I, Suguna Chundur, hereby submit this original work as part of the requirements for the degree of Doctor of Philosophy in Educational Studies.

It is entitled:
Digital Literacy: Beyond the Rhetoric of Economic Empowerment

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Digital Literacy: Beyond the Rhetoric of Economic Empowerment

A Dissertation

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By
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Abstract

Advancements in technology over the last two decades, have extended its reach beyond the educational and work sphere to the social, cultural, legal, and ethical aspects of our lives, creating a powerful impact on how we live, work, and connect with one another. But there are still groups where the penetration of technology is low: adults with little exposure to technology during their traditional learning years, users from lower SES, lower education levels, resulting in a digital divide between the digital haves and have-nots. This research project endeavored to study the phenomenon of digital divide through a set of theoretical frameworks: Rawls’ principles of justice as fairness provided the overall social justice umbrella, Sen’s capability approach grounded the study in the specificities of learners’ lives and acknowledged learner diversity, and Horton’s cultural education, Freire’s critical consciousness, and Eubanks’ critical technology education provided the pedagogical lens to understand the importance of the critical learning process in digital education. The phenomenon of digital divide was examined through the perspective of a group of non-traditional adult digital learners at a community-based technology learning center in order to illuminate what digital learning means to them in terms of their empowerment and agency, and how they might perceive conscientização in their learning process. The research project also examined obstacles to digital learning perceived by the learners and the actions to overcome these obstacles as identified by the participants.

Participants recruited were adults attending basic digital literacy courses for personal and professional development. Data were collected over three stages of research employing photovoice, personal interviews, and Group Level Assessment (GLA) methods.
Analysis of the data collected during the three stages of research revealed broad themes in technology usage, identified by participants. The photovoice stage of research revealed the themes of Cultural Transformation, Privacy, Safety/Security, Transition/Change, Complexities of Digital Life, Marketing, Digital Resources and Benefits. The personal interviews highlighted categories such as Concrete Concerns, Socio-Cultural Concerns, Usage, Technology Learning approaches, and Impediments to such learning that participants identified. The Group Level Assessment led to a set of specific recommendations for supportive digital instruction such as Contextual Instruction that displayed an awareness of diversity and learner traits and the identification that learners’ basic needs have to be satisfied before learning can happen.

The findings from the study support the concept of situated or contextual technology that seeks to increase the benefits of technology for adult learners while providing them the tools to manage complex digital environments through relatable instruction, user-centric design for technological tools and interfaces, and more robust government action in alleviating the digital divide through well-designed digital literacy programs.
Acknowledgements

Thou Art That: A great dictum from the Upanishads, interpreted by the Advaita School of Philosophy to mean the equality of the Ultimate Reality (Brahman) and the Self (Atman); that infinite oneness in human nature that manifests as ethics, morality, and goodness.

This journey of personal and professional fulfillment has been made possible by the wonderful learning environment at the University of Cincinnati as I have learnt and grown throughout the past decade as an employee and as a student of the University.

I would like to extend my grateful thanks to my dissertation committee members: Dr. Mary Brydon-Miller, an inspiring role model who has encouraged, supported, and guided me through the different stages of the doctoral program, Dr. Miriam Raider-Roth for exemplifying the relational aspect of teaching and learning through her nurturing persona throughout my time in the program, and Dr. Sarah Stitzlein for her support and encouragement in guiding me to be a more critical reader/writer.

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Chapter 1
Introduction

Digital Divide and Digital Literacy – An Overview

The digital revolution heralded by an explosion in technology in terms of both affordability and range has brought about unprecedented change in many spheres of our lives. The World Wide Web has been a great leveler in terms of delivery of information to a wide swath of the population. Beyond the educational and work spheres, the social, cultural, legal, and ethical aspects of the impact of Information and Communication Technologies have come to the forefront in recent years. Research has focused on the affordability and availability of technology as well as skills and abilities of users in acquisition of technology or the lack thereof that has resulted in a “digital divide”. While the rapid changes in our lives brought about by technology do not seem to slow down, the gap between those enjoying the benefits of the digital world and those who do not will only widen in the future (van Dijk, 2005; Warschauer, 2003). This is a recipe for a continuing and increasing inequality not merely in the economic sphere but in personal, social, and cultural spheres of our lives where technology seems to play an increasingly larger role. An in-depth exploration of the research in the area of digital divide guided my decision to adopt a more qualitative and community-based study of the impact of technology on the lives of the digital have-nots that may help stakeholders focus on learners’ understanding of the role of technology in their own lives and would help the discussion on how best to address the digital divide. My study as outlined below will, I hope, shed new light on the connections between digital-skills learning and the specific life experiences or historicity (Freire, 1970/1999) of adult learners that may influence the process of learning. It is my hope
that this study may help learners situate their individual understanding and perception of technology in their own lives beyond the rhetoric of economic empowerment that is common in discourses on digital divide.

**Significance of the Study**

My focus on digital learning of adult learners has its underpinnings in my own experience as an adult adopter of technology as well as my understanding of how rapidly changing digital technology challenges novice adult learners. For such learners, it is challenging to learn as well as to keep up with advances in technology. In this study, I explored the gap between the rhetoric of economic empowerment that pervades the discourse on digital divide and digital literacy and the actuality of the digital lives of adult learners attempting to improve their digital skills. Kvasny (2006) critiques access-based solutions to the digital divide as “ahistorical and technologically deterministic” on the basis that they do not address the underlying social inequalities in the quality of education, work, consumption opportunities, and democratic participation that act as limitations on historically disadvantaged groups. Well-funded digital literacy programs that attempt to provide opportunities for acquisition of digital skills to digitally marginalized groups have also been criticized for not addressing the underlying inequalities that fuel the divide (Eubanks, 2011; Kvasny, 2006; van Dijk, 2005). I reject the common rhetoric of digital learning in terms of merely increased economic opportunities and instead seek to explore a more liberatory approach to technology learning where adult learners can situate technology in their own lives in order to give meaning to its applications, to take control of their own learning, and thereby attempt to influence and shape the technology with which they interact. While technology education alone cannot fully address structural
inequalities, I agree with Servon’s (2002) opinion that used wisely, technology has the potential to provide new ways to address these problems of inequality. In the recommendations section of this dissertation I specifically put forth possible actions by individuals, communities, and governmental organizations that could alleviate the digital divide and contribute to a more just digital world.

