband adoption including “community control” or the idea that those with low SES but access to computers in a professional capacity also wanted the freedom to access technology within other spaces and on their own timeline. Computers and connection are not enough without technological relevancy, competence and confidence. Taking this framework a step further would include community-based participation in conceptualizing citizens’ perceptions of technology relevancy.

### **Digital Inclusion Policy**

According to O’Neil (2002), the study of community informatics requires that there is much attention being paid to the “digital society” which has forced communities, government and IT entities to push community technology initiatives that utilize ICT to improve both socioeconomic and political climates. The E-Government Act of 2002 (Congress, 2002), implemented by the Bush administration, sought to enact federal management and promotion of nationwide electronic government services. This new policy required agencies to develop measures that track the impact of E-Government as a mechanism for progressing civic-

centered government agency goals as well as connecting those outcomes to delivering services to citizens, businesses and other branches of government. The E-Government Act also mandated that agencies consider the impact of developing E-Government policy and programs on citizens who lacked reliable digital access. This transparent and progressive gesture is reflective of what has been developing as a movement known as “open government” (Obama, 2009). In response, the *Memorandum on Transparency and Open Government* was introduced by the Obama administration in 2009 as a federally-mandated initiative designed to “take immediate, specific steps to achieve key milestones in transparency, participation, and collaboration” (Obama, 2009) with regards to government-citizen relations. It encourages federal, state, and local government institutions to gradually incorporate the outlined principles within programs and services.

Defining digital inclusion is a complex endeavor because it is a highly subjective concept. From an institutional perspective, “Digital Inclusion encompasses three areas: Access, technology literacy, and relevant content and services. . . .Inclusion seeks equity for all residents, as well as small businesses and community-based (non-profit) organizations.” (City of Seattle, 2014). This perspective acknowledges that all three primary factors have an interactive relationship and together determine individual and collective participation in the digital economy. The National Telecommunications and Information Administration (NTIA) set in motion a federal reformation with regards to national standards for expanding broadband services through the American Recovery and Reinvestment Act (National Technology & Information Administration, 2010). An extension of this legislature was the Broadband Technology Opportunities Program (BTOP) which has three project categories

including comprehensive community infrastructure, public computer centers, and sustainable broadband adoption (NTIA, 2010).

The NTIA stimulus funds, BTOP programs and digital inclusion initiatives pioneered the way in which broadband adoption was measured by changing impact metrics from “home-subscription” to a wider spectrum that is a more inclusive model considering community need. The long term goals of Recovery Act investments were to “help bridge the digital divide, improve access to education and healthcare services, and boost economic development for communities held back by limited or no access to broadband – communities that would otherwise be left behind” (NTIA, 2010). In 2009 the State Broadband Data and Development (SBDD) program was launched to facilitate the integration of broadband and IT into state and local economies. To date, this program has awarded \$293 million to all 50 states, five US territories and the District of Columbia. Once grantees were awarded funding, they were expected to use the support to develop “efficient and creative use of broadband technology to better compete in the digital economy” (NTIA, 2010). The SBDD program also collects data on a semi-annual basis to develop an interactive national broadband map to illustrate progress and development across the country.

More recently, the Obama Administration (Zients, 2015) delegated that the Broadband Opportunities Council (BOC), an interagency initiative, request public input on ways in which federal agencies can more effectively promote broadband employment, adoption, and competition. Additionally, the BOC reviewed existing current federal broadband programs and provided four recommendations:



- (1) Modernize Federal programs to expand program support for broadband investments;
- (2) Empower communities with tools and resources to attract broadband investment and promote meaningful use;
- (3) Promote increased broadband deployment and competition through expanded access to Federal assets;
- (4) Improve data collection, analysis and research on broadband. (Zients, 2015)

The council seeks to bring high speed affordable broadband access through grassroots, public and private collaborative partnerships. As a result of federal level policy reform, government institutions have begun developing community technology initiatives in an effort to better understand the technology needs of their citizens as well as inform future policy.

Local governments are beginning to support the notion of a “digital society” and prioritizing community technology initiatives- that recognize that ICT can be used to improve communities within socio-economic and political realms (O’ Neil, 2002). In an effort to address digital inclusion implementation pragmatically, federal programs such as the FCC Omnibus Broadband Initiative have conducted research to inform national level digital inclusion through white papers like the Broadband Adoption and Use in America (Horrigan, 2010). Additional non-governmental entities like PowerUp (Wyne & Cooper, 2007), a campaign for digital inclusion, have taken the opportunity to translate data into directives for local municipalities to embed within their efforts. PowerUp suggests that municipalities utilize technology to revive their services by integrating it into already established social services (Wyne & Cooper).

Other best practice solutions include the creation of digital hubs within community spaces, also known as community anchor institutions (CAI's) that provide community-level support to underserved individuals and/or neighborhoods (IMLS, 2013). When personal access to technology is limited or nonexistent, the role of CAI's becomes highly critical. These organizations include but are not limited to community centers, public libraries, social service organizations, and educational institutions. Although CAIs are generally accessible to most citizens, they vary in their ability to provide comprehensive or consistent access and often come with their own set of restrictions. Some of those limitations include a limited number of devices, unreliable internet connections, and outdated resources. These spaces are ideal environments for ecologically-centered studies on the benefits of community-based access and can inform local governments on the importance of investing in wired spaces when personal access is limited. Most recently, the City of Minneapolis conducted studies from 2012 through 2014 assessing the state of community technology within their communities (City of Minneapolis, 2014). Variables included questions regarding resident demographics, internet and device access, frequency of use, and comfort levels with technology.

### **Measuring Digital Inclusion within Municipal Government**

In 2012, the City of Minneapolis contracted the National Research Center and conducted a "Community Technology" (City of Minneapolis, 2014) study dedicated to determining the state of the digital divide within their metropolitan area. Subsequently, in an effort to document the long-term changes in digital inclusion within the city, the survey was replicated in 2013 and 2014. This research initiative was an examination of community

technology and also pushed the research on digital inclusion forward by including measures on technology relevancy and technology efficacy. Households were randomly selected to participate in the study and 2,578 residents completed surveys (a 30% response rate). The citywide results revealed that “residents generally found help for any computer or Internet issues through a variety of means and participated frequently and comfortably in many basic digital activities, including emailing and using social media” (City of Minneapolis, 2014, p. 3). However, there were significant differences in citizen response rates across neighborhoods and socio-demographic characteristics. The most relevant findings were related to differences among minority participants with regards to income, non-user profiles, digital literacy skills, and perceived value.

Results from the 2012 survey indicated that approximately 9 out of 10 of non-users reported an income under \$50,000 with 40% of those respondents reporting an income under \$10,000. With regards to race, 45% of African Americans reported not having a computer in the home and 25% were without internet access. African Americans were less likely than their White counterparts to access the internet or feel comfortable conducting online activities and were also most likely to seek assistance with technology at the library. Native American residents felt as though there were no technology assistance options available to them, but they did use the internet to research for civic engagement activities and social service information. Finally, Asian American residents reported the most usage and utilized the internet for education as well as content creation. With regards to digital literacy skills, residents over the age of 55 reported less computer and internet use than younger participants. Overall, these older residents were uncomfortable searching and applying for

jobs online (19%), with online education (38%), and reported low levels of comprehension around cyber security. Findings also indicated that a significant number of residents in general did not use the internet to seek out community resources (22%), engage in civic activities (43%), or obtain health information (15%) (City of Minneapolis, 2014).

Over the past 15 years, the provision of equitable digital access has quickly become an issue of interest within academic and public sectors. Previous examinations of information communication technology have evolved to more closely consider the impact of rapid and complex technical innovations on citizens. The key to an inclusive approach to researching digital access requires that scholars employ an ecological approach to predicting adoption. Over time, the challenge of addressing disparate access has made its way to the progression of policy dedicated to digital inclusion. The following literature review is aimed at discussing variables that have been identified in previous research as influencers on technology adoption and specifically highlights scholarship regarding demographics and social context.

## **CHAPTER 2: LITERATURE REVIEW**

The following literature review seeks to further explore previous research on contextual variables related to influencing digital inclusion such as adopter characteristics, community connectedness, technology relevancy, and technology efficacy to provide further context for the present study.

### **Adopters versus Non-Adopters**

Apart from monetary resources, a number of other factors could significantly influence an individual's likelihood of successfully navigating our digital society. Since 2010, the Pew Research Center, a nonpartisan research institution, has been conducting extensive research on national trends related to the internet and technology within the United States (Pew, 2015). Their reports cover a multitude of topics; most recently, they have released a set of reports that identify the unique characteristics of adopters and non-adopters of technology. In 2013, Home Broadband study (Pew, 2013a) analyses were conducted from a representative sample of 2,252 participants with race/ethnicity, age, education attainment, household income, and urbanity (i.e. urban, suburban & rural) impacting rates of home broadband access. Results revealed that 70% of American adults aged 18 and older reported having access to a high-speed broadband connection at home. However, the percentages of access varied depending on age categories which included 18-29 (80%), 30-49 (78%), 50-64 (69%), and 65+ (43%). With regards to race and ethnicity, African American (64%) and Latino (53%) respondents lagged behind in home broadband adoption when compared with White respondents (74%). Individuals without a high school diploma (37%) or who had only a high school education (57%) reported significantly less home broadband adoption than

those with some college or a college degree (89%). There were also significant differences related to income levels with only 54% of respondents with a household income of less than \$30,000 per year reporting home broadband adoption.

A deeper look into technology use between different income groups uncovered that 43% of individuals within the \$30K and below household income bracket mostly used their cell phones to access the internet. An examination of internet use in May 2011 related to online job searches revealed that only 20% of all adults within this income bracket utilized the internet to search for employment (Pew, 2013b). A study conducted in December 2012 (Pew, 2013b) yielded a large percentage gap in desktop/laptop ownership between income reports of \$30K and under (59%) and over \$75K (96%). The 2013 broadband technology fact sheet revealed that those least likely to use internet were senior citizens, adults without a high school diploma, and individuals that lived in households with a combined income of less than \$30,000 annually (Pew, 2013b).

Longitudinal research has revealed that these particular variables (i.e. demographic factors) have consistently and significantly correlated with home broadband adoption. According to the Broadband Adoption and Use in America report and Pew digital divide research, there are three primary factors related to barriers to technology adoption and access: cost, lack of digital literacy skills, and perceived relevancy (Horrigan, 2010; Rainie, 2015). Regarding costs, the report also cited that adopters pay nearly \$41 a month for broadband services which are often included in a “bundled” package with other services such as cable and home phone. (Horrigan, 2010). The non-adopters that reported cost being a concern (52%) provided an estimate of what they would be willing to pay for service which averaged

\$25 a month (Horrigan). The difference average price paid for adopters and average estimate of what non-adopters would be willing to pay speaks clearly to the notion that cost serves a significant barrier for under connected populations. Finally, through this data emerged a list of key demographic factors that contribute to digital exclusion which together create a distinct conception of ‘user profiles.’

Identifying socio-economic factors that contribute to the technological marginalization of certain citizens is an integral part of devising innovative strategies to addressing methods of reversing this challenge. In addition to demographic data, consideration for the combined impact of social influence should also be a part of expanding the scope of significant factors. Specifically, there should be inclusion of more implicit variables such as general attitudes toward technology, perceived relevancy, technical confidence, and social ties, which could provide context for implications regarding digital inclusion research.

### **Community Connectedness**

The present study hypothesizes that strong community ties and social influence could also impact the type of decisions citizens make when it comes to shaping social values and investing in resources. For this study, the psychological construct of sense of community was used to examine community connectedness. McMillan & Chavis (1986) introduced four elements that contribute to building a sense of community, which include membership, influence, reinforcement and fulfillment of needs, and shared emotional connection. Membership involves an investment of self, which yields a sense of ownership within the community as well as provides emotional safety, a sense of belonging, and protection against

potential threat. Second is influence, which consists of interactions through which individuals feel that their environment is responsive to both individual and collective needs.

Reinforcement and fulfillment of needs occurs within an environment that reinforces the belief that both individual and communal needs are being met which facilitates a sense of togetherness. With shared emotional connection, social values held by communities with strong ties could impact values and decisions developed by individual members, particularly around resource adoption. Finally, a shared emotional connection is an important part of defining community because shared values help members identify what they need individually and collectively (McMillan & Chavis). Chavis & Pretty (1999) have added psychosocial context to the psychological sense of community construct. From this perspective, belonging to a supportive community involves feeling a sense of ownership and social responsibility. Individuals who experience this communal responsibility participate in reciprocal exchange with their community which facilitates the development of strong social ties. This framework could be particularly useful in research seeking to explore a theoretical link between the strength of communal ties and household technology adoption.

Additionally, consideration for the role that social ties play in driving innovation is an integral part of understanding how technology is disseminated within communities. House (1981) addresses the significance of community as the underlying component of the socio-cultural implications of innovation. In other words, an individual's environmental culture may contribute to how innovation is interpreted within that space. House (1981) also suggests that the manner in which innovation is integrated to an environment can, in turn, encourage how social change occurs within those spaces. Kavanaugh & Patterson (2001)



conducted a longitudinal study on the impact of technology on community involvement and the development of social capital with the Blacksburg Electronic Village (BEV) initiative. The BEV study revealed that the length of time residents spent using the internet was correlated to online activities aimed at creating social capital. The authors drew the conclusion that residents engaging in social-capital building activities within their own communities could impact their attachment and involvement, which could then lead to an increased quality of life (Kavanaugh & Patterson).

Social capital, in part, refers to the amount and quality of communication about a community that takes place among its members within their social networks. One outcome of this participation and talk is the development of social trust that facilitates collective social action toward achieving common social goals (i.e. civic engagement). The impact of socio-technical innovations within communities is a topic within the field of innovation that could benefit from additional research: “Unlike innovations that are driven by profit motive or competitive business pressures, social innovations are generally triggered by a concern with people and communities rather than commercial gain” (Dawson & Daniel, 2010, p. 2). This concern for implications that social innovations have on communal well-being should be explored more deeply and further researched. In social innovation, the primary focus is generating innovative activity with a social objective (Dawson & Daniel). In turn, this requires a people-centered approach to while “shifting the focus toward social innovation combines creativity with the concern for social welfare, which has the potential to provide “collateral outcomes” (Dawson & Daniel). Promoting socially-focused research on

technological innovation involves a crucial shift in focus which considers individual level influences like self-perceptions.

### **Technology Relevancy & Efficacy**

The social value of internet use has now been enveloped within what is currently referred to as a “digital economy.” Torkzadeh and Van Dyke (2001) explain that “internet usage by the individual is a pivotal concept that influences our understanding of the social and economic impacts of information technology” (p. 275). Research through NTIA in 2013 identified several barriers that impact broadband adoption; one of the most prevalent among non-adopters is relevance. Resisters of broadband adoption do not believe that broadband internet can enhance their lives and they are used to accessing resources without digital tools such as computers, internet and online social service systems (NTIA, 2013). There could be an empirical link between negative perception of technology relevancy and confidence in ability, also referred to as technology efficacy. To this end, social cognitive theory is useful when assessing how individuals ascribe value to technology engagement.

According to Torzkzadeh & Van Dyke (2001), self-efficacy is reached when “individuals appear to evaluate information about their capabilities and then regulate their choices and efforts accordingly” (p. 275). Previous research on self-efficacy has noted that positive and strong perceptions about individual ability can yield positive performance outcomes. The authors also indicate that there are three primary components of self-efficacy: *magnitude* or the level of difficulty that individuals think they can successfully attain; *strength* or the belief in their magnitude; and *generality* or the degree to which an individual’s expectations generalize across other situations (Torzkzadeh & Van Dyke). As a

construct, self-efficacy can be measured on a spectrum of specificity as it relates to various types of activities. The relationship between self-efficacy and technology skills has direct implications for successful broadband adoption. There is value in scholarship that recognizes that self-efficacy can be a useful foundation for exploring the relationship between individual self-perception of competency as it relates to technology use (Torzkzadeh & Van Dyke).

Research such as this is essential for organizations seeking to increase technology adoption in communities with low rates of access and use. Cassidy and Eachus (2002) argue, “This inability may be real—in that the individual genuinely may not have the necessary skills or abilities—or it may simply be a belief which results in incapacity and poor motivation as in the case of self-efficacy expectations” (p. 134). Technology efficacy as a construct that must be measured directly since it is an egocentric construct (Cassidy & Eachus) that requires individuals reflect on their perceptions of personal ability. Moreover, the most common method of assessing this concept is through self-report measures.

Kim and Glassman (2013) proposed that individuals “with higher levels of Internet self-efficacy will be more willing to explore, take chances, and attempt to solve problems using fast developing Internet applications” (p. 1421). The researchers developed an Internet Self-Efficacy Scale (ISS) which was developed with a strong foundation in behavioral theories (i.e. Bandura) related to self-efficacy. The 25-item measure was assessed using Exploratory Factor Analysis through data collected from a sample of college students. Factor loadings from the EFA yielded a 17-item measure with a five factor solution including reactive, differentiation, organization, communication, and search self-efficacy (Kim & Glassman). Self-perception defined as one’s individual abilities to use the internet is an

important aspect in everyday life at multiple levels. Perceptions of ability could be a significant determining factor on whether or not residents prioritize technology adoption as a life skill. The authors explain, “Internet self-efficacy can be measured in a number of ways, from self-efficacy in using and completing technically oriented problems to the ability to use new types of communications and internetworking capabilities to create and maintain purposeful communities” (Kim & Glassman, p. 1421).

It should be noted, however, that measuring technology self-efficacy can be a difficult task given the fact that technology is dynamic and constantly evolving. Cassidy and Eachus, (2002) explain:

By being aware of the factors which determine capability beliefs in computer users and having access to an instrument capable of measuring these beliefs, educators can both develop programs which enhance self-efficacy beliefs and put in place mechanisms which support individuals with negative self-efficacy beliefs. (p. 146-147)

Assessing self-perception perceived technology relevancy, and are key components of promoting more meaningful technology.

### **Summary of Literature**

Previous research on the digital divide has dichotomized and simplified the disparities within technology access (Selwyn, 2004) focusing mostly on factors that contribute to exclusion. However, foundational theory urges that scholars examine the role of relationships (House, 1981), cumulative impacts (DiMaggio et al., 2001), and systemic influence (Hughes, 1994) regarding technology use. Unfortunately, a majority of prior

studies have also focused singularly on demographic factors as they relate to disparate technology access (Gangadharan & Byrum, 2012). Subsequent and more ecologically focused studies have revealed that social and demographic factors are significantly related to of home broadband adoption (Pew, 2013a-c) and technology use (City of Minneapolis, 2014). In an effort to re-conceptualize digital inclusion scholarship, researchers are gradually transitioning into a framework that analyzes additional factors that may contribute to inclusive technology equity (Selwyn, 2004) and meaningful broadband adoption (Gangadharan & Byrum). These variables include social influence (Verdegem & Verhoest, 2009), technology relevancy (NTIA, 2013), and/or technology efficacy (Cassidy & Eachus, 2002; Kim & Glassman, 2013; Torzkzadeh & Van Dyke, 2001), and sense of community. Given that the path toward digital inclusion is one that can be quite difficult for many citizens to navigate, local municipalities are moving to the forefront of addressing this issue by examining these issues in-depth and creating data driven and community centered pipelines toward digital inclusion.

### **Present Study**

“Raleigh Connected” was created as a comprehensive technology initiative geared toward promoting holistic digital inclusion by providing a resource and access driven technology infrastructure. In 2010, the City of Raleigh was a recipient of a Broadband Technology Opportunities Program (BTOP) grant (NTIA, 2010). These funds were used to provide subsidized high speed broadband services to properties in underserved areas within the city (City of Raleigh, 2015b). Efforts were geared specifically toward apartment complexes in order to maximize the impact of the resource provided. In addition, in

partnership with One Economy (previously known as a community-centered technology initiative, Raleigh Digital Connectors) was created (City of Raleigh, 2015b). The Digital Connectors is a national program dedicated to empowering youth through technology and community service (<http://corporate.comcast.com>). As participants in the Raleigh Digital Connectors program, students are required to dedicate some aspects of their service to multi-generational digital literacy training. The goal of this program is to recruit youth from all areas of the City of Raleigh to serve as technology ambassadors outside and within their respective communities. Since the inception of the Raleigh Digital Connectors program and the dissemination of BTOP funding, there have not been any data collection efforts around digital inclusion trends such as that within the City of Raleigh.

The overall goal of the present study is to better understand and explain the factors that contribute to the digital inclusion culture within the City of Raleigh. The study was conducted in two phases. First, a participatory pilot study was conducted that directly engaged a representative sample of residents (i.e. geography, race/ethnicity, income etc.) across various communities within the City of Raleigh. Emerging themes were generated from focus groups and Citizen Advisory Council meetings and were used to inform the development of the Community Digital Inclusion Survey (CDI). The second phase of the study deployed the CDI to Raleigh residents through face-to-face interaction, postal mail, the project webpage and email. The variables of focus included demographic information, technology access, brief sense of community, attitudes toward technology, technology relevancy, technology relevancy and e-government activity. Listed below are the primary research questions and hypotheses for this study.

## **Research Questions & Hypotheses**

**Research Question 1 (RQ1).** What role do socio-demographic factors play in technology access through digital devices?

**H1:** Citizens would vary across income level, race/ethnicity, and age with regards to rates of access to technology. Specifically, the data would reflect previously reported trends with ethnic minority, low income, and older participants reporting less access.

**Research Question 2 (RQ2).** To what extent do social and individual level factors like Sense of Community, Attitudes Toward Technology, and SES influence the relationship between Technology Efficacy and Technology Relevancy?

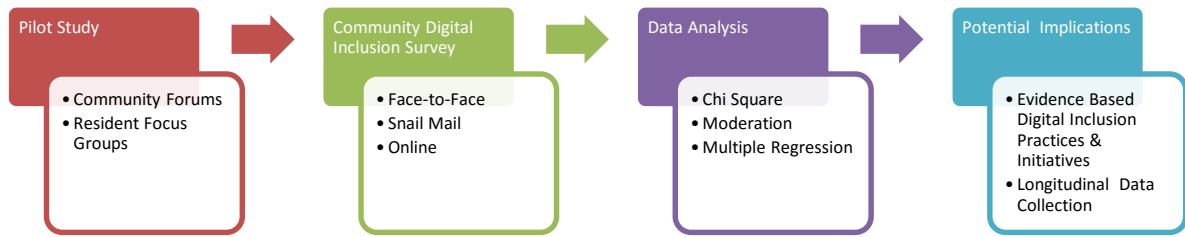
**H2a:** Sense of Community would moderate (strengthen) the relationship between Technology Efficacy and Technology Relevancy.

**H2b:** Attitudes Toward Technology would moderate (strengthen) the relationship between Technology Efficacy and Technology Relevancy.

**Research Question 3 (RQ3).** What is the impact of perceived technology efficacy suggest regarding e-government activities?

**H3:** High scores on perceived technology efficacy will predict high scores on frequency of e-government activities.

The Community Digital Inclusion (CDI) study followed a non-experimental survey research design (See Figure 2). The survey was developed to gather demographic information, assess technology access and habits, and examine potential social influences on technology use (See Appendix G).



*Figure 2.* Steps for Research Design and Methods



## CHAPTER 3: METHODOLOGY

The following study was conducted in two phases including a pilot study focused on citizen engagement and the deployment of the Community Digital Inclusion Survey.

### **Phase One: Pilot Study**

The overall guiding question for this portion of the study was: What are the social, cultural or economic factors that influence resident perceptions of technology? This question was addressed through pilot qualitative data collection with City of Raleigh residents. First, Citizens Advisory Council meetings were attended in an effort to promote civic transparency and offer residents an opportunity to learn more about the proposed project intentions, survey details, and the proposed use of the data. The researcher attended a total of 16 Citizen Advisory Council (CAC) meetings. CACs are nonpartisan entities independent of the City Council that serve as a link between Raleigh residents and City government (City of Raleigh, 2015a). Participation in these initial meetings was designed to (a) inform local community members of the community technology study, and (b) garner support for the project and recruit participants. The second portion of the pilot study involved directly engaging City of Raleigh residents of varying ages in small group discussions about their perceptions of technology. The overall purpose of this pilot project was to assess the strength of the proposed study and to better gauge how citizens defined digital inclusion in their everyday lives.

**Participants.** A small sample of residents was recruited to collect preliminary data on resident perceptions of technology access and use within the City of Raleigh. Residents residing within the Southeast area of Raleigh offered their unique assessment of technology

adoption as representatives of an older population with limited technology capital. The first group included residents participating in a 6-week digital literacy training class at a local community center consisting of approximately 12 senior citizens and adults between the ages of 35-75 years of age. Residents engaged in two discussion groups: a pre-digital literacy training discussion that focused on exploring potential social, cultural or economic factors that might influence resident perceptions of technology, and a post-digital literacy training World Café designed to examine whether those perceptions were altered as a result of participation in the computer classes. The second focus group was conducted with parents of 2014-2015 Raleigh Digital Connectors youth program with only 2 parents participating in the 35 to 44-year-old age range (with parents that opted out falling above and below the reported age range). Youth chosen for this program were selected from various communities within the City of Raleigh. Parents of these students were essential because they were able to provide their perspective as parents of youth that are digital natives, meaning that they have grown up in an environment where technology access has been a consistently embedded in their lived experience similar to youth in general residing within US (Prensky, 2001).

**Procedure.** Each focus group was led utilizing the “World Café” method (The World Café Community, 2002). The purpose of the World Café conversation method is to facilitate a dialogue that is collaborative, engaging and that encourages action. Utilizing this method, the researcher was able to lead an in-depth discussion centered on technology adoption and to simultaneously draw conclusions confirmed by the participants. In addition, at the start of each session, participants were asked to complete consent forms and a brief demographic survey. During the focus groups, residents were provided general insight about

the project and engaged in digital literacy training. The following guiding questions for the focus groups, intended to facilitate discussion, were adapted from a conceptual framework that takes into account social context as an influence on technology adoption (Selwyn, 2004).

Focus group questions were as follows:

1. What immediately comes to mind when you think of technology?
2. What does access to a computer and internet mean in your life?
3. What would you like to be able to do with digital technology?
4. Does your access to a computer or internet impact how you use them?

### **Findings from the Pilot Phase**

Focus content was managed by the Principal Investigator (PI) with the assistance of three co-facilitators, all of whom were responsible for presenting one question to four small groups of residents. The PI gathered all of the written responses and held discussions in real time with residents to draw conclusions from emerging themes. Senior citizen residents provided insight that confirmed barriers identified in previous research regarding factors that contribute to low technology adoption among elderly citizens, including low confidence in technical skills and limited digital literacy (NTIA, 2013; Horrigan, 2010). Their perceptions of technology centered on it as a tool for gaining knowledge and communication. Having access meant that they needed to “keep up with the times” and be familiar with technology lingo. Although they felt intimidated by technology, they also understood its utility and relevance in their everyday lives as it related to employment, connection with family, etc. Their digital literacy goals ranged from acquiring basic skills (i.e. typing), accessing information relative to the maintenance of their everyday lives (i.e. banking, medical

information, employment etc.), and feeling more confident in their technical skills overall. Additionally, during the post-digital literacy training discussion, another focus group conducted by the PI revealed that increased digital literacy, another known factor in influencing technology adoption, inspired residents to want to continue their computer training and invest in refurbished digital devices. The parent discussions revealed that they felt their personal identity was tied to technology access in ways that were essential to their livelihoods and professional development. They also felt as though there were constant societal pressures to upgrade technology without proper training to do so seamlessly. Finally, regarding the parents of Raleigh Digital Connectors, they perceived their children to be constantly connected and felt that there were no established standards for how much technology youth should be allowed to consume. The focus groups were an essential part of informing the Community Digital Inclusion Survey data collection process. Suggestions that arose included the addition of new items previously not included on the survey (i.e. Community internet access) and targeting under-resourced communities for participation recruitment; those are two examples of how resident feedback influenced the survey instrument and project strategy. Inclusion of citizen voice was an important part of shaping the larger quantitative research goals and assisted the researcher in capturing digital inclusion trends specific to the City of Raleigh.

## **Phase Two: The Community Digital Inclusion Survey**

**Participants.** Eligible participants for this study included residents that were 18 years of age or older and lived in the City of Raleigh. The desired sample was intended to include residents that were diverse and representative of the City of Raleigh population (City of

Raleigh, 2015c). Geographically, the goal was to capture residents from various household sizes, household types (e.g. renters vs. homeowners) as well as new and established community members. The study also sought residents from different age groups, racial/ethnic backgrounds and socioeconomic backgrounds. Finally, the study was intended to sample residents with varying access and experiences with technology. However, post-data collection revealed a significant disproportionate representation among several demographic factors including education, race and income.

**Procedures.** A diverse array of methods was used to generate a heterogeneous sample of participants across multiple demographic and geographic categories. Residents were recruited through community events, citizen advisory council meetings, flyers/posters distributed in public spaces, and through postal and electronic mailings.

The first method of recruitment occurred through citizen engagement including CAC meetings and resident focus groups. An online survey link was also emailed to residents that subscribed to city of Raleigh E-Newsletters (n=1500) and paper-pencil surveys were mailed to residents that opted in to receive mailings from the Community Services Division at the City of Raleigh (n=445). Hard copy surveys were also mailed to a randomly selected sample of addresses (n=1300) using the Raleigh Neighborhood Registry (City of Raleigh, 2015d) located near properties that had previously received free Wi-Fi access in a federally-funded project in 2010. In addition, hard copy surveys were also dropped off at four low-income community housing properties (n=301) and were made available through a project webpage and via City of Raleigh social media. Residents were informed about the survey through project posters posted in community centers where a shortened URL and QR code (Appendix

A & B) made it possible to take the survey on a smartphone. Finally, the researcher also attended community events and provided hard copies, iPads and laptops for residents to take the survey as well. The CDI survey was active for data collection from April 20, 2015 through June 26, 2015. A letter to citizens was included in both the online and hardcopy forms of the CDI surveys. The letter provided information about the purpose of the project and required participants to acknowledge their informed (See Appendix G &H).

Table 1

*CDI Survey Deployment Descriptives*

	Online Surveys*		Hard Copy Surveys		In-Person Hardcopy Surveys
	<u># Emailed</u>	<u># Completed</u>	<u># Mailed</u>	<u># Completed</u>	<u># Completed</u>
Survey Details	1500	801(53.4%)	1745	322(18.5%)	23

\*Note: Electronic distribution also included Social Media, Project Webpage & Email Forwarding

Overall, there was a total of n=1145 responses from citizens combined in both email (n=801) and hardcopy (n=344) (See Table 1). Independent variables of interest included demographic information, sense of community, attitudes toward technology, and technology efficacy. Dependent variables included measures of internet access, technology relevancy and frequency of e-government activities. Proposed analyses were focused on identifying

variance in technology adoption among residents, examining the relationship between technology efficacy and relevancy, and technology efficacy as a predictor of e-government use.