Statistical information on technology usage among different demographic groups of users speak to differences in access and adoption of technology among such groups. The Internet being one of the main conduits of digital information, I examine some statistics relating to the adoption and usage of Internet to provide much needed background for the study. According to the Internet and Society unit of the Pew Research Center which has been studying Internet adoption trends for the past 15 years, as of June 2015, 84% of American adults use the Internet. There have been across the board improvements in Internet usage in most sub-groups. The table below provides a snapshot of the data published by Pew (Perrin & Duggan, 2015):

**Demographics of Internet Users in 2000 and 2015**

Table 1- Demographics of Internet usage 2000-2015

<table>
<thead>
<tr>
<th>Demographic</th>
<th>% of Americans who use the Internet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>All Adults</td>
<td>52%</td>
</tr>
<tr>
<td>Men</td>
<td>54%</td>
</tr>
<tr>
<td>Women</td>
<td>50%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White, Non-Hispanic</td>
<td>53%</td>
</tr>
<tr>
<td>Black Non-Hispanic</td>
<td>38%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>46%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>18-29</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>30-49</td>
</tr>
<tr>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
</tr>
<tr>
<td>Less than $30,000/year</td>
<td>61%</td>
</tr>
<tr>
<td>$30,000-$49,9999</td>
<td>34%</td>
</tr>
<tr>
<td>$50,000-$74,000</td>
<td>72%</td>
</tr>
<tr>
<td>$75,000+</td>
<td>81%</td>
</tr>
<tr>
<td>Educational attainment</td>
<td></td>
</tr>
<tr>
<td>No high school diploma</td>
<td>19%</td>
</tr>
<tr>
<td>High school grad</td>
<td>66%</td>
</tr>
<tr>
<td>Some College</td>
<td>93%</td>
</tr>
<tr>
<td>College+</td>
<td>97%</td>
</tr>
</tbody>
</table>

Overall, the gaps in Internet usage between Whites and minorities and between men and women have closed considerably. Household income and educational attainment continue to be strong indicators of Internet usage level with individuals in the higher income and higher educational attainment groups showing higher Internet usage than individuals with lower education levels and lower incomes. There is a very small difference in Internet usage based on gender whereas the differences in Internet usage based on race appear to be larger between White and Black at 7% than between White and Hispanic at 4%. While this is an improvement over the statistics from the year 2000 when the difference between White and Black was 15% and between White and Hispanic was 7%, there is still room for improvement. Here are some important findings of the survey that may have an impact on the discussion of the phenomenon of digital divide (Perrin & Duggan, 2015):
1. Older adults have lagged behind younger adults in adoption and use of the Internet, though seniors show a faster rate of adoption compared to other age-based, demographic groups.

2. Those with college degrees and those who live in households earning more than $75,000 are more likely to be Internet users than households earning lower levels of income or having lower levels of educational attainment.

3. African-Americans and Hispanics are less likely to use the Internet than Whites and English-speaking Asian Americans.

4. Those living in rural areas are less likely than those in suburban and urban areas to use the Internet. The Pew report attributes the reason to the circumstance of rural communities tending to have a higher proportion of residents who are older, lower-income, and have lower levels of education.

While the percentage of Internet users has jumped from 52% in 2000 to 84% as of 2015, gaps in usage remain between the general population and the above mentioned groups consisting of non-traditional learners such as minorities, lower SES households, and seniors.

As of 2015, about 15% of Americans do not use the Internet according to the Pew Research Center though it is much lower than the 48% who did not use the Internet in 2000. A third of the non-users stated that they had no interest in doing so or that they did not think the Internet was relevant to their lives. About 32% of non-users stated that the Internet was too difficult to use including 8% of this group whose stated reason was that they were “too old to learn”. About 19% of the non-users cited cost as an issue for non-use. These disparities in usage in specific demographic users such as minorities, seniors, and lower SES households have also
been noted by the digital divide scholars. Van Dijk (2005) observes that the relative differences between social groups may grow because of the continuing development of more advanced information systems and Internet tools that impact the economic as well as the civic, and social lives of users while Kvasny (2006) also comments on the risk of certain groups such as older users, racial minorities, and low-income families being left further behind in the digital sphere.

As can be seen from the Pew Report cited above, there have been major improvements across many demographic groups in terms of technology usage. But lower adoption rates of technology persist among seniors, minorities, users from lower SES, and users with lower education levels. Research now needs to focus on the phenomenon of digital divide among such groups in a comprehensive way, considering the motivation, skill acquisition, and the context in which such users use technology. While the data from the Pew study views technology use from the access point of view, there are factors beyond access that affect adoption and use of technology. In my research on the issue of the digital divide and digital literacy among adult technology learners I adopt an approach advocated by other digital divide scholars (Eubanks, 2011; Klecun, 2008; Kvasny, 2006; van Dijk, 2005) that goes beyond technologically deterministic approaches focusing on access to resources, and considers the socio-cultural and political contexts of digital technology usage as well as the particularities of users’ lives that impact how they perceive and use technology.

**Research Rationale and Research Questions**

My study is grounded on the premise that there needs to be equal opportunity to access and use sources of information and knowledge in a democratic society as citizens in a democracy need access to critical information to make decisions and participate in
representative government as well as to share in the prosperity of the information age. As critical information is increasingly available in digital format, I draw on Rawls’ (1971/1999) fairness principle and Duff’s (2011) work on the importance of access to digital information in post-industrial societies to make the case that equal access to certain vital digital information such as electoral information, information critical for political citizenship, and legal rights information is important for robust participation in democratic societies. While Rawls’ fairness principle is a guide for access to critical digital information, Sen’s capability approach (Sen, 1992) allows for differentials in needs and motivations in acquisition of digital skills wherein digital learning can be contextualized to users’ abilities and needs and can be connected to their particular environments. Thus, community-based digital learning initiatives have been researched extensively over the years (Eubanks, 2011; Warschauer, 2003) as a means of providing localized and contextual solutions to the digital divide problems among the more disadvantaged. The more integrated approach of such studies that considered the lived experiences of the participants in the context of their day-to-day lives has guided me in my decision to take a participatory approach to study non-traditional, adult learners of digital technology and how they relate such technology back to their own lives.

The research was conducted in three stages using three different methods: photovoice, personal interviews, and Group Level Assessment in order to answer the following research questions:

1. What do digital skills mean to non-traditional learners? How do non-traditional learners define digital skills and perceive their applicability in their own lives?
2. How do non-traditional learners view and understand their personal and professional agency in the process of acquisition of digital skills?

3. What is the role of conscientização in the sphere of digital skills acquisition for these learners? What are the obstacles perceived by learners in their quest for “digital empowerment” as defined by the learners? How might they take action to overcome the perceived obstacles?

In the context of my research on adult technology learners’ perceptions of different aspects of their interactions with technology, I define digital empowerment as the ability of individual learners to understand and apply digital skills in various spheres of their lives to fulfill economic goals, to engage with the social and cultural aspects of the digital world for personal fulfillment if they so choose, and the ability to apply conscientização in interrogating the relationship between technology and inequality for a more just digital world. I also draw upon Bandura’s definition of human agency and the exercise of such agency through self-efficacy (Bandura, 1989) to frame my research questions. A participatory research setting was an apt choice to examine the role of personal and professional agency in achieving conscientização as learners come to perceive the contradictions in their own environments and seek to take action against unjust elements.
Organization of the Dissertation

I present a review of literature related to digital divide, research on the current state of digital literacy initiatives, and the theoretical frameworks underpinning my study in chapter two. In chapter three, I examine the use of participatory action research methods and qualitative methods used to collect data and the justification for the use of the chosen methods. In chapter four I present and analyze the results of the photovoice project while in chapter five I provide the results and analysis of the interview stage of the research project. I conclude data analysis with the presentation of the results of the Group Level Assessment process in chapter six. In chapter seven, I present the mappings between my theoretical frameworks and the results of the data analysis. I conclude this dissertation in chapter 8 with my recommendations, implications of this research, and directions for future research.
Chapter 2
Literature Review

Digital Divide in Literature

In 1995, with the Internet in the early stages of development and personal computer ownership showing a brisk upward trend (The Sociodemographics of Access and Adoption, 2001) the US National Telecommunications and Information Administration (NTIA) published a report titled “Falling Through the Net: A Survey of the “Have Nots” in Rural and Urban America” that first identified the fact that “disparities in access to telephone, personal computers (PCs), and the Internet across certain demographic groups – still exists and in many cases, has widened significantly” (US Department of Commerce, National Telecommunications & Information Administration, 1995). Albert Hammond, the founder of NTIA and Larry Irving, the NTIA Administrator were credited with inventing the term “digital divide.” However, there continue to exist conflicting reports on who coined the term digital divide as it is also traced back to Jonathan Webber and Amy Harmon of the LA Times who were credited with inventing the term in 1995 to describe the gap between those engaged with technology and those who were not, but Gunkel (2003) traces it back to Moore (1995) who used it to distinguish between those who assign value to technology and those who do not. Subsequently, this term has been widely used to describe this social phenomenon but its usage continues to be very unclear and confusing (Warschauer, 2003).

While the term has been appropriated by policymakers and referred to by journalists in mainstream newspapers, it is still “a moving target” (Compaine, 2005). Gunkel (2003) seconds
this opinion citing the unprecedented acceleration of change in I.T. as a reason for the multiplicity of meanings attributed to the term digital divide.

Based on my readings and research as well as my own experience, I would define the digital divide as missed opportunities in the social, economic, and political spheres of individual lives among groups with lower technology usage patterns due to reasons that include lack of economic resources, lack of access to meaningful digital experience, lack of skills and motivation. Such disadvantages overlying existing social and economic inequalities seem to further exacerbate digital inequalities. I explore in the section below, the various themes in the digital divide research that support my understanding and definition of digital divide.

**Major Themes in the Digital Divide Research**

Some of the common themes that emerge in a literature review of the concept of digital divide relate to access to technology, acquisition of technological skills, and usage of technology with prominence being attributed to the study of digital divide in terms of missed economic and political opportunities. A few researchers have looked beyond mere access and usage to study this phenomenon as a democratic and social justice issue to combat existing power structures. Such a view, in my opinion, is more reflective of the multi-dimensional nature of the phenomenon that encompasses economic, socio-cultural, as well as political realms of users’ lives. I present below my exploration of research that supports my definition of digital divide as a nuanced and complex phenomenon.

Many researchers, including Compaine (2001) have analyzed and predicted the rate of technology adoption in society through a statistical tool known as the Sigmond curve or the S-
curve. The S-curve is a mathematical model that presents the idea of progression in any field in the form of cycles with ebbs and flows and not necessarily as a linear progression. According to the Sigmoid curve proponents, for any new innovation there is usually a slow rate of adoption, with the initial adopters ahead of the curve but subsequently the market will normalize usage with more competitive price and products with the result that there will be market-driven solutions to the digital divide phenomenon as was the case for electricity and telephone. The S-Curve proponents’ view of the divide purely in terms of market forces ignores several important factors that differentiate Internet and Communication Technologies (ICT) from other technological advances of the past. Initial adopters do not remain static but move on to produce and consume more advanced technological innovations that require increased intellectual and economic capacity to acquire thus ensuring that they maintain their edge in the digital economy. Additionally, the S-curve explanation does not take into account the crucial relationship between access to ICT and use of ICT as this is not a simple dichotomous relationship. Thirdly, as van Dijk and Hacker (2003) point out, the S-curve pre-supposes that the entire population would be a potential population for adoption of technologies but this cannot be the case as some of the advanced digital technologies are too complicated to be adopted by the entire population. As a purely mathematical model such as the S-curve cannot represent the multi-dimensional and diverse aspects of the phenomenon of digital divide, I turn to other researchers who have adopted a more nuanced perspective of the issue.