### **Measures: Independent Variables**

**Demographic Questions.** Residents were asked questions related to residence characteristics including (See Appendix E): *How long have you lived in Raleigh?* (E.g. Less than one year to 10+ years); *Do you rent or own your current residence?* (E.g. Rent, Own & Other); *How many individuals currently live in your household?* (E.g. 1-10); *Under what zip code is your physical address located (NOT A P.O. BOX)?*; *Which Citizen Advisory Council (CAC) covers the area of the City that you live in?* (e.g. I don't know my CAC, Atlantic, etc.). Additionally residents were asked questions regarding demographic information including: *How old are you?*; *What is your gender?* (Female, Male & Other); *What is your race/ethnicity? YOU MAY CHECK ALL THAT APPLY* (e.g. American Indian/Alaskan); *Are you of Hispanic or Latino Origin?* (Yes or No); *Please indicate your highest level of education* (e.g. Less than High School); *Which of the following best describes your employment status?* (e.g. Part-time to Full Time); *Please estimate your yearly average combined household income* (e.g. Below \$20,000 to \$90k+).

**Sample Description.** The overall sample consisted of N=1103 completed surveys although only N=983 were used in analyses after data cleaning. Deleted cases included responses that did not provide any demographic information; since that was integral part of examining group differences, they were subsequently removed from this sample. Respondents ranged from 18 to 96 years of age. Residents were asked to report demographic

information as it related to residency in Raleigh (See Table 4). With regards to sampling goals, there was a larger portion of residents that had lived here for more than 10 years including years lived in Raleigh (17.9 % Less than 1 yr-4 years, 14.1%, 6-10 years and 67.9% 10+ years;  $M=2.50$ ,  $SD=0.78$ ), were homeowners (19.3% Rent, 79.2% Own or 1.5% Other), and were unfamiliar with which Citizen Advisory Councils (CAC) that they resided in (See Table 2). These findings indicated a sample that were long-term residents, established in their communities and slightly unfamiliar with the presence of civic governance bodies within their communities. Regarding demographic data, residents' age (Range 18-96;  $M=49.94$ ,  $SD=17.60$ ), and gender (Male=45.3%, Female=54.4% and Other=0.3%;  $M=1.46$ ,  $SD=0.51$ ) were well distributed. However, across race/ethnicity (1.2% Asian, 16.3% Black, 2.6% Latino, 77.4% White, 2.6% Mixed Race or Other;  $M=4.64$ ,  $SD=0.83$ ), residents in this sample were predominantly White. Additionally, residents were asked to report education, employment status and combined household income (See Table 3). Distributions from this sample did holistically meet the sampling goals for proportionate and diverse representation of Raleigh residents.



Table 2

*CDI Survey Participant Residence Information*

<b>Variable</b>	<b>%</b>	<b>Range</b>	<b>M</b>	<b>SD</b>
<b>Years Lived in this City</b>		1-3	2.50	0.78
Less than 1 yr-4 years	17.9%			
6-10 years	14.1%			
10+ years	67.9%			
<b>Residence Type</b>				
Rent	19.3%	1-3	1.82	0.42
Own	79.2%			
Other	1.5%			
<b>Household Size</b>				
1-3 People	84.1%			
4-6 People	15.4%	1-4	1.16	0.39
7-9 People	0.4%			
10+ People	0.1%			
<b>CAC</b>				
I do not know my CAC	36.8%			
Atlantic	1.5%			
Central	1.6%			
East	3.7%	1-21	8.04	6.72
Five Points	1.8%			
Forestville	0.8%			
Glenwood	3.2%			
Hillsborough	2.8%			
Midtown	4.1%			
Mordecai	6.0%			
North	4.7%			
North Central	2.0%			
Northeast	3.2%			
Northwest	5.9%			
South	1.7%			
South Central	1.4%			
Southeast	6.9%			
Southwest	4.5%			
Wade	4.7%			
West	2.6%			
<b>Zip Code</b>				
27601	6.7%			
27603	9.1%			
27604	15.6%			
27605	4.3%			
27606	4.5%	27601-27617	N/A	N/A
27607	9.2%			
27608	2.6%			
27609	9.4%			
27610	11.9%			
27612	7.1%			
27613	7.4%			
27614	2.5%			
27615	4.5%			
27616	3.4%			
27617	1.9%			

Table 3

*CDI Survey Participant Demographics*

Variable	%	M	SD
<b>Gender</b>		1.46	0.51
Female	54.4%		
Male	45.3%		
Other	0.3%		
<b>Race</b>		4.64	0.83
Native American	0.1%		
Asian	1.2%		
Black	16.3%		
Latino	2.6%		
White	77.4%		
Mixed Race or Other	2.6%		
<b>Age (Range 18-96 yrs.)</b>		49.73	17.34
18-24	3.1%		
25-34	19.4%		
35-44	20.6%		
45-54	14.8%		
55-64	15.4%		
65-74	15.6%		
75+	11.1%		
<b>Education</b>		4.95	1.15
Less than High School	0.8%		
High School	6.1%		
Graduate/GED			
Associate Degree	4.4%		
Some College	11.3%		
Bachelor's Degree	40.8%		
Graduate/Professional Degree	36.5%		
<b>Employment Status</b>		6.88	1.68
Other	1.9%		
Student	2.9%		
Unemployed Looking for Work	2.2%		
On Disability	1.9%		
Homemaker	2.7%		
Retired	24.9%		
Part Time	5.5%		
Full Time	58.2%		
<b>Combined Household Income</b>	6.4%	6.26	2.46
Below \$20,000	3.8%		
\$20,000 - \$29,999	7.0%		
\$30,000 - \$39,999	8.7%		
\$40,000 - \$49,999	9.4%		
\$50,000 - \$59,999	8.4%		
\$60,000 - \$69,999	6.9%		
\$80,000 - \$89,999	33.8%		
\$70,000-\$79,000	15.6%		
\$90,000 or more			

**Technology Efficacy.** Technology efficacy is a concept developed from the traditional notion of self-efficacy (Torzgzadeh & Van Dyke, 2001), which in recent years has been expanded to include perceptions of confidence in technical skills (Kim & Glassman, 2013). Technology efficacy was measured through one item: “*How confident are you in your ability to use the computer and Internet to find the information that you need?*” and a 5 point Likert response scale was used (1=Don’t Know; 5=Very Comfortable). There is no current psychometric data that supports that this specific item significantly measures technology efficacy as a construct. However, for the purpose of the study, it served as a suggestion of how residents may perceive their confidence level in their ability to use computers and the internet, which are the basic skills necessary for digital inclusion.

**Community Influence.** Community influence was measured by the Brief Sense of Community Scale (BSCS) developed by Peterson, Speer and McMillan (2008). The BSCS has four dimensions that measure sense of community which include: Needs fulfillment (NF), which are the perceptions that a members’ needs are being met by their community; membership (MB), which relates to a member feeling a sense of belonging; influence (IN), which is the sense a member matters and that the community also matters to members; and emotional connection (EC), which involves feeling a sense of attachment through shared experiences. There were a total of six items measured on a 5-point Likert scale that stated questions like “*I can get what I need in my neighborhood*” (1=Strongly Disagree; 5=Strongly Agree). Reliability analyses indicated that the items were significantly correlated for the entire measure  $\alpha = 0.86$  (See Table 4).

Table 4

*Reliability Analysis for Brief Sense of Community Scale*

Statistics for Scale	<u>N</u>	<u>Mean</u>	<u>Variance</u>	<u>SD</u>		
	8	26.99	33.73	5.81		
	<u>Mean</u>	<u>Min</u>	<u>Max</u>	<u>Range</u>	<u>Max/Min</u>	<u>Variance</u>
Item Means	3.74	3.17	3.61	.44	1.14	.02
Item	1.05	.84	1.21	.37	1.43	.01
Variances	.45	.26	.77	.52	3.00	.02
Item	.44	.22	.72	.50	3.26	.02
Covariances						
Inter-Item						
Correlations						
Item Total Statistics	Scale Mean If Item Deleted	Scale Variance if Item Deleted	Corrected Item Total Correction	Squared Multiple Correction	Alpha if Item Deleted	
Item #1	23.82	27.53	.43	.43	.86	
Item #2	23.72	26.57	.58	.51	.85	
Item #3	23.45	25.54	.71	.62	.83	
Item #4	23.38	26.16	.67	.56	.84	
Item #5	23.79	26.35	.58	.36	.85	
Item #6	23.58	27.75	.53	.32	.85	
Item #7	23.63	25.27	.71	.61	.83	
Item #8	23.58	25.61	.65	.54	.84	
			<u>Alpha</u>		<u>Standardized Item Alpha</u>	
Reliability Coefficients for 8 Items			.86		.86	

**Attitudes Towards Technology.** The attitudes variable was measured using an adapted question from the Digital Technology and Internet Access Trends in North Carolina Survey conducted from 1999 to 2013 (Wilson & Powers, 2014). This question related to individual technology attitudes regarding children, lived experience, economic success, reliance and usage. There were five questions measured on a 5-point scale (*1=Strongly Disagree; 5=Strongly Agree*). A sample question is “*It is important for school aged children to learn how to use computers and the Internet.*” An internal consistency analysis of the 5-

item scale was conducted and the scale proved to be highly unreliable ( $\alpha = .24$ ) as indicated in Table 5. Items #4 and #5 were reverse coded to take into account that they consisted of negatively-worded questions. Given the scale's poor reliability, this measure was not used in subsequent analyses. This could be a result of items that were meant to be examined as separate items. Further analysis such as exploratory factor analysis could provide clearer indications for what types of constructs these questions measure and if they are potentially correlated to one another.

Table 5

*Reliability Analysis for Attitudes Toward Technology*

Statistics for Scale	<u>N</u>	<u>Mean</u>	<u>Variance</u>	<u>SD</u>		
	5	18.32	5.59	2.36		
	<u>Mean</u>	<u>Min</u>	<u>Max</u>	<u>Range</u>	<u>Max/Min</u>	<u>Variance</u>
Item Means	3.67	2.24	4.68	2.44	2.09	.87
Item Variances	1.33	.44	2.10	2.67	4.73	.46
Item Covariances	-.05	-.93	.72	1.65	-.78	.20
Inter-Item Correlations	.005	.49	.54	1.04	-1.10	.10
		Scale				
	Scale Mean If	Variance if Item	Corrected Item Total	Squared Multiple	Alpha if Item	
Item Total Statistics	<u>Item Deleted</u>	<u>Deleted</u>	<u>Correction</u>	<u>Correction</u>	<u>Deleted</u>	
Item #1	13.64	4.57	.20	.31	-.47	
Item #2	14.05	4.43	.09	.34	-.42	
Item #3	14.78	3.41	.13	.18	-.64	
Item #4	14.74	5.92	-.32	.26	.22	
Item #5	16.08	5.07	-.24	.36	.14	
			<u>Alpha</u>		<u>Standardized Item</u>	
					<u>Alpha</u>	
	Reliability Coefficients for 8 Items		-.24		.02	

## **Measures: Dependent Variables**

**Technology Access.** Technology access was measured by a report of digital device ownership. A single question asked respondents to check each of the types of devices that they owned: “*What type of digital devices (devices that access the Internet) do you own? PLEASE CHECK ALL THAT APPLY*” (e.g. Smart Phone). Respondents could identify up to 9 devices and a grand total was calculated and then dichotomized into low device ownership (3 devices or less) and high ownership (4 devices or more). These items were measured dichotomously (0/No Response=No Ownership, 1=Ownership).

**Technology Relevancy.** Measuring perceptions of technology relevancy is an important part of better understanding how to promote adoption. This concept refers to an individual’s perception that owning and using technology is essential to his/her everyday life (NTIA, 2013; Horrigan, 2010). The positive perceptions of technology in the home could signify a step toward investment in this resource and shed light on the role that relevancy plays in understanding technology choices among Raleigh residents. This question addressed one of the key factors cited by previous research to be a significant predictor of technology adoption (NTIA, 2013; Horrigan, 2010).

General technology relevancy was measured by one item on a 5-point Likert scale which states “*How important is it for you to have access to computer and Internet at home?*” (5=Very Important; 1=Not important). Similar to technology efficacy, there is no current psychometric data that supports that this specific item significantly measures technology efficacy as a construct. However, for the purpose of the study, it served as a suggestion of

how residents may perceive their confidence level in their ability to use computers and the internet which are the basic skills necessary for digital inclusion.

**E-Government.** E-government is simply defined as “the production and delivery of government services through IT applications” (Moon, 2004). For the purposes of this study, e-government was measured by assessing participants’ frequency of specific online activities that were conducted through web based government sites. Residents were asked questions like “*How frequently do you do each of the following activities on the Internet...*”. (e.g. *1=Never/Not Applicable, 2=Less than once per month, 3=Monthly, 4=Weekly and 5=Daily*) regarding the following activities: engage with neighborhood and/or access neighborhood resources, seek information about city government services, communicate with city government, search and apply for jobs, attend online classes or trainings, research a topic of interest, search for health information, search for public transit information, and other (See Appendix G). Overall frequency was calculated by adding responses across all activities into a sum score. An inferential statistic such as this could have potentially distorted the data leading to the loss of unique details about certain e-government activities and how that may impact how often some citizens engage in them.

## CHAPTER 4: RESULTS

This study sought to more closely examine digital inclusion trends within the City of Raleigh. The following analyses examine the empirical impact of demographic factors and social context on technology access as well as use. The findings are presented in accordance with the stated research questions and hypotheses.

### **RQ1: What role do socio-demographic factors play in technology access through digital devices?**

The researcher hypothesized that citizens would vary across demographic factors with regards to rates of technology access as measured by number of digital devices owned. Specifically, the researcher hypothesized that CDI survey respondents would reflect findings in previous researchers' reported trends with male, high income, highly educated, full-time employed and younger residents reporting more access than their counterparts. A Chi-square test was used to determine whether there were significant differences between residents regarding demographic factors and the number of technology devices they owned. In order to more closely examine the differences between specific factors, 2x2 contingency tables were used to compare the categorical independent and dependent variables, each of which was collapsed into two categorical groups. Additionally, odds ratios were calculated to determine the effect size of any statistical differences uncovered between comparison groups. These results are reported in Tables 6 to 11.

**Education.** Education was dichotomized into two categories including “some college and below,” which included residents with associate degrees, some college, high school diploma/GED and with less than a high school degree. Since the percentage of residents with



a college degree and above was much higher than those in the aforementioned categories, they were subsequently collapsed. With regards to education, 58.8% of residents with some college education and below reported owning three devices or fewer, whereas only 42.9% of residents with a bachelor’s degree or higher reported the same. Conversely, only 41.2% of residents with some college education or less reported four devices or more, whereas 57.1% of residents with a bachelor’s degree or above reported the same. The difference was statistically significant,  $\chi^2(1) = 14.76, p < .001$ . Residents with higher education tended to report owning more devices, with residents with a bachelor’s degree or a higher degree were 1.9 times more likely than less-educated residents to report owning four or more devices.

Table 6

*Results of Chi-square Test and Descriptive Statistics for Education Status by # of Devices*

Education Status	# of Devices	
	3 Devices or Less	4 Devices or More
Some College & Below	107 (58.8%)	75 (41.2%)
Bachelor Degree & Above	312 (42.9%)	415 (57.1%)

*Note.*  $\chi^2 = 14.76, df = 1$ . Numbers in parentheses indicate column percentages. \* $p < .001$

**Employment.** In terms of employment status, 62.3% of residents working full time reported owning three devices or fewer, whereas only 35.6% of residents not working full time reported owning the same. Conversely, only 37.7% of residents working full time reported owning four devices or more, whereas 64.4% of residents not working full time

reported the same. The difference was statistically significant ( $X^2(1) = 61.87, p < .001$ ) with residents that were not fully employed 2.97 times more likely to report owning four devices or more; this finding was not consistent with the stated hypothesis.

Table 7

*Results of Chi-square Test and Descriptive Statistics for Employment Status by # of Devices*

Employment Status	# of Devices	
	3 Devices or Less	4 Devices or More
Full Time	221 (62.3%)	134 (37.7%)
Non Full Time	196 (35.6%)	355 (64.4%)

*Note.*  $\chi^2 = 61.87, df = 1$ . Numbers in parentheses indicate column percentages. \* $p < .001$

**Age.** The age variable was dichotomized into “middle age and below” (i.e. 18-49 years old) as well “senior” (50 years old and older) based on the distribution of age for the sample. Concerning age, only 32% of residents middle aged and below reported 3 devices or fewer, whereas 62.9 % of older residents reported the same. Conversely, 68% of residents that were middle aged and below reported four devices or more, whereas only 37.1% of older residents reported the same. The difference was statistically significant ( $X^2(1) = 86.18, p < .001$ ) with younger residents 3.59 times more likely than residents beyond middle age to report owning four devices or more.

Table 8

*Results of Chi-square Test and Descriptive Statistics for Age by # of Devices*

Age	# of Devices	
	3 Devices or Less	4 Devices or More
Middle Age & Younger (18-49)	156 (32%)	331 (68%)
Senior (50+)	264 (62.9%)	156 (37.1%)

*Note.*  $\chi^2 = 86.18$ ,  $df = 1$ . Numbers in parentheses indicate column percentages. \* $p < .001$

**Income.** Examining income, 56.6 % of residents with a median income for this sample and below reported three devices or fewer, whereas only 43% of residents with high income reported the same. Conversely, 70.5% residents with high income reported four devices or more, whereas only 29.5% of residents with a median income or below reported the same. The difference was statistically significant ( $X^2(1) = 61.42$ ,  $p < .001$ ) with residents with income beyond the median level being 3.07 times more likely than residents with lower income to report owning four devices or more.

Table 9

*Results of Chi-square Test and Descriptive Statistics for Income Status by # of Devices*

Income Status	# of Devices	
	3 Devices or Less	4 Devices or More
Median Income & Below	205 (56.6%)	135 (29.5%)
High Income	157 (43.4%)	323 (70.5%)

*Note.*  $\chi^2 = 61.42$ ,  $df = 1$ . Numbers in parentheses indicate column percentages. \* $p < .001$

**Race.** With respect to race, only 43.5% of White residents reported owning three devices or fewer, whereas 55.5% of non-White residents reported the same. Conversely, 56.5% of White residents reported four devices or more, whereas 44.5% of non-White residents reported the same. The difference was statistically significant ( $X^2(1) = 8.05$ ,  $p < .01$ ) with White residents 1.63 times more likely to own more digital devices than non-White residents.

Table 10

*Results of Chi-square Test and Descriptive Statistics for Race by # of Devices*

Race	# of Devices	
	3 Devices or Less	4 Devices or More
White	308 (43.5%)	400 (56.5%)
Non-White	96 (55.5%)	77 (44.5%)

*Note.*  $\chi^2 = 8.05$ ,  $df = 1$ . Numbers in parentheses indicate column percentages. \* $p < .01$

**Gender.** Finally, with regards to gender, 52.7% of females reported three devices or fewer, whereas only 37.6% of males reported the same. Conversely, 62.4% of males reported four devices or more whereas 47.3% of females reported the same. The difference was statistically significant ( $X^2(1) = 20.41$ ,  $p < .001$ ), with male residents being 1.67 times more likely than female residents to own three or more digital devices.

Table 11

*Results of Chi-square Test and Descriptive Statistics for Gender by # of Devices*

Gender	# of Devices	
	3 Devices or Less	4 Devices or More
Female	255 (52.7%)	229 (47.3%)
Male	157 (37.6%)	260 (62.4%)

*Note.*  $\chi^2 = 20.41$ ,  $df = 1$ . Numbers in parentheses indicate column percentages. \* $p < .001$

**RQ2: To what extent do social and individual level factors like Brief Sense of Community and SES influence the relationship between Technology Efficacy and Technology Relevancy?**

A hierarchical multiple regression analysis was conducted to test the hypothesis that the technology relevancy is a function of multiple social and individual factors, and more specifically that a) Brief Sense of Community would moderate (strengthen) the relationship between Technology Efficacy and Technology Relevancy, and b) SES would moderate (strengthen) the relationship between Technology Efficacy and Technology Relevancy.

**H1 & H2.** Regarding brief sense of community, correlation analyses revealed a non-significant interaction between BSCS and Technology efficacy, which indicated that BSCS did not moderate the relationship between technology efficacy and relevancy. Additionally, since the Attitudes Toward Technology could not be analyzed as a complete construct, this variable was not included in the analysis.

**H3.** To avoid potentially problematic high multicollinearity with the interaction term, the variables were centered and an interaction term between technology efficacy and income level was created (Aiken & West, 1991). Further analysis did reveal that the demographic variables of income and education highly correlated with one another. Also, both significantly moderated the relationship between technology efficacy and technology relevancy (See Table 12). Analyses including demographic variables revealed a non-significant interaction between age, gender and employment status which indicated they did not moderate the relationship between technology efficacy and relevancy.

For the first model, step one included only the variable technology efficacy, which accounted for a significant amount of variance in technology relevancy ( $R^2 = 0.52$ ,  $F(1, 845) = 911.17$ ,  $p < .001$ ). In the second step, two variables were included, which included both technology efficacy and income. The addition of the income variable resulted in no change to the amount of variance accounted for in technology relevancy ( $\Delta R^2 = 0.52$ ,  $\Delta F(2, 844) = 457.46$ ,  $p < .001$ ). Next, the interaction term between technology relevancy and income was added to the regression model. This final step continued to account for a significant proportion of the variance in technology relevancy ( $\Delta R^2 = .52$ ,  $\Delta F(3, 843) = 309.52$ ,  $p < .001$ ,  $\beta = -.09$ ,  $t(846) = -2.66$ ,  $p < .01$ ).

As indicated by the interaction plot (Figure 3), as technology efficacy increased, so did technology relevancy at all levels of income. In other words, at high levels of technology efficacy, high scores for technology relevancy reflected a similar predictive relation for low, mid and high income respondents. In addition, residents that reported low income and low perceived technology efficacy also had the lowest scores on technology relevancy.

Table 12

*Income Moderating the Relationship between Technology Efficacy and Technology*

*Relevancy*

	<i>B</i>	<i>SE B</i>	$\beta$
<b>Step 1</b>			
Constant	4.73	0.02	
Technology Efficacy	0.63	0.02	0.72**
<b>Step 2</b>			
Constant	4.73	.02	
Technology Efficacy	0.62	.02	0.71**
Combined Household Income	0.06	.04	0.04
<b>Step 3</b>			
Constant	4.76	0.02	
Technology Relevancy	0.56	0.03	0.65*
Combined Household Income	0.09	0.04	0.05
<b>Income <math>\times</math> Technology Efficacy</b>	-0.15	0.06	-0.09**

Note  $R^2=0.52$  for Step 1;  $\Delta R^2=0.52$  for Step 2 ( $p=.15$ );  $\Delta R^2=0.52$  for Step 3 ( $p<.001$ ). \* $p<.05$ , \*\* $p<.01$

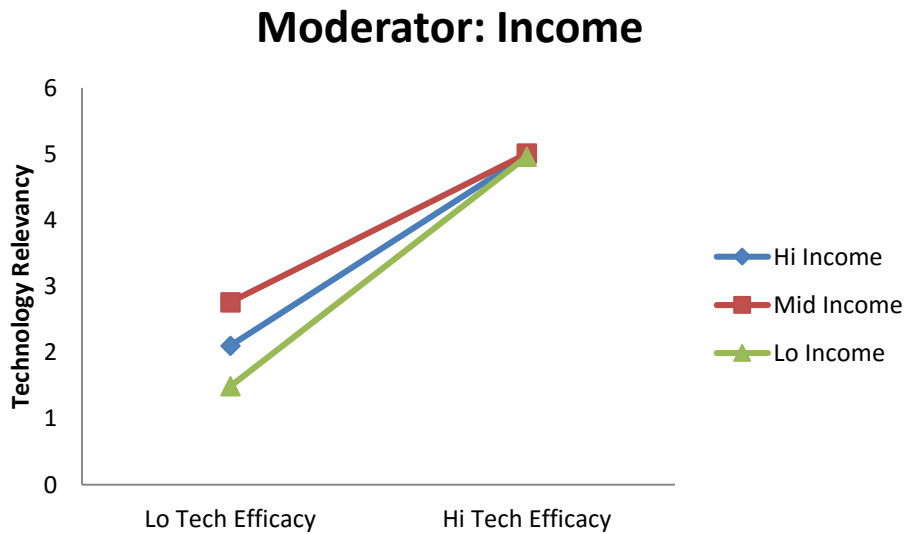


Figure 3. Moderation Effect of Education on the Relationship between Technology Efficacy & Technology Relevancy



As previously mentioned, in order to avoid potentially problematic high multicollinearity with the interaction term, the variables were centered and an interaction term between technology efficacy and education level was created (Aiken & West, 1991). Similarly-significant findings were reported for level of education. The first step included only technology efficacy, which continued to account for a significant amount of variance in technology relevancy ( $R^2 = 0.52$ ,  $F(1, 940) = 1019.39$ ,  $p < .001$ ). In the second step, two variables were included: technology efficacy and education. With the addition of the education variable, there was no change to the variance in technology relevancy ( $\Delta R^2 = 0.52$ ,  $\Delta F(2, 939) = 510.06$ ,  $p < .001$ ). Next, the interaction term between technology relevancy and education was added to the regression model, which continued to account for a significant proportion of the variance in technology relevancy ( $\Delta R^2 = .52$ ,  $\Delta F(3, 938) = 346.27$ ,  $p < .001$ ,  $\beta = -.09$ ,  $t(941) = -3.08$ ,  $p < .01$ ).

As indicated on the interaction plot (Figure 4), as technology efficacy increased, so did technology relevancy at all levels of education. At high technology relevancy, high scores for technology relevancy were similar for low, mid and high education. In addition, residents with lower scores on technology efficacy with low education had the lowest scores on technology relevancy.

Table 13

*Education Moderating the Relationship between Technology Efficacy and Technology*

Relevancy

	<i>B</i>	<i>SE B</i>	$\beta$
<b>Step 1</b>			
Constant	4.73	0.02	
Technology Efficacy	0.63	0.02	0.72**
<b>Step 2</b>			
Constant	4.73	.02	
Technology Efficacy	0.63	.02	0.71**
Education Level	0.04	.05	0.04
<b>Step 3</b>			
Constant	4.75	0.02	
Technology Relevancy	0.56	0.03	0.67**
Combined Household Income	0.02 -0.12	0.04 0.04	0.01* -0.08**
<b>Education x Technology Efficacy</b>			

Note  $R^2=0.52$  for Step 1;  $\Delta R^2=0.52$  for Step 2 ( $p_s=.38$ );  $\Delta R^2=0.52$  for Step 3 ( $p_s<.001$ ). \* $p<.05$ , \*\* $p<.01$

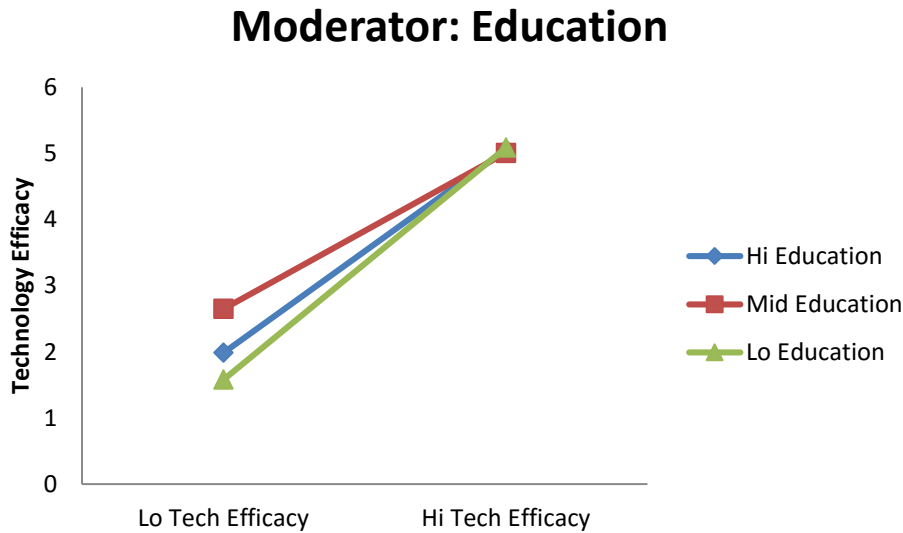


Figure 4. Moderation Effect of Education on the Relationship between Technology Efficacy & Technology Relevancy

**RQ3: What is the impact of perceived technology efficacy on e-government activities?**

**Correlation.** The researcher hypothesized that high scores on perceived technology efficacy would predict high scores on frequency of internet use, specifically e-government activities. A correlation analysis was conducted to examine the relationship between technology efficacy and levels of frequency regarding e-government activities with Table 14 summarizing the results. As can be seen, there were significant positive correlations between technology efficacy and demographic variables including gender ( $r=0.19$ ); education ( $r=0.35$ ); employment status ( $r=0.36$ ); and income ( $r=0.29$ ). Next, there were significant positive correlations between technology efficacy and technology relevancy with e-government activities ( $r=0.49$  and  $r=0.48$ , respectively). Third, there were significant

positive correlations between technology relevancy and demographic variables: gender ( $r=0.11$ ); education ( $r=0.26$ ); employment status ( $r=0.23$ ); and income ( $r=0.24$ ). Finally, there were significant positive correlations between e-government activities and demographic variables including gender ( $r=0.12$ ); education ( $r=0.27$ ); employment status ( $r=0.28$ ); and income ( $r=0.22$ ). These findings indicate that residents with consistent employment, male gender, advanced education, and higher household income reported significantly higher perceived confidence in their ability to use technology, higher perceptions of the importance of technology in their everyday life, and reported higher frequencies of e-government activities.

Additionally, there were negative and significant correlations between technology efficacy and age ( $r=-0.44$ ) and race ( $r=-0.22$ ). There were also negative and significant correlations between technology relevancy demographic variables age ( $r=-0.30$ ) and race ( $r=-0.24$ ). Furthermore, there were negative and significant correlations between e-government and demographic variables age ( $r=-0.36$ ) and race ( $r=-0.19$ ). This indicates that residents who were older and non-White reported significantly lower perceived confidence in their ability to use technology, lower perceptions of the importance of technology in their everyday life, and reported lower frequencies of e-government activities. Finally, technology relevancy, a potentially confounding variable for consideration in the moderation, was positively and significantly correlated with technology efficacy ( $r= .72$ ).