Mossberger, Tolbert, and Stansbury (2003) propose a broader definition of the problem as consisting of multiple divides: an access divide, a skills divide, an economic opportunity divide, and a democratic divide. They identify issues beyond access such as ability to use
technology naming it the skills divide which in turn perpetuates the inability of disadvantaged
groups to leverage economic opportunity as well as the opportunity to participate in the
political arena. It is the latter two types of divide relating to economic opportunity and
democratic participation representing equality of opportunity and democracy that marks the
digital divide issue as a social justice issue and an important area of public policy (Mossberger
et al., 2003).

Servon (2002) frames technology as a possible tool of social change. Making a case for
the importance of addressing digital divide she states:

It affects how we work and what we work toward, how we connect with each other and
with whom we connect, and how we make decisions and with what information. Living
on the wrong side of the digital divide, as do the persistent poor, means being cut off
from these changes and disconnected from the information society.” (p. 2)

In her comprehensive book on the phenomenon of digital divide, Sevron identifies
access, I.T. literacy, and relatable content as the three dimensions of digital divide that need to
be addressed in order to create holistic solutions that address underlying issues of inequality.
Her approach to alleviating the digital divide as “part of a larger effort to address historic and
deeply entrenched problems” (p. 21) resonates with me as I believe that such an approach
contextualizes the phenomenon of the digital divide and provides a more broad foundation to
solve this multi-dimensional problem.

Other researchers also see the digital divide as not merely an issue of access. Ferro,
Helbig, and Gil-Garcia (2011) have fashioned a multi-perspective model of digital divide that
includes IT literacy as well as different historical and social factors that drive individual adoption of digital technology. Boonaert and Vettenburg (2011) describe digital divide as “unequal access to the Internet and its use because of the interplay between different factors such as age, gender, origin, level of education, and socioeconomic status” (p. 55). Warschauer (2003) also takes a broad view of digital divide as being “marked not only by physical access to computers and connectivity but also by access to the additional resources that allow people to use technology well” and urges that attention needs to be paid to “issues of content, language, education, literacy, or community, and social resources” (p. 6). The multi-dimensional view of the phenomenon advocated by the researchers cited above reflected my own understanding of the digital divide in terms of my experience as a digital educator and an adult adopter of technology. As my research is focused on adult digital learners with lower education levels and lower SES, I believe such a multi-dimensional view to my research project would help me understand the economic as well as the socio-cultural, and political factors underlying the digital divide among my participants. To further highlight the multi-dimensional nature of the digital divide, I present below literature that explores the social and democratic inequality underlying the phenomenon.

The themes of social inclusion and democratic equality through challenging existing power structures appear in the work of some digital divide researchers. Klecun (2008) prefers the term “digital exclusion” rather than digital divide as it captures the idea that digital exclusion compounds social exclusion. She critiques technologically deterministic solutions to the divide as objectifying the non-technology users as the “Other” that further alienate them and reinforce their digital exclusion. Klecun’s conception of the digital divide as a social and
political issue rather than a developmental issue informed my own understanding of the phenomenon and helped me in framing a definition of the term that acknowledges the missed political and social opportunities of novice technology users. Barzilai-Nahoon (2006) calls for a more comprehensive study on the digital divide in terms of affordability, use, infrastructure access, accessibility, socio-demographic factors, and social and governmental constraints/support. Her claim is that technology is not a neutral artifact in society but being an intrinsic part of social and political life should be studied in those particular contexts. According to Kvasny (2005) the digital divide is a political outcome rooted in the historical systems of power and privilege that have excluded women, racial and ethnic minorities in terms of employment, housing, health, education, and consumption opportunities and “it is not simply a gap in access to and use of the Internet and computers” (Introduction and Motivation section, para. 3). Her examination of the digital divide discourses in a community-based technology program located in an urban working-class community revealed how social inequalities are reproduced by the acceptance of “instrumental, production-oriented use” of information technology by the program organizers as well as the program users. Kvasny recommends that digital literacy programs should go beyond economic empowerment by including opportunities for users to express their cultural identity and social practice. Kvasny’s work at a community technology center, and her efforts to understand technology learning in the context of the life experiences of learners provides a strong model for my research at the community technology center that serves adult learners where I attempt to understand the underlying economic, socio-cultural, and political causes of the digital divide for these learners.
Selwyn (2004) also talks about the social impact of digital exclusion in terms of technological inequalities between individuals and groups and goes beyond mere access especially through community centers and says “such access is meaningless unless people actually feel able to make use of such opportunities.” Selwyn’s critique of the limits of physical access is also reflected by Clement and Shade (2000) who are of the opinion that the digital divide is “not solely about physical access” but a continuum of devices, software, services, infrastructure, and governance. In particular, Clement and Shade’s recognition of the special needs of learners that arise out of the diversity of learners in terms of age, gender, education-level, and ethnicity is applicable to my research among adult learners with lower education levels and SES as I endeavor to ground the study in the lives of the learners, acknowledging the diversity of learners’ characteristics in order to contextualize the learning process and make the learning more meaningful to the learners’ lives.

In my analysis of the major themes in the digital divide research, I have highlighted the range of research themes, from simple statistical models of technology adoption to complex, multi-dimensional models that go beyond access to interrogate the underlying social and economic divide that underpin the digital divide. While I acknowledge that simple S-Curve models explain technology adoption rates, they do not take into account the social, cultural, and political milieu within which such a divide exists. In the section below, I further elucidate the connection between specific socio-cultural contexts and the phenomenon of digital divide in order to draw a more expansive picture of the phenomenon in current literature.
Digital Divide in a Socio-Cultural Context

While some digital divide researchers have begun to pay attention to the multidimensional aspect of the phenomenon in terms of access, usage, and skills, a few others have touched on the socio-cultural impact of the divide. Kvasny (2006) channels the theory of cultural reproduction to the domain of digital inequality and attempts to understand it within a system of social relations. In her research on the impact of community technology centers in cultural reproduction, she explores how longstanding social inequalities can shape beliefs and expectations with regard to the role of ICT in the lives of disadvantaged learners and how such expectations can drive the digital divide policy and digital divide alleviation program designs. Kvasny’s work provides me a socio-cultural lens to examine the nature of the digital divide and the digital literacy programs at my research location and to study their impact on the digital learning process of the learners, in terms of the economic as well as socio-cultural lives of the learners.

Many researchers have pointed to the underlying social inequality that may aggravate digital inequality. Kvasny (2006) states that “digital inequality is concerned with equitable access to the benefits derived from Internet and computer use. Digital inequality does not only reflect disparities in access to ICT; it also reflects ongoing social inequities in the US” (p. 161). Social inequities in the quality of education, work, consumption opportunities, and democratic participation are at the heart of digital inequality (Norris, 2001). Van Dijk (2005) conceives of digital divide as a social and political problem rather than a technological problem stating that the divide is “deepening where it has stopped widening” (p. 2). He also observes that where the question of access is being solved, the gaps in skills and usage show up as well throwing light on
prevailing social divisions as well as creating new inequalities. He shuns the dichotomous
division of haves and have-nots as being too simplistic and speaks of digital divide in terms of
“relative inequalities” (p. 4). The work of van Dijk and Kvasny support my perspective that the
benefits of the information revolution have not reached all sections of society even in advanced
countries such as the United States. Digital inequality seems to harken to a social divide and a
democratic divide that prevents parts of society from fully participating in the digital world.

In her work with disadvantaged women at the YWCA, Eubanks (2011) found her
participants to be conflicted about their relationship to technology. They did not fear
technology and acknowledged it as a tool for economic improvement. But the women were
also ambivalent about it, as they simultaneously recognized the power of technology as a tool
for success as well as an instrument of oppression. They related their experience with
technology used for surveillance at their low-wage work environments as well as technology
used in the social service system to track, monitor, and control what services were eligible to
them. Thus the rhetoric of digital technology as a tool of economic empowerment was not
realized in their own lives. Rather, their lived experiences indicated to them that technology
was used as an oppressive tool in the realm of the workplace as well as in their interactions
with the social service system. Thus, the workplace that may provide opportunities for
economic betterment and the social service system that may provide improved standards of
living become disempowering due to the nature of the technology employed in these
organizations. Eubanks’ work highlighted for me the importance of grounding and
contextualizing the technology experience in the lives of the learners and provided a way to
frame the issue as a social justice issue through a critical lens.
Though there seems to be a general consensus towards considering the digital divide as a continuum with disparities being visible in multiple dimensions, Yu (2006) notes that the interpretation of the digital divide is influenced by political ideologies to varying degrees and that such ideologies guide the definition and the policy prescriptions to ameliorate it. Yu further clarifies by identifying four categories of digital divide researchers. The first category acknowledges the digital divide as a natural phenomenon and predicts that the market economy via the trickle-down theory will eventually make ICT more accessible thus narrowing the digital divide (Compaine, 2001). The second category of researchers acknowledge the acuteness of the global digital divide as a global and developmental problem that has constrained commerce while the third category of scholars contend that the digital divide problem is informed by ethical and political economy theories and is not merely a developmental problem. The fourth category of researchers is of the opinion that there exists a social inequality and not a digital inequality (Warschauer, 2003) and that addressing the question of digital inequality independent of social inequality would further exacerbate the problem insofar as it may direct limited valuable resources to digital divide issues and away from pressing poverty issues.

Eubanks (2011) concurs with the fourth category of researchers saying that, “Many of us in the United States have engaged in a massive, collective, consensual hallucination about the power of technology, particularly information technology to “level the playing field,” create broad-based economic and social equality, and nurture transparency and accountability in democratic governance.” (p. xvi). Norris (2001) also poses the question of whether new technologies create new inequalities or reinforce existing divisions.
I agree with the third category of researchers that the digital divide is not merely a developmental problem but an underlying structural inequality problem and has to be addressed accordingly. My own experiences as an adult digital learner and as a technology educator teaching students from low SES and first-generation college attendees gives me a unique, personal perspective on how the underlying economic, socio-cultural inequalities that these learners face impact their ability to acquire digital skills and to leverage such skills in different spheres of their lives. While I do concur with the fourth category of researchers that the commonly used rhetoric of economic empowerment is not a sufficiently broad framework to address this complex problem, I disagree with their view that resources directed towards digital divide are opportunities lost in fighting more pressing issues. I do believe that well-designed digital literacy programs that are contextualized to novice technology learners’ life experiences would empower learners and create a climate of critical consciousness that can lead to newer ways of addressing digital inequality.

Based on the multi-dimensional nature of the digital divide as discussed above, my research project adopts a broad action research framework that considers not just the physical access to technology but studies the underlying socio-economic and cultural inequality that creates and perpetuates the divide at the local level, with a group of adult digital learners. I believe a participatory action research approach provides space for the adult learners to identify the oppressive social and political factors that affect their digital experience. The knowledge and experiences that the learners bring to the action research project would help policy makers and educational institutions formulate more informed digital literacy programs.
and policies that go beyond mere alleviation of the divide to provide critical technology awareness that situates digital literacy within the context of the learner’s life.

Role of Capital in the Digital Divide

The forms of capital have also been pursued as possible causes for the digital divide by researchers. In his work on the forms of capital, Bourdieu (1986) expands the idea of capital beyond the traditional economic meaning to include non-economic forms of capital such as cultural and social capital and explains how different types of capital can be acquired, exchanged, or converted into other forms. Bourdieu identifies cultural capital in three forms: the embodied state representing what individuals know and can do, the objectified state represented by cultural artifacts such as books, paintings, machines, and the institutionalized state represented by academic credentials and qualifications. Bourdieu defines the social capital of an individual as the sum of his or her relationship network and how well that individual can leverage such networks of connection for his or her benefit. While Bourdieu acknowledges that it is possible to convert one form of capital into another form and that all types of capital can be derived from economic capital through varying degrees of transformation, he does state that the nature of cultural and social capital is such that they cannot be completely attributable to or reduced to an economic form. According to Bourdieu, understanding the different forms of capital will help us understand the underlying structure and functioning of society and would also provide a lens to view persisting inequality that may not be completely attributable to economic inequality. Hesketh and Selwyn (1999) have posited that in the information society, technological capital can be another form of capital in addition to Bourdieu’s cultural, economic, and social forms of capital. Bourdieu’s (1986) theory of
cultural capital has also been used as a basis to study the relationship between socioeconomic status and computer use profiles of young people by Tondeur, Sinnaeve, van Houtte and van Braak (2010). In my opinion, the complexities of modern technologies and the level of intellectual capacity required in understanding and making meaningful use of technology in life lends itself well to the theory that the differences in learning and usage patterns can be affected by the cultural and social capital that users bring to the learning process in addition to the economic capital that is required to purchase the devices and services required.