Table 13

*Summary of Intercorrelations for Technology Efficacy, Technology Relevancy &*

*Demographic Variables*

	Age	Gender	Race	Educati on	Employe nt Status	Incom e	E- Government Activities	Technology Efficacy	Technology Relevancy
Age									
Gender	-0.02								
Race	0.07*	-0.15**							
Education	-0.20**	0.11**	-						
			0.22**						
Employment Status	-0.53**	0.15**	-	0.25**					
			0.15**						
Income	0.11**	0.18**	-	0.28**	0.32**				
			0.28**						
E- Government Activities	-0.36**	0.12**	-	0.27**	0.28**	0.22**			
			0.19**						
Technology Efficacy	-0.44**	0.19**	-	0.35**	0.36**	0.29**	<b>0.49**</b>		
			0.22**						
Technology Relevancy	-0.30**	0.11**	-	0.26**	0.23**	0.24**	<b>0.48**</b>	<b>0.72**</b>	
			0.24**						

**Multiple Regression.** High scores on perceived technology efficacy were hypothesized to predict high scores on frequency of e-government activities. A three-step hierarchical method was used to account for multicollinearity across the study variables. Step one controlled for the association that demographic variables had with the independent variable technology efficacy and outcome variable e-government activities. The researcher included variables age, gender, race, education, employment, and income and did so to ensure that any observed effects of the technology efficacy were independent of their influence. Step two took into account the potentially confounding impact of technology

relevancy, which was highly correlated with technology efficacy (See Table 14). Step three included the primary independent variable of interest, technology efficacy.

The multiple regression model with all seven predictors indicated that technology efficacy explained a significant proportion of the variance (27%) in frequency of resident e-government activity ( $\Delta R^2=.27$ ,  $F(8, 816)=39.21$ ,  $p<.001$ ). There was also a positive and significant relationship between high scores on technology efficacy and higher frequencies of e-government activities ( $\beta=.23$   $t(816)=4.89$   $p<.001$ ). As hypothesized, perceived high confidence in technical ability predicted more frequent online activities related to government resources.

Table 14

*Multiple Regression: Technology Efficacy Predicting E-Government Activity (Controlling for Demographic Variables & Technology Relevancy)*

	<i>B</i>	<i>SE B</i>	$\beta$
<b>Step 1</b>			
Constant	17.13	1.77	
Age	-0.09	0.01	-0.26**
Gender	1.10	0.39	0.09**
Race	-0.39	0.49	- 0.03
Education	2.27	0.49	0.16**
Employment Status	0.16	0.48	0.01
Combined Household Income	1.21	0.43	0.10**
<b>Step 2</b>			
Constant	5.59	2.00	
Age	-0.06	0.01	-0.18**
Gender	0.83	0.37	0.07*
Race	0.35	0.47	0.02
Education	1.42	0.48	0.09**
Employment Status	0.25	0.45	0.02
Combined Household Income	0.61	0.41	0.05
Income Technology Efficacy	2.51	0.24	0.35**
<b>Step 3</b>			
Constant	4.52	1.98	
Age	-0.05	0.01	-0.14**
Gender	0.64	0.37	0.05
Race	0.39	0.46	0.03
Education	1.01	0.48	0.07*
Employment Status	0.01	0.45	0.001
Combined Household Income	0.45	0.40	0.04
Income	1.56	0.31	0.22**
Technology Relevancy	<b>1.41</b>	<b>0.29</b>	<b>0.23**</b>
<b>Technology Efficacy</b>			

Note  $R^2=0.16$  for Step 1;  $\Delta R^2=0.25$  for Step 2 ( $ps<.01$ );  $\Delta R^2=0.27$  for Step 3 ( $ps<.001$ ). \* $p<.05$ , \*\* $p<.01$

## CHAPTER 5: DISCUSSION

### Demographic Influence

Although a significant number of citizens have technology access in some form, there are still individuals who are disproportionately more unlikely to have reliable access or benefit from digital resources (Hill et al., 2008). A substantial amount of research has been conducted on the role that demographic factors play in predicting technology competencies, use and adoption. In addition to assessing social context, the present study also sought to examine whether the technology habits of Raleigh residents reflected those of national-level digital inclusion research. For the purposes of the CDI study, technology access was defined by the number of digital devices that residents reported owning. According to the Nielson Digital Consumer report (2014), on average, Americans individually own four devices; similarly, *Bloomberg* (Kharif, 2012) reports that, on average, American households own approximately five Wi-Fi enabled devices with some reporting 15 or more. For the present study, access level was determined by the number of digital devices residents owned with four devices or more representing high access, and three devices or fewer being low access. Previous research noted a distinction between group differences in technology access regarding demographic factors such as education, race, income, employment status, age, and gender. The researcher found that results from the present study closely reflected trends from previous findings. The Pew Research Center has been collecting data around digital differences among individuals with respect to demographic factors since 2000 (Pew, 2015).

The present study also illustrated similar, though not generalizable, findings digital access is in some way impacted by demographic context. Sampling goals for this study



sought to recruit Raleigh residents varied across income, age, race, gender, employment, and education with regards to rates of access. Specifically, the researcher hypothesized that the findings would reflect previously-reported trends wherein ethnic minorities, low income, less educated, non-fully employed and older participants would report significantly less access. Results revealed that all of the demographic factors included in these analyses accept the hypothesis that younger, more educated, affluent, White residents report owning more digital devices. The one exception included employment status, which reflected residents in the non-full time employment category as more likely to own more digital devices. Controlling for any factors rather than examining each factor may have yielded more robust results, particularly because several of the demographic predictors may have been inter-correlated.

The CDI survey revealed that White residents were more likely to own four or more digital devices. This finding illustrates what previous research has continued to find, which is that non-White citizens are less likely to have reliable technology access (Pew 2009a ; Yardi & Bruckman, 2012). Additionally, the Pew 2011 Digital Differences study reported a 4% difference in internet access between men (80%) and women (76%). Although these differences are important to note, most research focused on between-group differences often neglects to consider distinctions within groups, an idea which Helsper (2010) referred to as the generalization problem. Hargitai and Hinnant (2008) found that women between the ages of 18-26 reported less technical knowledge and those that reported infrequent internet use also had limited knowledge about how to use it. Although the present CDI survey found that male residents were more likely than females to report owning more digital devices, what remains unknown are additional factors that could contribute to this varying access. Helsper

(2010) found that there were gendered differences in internet activities which were dependent upon the life stages individuals were operating in, specifically regarding employment and marital status. Future research should examine the potential for gender to interact with other demographic variables such as socioeconomic, employment or marital statuses as they relate to technology use.

In addition to gender differences, the CDI survey found that younger residents owned more digital devices than individuals that were older and more senior. Generational differences in perceptions and use of technology appear to be reflective of how the embedded nature of technology has evolved over time. The difference between older and younger citizens is a consequence of the latter growing up in a world where technology has been a consistent aspect of their entire lived experience (Prensky, 2001). These two groups have been divided into what Prensky conceptualized as “digital natives” and “digital immigrants.” Digital natives are younger individuals that are fluent in their use of technology, whereas digital immigrants found interest in technology at some point later in life and made the choice to adopt it (Prensky). Although older adults tend to be collectively less “connected,” this notion does not mean that they should be treated as one homogenous group when it comes to technical engagement (Hill et al., 2008), especially since they are one of the fastest growing populations with regards to technology adoption (Smith, 2014).

In accordance with age differences in technology use, the researcher also found other socioeconomic differences such as income, education and employment status. Residents with higher income and education reported owning more devices; however, residents that were employed full time reported the opposite. The seemingly atypical finding regarding

employment status highlights the diversity in experience and resources among individuals without full-time jobs. This finding is particularly interesting since that category included part-time, retired, students, unemployed, homemakers, individuals on disability, and “other.” Due to the size of the sample, it was difficult to infer significant differences between groups; therefore, they were collapsed. However, of the residents that reported working full time, most of them were 50+ years old (77.3%) with the remainder 18 to 49 years old (22.8%). What could be occurring is what Ahituv and Zeira (2011) referred to as an “erosion effect” where a negative correlation can be seen between older workers and technological progress. What occurs during this phenomenon is a decrease in older workers’ efforts towards learning new skills, whereas younger workers are actively seeking new technical knowledge. This difference in engagement at work may translate into how each of these groups personally invests in technology.

Findings also revealed that more affluent residents reported having more access as well as to be more educated, White, and employed in jobs where technology is critical. Hargitai and Hinnant (2008) found that those in privileged positions were more likely to use technology to access resources that would be beneficial to their well-being. Specifically, their data revealed that education predicted whether or not individuals visited capital enhancing websites (Hargitai & Hinnant, 2008). What the present study and previous research provide is strong evidence for research practice recommendations that catalyze mechanisms that deeply assess between and within-group differences regarding economic resources. Furthermore, using a cultural relevance as framework also assess how those differences in access capital are related to potential increase technical confidence. Additionally, educational

outreach regarding the importance of technology adoption should intend to promote its relevancy as means to creating and enhancing capital.

**Technology Efficacy & Relevancy.** The relationship between efficacy and relevancy is one that has not often been deeply explored as factors that promote digital inclusion. The present study revealed that the two variables were highly and significantly correlated, with scores on technology efficacy increasing with high scores on technology relevancy and vice versa. To further explore this positive relation, the present study sought to examine whether or not external factors would impact the strength of that relationship. What was found was that a resident's perceived community connectedness did not moderate the relationship between technology efficacy and technology relevancy. This was consistent with previous research on community involvement and internet use by Kavanaugh (2001), which found that residents' involvement and attachment to their community were not significantly correlated with their internet use. Nevertheless, extended use of the internet did indicate that residents would also be more likely to engage in activities that facilitated social capital enhancement, thus potentially leading to opportunities for upward mobility (Kavanaugh).

For the CDI survey, the researcher did find that demographic factors including income and education did significantly moderate the relationship between the two variables. Findings indicated that income played a unique role in strengthening the relationship between technology relevancy and technology efficacy. At high levels of technology efficacy and high technology relevancy, the impact of specific income levels was not as prevalent. In other words, a resident with high technology efficacy tended to report high perceived technology relevancy regardless of their income level. Findings suggest that skill level may be a key

component of addressing digital inclusion. A similar finding was reflected in education regarding differences in high levels and low levels of technology efficacy and technology relevancy. Overall, both income and education had the most significance when residents had lower feelings of efficacy which, in turn, impacted the importance they placed on technology. Findings are consistent with research showing the impact of confidence-building activities on encouraging digital inclusion regardless of socioeconomic status.

As indicated in Chapter 2, technology efficacy is built on the psychological construct of self-efficacy and has been used to help researchers better understand the motivation behind learning digital literacy skills, persistent technology use and understanding how technology fits individual's lived experience (Torzkadeh & Van Dyke, 2002). These researchers found that digital literacy training significantly influenced internet self-efficacy for individuals that had either high or low attitudes toward computers. The strong relationship between attitudes and efficacy found in the present study appears to reinforce the need to include psycho-social factors in digital inclusion research and beyond just access.

**Technology Efficacy & E-Government.** The E-Government Act of 2002 (Congress, 2002) established a framework that required federal agencies to utilize web-based mechanisms to interact with citizens more meaningfully. The goal was to set in motion strategies that provided services to address citizens' needs, improve communication policies inside and between other agencies, and ensure the accessibility of information. With the transition of government services to more web-based formats, many citizens are taking advantage of the convenience of "direct" contact where they could theoretically quickly and easily request information, share opinions, and file complaints (Thomas & Streib, 2003).

Nevertheless, civic activity that encourages interfacing with government online does not always take into account any variance in citizen technical skill or comfort with using the internet to seek information. The CDI study intended to examine the relationship between technology efficacy and e-government activities. Specifically, a high level of confidence in technical ability was thought to predict more frequent web based engagement with government. The researcher found that technology efficacy significantly and positively predicted high frequency in e-government activities. In other words, residents with high perceived technology efficacy reported engaging more frequently in online activities that could require them to utilize web-based government resources. This finding provides even more evidence for assessing those with lower efficacy and how that might prevent them from being able to successfully acquire crucial information online. Thomas and Streib (2003) found in their Georgia-based study on citizen initiated contact with government that the existing digital divide was more prominent among internet users that visited government web sites versus citizens that were solely engaged in general internet use.

Disparate access should be a primary concern for government institutions because of its mission to serve all citizens. If a disproportionate amount of exclusion occurs through government online platforms, then there should be strategies in place to address digital illiteracy and facilitate the diffusion of technology access (Thomas & Streib, 2003). Although it is not feasible for government institutions to be solely responsible for addressing the technical needs of citizens, it can be a part of promotion of outreach and education. Formal institutions can ensure that those citizens experiencing challenges with technology still have traditional options via face-to-face access to services and information. During these

interactions, public servants can begin to gradually introduce online options while allowing citizens to become more familiar and comfortable with using technology to address their needs. Providing internet access and training opportunities to build skills to facilitate computer use can also shed light on the utility of government websites (Sipior & Ward, 2005). Citizens may be unaware that there are resources available to them instantly online; however, building their confidence through greater exposure to such resources could change that dynamic.

### **Limitations**

**Underrepresented Sample.** In the case of the CDI survey there was difficulty capturing a representative sample that could provide implications about diverse residents within City of Raleigh and their technology habits. Although the sample distribution for race resembled that of the City of Raleigh population there were still inconsistencies present as it related to representation. There was an overrepresentation of white residents in the project sample (77.4%) compared to the entire Raleigh population (61.3%). Additionally, residents of color were underrepresented within the CDI sample with percentages that were also lower than what was reported for the City of Raleigh Population (See Table 15).

Table 15.

*CDI Sample & Raleigh Population Comparisons*

	CDI Sample	City of Raleigh Population
White	77.4%	61.3%
Black	16.3%	27.2%
Latino	2.6%	12.0%
Native American	0.1%	Not Included
Mixed Race or Other	2.6%	7.9%

A potential reason why some Raleigh residents did not participate in the CDI survey could be a consequence of political mistrust which can play a role in how citizens choose to engage with government. Although demographic factors are the most commonly-cited (e.g., SES), other researchers have hypothesized other, more complex reasons that might explain diversity in sociopolitical behavior among racial/ethnic groups (Marschall, 2001), particularly because this research was being managed through a government body. Note that distrust leads to challenges in addressing issues and often mistrust is related to individuals being dissatisfied with the way the government performs (Avery, 2009). This distrust could have been particularly relevant for citizens that are members of underrepresented populations, including African American and Latino. Previous research has indicated that for both African Americans and Latinos, social context is key to political participation, specifically regarding building community around religious activities, length of time lived in



a community, and the depth of their neighborhood social ties, whereas for White residents, only social ties was the most important indicator (Marschall, 2001).

The premise of ethnic community theory purports that higher salience of an individual's race and class (particularly within Black communities) promotes increased civic activism among African Americans (London & Hearn, 1977). Conversely, for Latino Americans, it is often salience surrounding their immigrant status that contributes to their tendency to be less civically motivated (Marschall, 2001). Additional reasons why individuals did not participate in the survey could have been related to community stability. According to Ramakrishnan & Espenshade (2001), people that have lower residential stability are often not as connected or invested in their communities, therefore resulting in limited civic engagement. This notion could apply to Raleigh residents that are transient such as renters or individuals within communities with limited capital. Better understanding the role that community and group membership play in civic activities is useful information for identifying culturally-relevant methods facilitating trusting relationships between scholars, citizens and officials within government led research. As more local municipalities are beginning to use data as a tool for improving citizen relations and delivering e-government services, they should also assess perceptions regarding citizen-government relations. Contextual data will be an essential part of addressing perceived barriers, marginalization or mistrust, all of which have the capacity to influence participation in future data collection.

**Limitations for Research.** The research team consisted of one principal investigator with limited data collection and administrative support. A city-wide data collection effort would normally require a comprehensive team to address various aspects of the project.

Ideally, this team would consist of several team members with collaborative roles and provide incentives for participation, which this study did not offer. In addition to the principal investigator, research assistants would be critical for assisting with identification of community partners, citizen engagement and data collection. A team of research assistants could consist of a mixture of undergraduate and masters-level graduate students as well as Raleigh residents. The inclusion of Raleigh residents would have been useful with regards to gaining citizen trust and for assisting with establishing legitimacy of the project within diverse communities. This approach would have allowed the researcher to intervene within diverse Raleigh communities “in such a way that they receive services and resources and increase their political awareness and capacity for mobilization and the same time” (Nelson & Prilleltensky, 2005, p. 189).

There are also internal challenges that arise with conducting community psychology focused research within a government institution including what Nelson & Prilleltensky (2005) refer to as “systemic entanglements,” where conservative and regressive perspectives need to be addressed. Although this research was well-received by the City of Raleigh, there was verbal feedback provided by residents that a study like this was irrelevant because of the seemingly-pervasive access to technology for most residents. Ultimately, residents that perceived this study negatively may have been less inclined to participate.

Navigating varying perspectives like this requires Community Psychologists to consider taking into account contextual information to determine methods of education and intervention that are inclusive. Nevertheless, municipal government is not a monolithic institution, and the benefit of embedding digital inclusion work at this level provides the

opportunity for action research and the ability to “influence policy processes through the dissemination of relevant data” (Nelson & Prilleltensky, 2005, p. 171). Often the challenge community psychologists in government face rests in their ability to identify spaces for change promotion and uncover effective support both inside and outside of the political environments (Nelson & Prilleltensky, p. 163). Ultimately, a larger, diverse, and collaborative team would allow for a more inclusive effort at measuring digital inclusion.

**Engagement Strategy.** Another limitation that could have impacted the response outcome of the CDI survey was related to the community engagement strategy. Prior to data collection, the researcher attended several Citizens Advisory Council meetings (CACs); however, these community governance structures were not always holistically representative of the Raleigh communities they intended to serve. Although these early encounters with citizens were an important part of promoting civic transparency around the project, the interactions were not sufficient enough to properly engage with more diverse populations. Earlier engagement with certain populations such as communities with limited capital and with residents of color could have been beneficial in establishing trust and providing awareness about the purpose and potential benefits of the CDI survey. Intentional engagement would have allowed the researcher to ensure that the resident conversations, data collection, and community were inclusive processes.

According to Bond & Mulvey (2000) both representation and perspective are necessary principles for facilitating inclusion effectively. In this context, representation is defined by the active participation of disadvantaged groups, whereas perspective takes into account the unique and diverse point of view of disadvantaged groups (Bond & Mulvey).

Engagement that was consistent, intentional and carefully planned with leaders as well as foundational organizations within communities of color could have increased the response rates of underrepresented Raleigh residents.

**Methodology.** The CDI survey utilized a mixed-mode survey technique in order to increase the probability of capturing diverse responses. Methods of data collection included posters with QR codes (e.g. smart phone participation), in-person engagement at community events, and City of Raleigh social media (e.g. Twitter & Facebook). The two primary and most successful methods of data collection occurred through an online platform and hard copy surveys through the mail. Previous research comparing the two methods of data collection has uncovered notable differences in response rates. Cook, Heath, and Thompson (2000) acknowledge this fact in their meta-analysis of internet surveys research design and financial advantages of utilizing web-based questionnaires as well as the response bias and decreased response rates associated with this type of measurement. Börkan (2010) further explored this finding by utilizing mixed-mode surveys in order to assess if this was an appropriate technique for educational research. Overall, they found that respondents that completed web surveys had much lower response rates than those sent through mail, and online respondents were significantly younger than those that participated through mail (Börkan (2010)). These findings were mirrored in the CDI project with participants in the 18 to 49 (61.5%) age category participating more online than those 50 to 90+ years old (38.5%) (See Table 16).

Table 16.

*Age Differences by Survey Type*

Survey Type	Age	
	<u>18-49</u>	<u>50-90+</u>
Online	61.5%	38.5%
Hard Copy	30.3%	69.3%

In addition to age differences with online surveys access, varying levels in quality of internet access that respondents had could have also impacted response rates. Response rates could have also been impacted since there were more opportunities for citizens to participate online versus through a hardcopy. In hindsight it was uncovered that there were no web links present on hardcopy surveys sent through the mail which meant that some residents were limited to one method of participation which brings the threat to external validity. In other words, since all of the residents did not have the option to access the survey online their may been some that chose not to respond therefore decreasing the opportunity for the researcher to infer generalizable conclusions. Another potential influence was selection bias and since residents had the choice to participate there is no way to account for what digital inclusion looks like for residents that did not respond. Future studies should explore these factors as potential limitations to acquiring diverse samples.

Other noteworthy limitations were related to measurement. Both technology relevancy and technology efficacy were measured by one-item scales. Previous research has demonstrated that single-item scales at times do not perform as well as multi-item scales (Diamantopoulos, 2012). Although this limitation could have impacted study outcomes, there is room for advocating for the use of well-structured and straightforward single item measures that seek to assess one concept. Lastly, the items intended to measure attitudes toward technology did not present as a reliable construct. The items were borrowed from a previous research study examining digital trends in the state of North Carolina (Wilson & Powers, 2014) where they were not used as a validated scale. Although they were treated as one construct for the CDI survey, their lack of validity and reliability tests in previous research likely contributed to non-significance present in the current study.

### **Future Research**

To expand research efforts, local municipalities could partner with research institutes or academic institutions to develop longitudinal projects to track how digital habits change over time. Measuring the evolution of access, use and adoption will be important to track, especially with the introduction of high-speed gigabit services provided by national-level internet service providers (ISPs). Having the ability to measure the impact of internet access at gigabit speed will be an essential part of promoting the relevancy of broadband adoption as an avenue for civic innovation and digital citizenship. Bimber (2010) closely examined the relationship between civic engagement and information technology stating that “the technological revolution associated with the Internet is coinciding with energetic scholarly and public interest in the state of civic engagement.” (p. 329). As a result, scholars are

beginning to more closely examine the relationship between technology and civic engagement. Bimber also encouraged scholars to take a unique approach to this hypothesized relationship and reject the notion of polarizing technology-related civic engagement and traditional civic engagement. Instead, the author suggests considering the role that integrated technologies play in connecting communication channels as well as citizens (Bimber). The author also proposes scholars abandon the idea of the sole impact of “the internet” because of the presence of mutualism between traditional and contemporary modes of communication within civic life that are beginning to impact how citizens access resources. This, in turn, requires government institutions interested in promoting digital inclusion to revise their research practices to be community-centered, inclusive, and cognizant of the diversity of digital access. The following section discusses in detail some direction for future digital inclusion research led by local government.

**Government-Community Engagement.** A common misconception regarding community engagement is that most citizens have no true interest in civic activities. However, research exploring this notion has revealed that motivation to engage often differs depending on an individual’s group membership. As previously mentioned, a primary deterrent for civic engagement among African American, Latino, and low-wealth citizens is political mistrust (Avery, 2009; Hetherington, 1998; Marschall, 2001). Government entities interested in measuring and promoting digital inclusion should keep in mind the potential influence of political mistrust and work to address this in an effort to foster stronger relationships with underrepresented communities. This could be addressed through formal measurement and during the outreach stages of engagement.

For municipalities seeking to examine digital inclusion, adding measures to a city-wide survey that assess attitudes toward government could allow researchers to better understand the climate of community-based socio-political perspectives. Engaging with communities ahead of asking them for sensitive information might build trust and better prepare them to share information as well accept future services. According to Hetherington (1998), higher levels of trust are of great benefit to both elected officials and political institutions. Marschall (2001) found that for some communities of color, being actively involved in local organizations and having social ties within their community significantly predicted political activity. It is in these spaces that government-centered research teams should begin. Assessing the culture and perspectives of digital inclusion among policy makers could be another essential part of driving how government bodies could serve as organizational digital inclusion advocates.

**Inclusive Framework.** Hill et al. (2008) suggest the use of internet engagement research which moves beyond a dichotomizing analysis of digital access. Neglecting to foster inclusion can undoubtedly lead to the occurrence of oppression (Nelson & Prilleltensky, 2005). Researchers should explore the stories of traditionally marginalized groups and attempt to utilize data as a method of identifying predictors of technology adoption. Acknowledging and including those cultural nuances promotes the core values of inclusion, which are respect for diversity and relativity (Nelson & Prilleltensky). Additionally, formal institutions should research ways in which these populations have successfully used technology to thrive and build on that evidence base to promote technology relevancy.



While prioritizing inclusion is essential, researchers and government alike must keep in mind that treating citizens as one homogeneous community can unintentionally exclude the influence of power dynamics. According to Rappaport (1981), dialectical thinking can address the role of power by considering the complexity of social problems among different groups and offering multiple solutions. Government entities on both a small and large scale have the capacity to increase the likelihood that citizens can adopt technology through inclusion and adoption-focused policy. Digital inclusion policy reformation should be driven by culturally-relevant data, diverse narratives, and strengths-based strategy. As these institutions gradually digitize their services, processes and how they interface with citizens, they are also in part responsible for preparing them to utilize these systems. Creating digital inclusion divisions within departments focused on community services as well as information technology could centralize the creation of resources specifically dedicated to increasing digital literacy. Findings in the present study around impact of psycho-social factor like efficacy and relevancy on digital activity make a case for prioritizing confidence building outreach that also emphasizes the importance of the ways technology can improve a citizen's lived experience. Those efforts may need to be concentrated toward underserved populations so that they can feel empowered individually and collectively.

**Explore the Access Spectrum.** The conversation about digital access is evolving from a divisive framework into a scholarly movement where researchers are taking into consideration that disparate access now falls on a continuum. With a large majority of US citizens owning devices while having the ability to get connected on multiple digital platforms, technical deficits are gradually being defined by the quality of access. As data is

translated into intervention, utilizing an approach that considers the range of experience and skill among individuals will be an important part of creating holistic approaches to promoting digital inclusion. For example, although seniors are traditionally less connected than youth, they are currently the fastest-growing population of technology users. Additionally, even though young people are considered digital natives, often the types of activities they engage in online tend to be recreationally focused. As the transition in device-to-human engagement and between digital spaces become more discrete and seamless, citizens on the margins of skill are often left behind. With regards to teaching digital literacy skills, an emphasis on teaching computer basics is no longer sufficient, particularly because of gradual integration of technological platforms. Teaching technical fluency now requires an emphasis on scaffolding skills that lend themselves to promoting the mastery of gradually complex technical environments. In other words, constant iterations of existing technologies could be challenging for those not equipped with the basic competencies needed to catch up to such rapid changes.

## **Conclusion**

The present study has demonstrated the importance of exploring local government as a source for the assessment and promotion of digital inclusion through the informative capacity of preliminary data. The challenges associated with sampling alone suggest a need for further engaging with communities with limited capital. Introducing municipal level examinations of technology adoption such as that of the Community Digital Inclusion survey is a relatively novel approach; however, these institutions have an opportunity to assist in steering the direction of digital inclusion policy. According to Bachen et al. (2008),

information communication technology (ICT) is becoming the primary vehicle through which individuals engage in civic education/participation: “Citizens who are ignorant of ICT policy may be increasingly unable to protect and influence the bedrock conditions that support their ability to learn and communicate about all public affairs” (p. 291). The CDI survey further expanded on the importance of considering social context by including sense of community, attitudes, technology efficacy and technology relevancy in addition to demographic variables. Often, local governments create interventions that promote device ownership without considering the role of contextual factors and how they congruently impact adoption. Findings suggest that there is significance in taking into account how confident a citizen feels about their ability to use digital resources and how those perceptions translate into e-government activities.

Finally, future research surrounding digital inclusion should be dedicated to the promotion of reframing the ways in which technology can enhance both the individual and collective experience by cultivating a movement toward civic innovation. Reformation in perspective regarding this concept could include the incorporation of an ecological framework within municipal systems working to address digital inequity. In this, the Community Psychologist must consider that “the principle to remember is that we are there to link the immediate concerns with larger structures of inequality” (Nelson & Prilleltensky, 2005, p. 164).

The CDI project confirmed what previous scholars have found, which is that some groups are consistently lagging behind in access; however, it also uncovered contextual nuances that can encourage digital engagement with government. Reframing the lens in

examining the issue proved to challenge the traditional notion that the mere presence of material resources was the most influential predictors of digital engagement. In fact, most research to date has centered on digital access has focused solely on the provision of technology access which over time has demonstrated an ineffective practice (Hsieh et al., 2014). This misconception has led to a myopic strategy for measurement and advocacy surrounding digital access which is, in part, a consequence of a lack of an inclusive and ecological framework within scholarship (DiMaggio et al., 2001). The present study adds to the growing empirical philosophy that encourages formal institutions to acknowledge implicit influences as equally important facets of digital inclusion promotion.