Other researchers such as Selwyn (2004) also acknowledge the roles of the different forms of capital in acquisition and meaningful use of ICT. In his view, while economic capital helps in access to technology, cultural capital in the information age such as technical skills and socialization in techno-culture as well as social capital in the form of relationships with other individuals and networks of institutions, play a significant role in not just acquiring digital skills but also in maintaining interest in digital technology in an increasingly complex technological world.

I would propose that technological capital is derived from Bourdieu’s economic, social, and cultural capital and is not a stand-alone resource of its own. I would also argue that the information economy that values technological knowledge has heightened the difference between those who have the technological capital and those who do not and has further accelerated stratification and inequality. Economic capital allows individuals to procure access to technology but such access has to be augmented by knowledge and skills to interface with technology, signifying the importance of cultural capital. The possession of social capital allows an individual to tap into their network of connections to further their interests and this is
particularly true with regard to the networked, digital world. LinkedIn, the professional network portal is the epitome of social capital, underpinned by cultural capital represented by knowledge, and economic capital as represented by access to digital technologies. Here is my conceptualization of capital as the driver of inequality whereby possessing different forms of capital would increase one’s chances of maintaining and increasing overall capital to varying degrees depending on context and individual characteristics:

Figure 1 - Technological Capital

In the figure above, the arrows pointing upward illustrate how a combination of the three types of capital: economic, cultural, and social, generates technological capital that in turn allows the holder of such capital to acquire digital level skills. The arrows pointing downward indicate that the cumulative effect of accumulated digital skills and knowledge in
turn increases the capacity of an individual to accumulate technological, economic, cultural, and social capital.

**Digital Literacy**

The phenomenon of the digital divide and ways to alleviate the divide have been treated as complementary issues by digital divide scholars. Terms such as digital literacy, information literacy, and digital skills have been used by various scholars to encompass the technical knowledge they consider crucial for bridging the digital divide. The common thread in the discussion on digital knowledge appears to be an understanding that merely knowing how to operate a computer is not literacy. For the purposes of this dissertation, I define digital literacy as the intelligent and strategic use of technology to leverage knowing and learning in ways that add meaning to each individual’s life and would make for a rich digital life. In the paragraphs below, I explore some of the terms scholars have used to define knowledge of technology and conclude this section with some specific definitions of digital literacy that support my understanding and use of this term.

One definition of digital literacy available in the literature is “the ability to understand and use information in multiple formats from a wide variety of sources when it is presented via computers and particularly, through the medium of the Internet” (Gilster, 1997, p. 1). Moll and Krugg (2008) differentiate Information and Communication Technologies (ICT) from digital literacies in that ICT places more importance on the social and cultural aspects that help construct knowledge. Warlick (2009) speaks of 21st century literacy as involving “a range of skills to find, navigate, access, decode, evaluate, and organize the information from a globally networked information landscape” (p. 17) where almost all information will be delivered
through some type of digital device. While these definitions represent a wider lens than mere acquisition of computer skills and usage and highlight the complexity and nuances of technology learning, I contend that my definition of digital literacy captures these nuances in a succinct manner.

Van Dijk (1999) takes a different but overlapping view of the idea of digital learning as representing the acquisition of operational skills, information skills, and strategic skills. He places these three different types of skills under the umbrella of digital skills. The digital skills so defined by van Dijk include ability to operate computers and also the abilities to search, select, process, and apply information from various sources. He has further elaborated the definition in 2005 to include instrumental, informational, and strategic skills and proposes that digital skills involve the skill to operate computers and network connections, the skill to search, select, process, and apply information from a superabundance of sources and the ability to strategically use this information to improve one’s position in society. Merchant (2009) also names the acquisition of digital knowledge as digital skills. He considers digital skills as the ways in which new technologies intersect with changing practices in meaning-making in the contemporary world. While van Dijk and Merchant use the term digital skills to describe specific knowledge required to effectively use technology, their nuanced understanding of this concept reflects the definition of digital literacy by Glister (1997), Krugg (2008), and Warlick (2009) cited above. The process of acquisition and effective use of digital technology has been identified by various terms but they refer to the same learning process. Hence, in this dissertation, I adopt and use the term digital literacy to represent the effective and strategic use of technology by
individuals to add meaning to their digital activities in the economic, cultural, and political realms of their lives.

While the above definitions run more along utilitarian and technologically deterministic lines there are some others that take the long view. For example, Markham (2004) considers digital literacy as a set of social practices that are entwined with how we live and work while Clement and Shade (2000) take a more nuanced approach in defining the question of access to information and communication facilities and recommend studying digital literacy, and more specifically access to digital technology, using a holistic model that encompasses both the technical and social aspects of acquisition of digital literacy. They call for such a model to support a multiplicity of usage roles, addressing the full range and diversity of users, recognizing the interaction of social and technical dimensions, highlighting access gaps of social need that may not be addressed by market forces alone. Clement and Shade’s model, would in my opinion, address the concerns of scholars (Eubanks, 2011; van Dijk 2005) that the alleviation of the digital divide is technocratic without considering the lived experiences of the learners and would give rise to more comprehensive solutions to the digital divide issue. In my opinion, the progressively more sophisticated definition of digital skills in the literature reflects the increasing complexity of technology, networks, and devices and the greater intellectual skills required to keep up with rapid advances in this area.

The work of Eubanks with disadvantaged women and Kvasny’s work with learners in community technology centers in a poor neighborhood provide adult learners’ perspectives on the controlling and oppressive nature of their interaction with technology. Additionally, van Dijk’s view of digital inequality as a social and political problem and the application of
Bourdieu’s notion of capital highlight the deleterious effect of the digital divide on the economic, socio-cultural, and political lives of the disadvantaged. Digital divide scholars (Clement & Shade, 2000; Warschauer, 2003) call for comprehensive solutions to digital divide that acknowledge and include the technical, socio-cultural, and political aspects of technology use by learners. Therefore, I believe ideas of social equality and democratic engagement need to drive programs that aim to alleviate the digital divide. In order to be a truly inclusive and transformative endeavor, the goals of these programs need to originate from the disadvantaged groups through a democratic process that allows them to make sense of technology and its role in their daily lives. Moving away from the economically driven technological determinism of researchers such as Compaine (2001), I have endeavored to examine the issue of digital literacy acknowledging individual differences and social location (Eubanks, 2011) as I believe that building digital literacy programs designed this way would provide rich digital learning experiences to bring about lasting change and social inclusion (Warschauer, 2003) in efforts to bridge the digital divide.

**Critique of Digital Divide Discourse**

Klecun (2008) posits that the discussion on digital divide is “simplistic and deterministic” (p. 272), setting the path for a technological solution in terms of physical access to technology and digital skills education. Such an approach might align with the interests of telecommunication and technology companies but might further widen the divide between the general population and disadvantaged groups as merely technological solutions do not provide learners with a critical understanding of how technology shapes their lives.
Eubanks (2011) criticizes “magical thinking” (p. xvi) as the driver of technology-based economic development programs without taking into account inequality created by race, class, and gender. In her work with low-income women in technology workshops, Eubanks found that redistributive schemes providing access miss the point that technology is a tool that converts them to “haves” but does not address the social and financial environment these women live and work in. Their experience with technology in low-end jobs, surveillance technologies at work, and their encounters with computers in the social service system have exposed them to the exploitative face of technology and have made them ambivalent about the possibilities of technology to better their lives. Drawing a parallel to her own life where technology has made it easier for her to have a fulfilling career, an easier relationship with government in simplifying her performance of civic obligations, and an ability to engage in ecommerce, and maintain professional and personal networks, she argues that where people are located “in relationship to the power structures of society – that is, their ‘social location’ – has an enormous impact on how they encounter and relate to the tools of the information revolution” (p. 23). Eubanks’ writing juxtaposes the power of privilege to leverage technology to more meaningful action by the haves as against the dead-end, low level interactions that the “have-nots” experience with technology. A distributive paradigm for access to ICT is economically important but more important is the study of how marginalized groups interact with technology in their everyday lives through an intersectional approach of social location that throws light on the oppressive nature of existing technologies for groups facing discrimination due to race, class, or ethnicity. Eubanks’ research on her community-based digital literacy work with low-income women with a focus on equity and social justice is a major
shift away from technologically deterministic, redistributive models and is a strong model for further work with other marginalized groups using the concept of social location.

The notion of social location impacting user experience with ICT is echoed in the relational view of digital inequality taken by van Dijk (2005). Channeling the sociologist Charles Tilly, he perceives digital inequality as a subset of social inequality and contends that it is the “bonds, relationships, interactions, and transactions between people” (p. 11) that provide a relational framework to study the concept of inequality. The relational view helps direct attention to the relative inequality between people, their position and resources, and moves away from the idea of an absolute divide to a more realistic view of divide as a continuum with one’s position in the spectrum determined by access to people and networks.

The theme of social location with respect to technology is also touched upon by Kvasny (2006). Her work on the cultural reproduction of digital inequality theorizes that Internet and Communication Technologies (ICT) are socially located and implicated in bringing about digital divide. She critiques Community Technology Initiatives as seeking out the so-called digital illiterates to provide them with the means to learn ICT skills thus playing a role in a value-judgment process of categorizing the haves and have-nots of technology skills. She uses Bourdieu’s concept of cultural capital to extend the role of educational institutions to Community Technology Initiatives as being part of the process of cultural reproduction. According to her, Information and Communication Technologies do provide “a highly efficient and cost-effective mechanism for perpetuating systems of power and privilege” (p. 163). A realistic study of digital divide needs to include this historically constituted social reality where the “haves” and “have-nots” play a role in reproducing these inequalities. Solutions to the
digital divide on purely distributive basis do not address the underlying social forces that act as limitations on historically disadvantaged groups according to Kvasny (2006).

The work of researchers calling for an inclusive approach to the issue of digital divide (Eubanks, 2011; Kvasny, 2008; van Dijk, 2005) that considers not merely the economic but the social, political, and cultural aspects of learners’ lives reflects my own understanding and experience of the phenomenon as a technology educator. In my classroom, I teach first generation college attendees with low levels of the forms of economic, social, cultural capital identified by Bourdieu and thus the starting point of their digital education affects their learning. Hence, I clearly identify with some researchers who acknowledge that the socio-cultural position of a learner in the digital realm would affect how they might view technology. In particular, Eubanks, van Dijk, and Kvasny speak of the concept of “social location” that affects how a novice digital learner might perceive and experience technology in his/her daily life and the reality that the rhetoric of economic empowerment may not come to pass for those in the fringes of the digital world. I believe that social location plays a critical role in the technology experience, hence I reject the simplistic dichotomy of digital have-nots, and identify digital divide as a product of underlying structural inequalities. I agree with Eubanks that we can find alternative solutions to address digital divide by using local knowledge to build “networks based on truth, trust, reciprocity, and reconciliation” (Eubanks, 2011, p.39).

In her work with disadvantaged women at the YWCA Eubanks had this to say regarding social justice in the information age:
By broadening our focus beyond developing technological artifacts and skills and understanding technology and the information economy in the context of participants’ everyday lives, WYMSM opened a way to think more broadly about what social justice means in the information age. (Eubanks, 2011, p. 156)

I believe this quote provides a way forward for my research and provides a rationale for me to adopt a multi-dimensional model of the digital divide and places the phenomenon squarely at the intersection of technological, socio-cultural, and economic environments of individual learners’ experiences as informed by their social/positional location (Eubanks, 2011; van Dijk, 2005) in order to achieve a more in-depth understanding of the phenomena of digital divide and digital literacy. I believe this approach, goes beyond physical access to technology and helps highlight the particularities of the digital experience of adult learners while also attempting to build a broad picture of the impact of digital literacy programs in alleviating the digital divide.
Theoretical Frameworks