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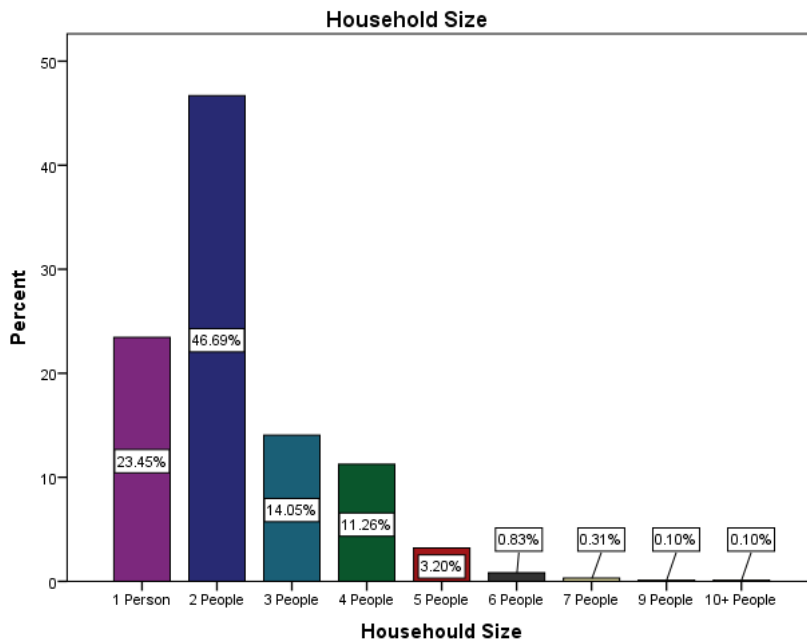
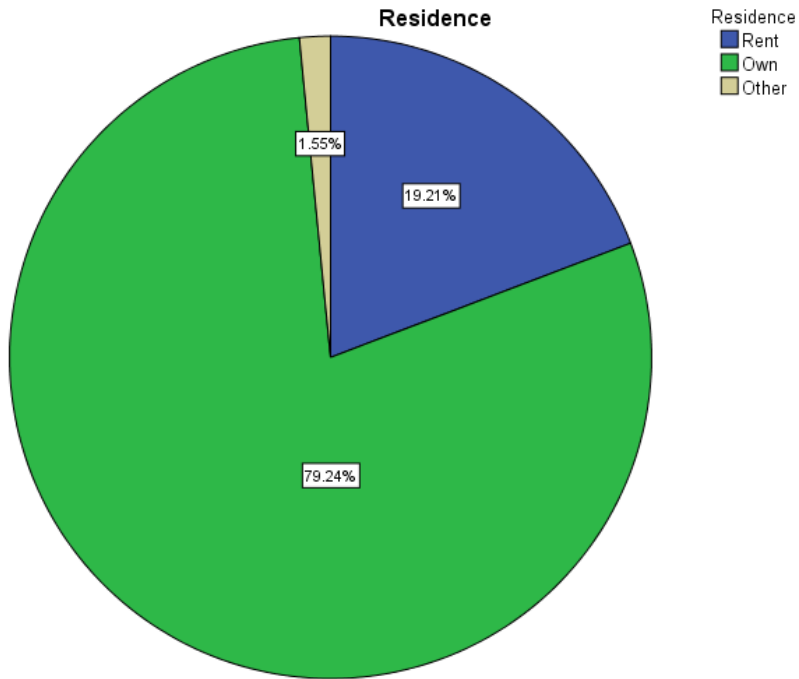
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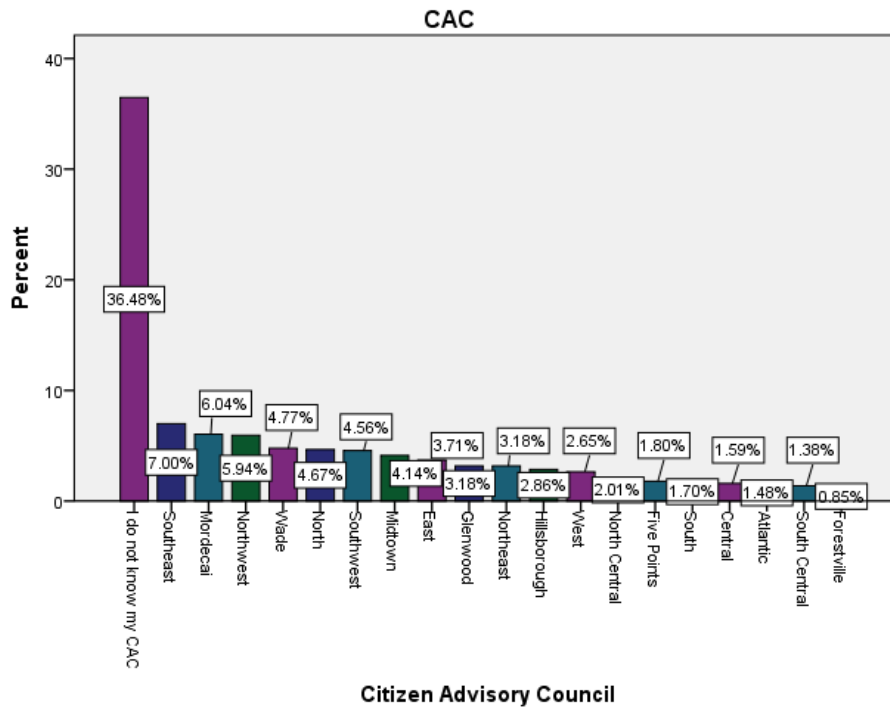
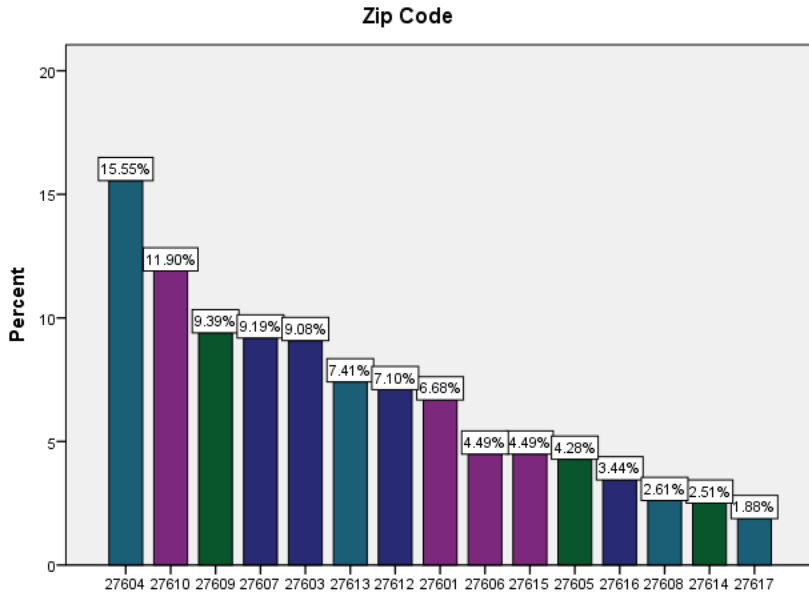


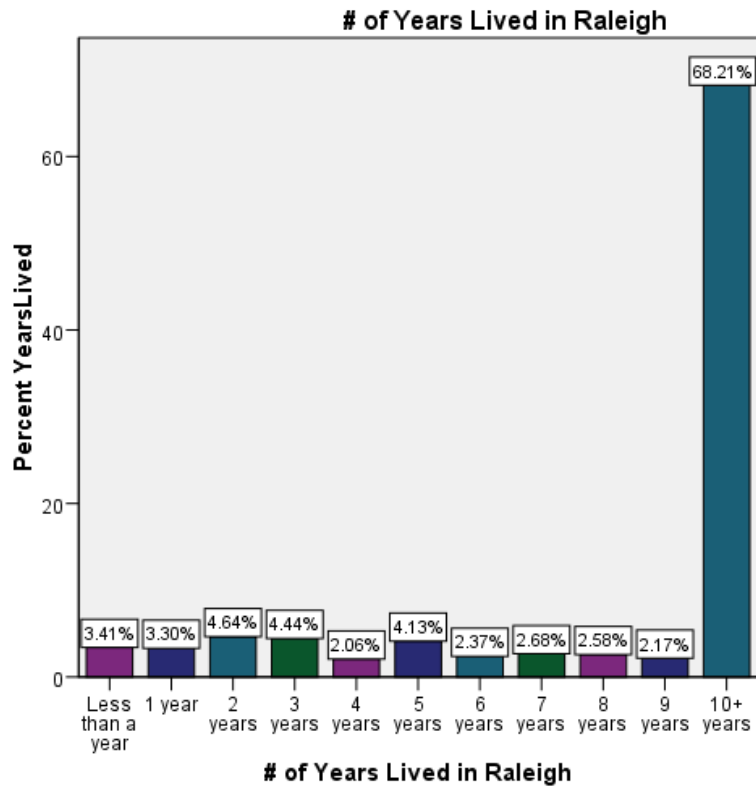
## APPENDICES

## APPENDIX A: DEMOGRAPHICS

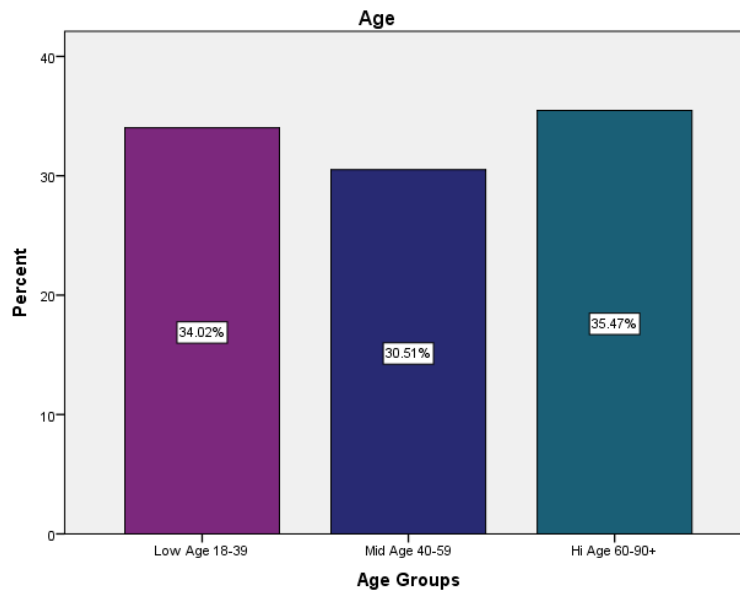
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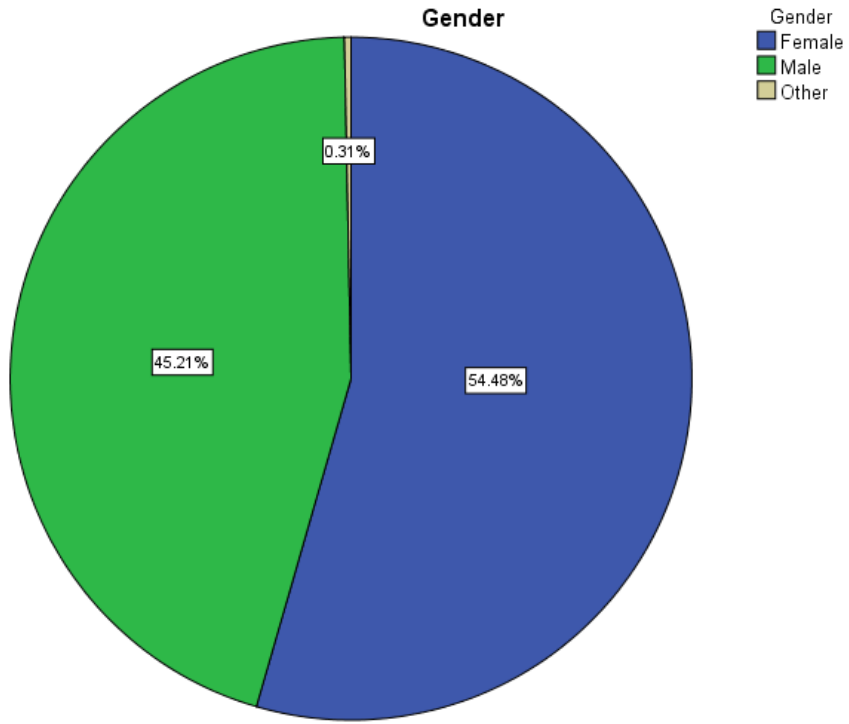


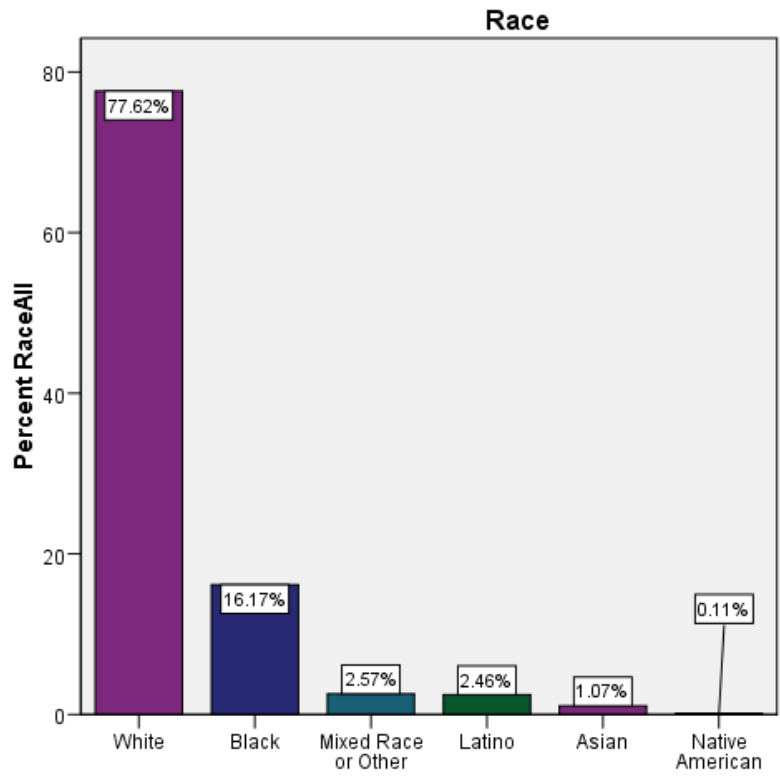


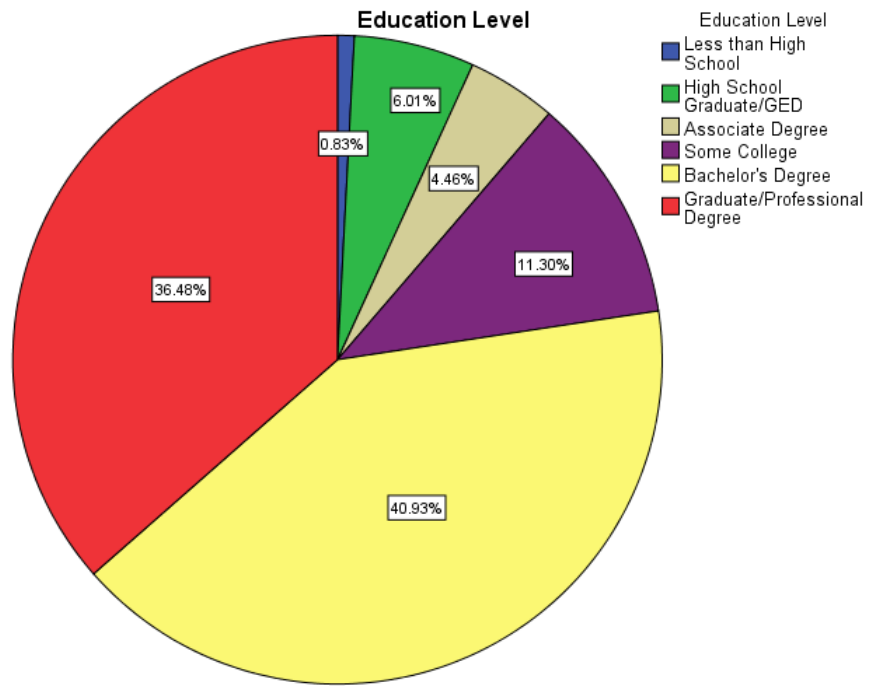


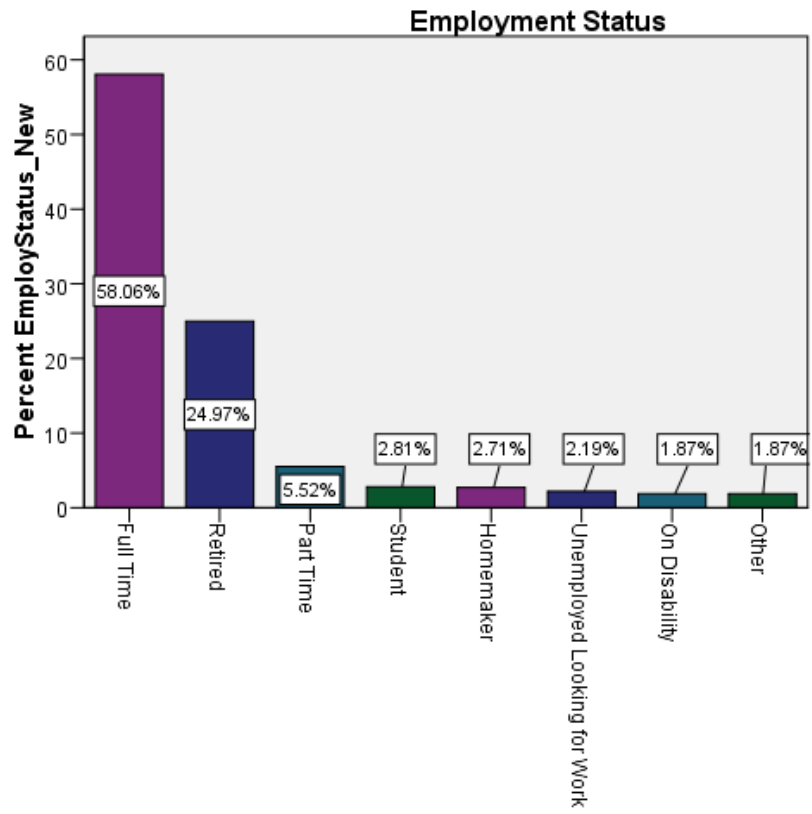
## General



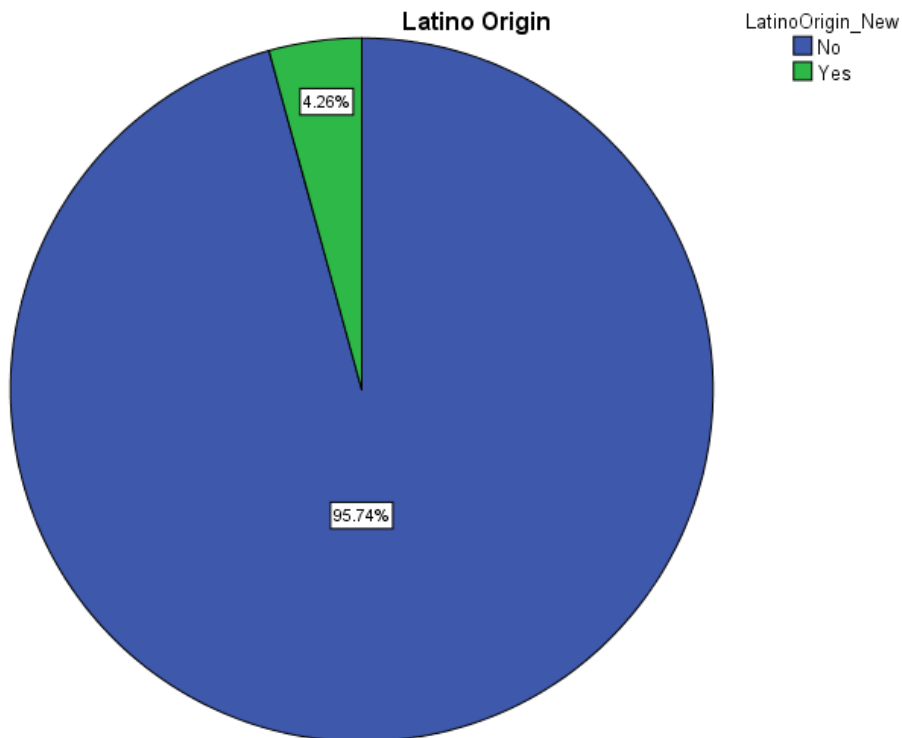
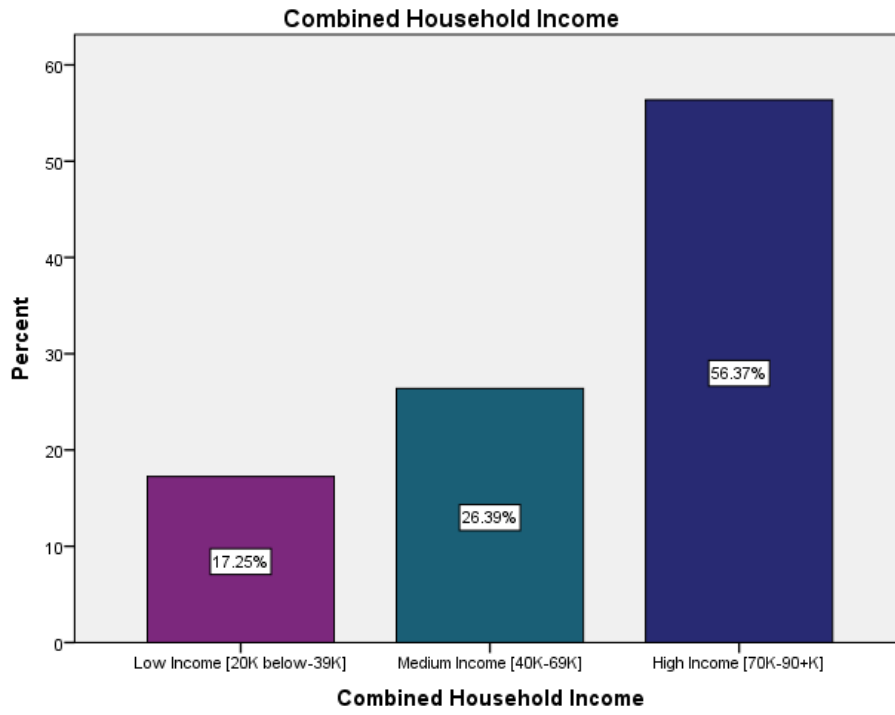




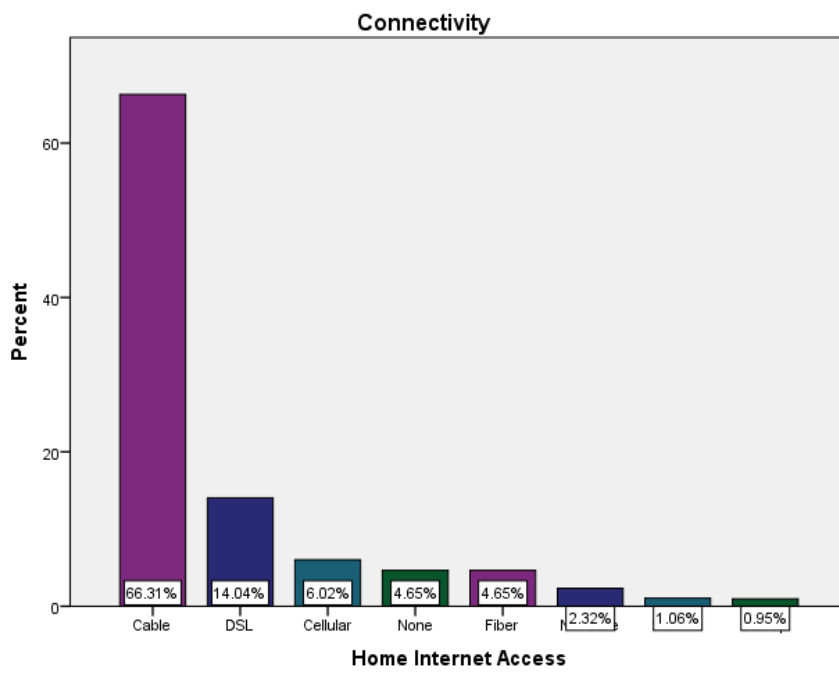
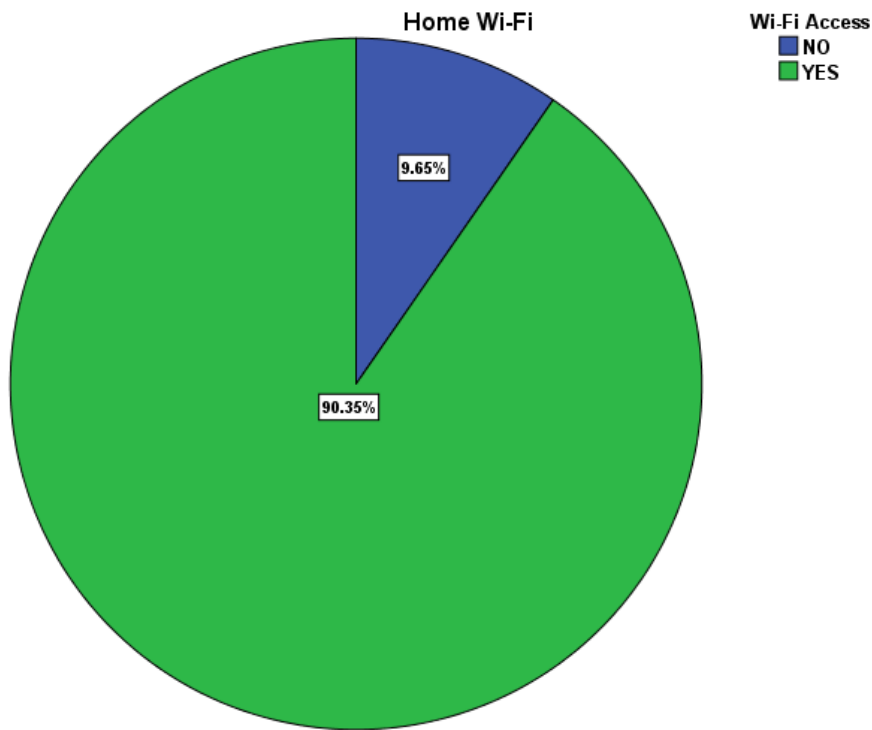


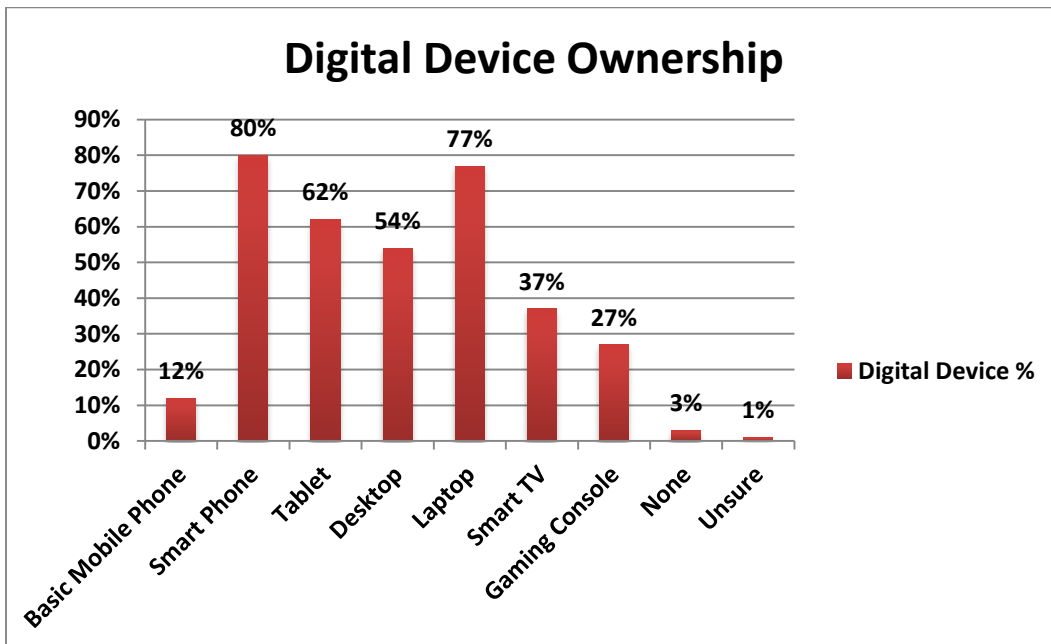
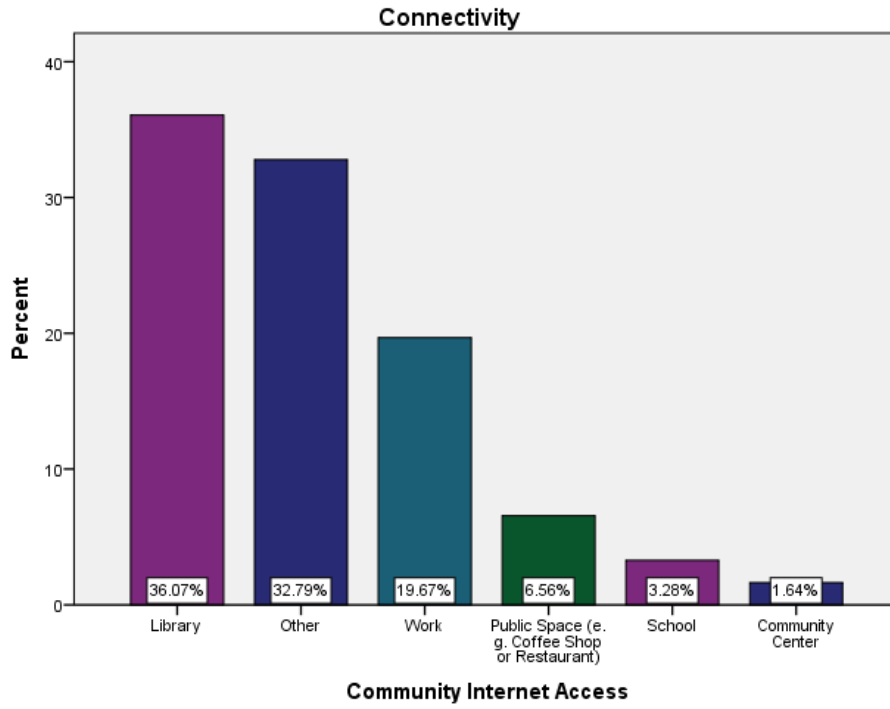


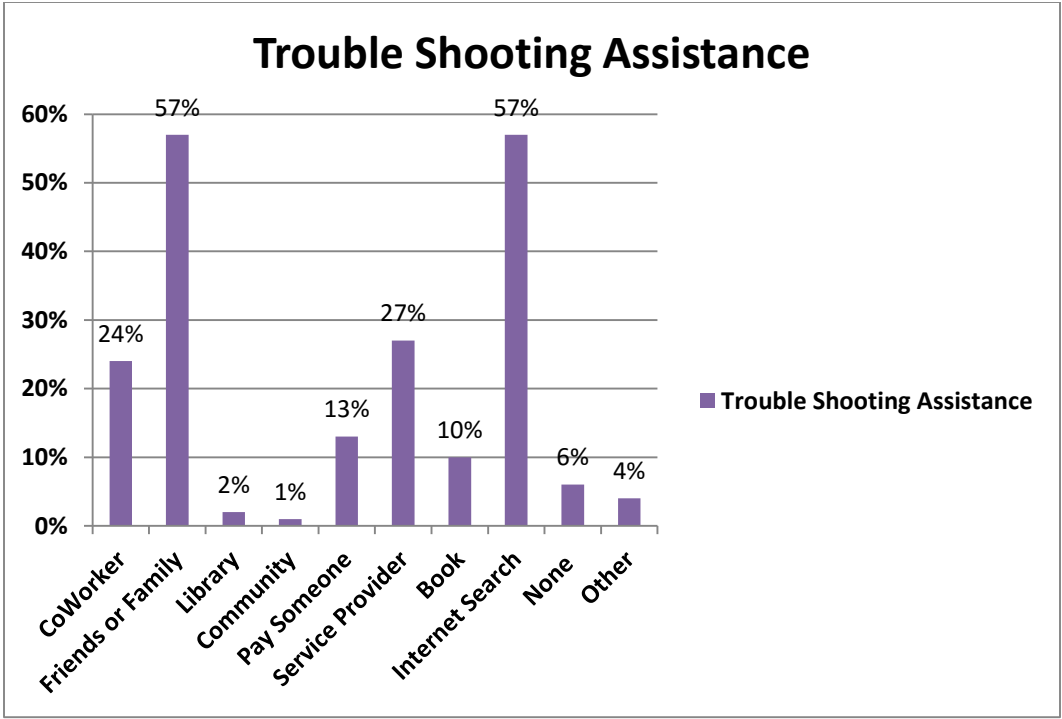




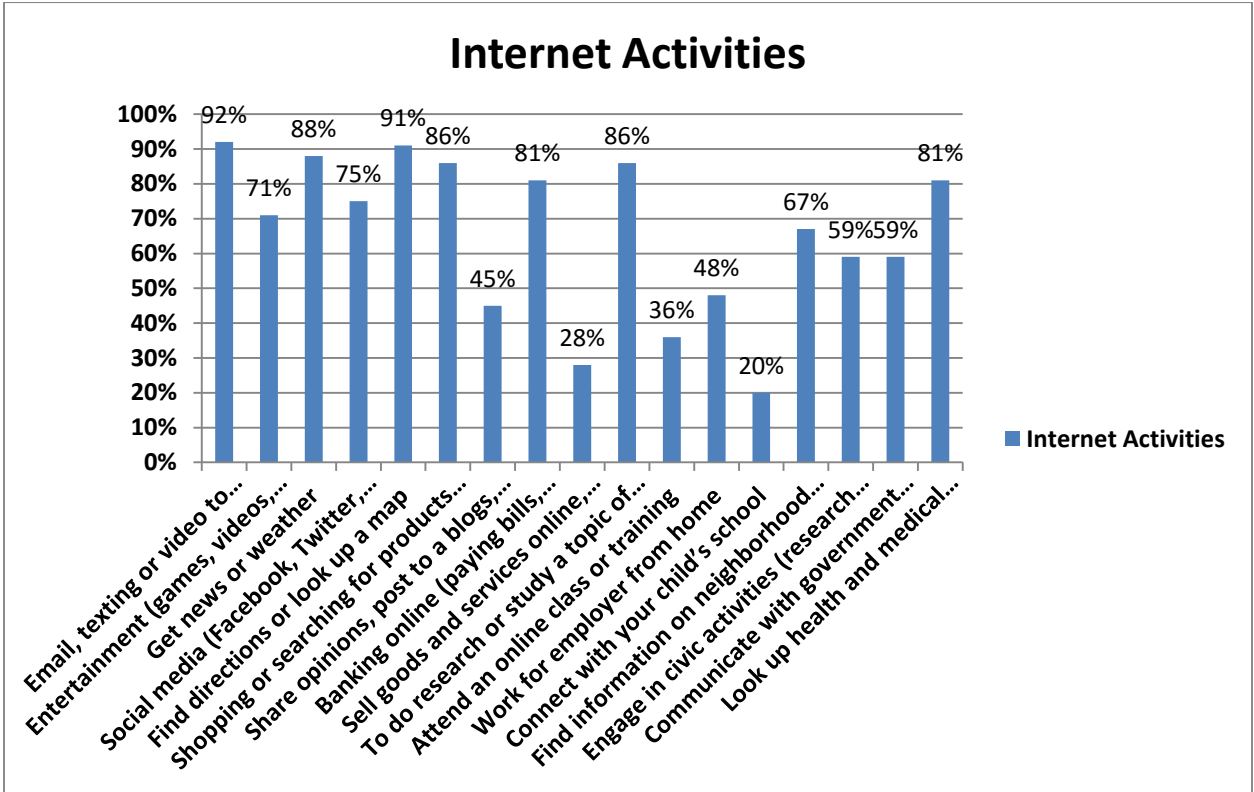
## OWNERSHIP, ACCESS & SUPPORT



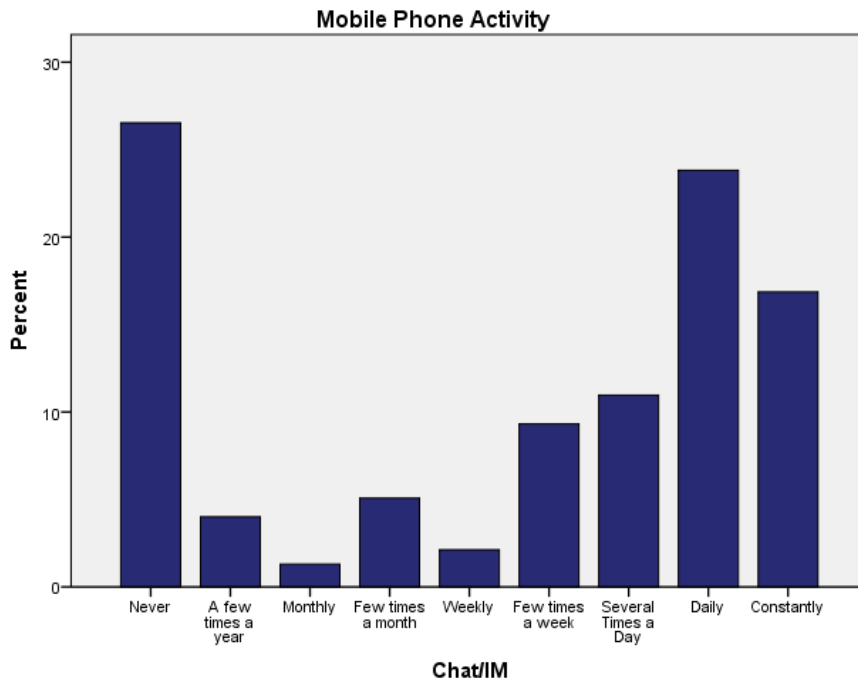
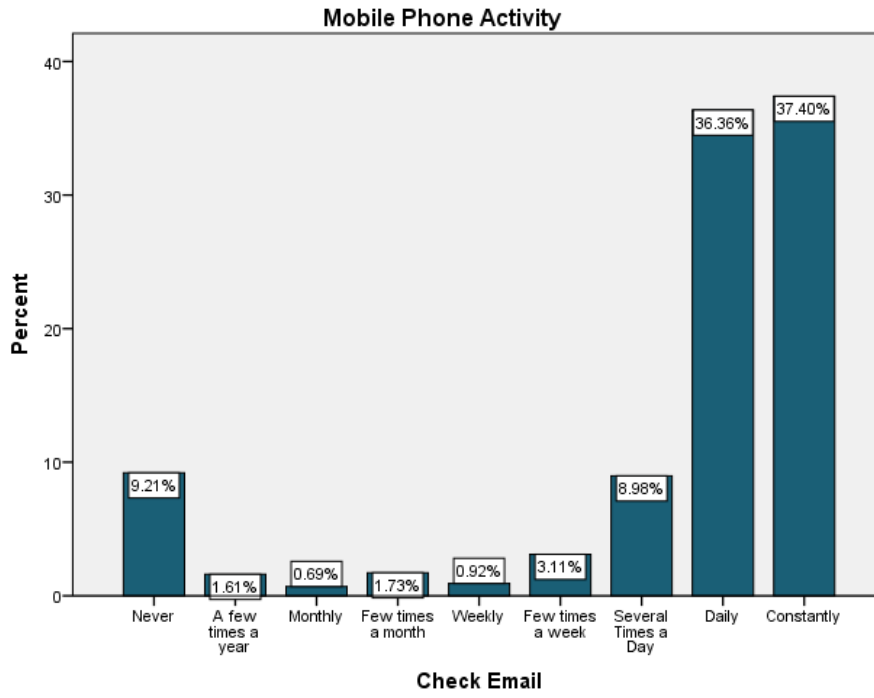


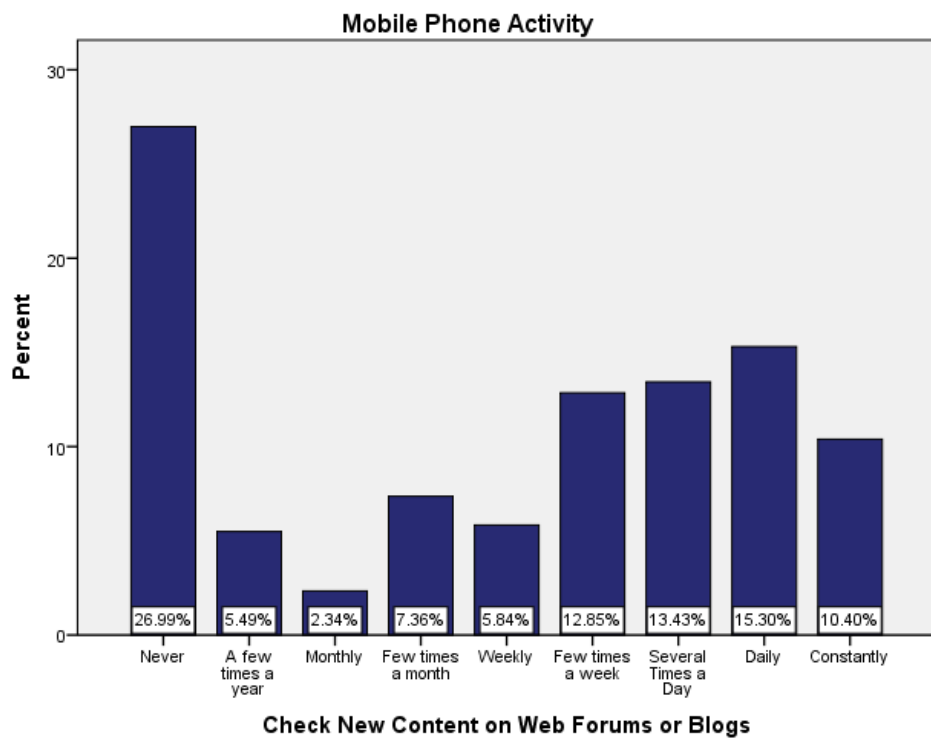
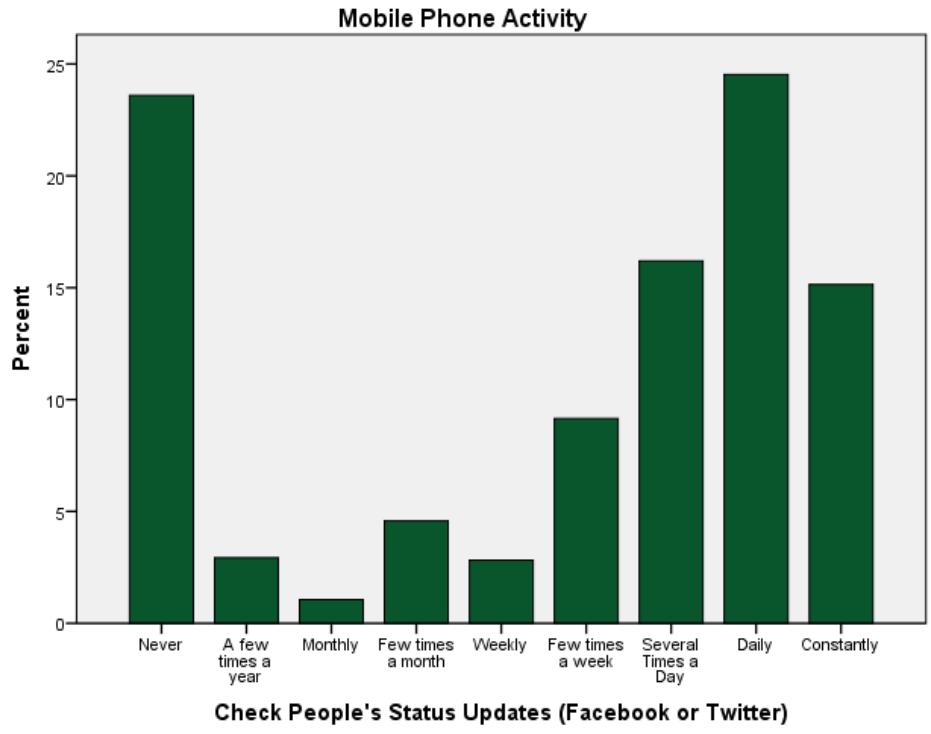


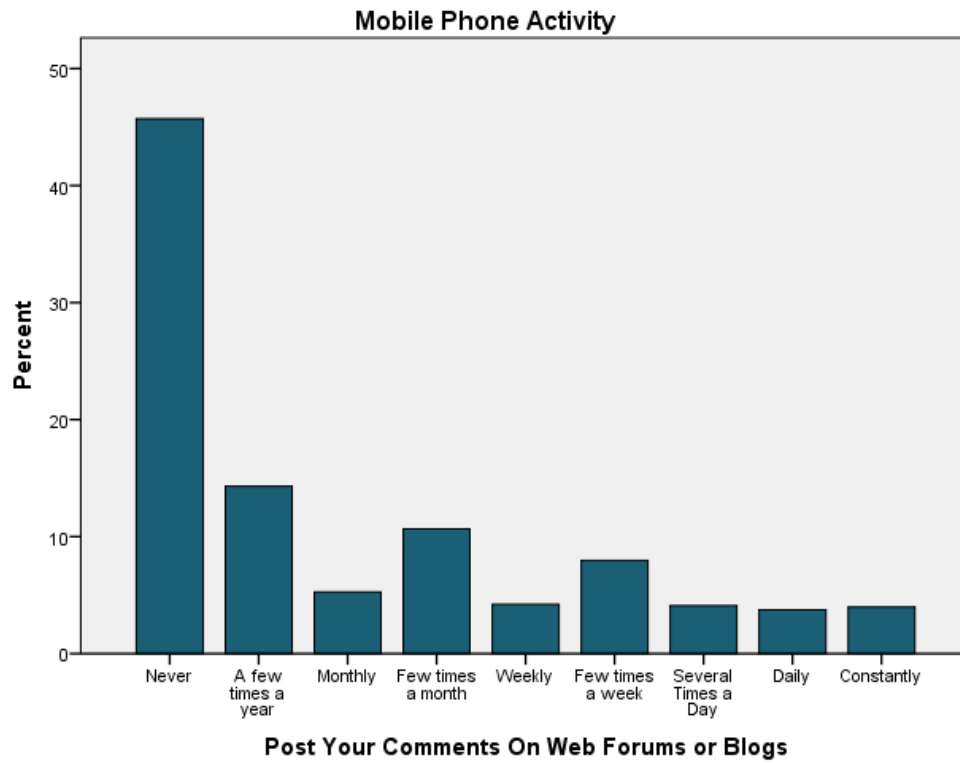
**ONLINE ACTIVITIES & TECHNICAL COMPENTENCIES**



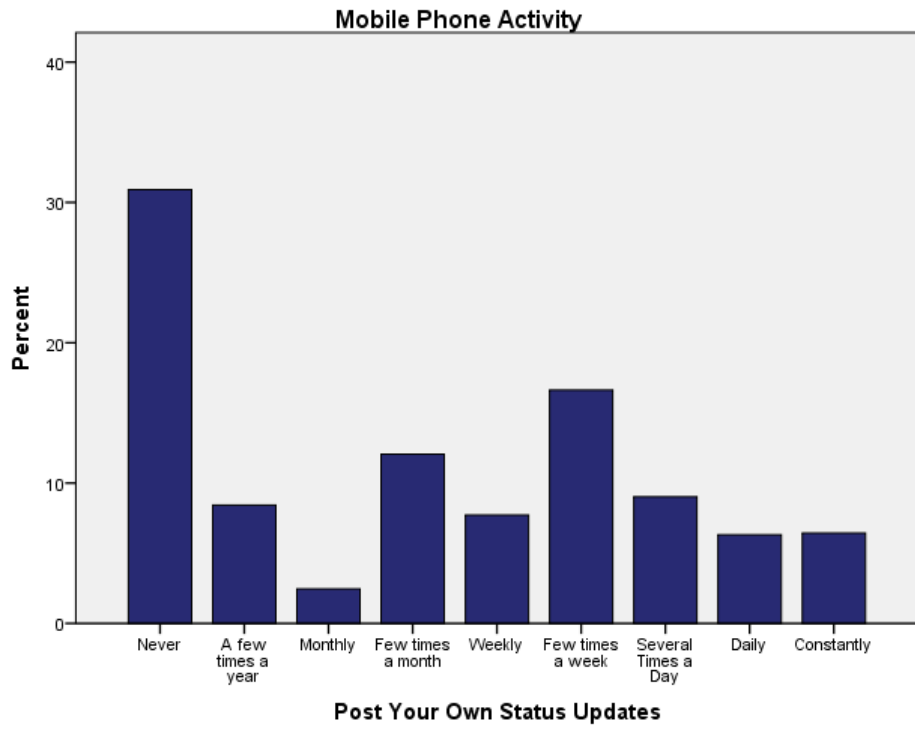
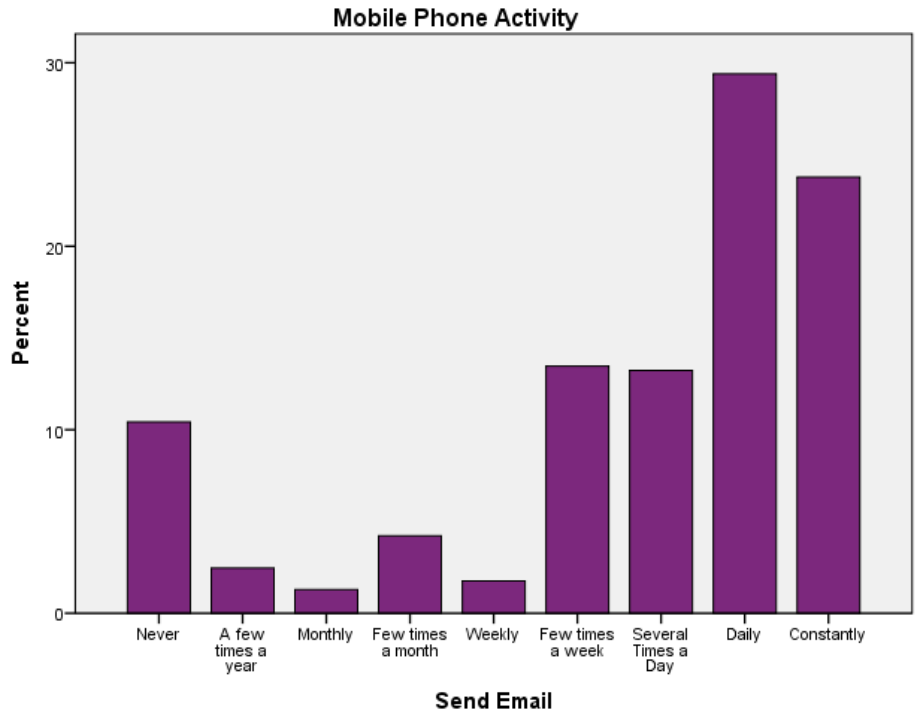
## Mobile Phone Activity



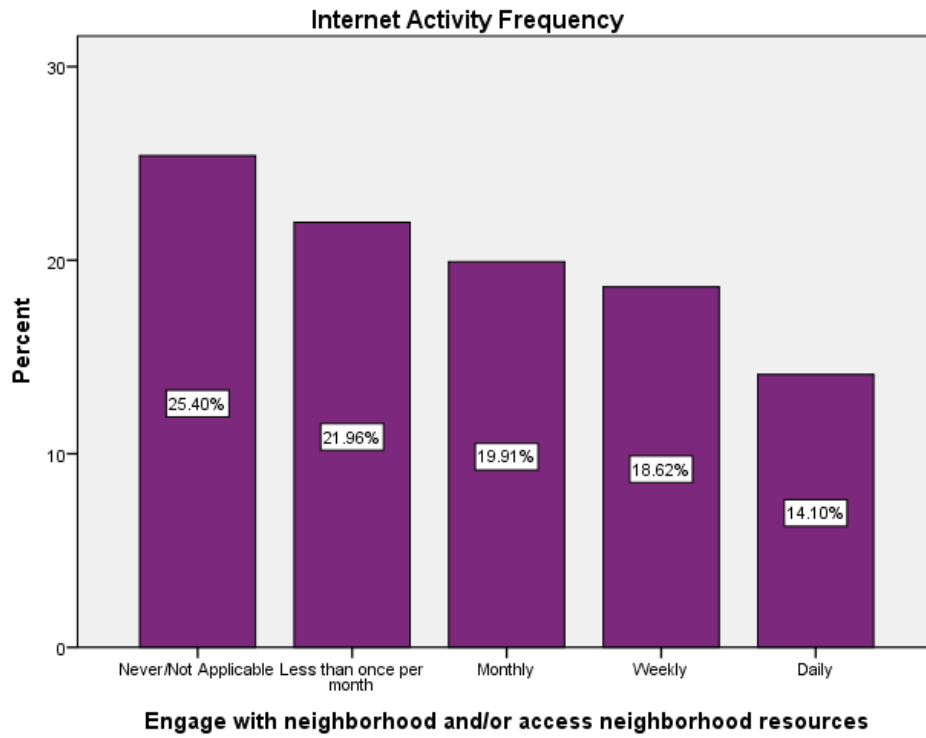


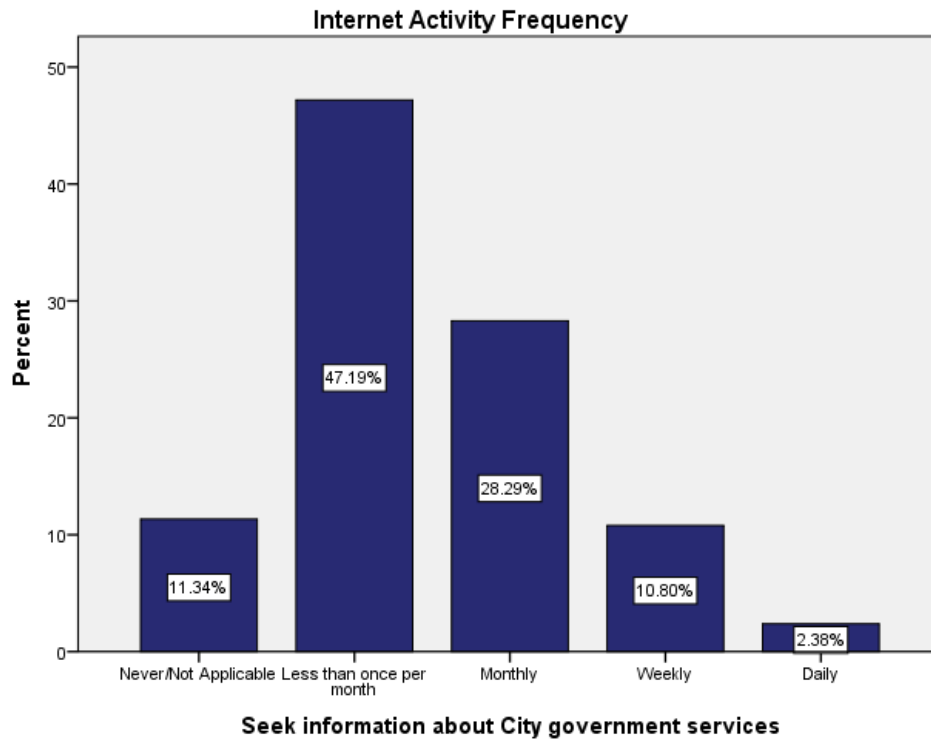


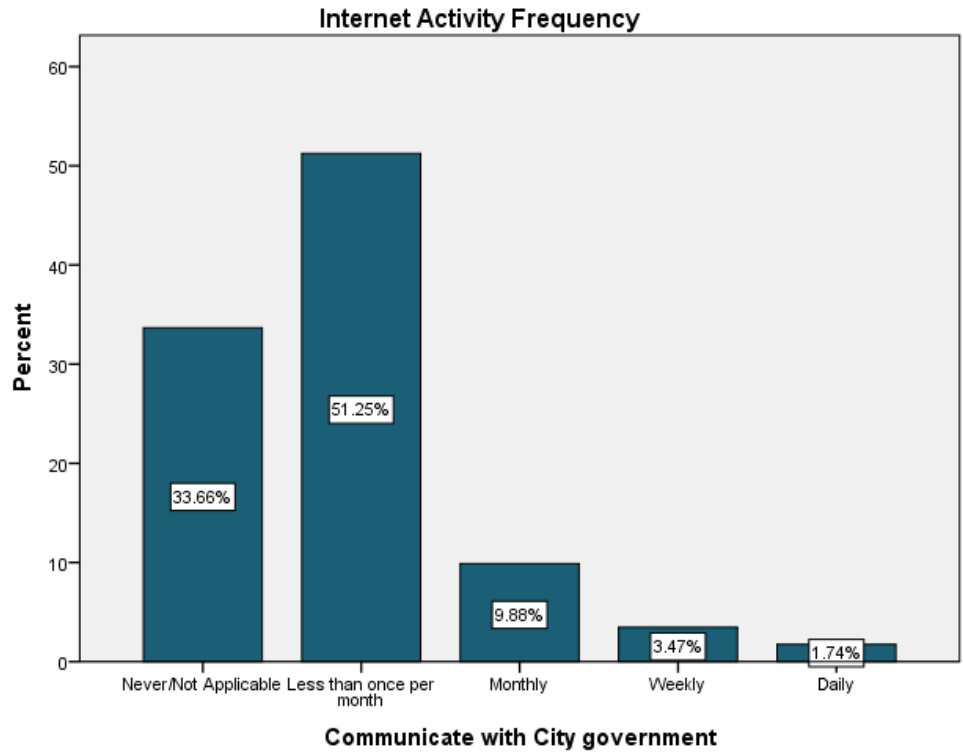


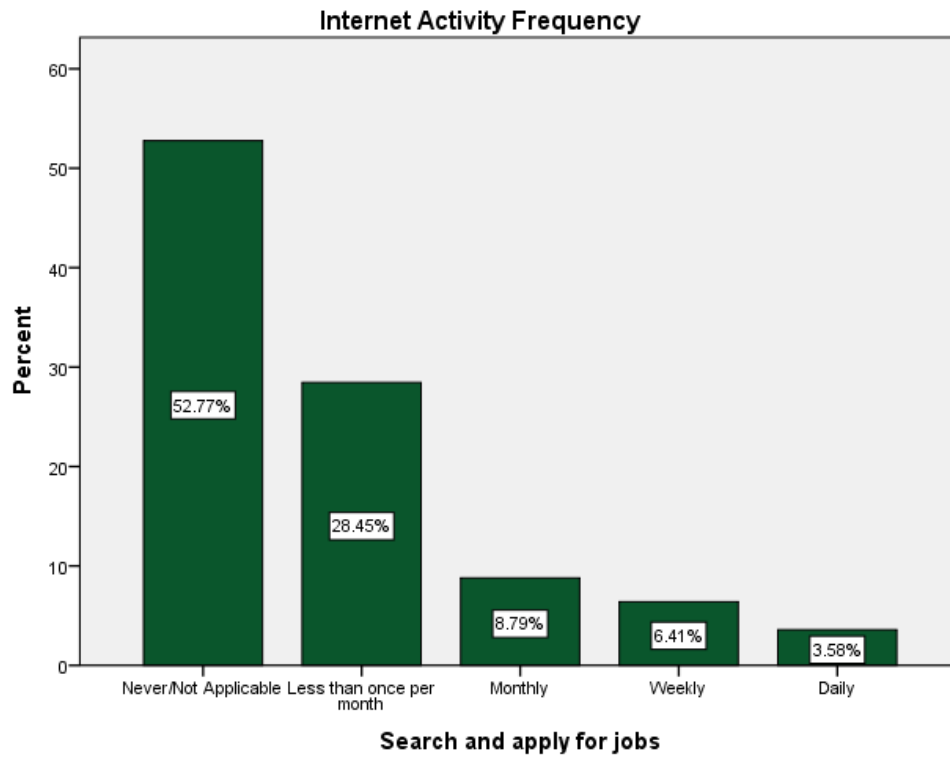


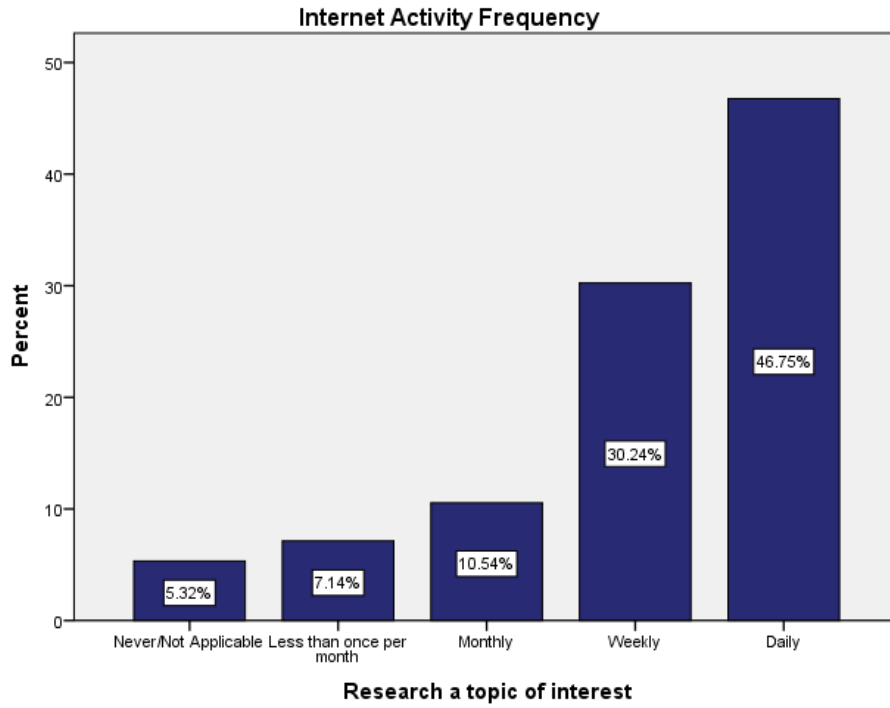
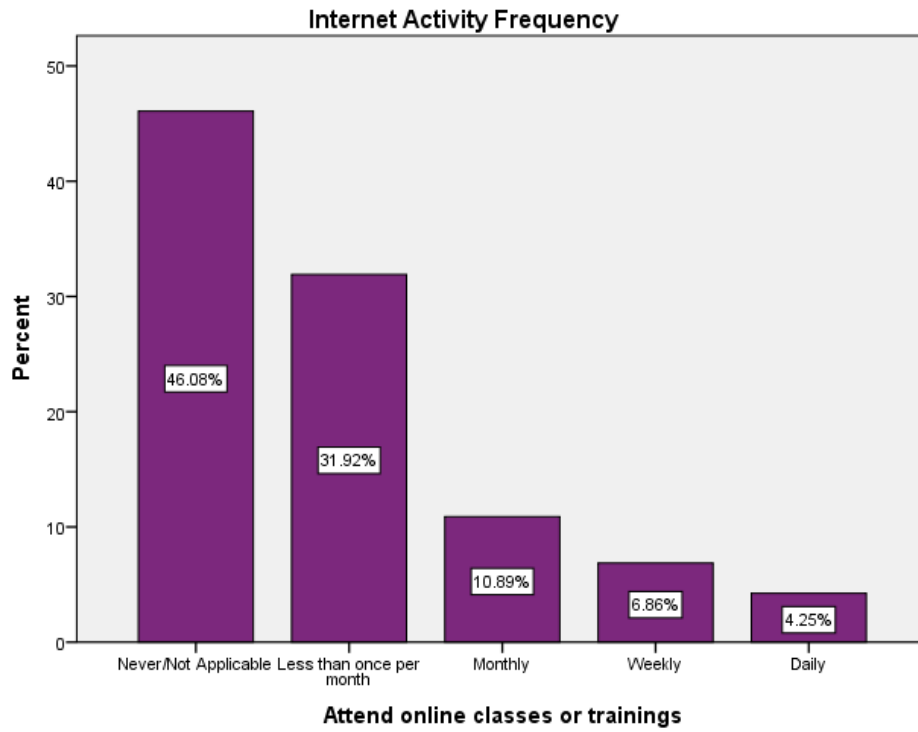
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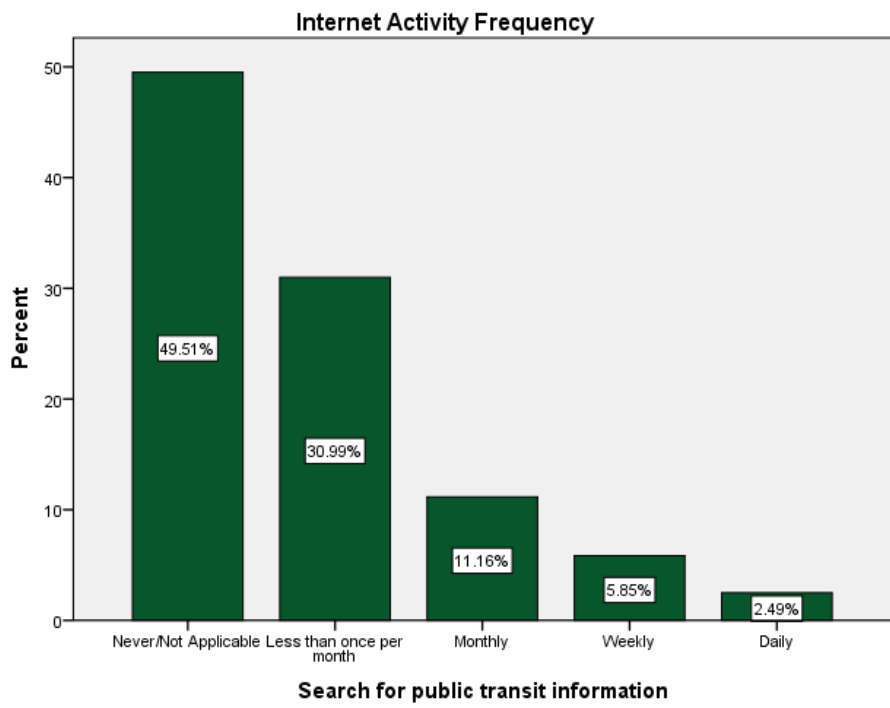
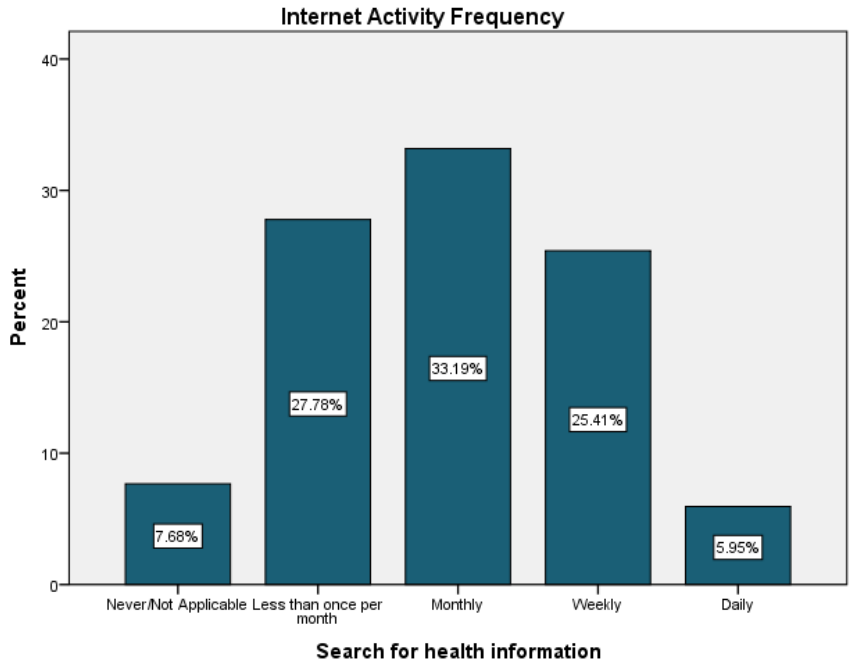


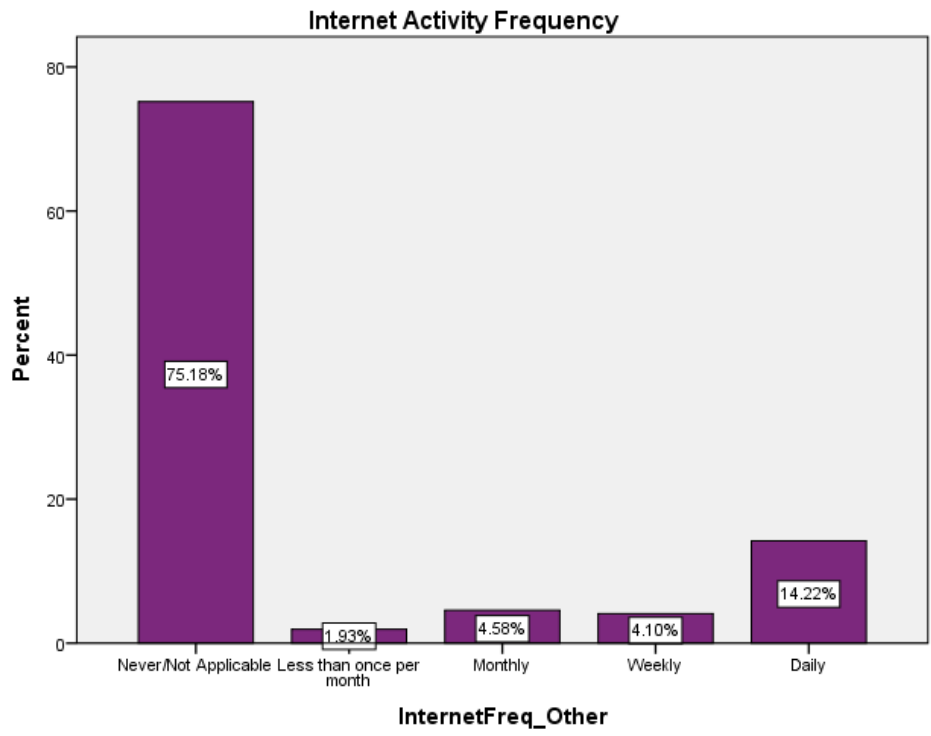






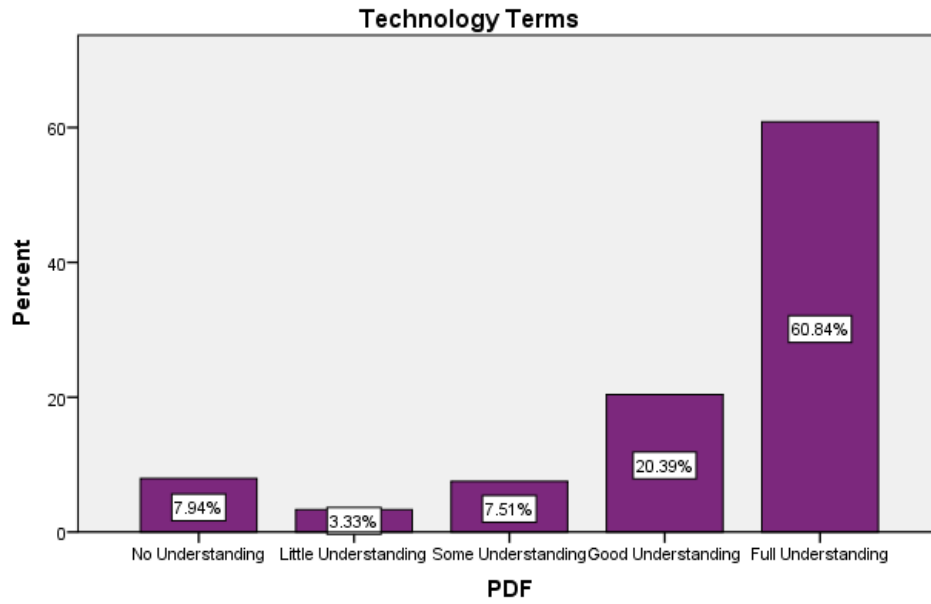


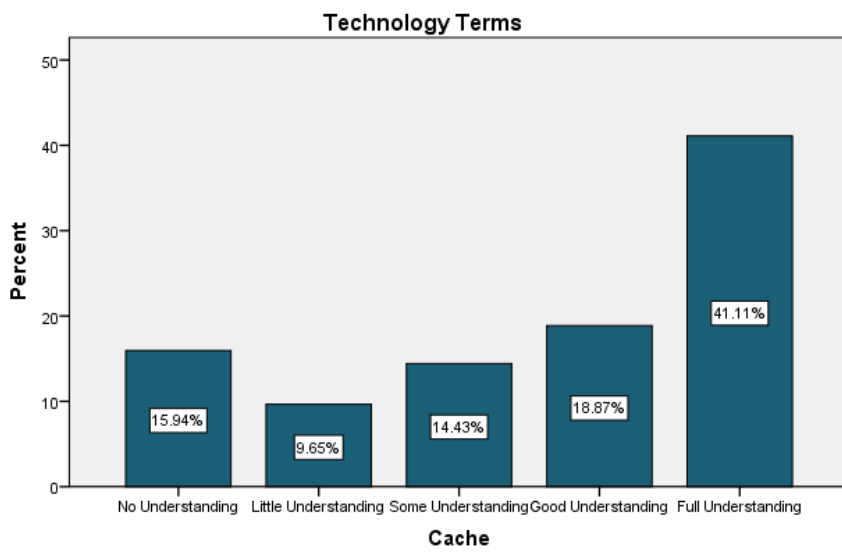
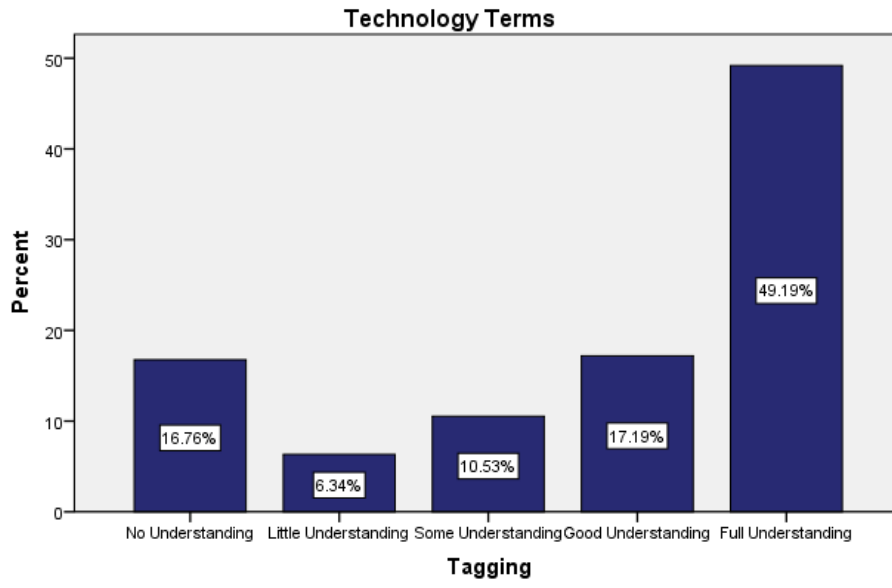


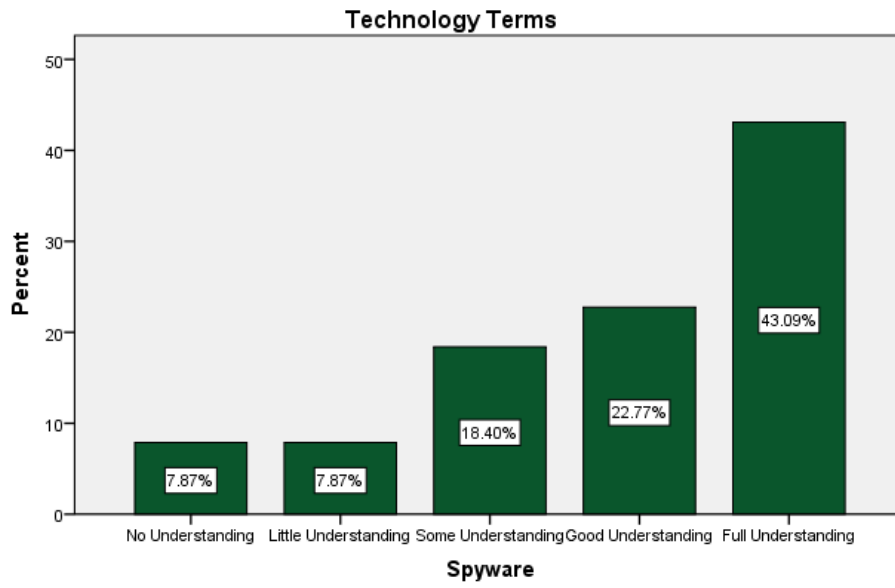


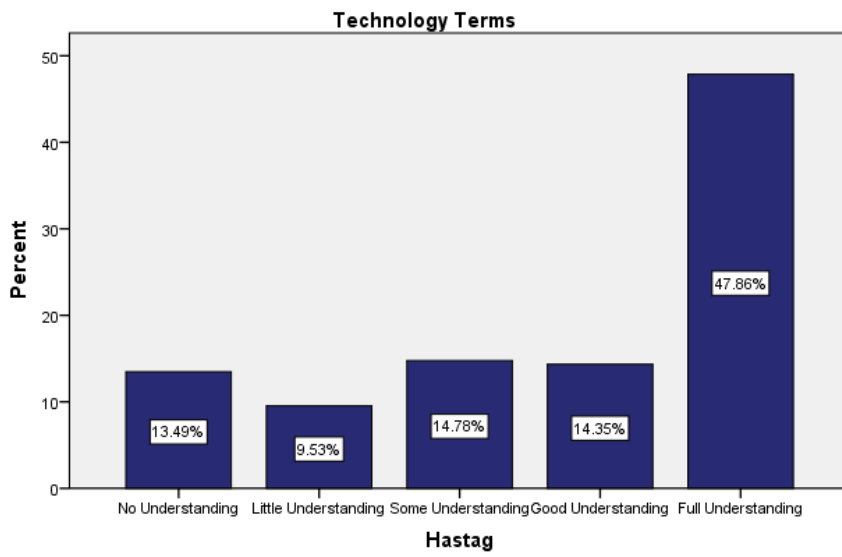
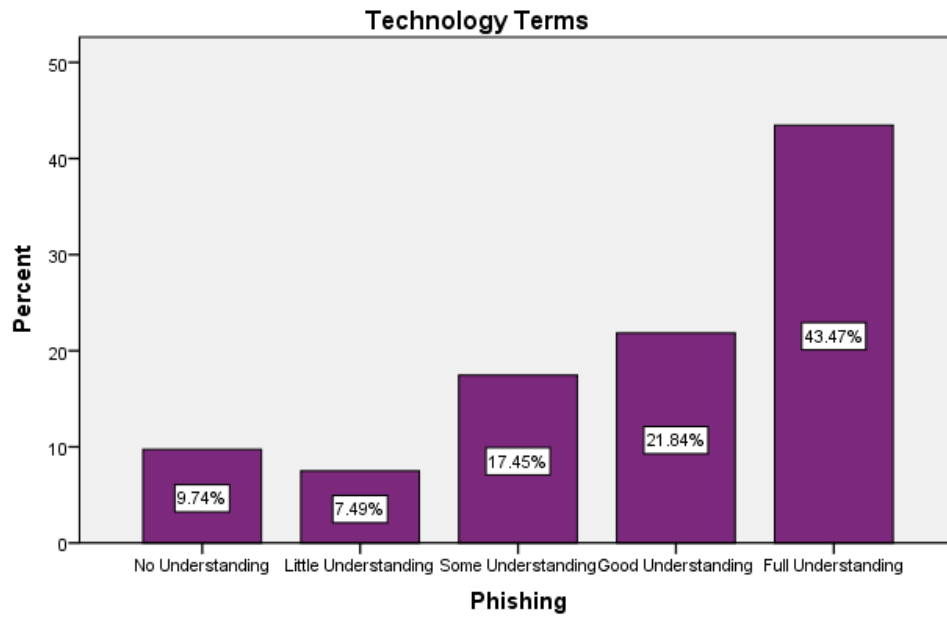


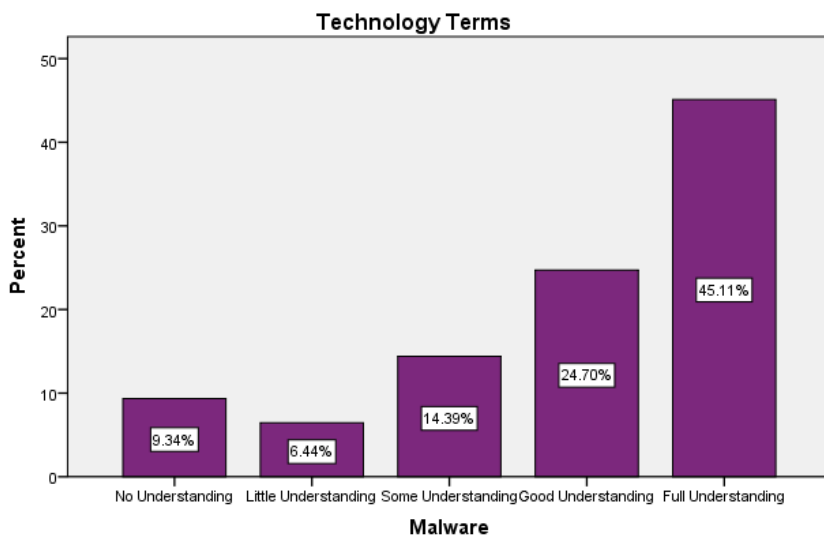
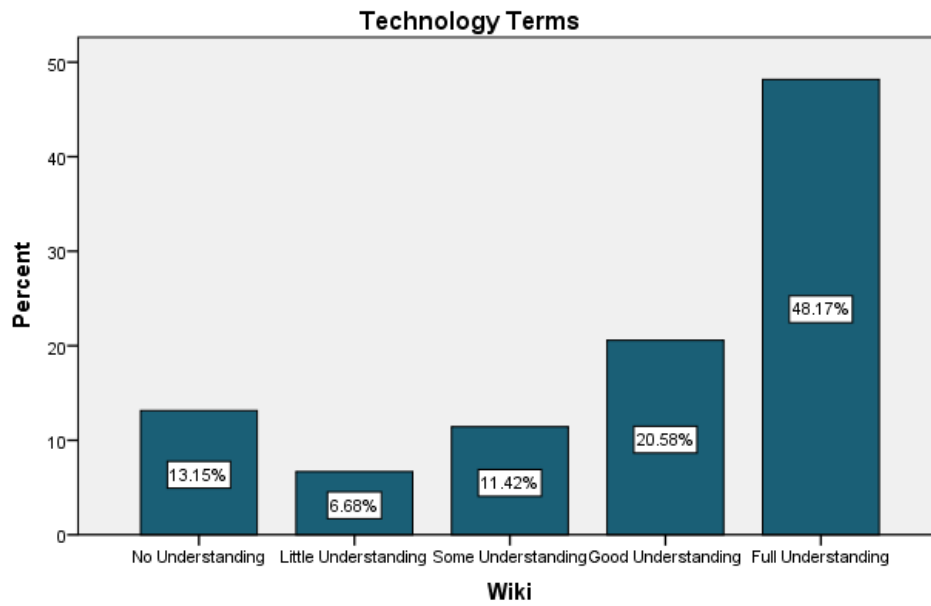
## Technology Terms

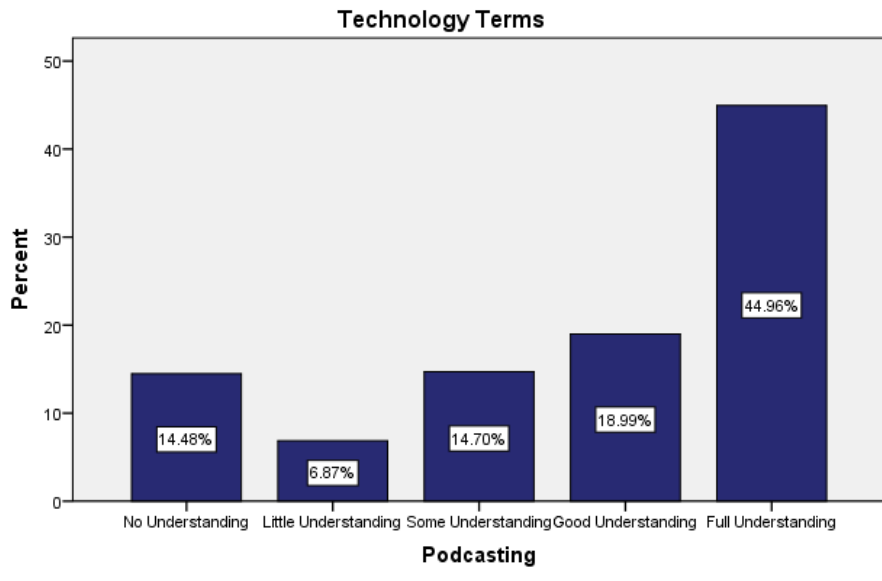


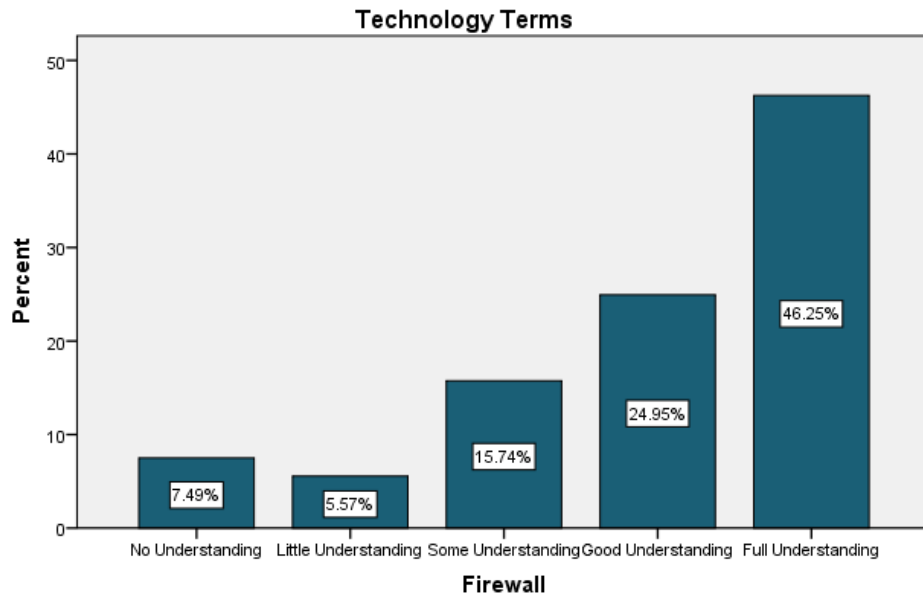


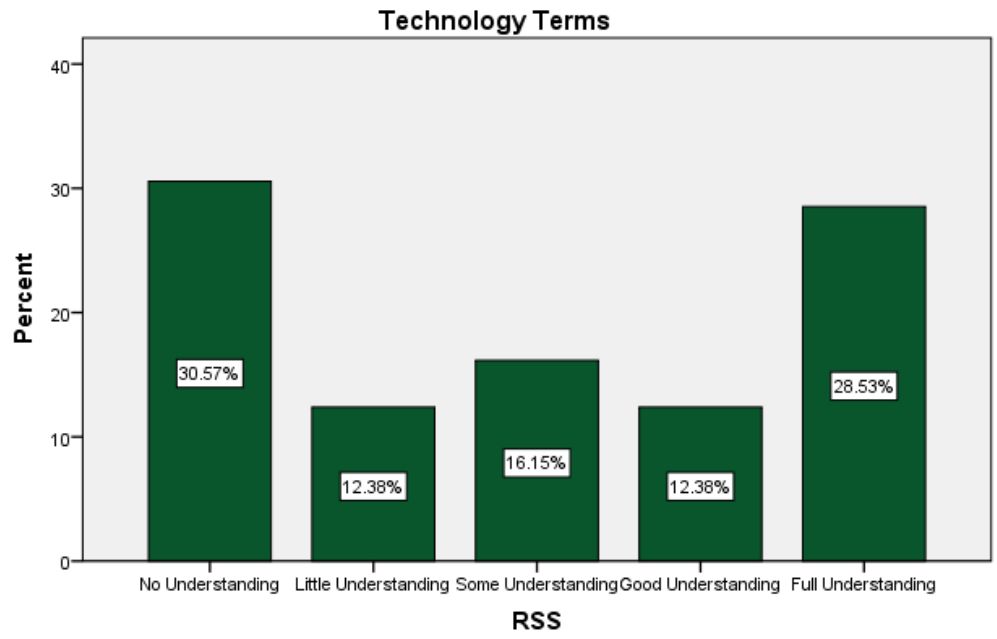




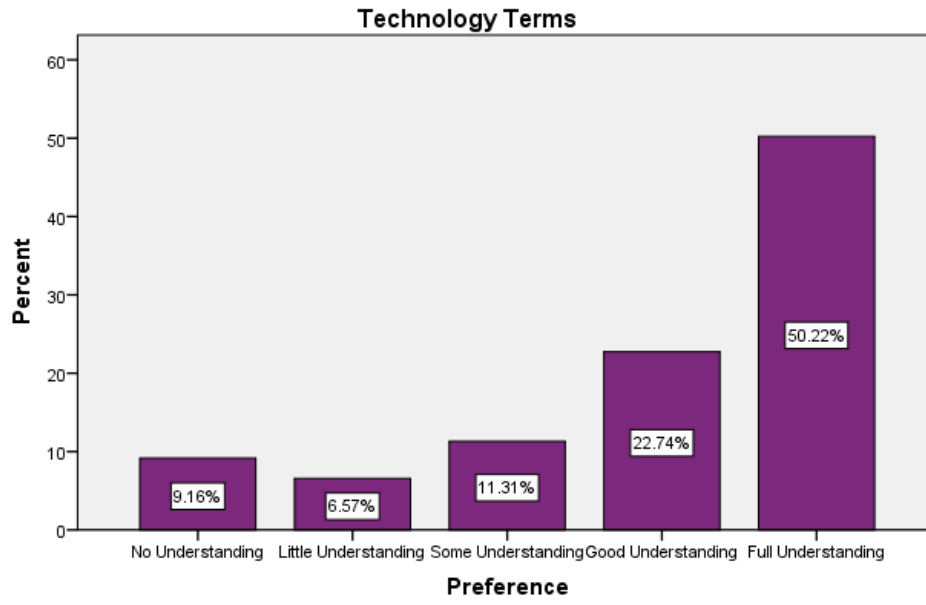


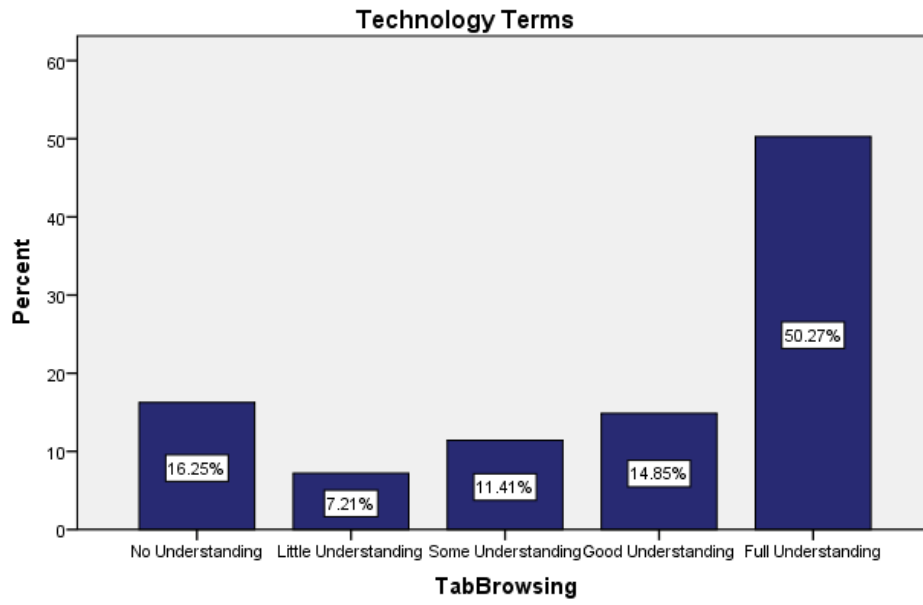


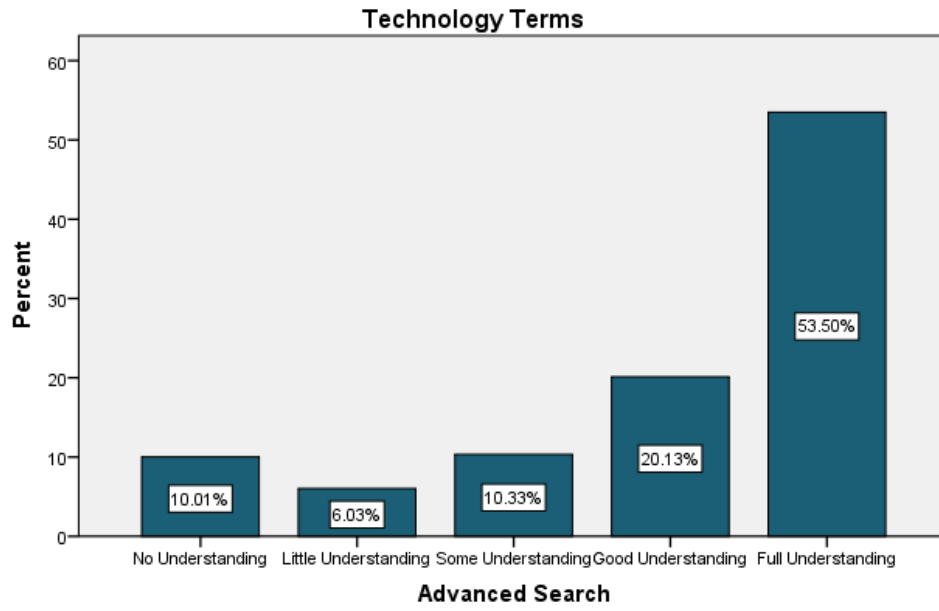


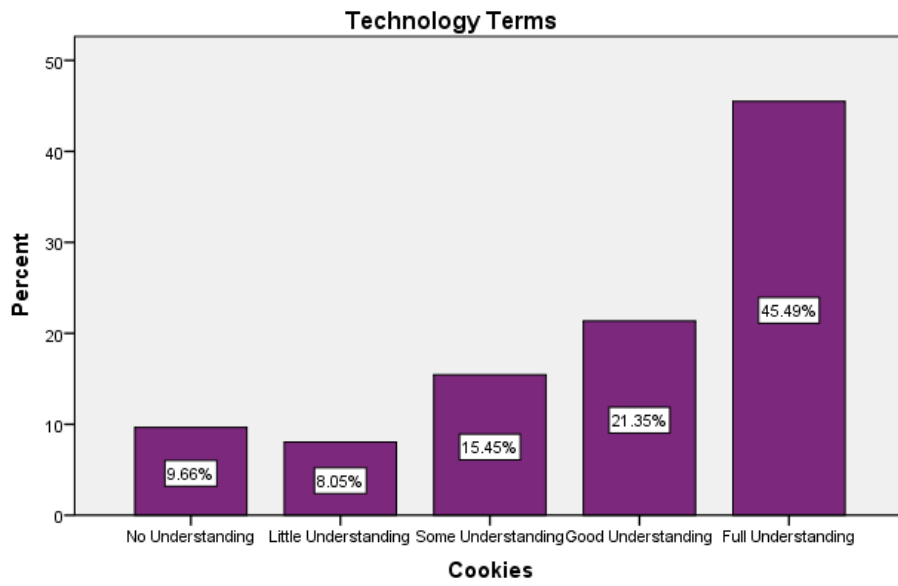
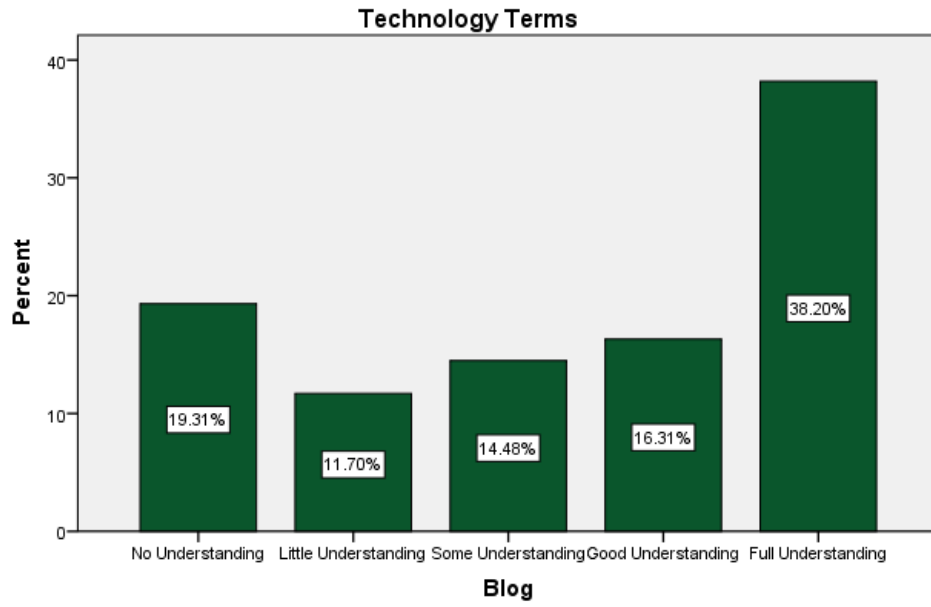






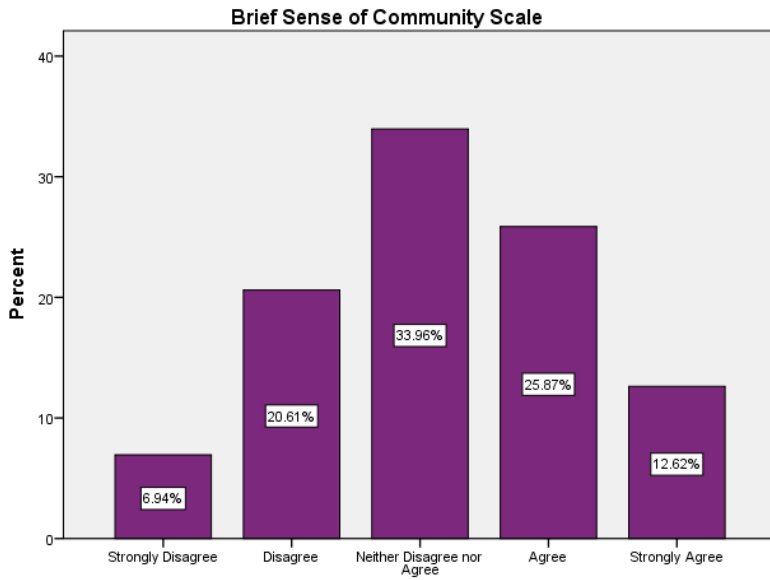




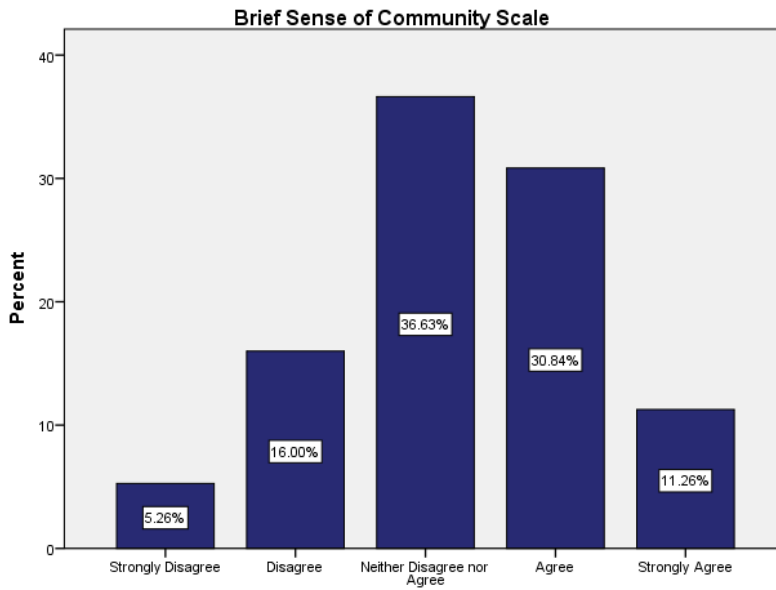


# ATTITUDES & SENSE OF COMMUNITY

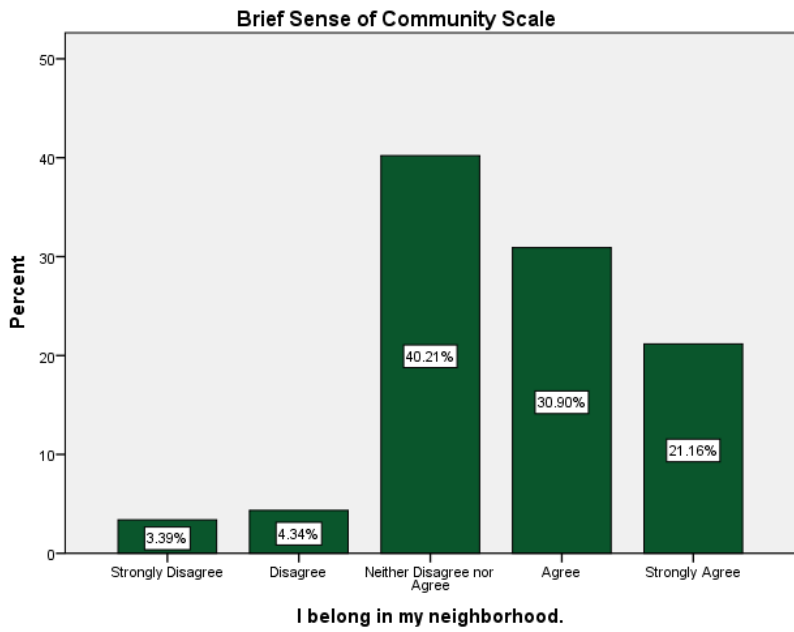
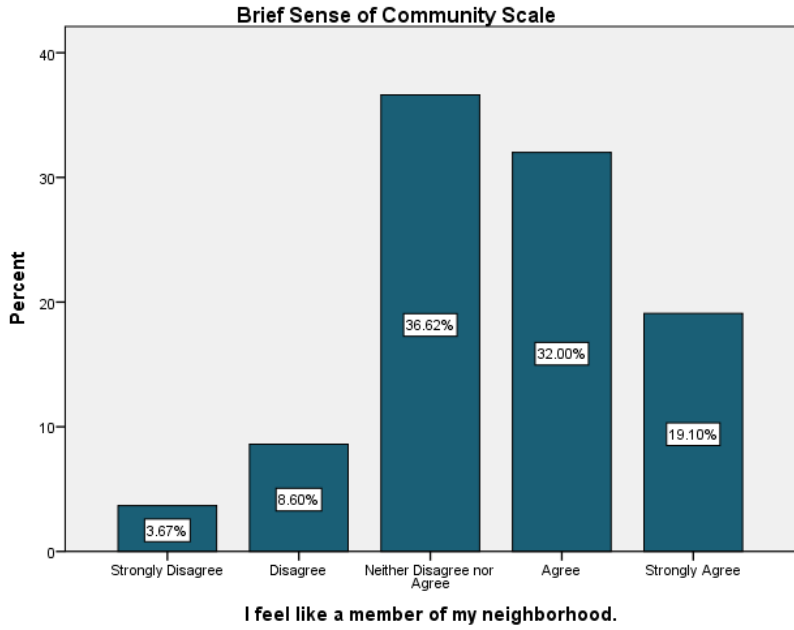
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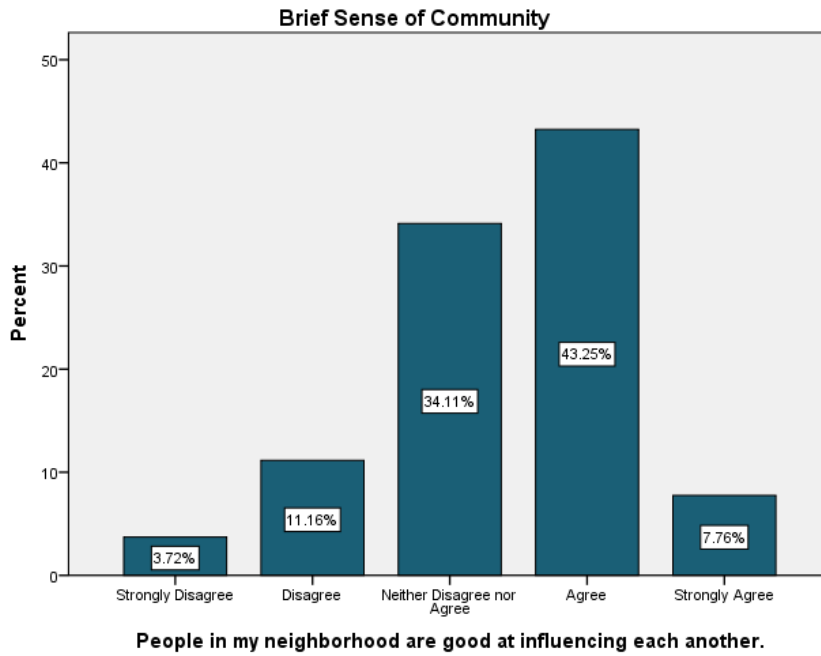
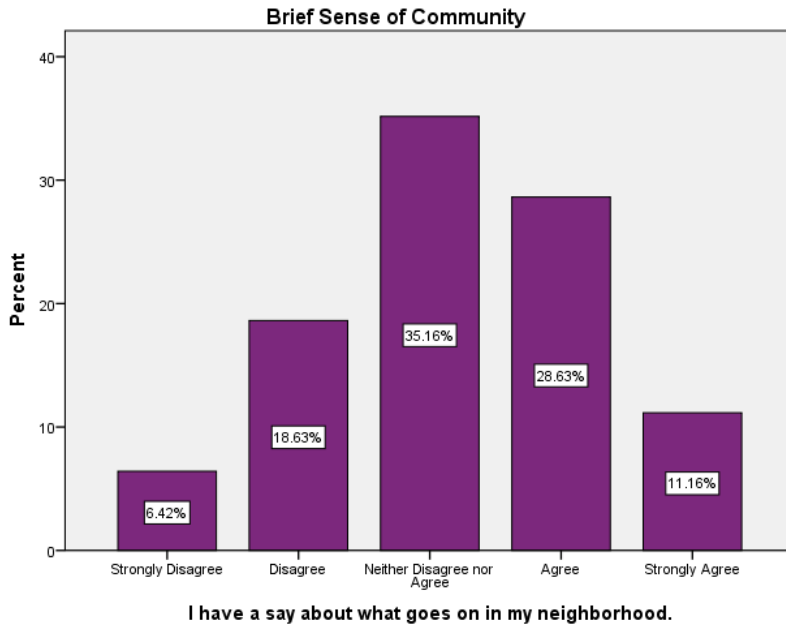


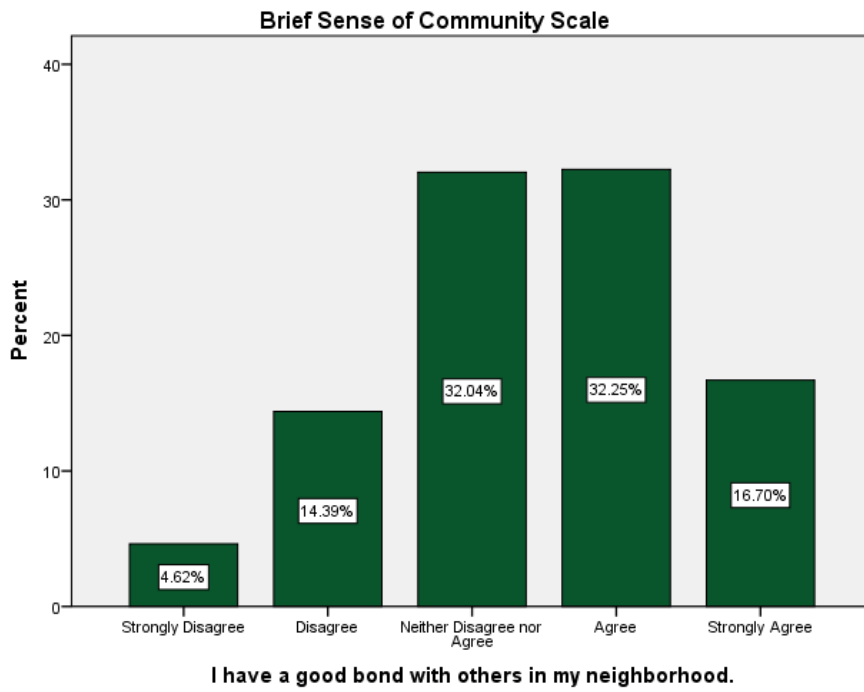
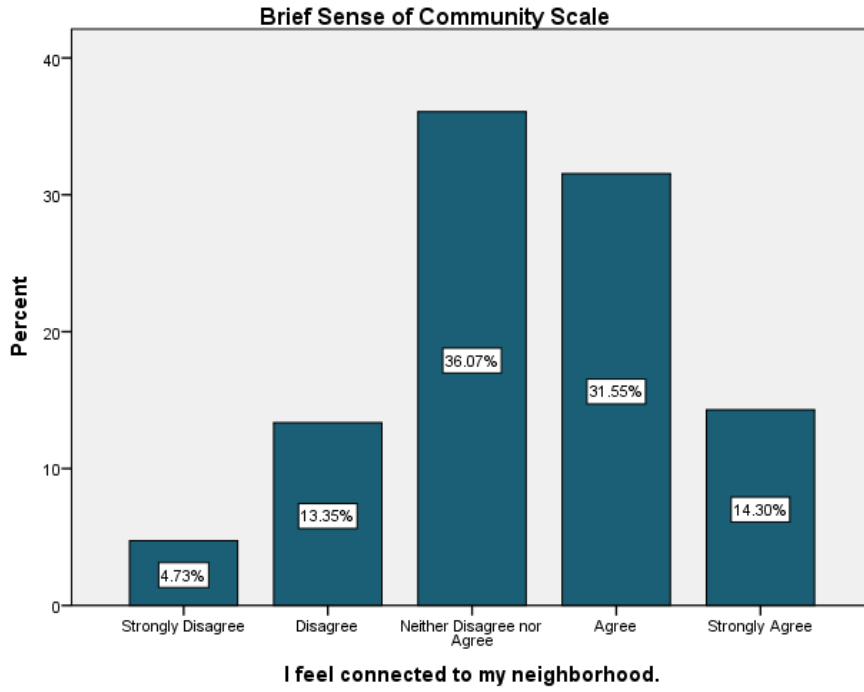
**I can get what I need in my neighborhood.**



**My neighborhood helps me fulfill my needs.**

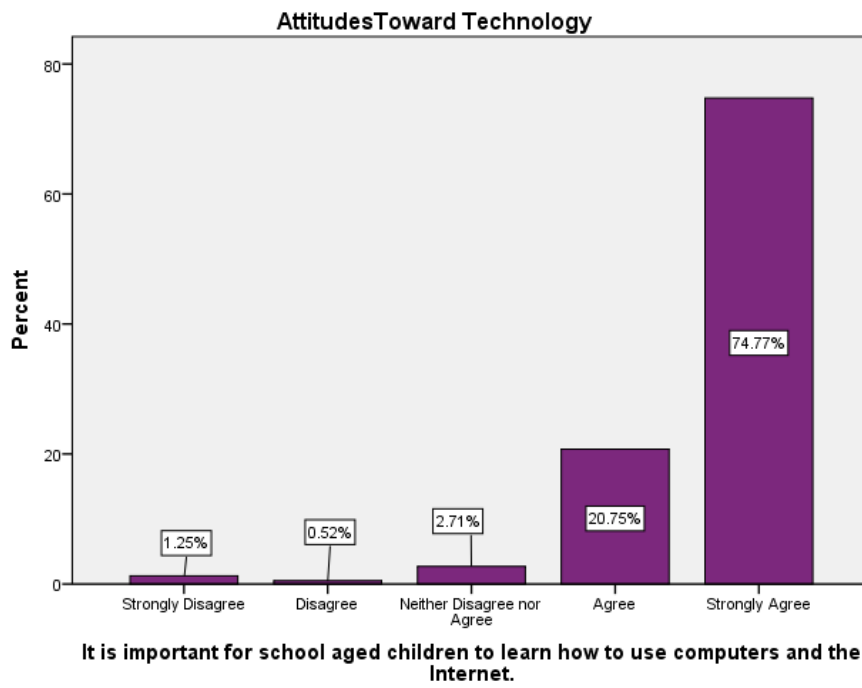


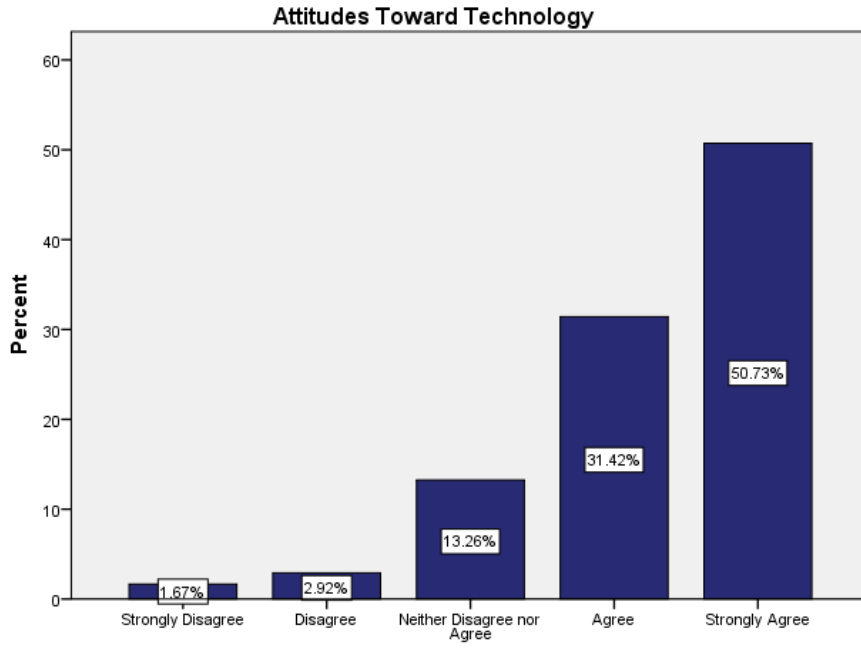




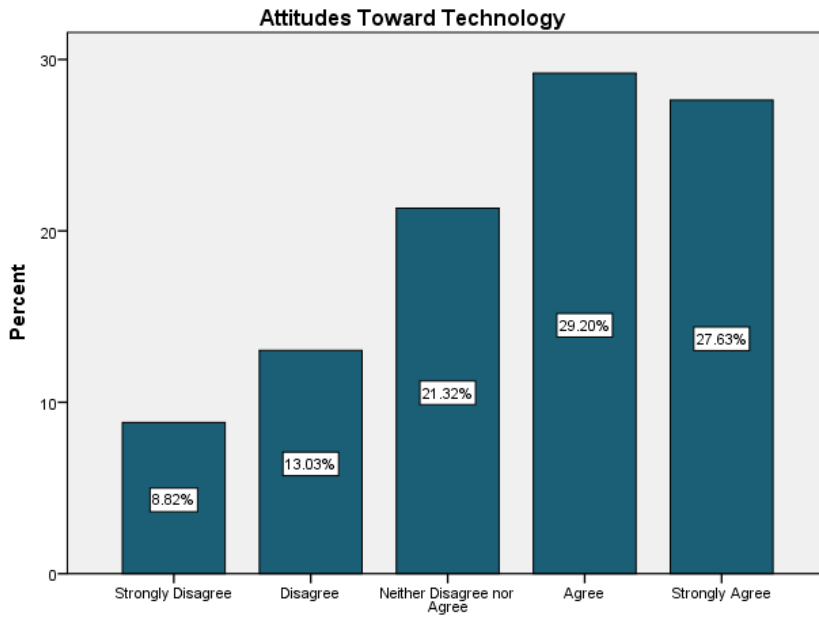


## Attitudes toward Technology

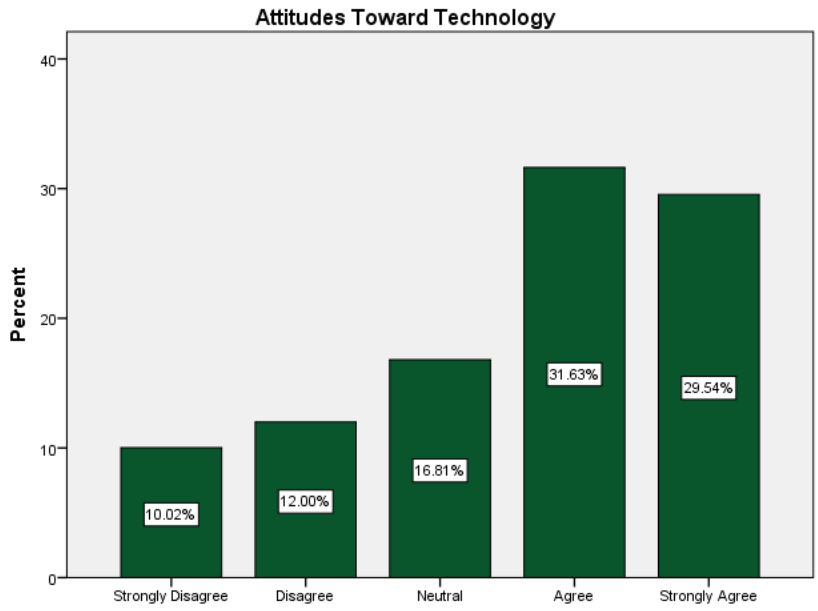




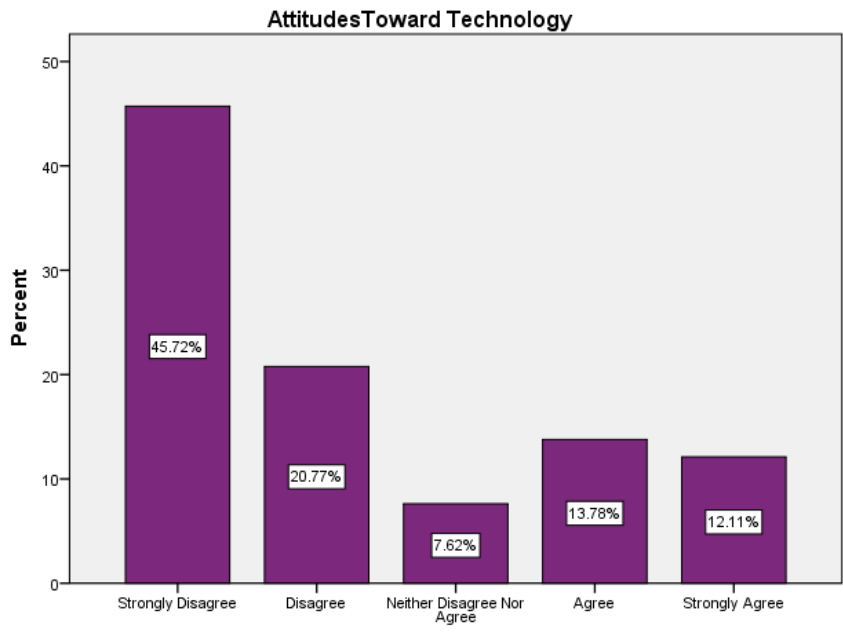
**Computers and the Internet are an important part of having a better life.**



**Computers and the Internet are a very important part of economic success.**

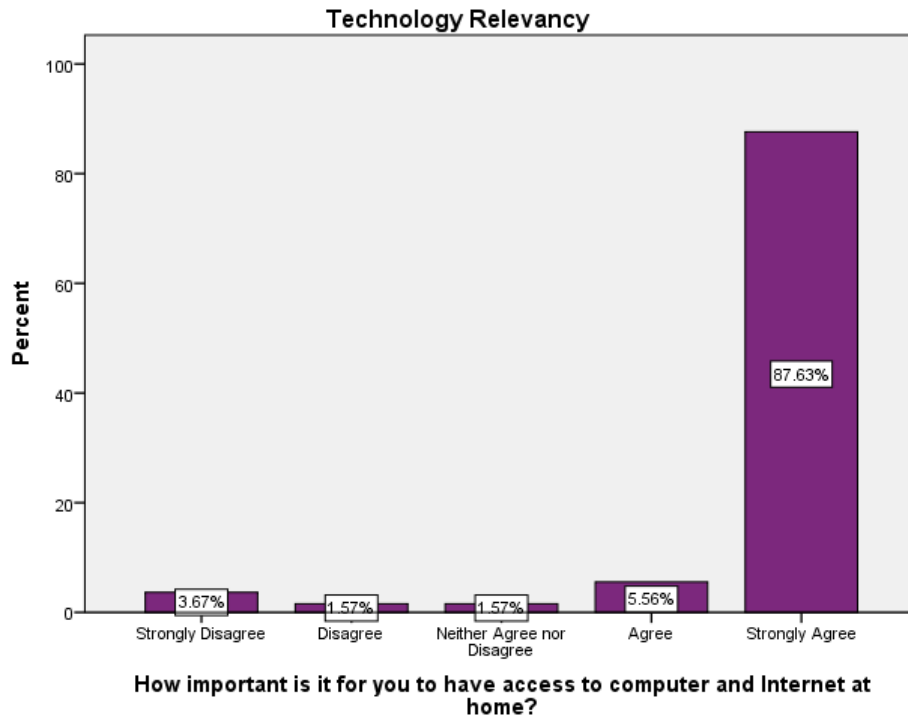


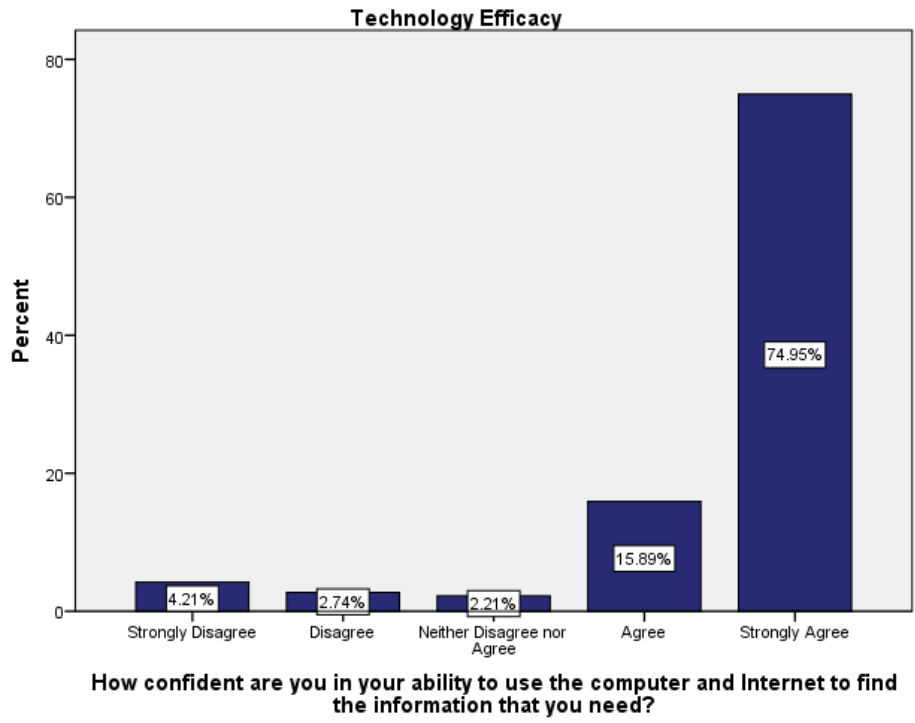
**We have come to rely too much on computers and the Internet.**



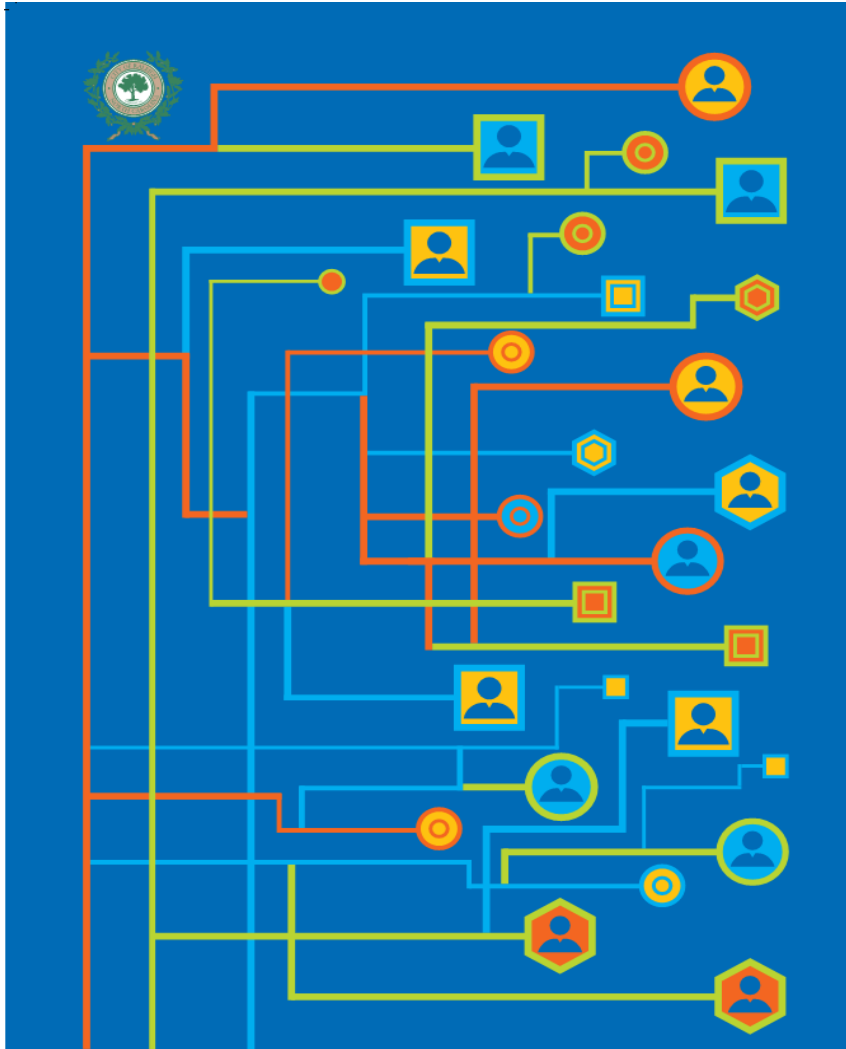
**Most people do not use computers and the Internet.**

## Technology Relevancy & Technology Efficacy





## APPENDIX B



### Community Digital Inclusion Survey

TAKE THE SURVEY

How do you access online information and use technology?

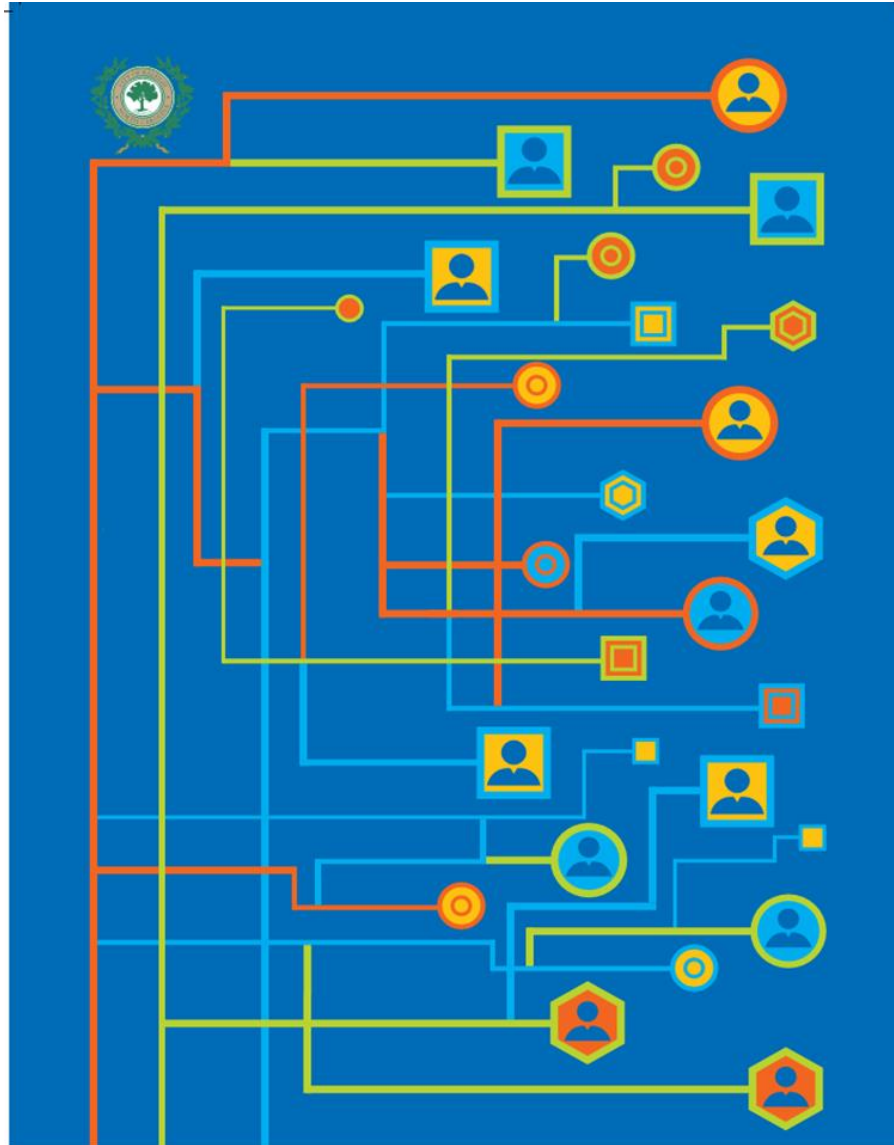
Raleigh residents are invited to complete a brief survey on how technology affects their everyday life. We want to learn about your experience with computers, the Internet, and what motivates you to use technology. Your input will help inform how the City of Raleigh Information Technology Department delivers future youth and resident programs.



For more information contact Brittney Cofield-Poole, City of Raleigh Information Technology Department  
Brittney.Cofield-Poole@raleighnc.gov or 919-996-4655.

<http://goo.gl/5308t2>

## APPENDIX C



### Encuesta sobre Inclusión Digital Comunitaria

¿Cómo accede información en línea y usa de la tecnología?

Queremos aprender de su experiencia con las computadoras, el Internet, y lo que le motiva a utilizar la tecnología. Su aportación ayudará a informar qué programas para jóvenes y residentes puede en el futuro ofrecer el Departamento de Tecnología de Información de la Ciudad de Raleigh. Se invita a los residentes de Raleigh a completar la breve encuesta antes del 31 de mayo de 2015.

O para más información comunicarse con Brittney Cofield - Poole, Departamento de Tecnología de Información de la Ciudad de Raleigh [Brittney.Cofield-Poole@raleighnc.gov](mailto:Brittney.Cofield-Poole@raleighnc.gov) o 919-996-4655.

COMPLETA LA ENCUESTA



<http://goo.gl/5308t2>

## APPENDIX D



### Community Technology Focus Group!

**Volunteer to share your thoughts on how technology impacts your everyday life!**

#### What does technology access mean to you ?

You are invited to participate in a community focus group at Chavis Community Center on (Date TBD). This opportunity is apart of a larger community digital inclusion research project. We are interested in learning more about your experiences with computers, the internet, and your thoughts about technology resources used by citizens within the City of Raleigh. Your input is valuable and would assist us in improving our community-based digital literacy programming.

**REGISTER TODAY!!  
Adults / Seniors Only**

**WHAT: Community Technology Focus Group  
WHEN: TBD**



**APPENDIX E**

**Consent to Participate in Focus Group  
As part of █████ Resident Computer Training  
Monday October 6, 2014  
6:00-7:30pm**

The purpose of the group discussion and the nature of the questions have been explained to me.

I consent to take part in a focus group about my experiences, including my thoughts about technology resources used by citizens within the City of Raleigh. I also consent to have my pictures taken during this focus group session.

My participation is voluntary. I understand that I am free to leave the group at any time. If I decide not to participate at any time during the discussion, my decision will in no way affect the services that I receive at █████ Community Center.

None of my experiences or thoughts will be shared with anyone outside of the City of Raleigh Information Technology Department unless all identifying information is removed first. The information that I provide during the focus group will be grouped with answers from other people so that I cannot be identified.

\_\_\_\_\_  
Please Print Your Name \_\_\_\_\_  
Date

\_\_\_\_\_  
Please Sign Your Name

\_\_\_\_\_  
Program Manager Signature \_\_\_\_\_  
Date



**APPENDIX F**

**RESIDENT & PARENT CAFÉ DEMOGRAPHIC INFORMATION SURVEY**

How long have you lived in Raleigh?

- Less than a year
- 1-2 years
- 3-5 years
- 6-10 years
- More than 10 years

Do you rent or own your current residence?

- Rent
- Own

What is your CAC? \_\_\_\_\_

What is your Zip Code? \_\_\_\_\_

What is your race/ethnicity?

- American Indian/Alaskan Native
- Asian/Asian Indian/Pacific Islander
- Black/African American
- Latino American
- White
- Other \_\_\_\_\_

What is your gender?

- Female
- Male
- Other \_\_\_\_\_

In which category is your age?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75+

Please estimate your average house income:

- Less than 25,000
- 25,000-50,000
- 50,000-75,000
- 75,000 or more

Which of the following best describes your employment status?

- Full Time
- Part Time
- Retired
- Homemaker
- On disability
- Unemployed looking for work

Please indicate your highest level of education:

- Less than High School
- High School Graduate/GED
- Associate Degree
- Some College
- Bachelor's Degree
- Graduate/Professional Degree

## DIGITAL ACCESS

What type of Internet access do you have at home?

- No Internet Access at Home
- Dial Up
- Cable
- DSL
- Wi-Fi
- Satellite
- Cellular
- Don't Know

What type of digital devices do you own at home? Check all that apply:

- Mobile Phone
- Tablet
- Desktop/PC
- Laptop
- None
- Don't Know

If you DO NOT have access to the internet or digital devices at home where do you access them most frequently?

- Work
- School
- Library
- Community Center
- Public Space (i.e. Coffee Shop)

How do you get help with computer or internet questions or problems? Check all that apply:

- Not applicable
- Coworkers
- Friends or family
- Library
- Community technology center/Public lab
- Pay someone for technical support
- My Internet provider
- No one/No help available
- Books/Reference materials
- Computer/Internet resources

## **APPENDIX G**

### **Resident & Parent Café Focus Group Questions**

- 1. What immediately comes to mind when you think of technology?**
- 2. What does access to a computer and internet mean in your life?**
- 3. Does your access to a computer or internet impact how you use them?**
- 4. What would you like to be able to do with digital technology?**

## APPENDIX H



### City of Raleigh

### 2015 Community Digital Inclusion Survey

Dear City of Raleigh Resident:

The City of Raleigh is interested in learning more about your thoughts on important issues within our community. As a resident of the City of Raleigh, you are being asked to participate in the City of Raleigh 2015 Community Digital Inclusion Survey.

#### **Purpose**

Please take a few minutes to fill out the enclosed survey. Your feedback will help the City better understand residents' access to and experiences with computers, mobile devices and the Internet. You should find the questions interesting and we will definitely find your answers useful.

#### **Participation**

Our goal is to hear from both men and women of all ages. Please choose an adult in your household (anyone 18 years or older) to spend a few minutes completing the survey. Your participation in this study is completely voluntary and you can withdraw at any time. You are free to skip any question that you choose without jeopardy to your participation in any of the activities related to the Community Digital Inclusion project.

You will not be asked to provide any personal identification information on this survey. In addition, all data obtained will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). All surveys will be concealed and kept confidential to the extent allowed by law. **Please return your completed survey by June 26, 2015.**

#### **Questions**

If you have any questions about the survey please contact Brittney M. Cofield-Poole at [Brittney.Cofield-Poole@raleighnc.gov](mailto:Brittney.Cofield-Poole@raleighnc.gov) or 919-996.4655. If you feel you have not been treated according to the descriptions in this form, or your rights as a survey participant have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919-515-4514).

**Please indicate whether you agree to participate in this survey by checking the YES or NO response:**

- Yes, I am a Raleigh resident 18 years or older and agree to participate in the survey.
- No, I am not a Raleigh resident and I do not agree to participate in the survey.

**1. How long have you lived in Raleigh?**

- Less than a year
- 1 year
- 2 years
- 3 years
- 4 years
- 5 years
- 6 years
- 7 years
- 8 years
- 9 years
- 10+ years

**2. Do you rent or own your current residence?**

- Rent
- Own
- Other \_\_\_\_\_

**3. How many individuals currently live in your household?**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10+

**4. Under what zip code is your physical address located (NOT A P.O. BOX)? \_\_\_\_\_**

**5. Which Citizen Advisory Council (CAC) covers the area of the City that you live in?**

- I do not know my CAC
- Atlantic
- Central
- East
- Five Points
- Forestville
- Glenwood
- Hillsborough
- Midtown
- Mordecai
- North
- North Central
- Northeast
- Northwest
- South
- South Central
- Southeast
- Southwest
- Wade
- West

**PLEASE ANSWER THE FOLLOWING SET OF QUESTIONS RELATED TO HOW YOU ACCESS THE INTERNET AND WHERE YOU GO WHEN YOU NEED HELP.**

**6. What type of digital devices (devices that access the Internet) do you own? PLEASE CHECK ALL THAT APPLY**

- Basic Mobile Phone (e.g. Flip Phone)
- Smart Phone (e.g. Touch Screen & Internet Capable)
- Tablet
- Desktop/PC
- Laptop
- Smart TV (Internet Capable with Apps)
- Gaming Console or System
- None
- I am not sure

**7. Do you have access to Wi-Fi (Wireless Internet) in your home?**

- Yes
- No

**8. What type of Internet access do you have at home?**

- Dial up through the telephone
- DSL
- Cable
- Satellite
- Fiber
- Cellular/Mobile wireless
- I am not sure
- I do not have Internet access

**9. If you DO NOT have access to the Internet at home, where do you access the Internet most frequently?**

- Work
- School
- Library
- Community Center
- Public Space (e.g. Coffee Shop or Restaurant)
- Other \_\_\_\_\_

**10. How do you get help with computer or Internet questions? PLEASE CHECK ALL THAT APPLY**

- Coworkers
- Friends or family
- Library
- Community technology center/Public computer lab
- Pay someone for technical support
- My Internet provider
- Books/Reference materials
- Search Engines
- No one/No help available
- Other \_\_\_\_\_
- Not applicable

**11. Please tell us how often you use the Internet on your MOBILE PHONE to do any of the following things:**



	Constantly	Several times per day	Daily	Few times a week	Weekly	Few times a month	Monthly	Few times a year	Never
Check Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Send Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chat/IM (instant messaging)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check people's status updates (Facebook or Twitter)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post your own status updates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Check new content on web forums or blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post your comments on web forums or blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**PLEASE ANSWER THE FOLLOWING SET OF QUESTIONS RELATED TO YOUR INTERNET ACTIVITIES.**

**12. How do you use the Internet? PLEASE CHECK ALL THAT APPLY**

- Email, texting or video to communicate
- Entertainment (games, videos, music, etc.)
- Get news or weather
- Social media (Facebook, Twitter, LinkedIn, etc.)
- Find directions or look up a map
- Shopping or searching for products and services
- Share opinions, post to a blogs, review a product or service
- Banking online (paying bills, investing, etc.)
- Sell goods and services online, advertise
- To do research or study a topic of interest
- Attend an online class or training
- Work for employer from home
- Connect with your child's school
- Find information on neighborhood resources and events
- Engage in civic activities (research information about an issue or a candidate),
- Communicate with government (seek services, get a license, discuss a problem)
- Look up health and medical information

**13. How frequently do you do each of the following activities on the Internet?**

	Never/Not Applicable	Less than once per month	Monthly	Weekly	Daily
Engage with neighborhood and/or access neighborhood resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seek information about City government services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicate with City government	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search and apply for jobs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attend online classes or trainings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Research a topic of interest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search for health information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Search for public transit information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please list below)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**14. How important is it for you to have access to computer and Internet at home?**

- Very Important   
  Important   
  Neutral   
  Somewhat Important   
  Not Very Important

**15. How confident are you in your ability to use the computer and Internet to find the information that you need?**

- Very Confident   
  Confident   
  Neutral   
  Somewhat Confident   
  Not Very Confident

**16. How much do you understand the following computer and Internet-related terms?**

	No Understanding	Little Understanding	Some Understanding	Good Understanding	Full Understanding
PDF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tagging	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spyware	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phishing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hashtag (#)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wiki	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
JPEG	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Malware	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Podcasting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Firewall	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
RSS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preference settings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tabbed browsing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advanced search	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weblog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cookies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Please select how much you AGREE or DISAGREE with the following statements about computers and the Internet.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
It is important for school aged children to learn how to use computers and the Internet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computers and the Internet are an important part of having a better life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computers and the Internet are a very important part of economic success.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We have come to rely too much on computers and the Internet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people do not use computers and the Internet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Please select how much you AGREE or DISAGREE with the following statements about your neighborhood.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I can get what I need in my neighborhood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My neighborhood helps me fulfill my needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like a member of my neighborhood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I belong in my neighborhood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I have a say about what goes on in my neighborhood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People in my neighborhood are good at influencing each another.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel connected to my neighborhood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a good bond with others in my neighborhood.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. How old are you? \_\_\_\_\_

20. What is your gender?

- Female  Male  Other \_\_\_\_\_

21. What is your race/ethnicity? YOU MAY CHECK ALL THAT APPLY.

- American Indian/Alaskan Native       Black/African American       White  
 Asian/Asian Indian/Pacific Islander       Latino American       Other \_\_\_\_\_

22. Are you of Hispanic or Latino Origin?       Yes       No

23. Please indicate your highest level of education:

- Less than High School       Associate Degree       Bachelor's Degree  
 High School Graduate/GED       Some College       Graduate/Professional Degree

**24. Which of the following best describes your employment status?**

- Full Time
- Part Time
- Retired
- Homemaker
- On disability
- Unemployed looking for work
- Student
- Other \_\_\_\_\_

**25. Please estimate your yearly average combined household income:**

- Below \$20,000
- \$20,000 - \$29,999
- \$30,000 - \$39,999
- \$40,000 - \$49,999
- \$50,000 - \$59,999
- \$60,000 - \$69,999
- \$70,000 - \$79,999
- \$80,000 - \$89,999
- \$90,000 or more

*Thank you for your time and participation!*

## APPENDIX I



### City of Raleigh

#### Consulta sobre Inclusión Digital Comunitaria en Raleigh 2015

Estimado/a residente de la Ciudad de Raleigh:

La Ciudad de Raleigh está interesado en aprender más acerca de sus pensamientos sobre temas importantes dentro de nuestra comunidad. Como residente de la Ciudad de Raleigh le pedimos que participe en la Consulta sobre Inclusión Digital Comunitaria en Raleigh 2015.

#### **Propósito**

Por favor, tómese unos minutos para llenar la encuesta adjunta. Sus comentarios nos ayudarán a entender mejor el acceso y experiencias de los residentes de la Ciudad con las computadoras, dispositivos móviles e Internet. Usted debe encontrar las preguntas interesantes y sin duda sus respuestas serán útiles.

#### **Participación**

Nuestro objetivo es escuchar a los hombres y mujeres de todas las edades. Por favor, elija un adulto en su hogar (cualquier persona de 18 años o más) para en unos minutos completar la encuesta. Su participación en este estudio es completamente voluntaria y usted puede retirarse en cualquier momento. Usted es libre de saltar cualquier pregunta que usted elija sin poner en riesgo su participación en cualquiera de las actividades relacionadas con el proyecto de Inclusión Digital Comunitaria.

En esta encuesta no se le pedirá que proporcione información de identificación personal. Además, todos los datos obtenidos serán confidenciales y sólo serán reportados en un formato agregado (para informar de los resultados sólo combinados y nunca informar datos individuales). Todas las encuestas son secretas y confidenciales en la medida permitida por la ley. **Por favor, devuelva la encuesta completa en el sobre con franqueo pagado antes del 19 de junio de 2015.**

#### **Preguntas**

Si tiene alguna pregunta sobre la encuesta, por favor póngase en contacto con Brittney M. Cofield-Poole en [Brittney.Cofield-Poole@raleighnc.gov](mailto:Brittney.Cofield-Poole@raleighnc.gov) o 919.996.4655. Si usted siente que no ha sido tratado de acuerdo con las descripciones de esta forma, o sus derechos como participante de la encuesta han sido violados durante el transcurso de este proyecto, puede ponerse en contacto con Deb Paxton, Administrador de Cumplimiento Normativo, Box 7514, NCSU Campus (919)515-4514. ¡Gracias por su tiempo y participación! Por favor, haga clic abajo para continuar.

**Por favor, indique si acepta participar en esta encuesta , marcando la respuesta SI o NO:**

- Sí , soy un residente de Raleigh de 18 años o más de edad y estoy de acuerdo con participar en la encuesta.
- No, yo no soy un residente de Raleigh o no estoy de acuerdo con participar en la encuesta.

**1. ¿Cuánto tiempo ha vivido en Raleigh?**

- |                                       |                              |                                     |
|---------------------------------------|------------------------------|-------------------------------------|
| <input type="radio"/> Menos de un año | <input type="radio"/> 4 años | <input type="radio"/> 8 años        |
| <input type="radio"/> 1 año           | <input type="radio"/> 5 años | <input type="radio"/> 9 años        |
| <input type="radio"/> 2 años          | <input type="radio"/> 6 años | <input type="radio"/> 10 años o más |
| <input type="radio"/> 3 años          | <input type="radio"/> 7 años |                                     |

**2. ¿Tiene casa propia o alquila su residencia actual?**

- Alquilo     Casa propia     Otra \_\_\_\_\_

**3. ¿Cuántas personas viven actualmente en su casa?**

- |                         |                         |                         |                                |
|-------------------------|-------------------------|-------------------------|--------------------------------|
| <input type="radio"/> 1 | <input type="radio"/> 4 | <input type="radio"/> 7 | <input type="radio"/> 10 o más |
| <input type="radio"/> 2 | <input type="radio"/> 5 | <input type="radio"/> 8 |                                |
| <input type="radio"/> 3 | <input type="radio"/> 6 | <input type="radio"/> 9 |                                |

**4. ¿Bajo qué código postal está su dirección física (no un apartado postal)? \_\_\_\_\_**

**5. Cuál Consejo Asesor Vecinal (Citizen Advisory Council, en ingles) cubre el area de la ciudad en la que usted**

**Vive?**

- |   |                                    |                                     |                                     |
|---|------------------------------------|-------------------------------------|-------------------------------------|
| <input type="radio"/> No conozco mi Consejo Asesor Vecinal Atlantic | <input type="radio"/> Forestville  | <input type="radio"/> North         | <input type="radio"/> South Central |
| <input type="radio"/> Central                                       | <input type="radio"/> Glenwood     | <input type="radio"/> North Central | <input type="radio"/> Southeast     |
| <input type="radio"/> East  | <input type="radio"/> Hillsborough | <input type="radio"/> Northeast     | <input type="radio"/> Southwest     |
| <input type="radio"/> Five Points                                   | <input type="radio"/> Midtown      | <input type="radio"/> Northwest     | <input type="radio"/> Wade          |
|   | <input type="radio"/> Mordecai     | <input type="radio"/> South         | <input type="radio"/> West          |

**POR FAVOR RESPONDA A LA SIGUIENTE SERIE DE PREGUNTAS RELACIONADAS CON EL MODO DE ACCESO A INTERNET Y DÓNDE VA CUANDO NECESITA AYUDA.**

**6. ¿Qué tipo de dispositivos digitales (dispositivos que accesan Internet) tiene? MARQUE TODOS LO QUE CORRESPONDAN**

- |   |   |   |
|---|---|---|
| <input type="radio"/> Teléfono Móvil Básico (e.g. Flip Phone)           | <input type="radio"/> Desktop/PC                                | <input type="radio"/> Consola o Sistema de juegos |
| <input type="radio"/> Smart Phone (e.g. Pantalla con sensor e Internet) | <input type="radio"/> Laptop                                    | <input type="radio"/> Ninguno                     |
| <input type="radio"/> Tablet  | <input type="radio"/> Smart TV (Capacidad de Internet con Apps) | <input type="radio"/> No sé                       |

**7. ¿Qué tipo de acceso a Internet tiene en su casa?**

- |   |   |  |
|---|---|--|
| <input type="radio"/> Discado por teléfono (dial up)DSL | <input type="radio"/> Satellite                 | <input type="radio"/> No tengo acceso a Internet |
| <input type="radio"/> Cable                             | <input type="radio"/> Fibra                     | <input type="radio"/> No sé                      |
|   | <input type="radio"/> Celular/Móvil inalámbrico |  |

**8. ¿Tiene acceso a Wi - Fi (Internet inalámbrico) en su casa?**

- Sí       No

**9. Si NO accesa Internet en su casa,¿ dónde lo accesa con mayor frecuencia?**

- |                               |  |  |
|-------------------------------|--|--|
| <input type="radio"/> Trabajo | <input type="radio"/> Biblioteca         | <input type="radio"/> Espacio Público (e.g. cafetería o restaurante) |
| <input type="radio"/> Escuela | <input type="radio"/> Centro Comunitario | <input type="radio"/> Otro _____                                     |

**10. ¿Cómo obtiene ayuda con la computadora o preguntas sobre Internet? MARQUE TODOS LO QUE CORRESPONDAN**

- |  |   |   |
|--|---|---|
| <input type="radio"/> Compañeros de trabajo  | <input type="radio"/> Pago a alguien para ayuda técnica | <input type="radio"/> Nadie/No hay ayuda disponible |
| <input type="radio"/> Amigos o familia   | <input type="radio"/> Mi proveedor de Internet          | <input type="radio"/> Otros _____                   |
| <input type="radio"/> Biblioteca   | <input type="radio"/> Libros o materiales de referencia | <input type="radio"/> No corresponde                |
| <input type="radio"/> Centro comunitario de tecnología / laboratorio computarizado público | <input type="radio"/> Máquinas de búsqueda              |   |

**11. Favor de marcar la frecuencia con la cual usa Internet o su TELÉFONO MÓVIL para alguna de las siguientes:**



	Constantemente	Algunas veces al día	Diariamente	Algunas veces a la semana	Semanalmente	Algunas veces al mes	Mensualmente	Algunas veces al año	Nunca
Revisar Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enviar Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chat/IM (instant messaging)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Revisar actualidad de las personas (Facebook o Twitter)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Actualizar mi Facebook o Twitter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Revisar nuevo contenido de Internet en foros o blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Escribir mis comentarios en Internet en foros o blogs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**FAVOR DE CONTESTER LOS SIGUIENTES GRUPOS DE PREGUNTAS RELACIONADAS CON SUS ACTIVIDADES EN INTERNET.**

**12. ¿Cómo usa Internet? MARQUE TODOS LOS QUE CORRESPONDAN**

- |  |  |
|--|--|
| <input type="radio"/> Correo electrónico, mensajes de texto o vídeo para comunicarse           | <input type="radio"/> Para investigar o estudiar un tema de interés  |
| <input type="radio"/> Entretenimiento (juegos, vídeos, música, etc.)                           | <input type="radio"/> Asistir a una clase en línea, adiestramiento, o formación                                      |
| <input type="radio"/> Noticias o el tiempo   | <input type="radio"/> Trabajo de empleo desde la casa  |
| <input type="radio"/> Medios sociales (Facebook, Twitter, LinkedIn, etc.)                      | <input type="radio"/> Conectarse con la escuela de su hijo/a   |
| <input type="radio"/> Encontrar direcciones o buscar un mapa                                   | <input type="radio"/> Encontrar información sobre recursos y eventos de la comunidad                                 |
| <input type="radio"/> Hacer compras o la búsqueda de productos y servicios                     | <input type="radio"/> Participar en actividades cívicas ( información de investigación sobre un tema o un candidato) |
| <input type="radio"/> Compartir opiniones, artículos en blogs , revisar un producto o servicio | <input type="radio"/> Comunicarse con el gobierno ( buscar servicios , obtener una licencia, discutir un problema )  |
| <input type="radio"/> Banca en línea ( pago de facturas, inversiones, etc.)                    | <input type="radio"/> Buscar información médica o de salud   |
| <input type="radio"/> Bienes y servicios vender en línea, publicidad                           |  |

13. ¿Con cuánta frecuencia desarrolla las siguientes actividades en Internet?

	Nunca/no corresponde	Menos de una vez al mes	Mensualmente	Semanalmente	Diariamente
Comunicarse con el vecindario y / o acceder a los recursos del vecindario	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buscar información sobre los servicios del gobierno de la ciudad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comunicarse con el Gobierno municipal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buscar y solicitar empleo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Asistir a clases en línea o capacitaciones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investigar de un tema de interés	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buscar información sobre salud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buscar información pública de tránsito	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Otros ( por favor escriba a continuación)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. ¿Cuán importante es para usted tener acceso a una computadora e Internet en su casa?

- No es importante     Algo importante     Neutral     Importante     Muy importante

15. ¿Cuán confiado/a se siente en su habilidad de usar la computadora e Internet para encontrar la información que necesita?

- No muy confiado/a     Algo confiado/a     Neutral     Confiado/a     Muy confiado/a

16. ¿Cuánto entiende los siguientes términos informáticos y relacionados con Internet?

	No Entendimiento	Poco Entendimiento	Algunos Entendimiento	Buen Entendimiento	La comprensión completa
PDF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marcar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cache	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Spyware	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phishing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Etiqueta (#)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wiki	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
JPEG	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Malware	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Podcastin (transmisión personal)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Firewall	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
RSS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Configuración preferencias	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Navegación por pestañas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Busqueda avanzada	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weblog	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cookies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**17. Favor de seleccionar su ACUERDO o DESACUERDO con los siguientes enunciados sobre las computadoras e Internet.**

	Muy en desacuerdo	En desacuerdo	Neutral	De acuerdo	Muy en acuerdo
Es importante que los niños en edad escolar aprendan a usar las computadoras e Internet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Las computadoras y el Internet son parte importante para tener una vida mejor.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Las computadoras y el Internet son una parte muy importante del éxito económico.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hemos llegado a confiar demasiado en las computadoras y el Internet .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Muchas personas no usan computadoras ni Internet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**18. Favor de seleccionar su ACUERDO o DESACUERDO con los siguientes enunciados sobre su vecindario.**

	Muy en desacuerdo	En desacuerdo	Neutral	De acuerdo	Muy de acuerdo
Puedo conseguir lo que necesito en mi vecindario .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mi vecindario me ayuda a cumplir con mis necesidades.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Me siento como un miembro de mi vecindario.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Siento que pertenezco a mi vecindario.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tengo algo que decir acerca de lo que pasa en mi vecindario.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La gente de mi vecindario son Buenos con los otros .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Me siento conectado a mi vecindario.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tengo una buena unión con los demás en mi vecindario.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. ¿Qué edad tiene? \_\_\_\_\_

20. ¿Cuál es su género?

Femenino  Masculino  Otro \_\_\_\_\_

**21. ¿Cuál es su raza/grupo étnico? MARQUE TODOS LOS QUE CORRESPONDAN.**

- Nativo Americano/Nativo de Alaska       Negro/Africano- Americano       Blanco  
 Asiático/Asiático Hindi/Isleño del Pacífico       Latino American       Otro \_\_\_\_\_

**22. ¿Es de origen hispano o latino?**       Sí       No

**23. Favor de indicar su nivel de escolaridad/educación:**

- Menos de escuela superior/preparatoria       Grado Asociado       Grado/Diploma Universitario  
 Escuela superior/Preparatoria/GED       Cursos Universitarios       Escuela Graduada/Grado Profesional

**24. ¿Cuál es su actual condición laboral/de empleo?**

- Jornada Completa       Ama/o de Casa       Estudiante  
 Jornada Parcial       Incapacitado       Otro \_\_\_\_\_  
 Retirado       Desempleado buscando trabajo

**25. Favor de estimar el ingreso anual combinado de su casa:**

- Menos de \$20,000       \$40,000 - \$49,999       \$70,000 - \$79,999  
 \$20,000 - \$29,999       \$50,000 - \$59,999       \$80,000 - \$89,999  
 \$30,000 - \$39,999       \$60,000 - \$69,999       \$90,000 o más

*Gracias por su tiempo y participaci*