The nature and complexity of the phenomena of digital divide and digital literacy required a multi-dimensional approach that could engage the different realms of the phenomena such as economic, socio-cultural, and political spheres of adult learners’ lives, mediated by factors such as access, motivation, skills, and usage in the context of the lived experiences of the learners. The literature review of the phenomenon of the digital divide has provided an understanding of how digital inequality has not only excluded disadvantaged individuals and communities from the benefits of the information revolution (van Dijk, 2005) but it is also an indicator of the underlying social inequalities that exist (Kvasny, 2006; van Dijk, 2005) in our society that results in the disadvantaged being unable to leverage technology in various spheres of their lives. Since I view this issue as one of social justice, I turn to Rawls’ Theory of Justice as Fairness to highlight the importance of addressing it on the basis of equity and fairness. An overall just and equitable digital environment is informed by Rawls’ ideas of fairness and liberty while Sen’s capability approach would provide the more specific structure of how individual learners can balance their capabilities and needs to achieve the digital skills that they determine are required, on their terms. Critical education theories such as Horton’s culturally rooted education, Freire’s critical education, and Eubanks’ popular technology education would help fashion the digital literacy programs that provide the most empowering learning outcomes to adult digital learners. In the sections below, I highlight the alignment between the philosophies of Rawls, Sen, Horton, and Freire and my own understanding of the phenomenon of the digital divide, shaped by the broad-based approach recommended by Kvasny, van Dijk, and Eubanks.
Rawls, in his general conception of justice as fairness states that "All social values - liberty and opportunity, income and wealth, and the social bases of self-respect are to be distributed equally unless an unequal distribution of any, or all, of these values is to everyone’s advantage" (Rawls, 1971/1999, p.54). In further elucidating this conception Rawls defines these requirements as primary goods, rights, liberties, and opportunities, and income and wealth that every rational man is presumed to want. In identifying the two principles of justice for societal institutions, Rawls presupposes that the social structural can be viewed as having two distinct parts.

According to Rawls (1971/1999), there are two principles of justice with the first principle based on liberty such that each person is to have an equal right to an extensive system of liberties such as the right to vote, freedom of speech and assembly, and freedom to hold private property, collectively called civil and personal liberties and these liberties should be distributed equally and must be compatible with the rights of others. Rawls’ second principle based on wealth allows for social and economic inequalities provided such inequalities are of the greatest benefit to the least advantaged and attached to offices and positions that are open to all on the basis of equality of opportunity. Such inequalities are justified only to the extent that they improve the lives of those who are worse-off due to such unequal distribution.

According to Rawls’ second principle or the difference principle as it is called, while the differences in natural abilities and social positions that some are born with are a fact of life and cannot be eliminated, the advantages that can be derived from such differences can be put to work for the benefit of those who are worse off. Thus, arbitrary natural benefits can be converted to a collective resource for common good.
I make a case here that digital literacy or access and ability to use digital information should be considered a primary good and lack of access or inability to master and use digital information and digital technology in a meaningful way leads to digital inequality. Daniel Bell (1973/1999) prophesized that knowledge and information would supersede land, labor, and capital as the source of wealth and power and this would create its own inequalities. With technology permeating every aspect of our lives, unaddressed digital inequality would progressively worsen structural inequalities that exist. Thus, there is a strong rationale for exploring the access to information in digital formats through Rawls’ first and second principles.

Duff (2011) believes that we are moving towards an information society that rewards the knowledge and information workers and this disadvantages those without such knowledge both in economic and social terms as well as disempowers them politically in this age of political activism driven by digital media. He states that the digital divide “reveals the underlying problem of structural inequalities in the distribution of social resources, not least certain valuable types of information” (p. 610). I would argue that with the pervasive use of digital information in political spheres such as voting precinct information or extensive resources about political candidates’ positions available online, as well as in economic spheres such as ability to search and apply for jobs online, ability to shop effectively for health insurance to name just a few activities that may positively impact a person’s economic abilities, the presence of digital divide among certain groups within the population would place them at a distinct disadvantage. At present, there are traditional alternatives to digital information in the critical areas of political rights, economic opportunities, and social interactions and lack of access to digital information in these areas may not violate Rawls’ first principle. But with the
increasing speed of digitization of information that we have witnessed over the past two decades, I foresee a time in the near future when lack of access to digital information in the political and economic spheres would violate Rawls’ first principle. While the second principle states that certain levels of social and economic inequalities are acceptable provided that the benefits flow to the least advantaged and that the benefits are attached to offices and positions open under the principle of equality, the inequalities that have arisen in the digital economy are far beyond what this principle proposes with the knowledge and information holder reaping benefits of several orders of magnitude compared to the worker. The trickle-down effect of advancement in technology has, to a certain extent, reached the educated and the middle-class who have the economic resources and the intellectual capability to keep up with the punishing rate of change in technology but those at the bottom-end of the spectrum have not felt the benefits of the technology revolution. Interconnectivity as a result of technology has made us aware of hardship and poverty around the world and we are in a position to provide relief through charity efforts over the Internet which may provide immediate relief but the benefits of technological revolution in terms of improved economic prospects and enriched social and political lives have not reached the least advantaged. The social and economic inequality of the information society thus does not benefit the least advantaged and violates the second principle of justice.

Rawls believed that the basic structure of society should be the primary subject of justice as the effects of a person’s place in society or starting place, has a profound impact on that person from the start of life. Rawls’ focus is on social justice as it applies to the structure of society and the way in which social institutions distribute fundamental rights and duties and
determine how the benefits or advantages are distributed among the participants in social institutions. Rawls describes social institutions as the political constitution and the principal economic and social arrangements that define “men’s rights and duties and influence their life prospects, what they can expect to be and how will they hope to do” (Rawls, 1971/1999, p.6).

On the question of society favoring certain starting places over others, Rawls talks about social positions and of those different positions having different expectations of life determined not merely by economic and social factors but by political systems also. With respect to the application of Rawls’ theory to the question of digital divide, I would like to draw a parallel here to Eubanks’ (2011) idea of the social location of a person determining her experience of and attitude towards technology and that the nature of the interaction of disadvantaged users with technology is very dissimilar to the way more advantaged users view and use technology and this has to be considered when developing policies aimed at bridging the digital divide. The recurring theme of social position/location with respect to experiencing inequality highlights the difference in the technology experience of users depending on their position in society and offers a rationale for the importance of just institutions and just programs to bridge the digital divide. Rawls’ idea of starting place and Eubanks concept of social location highlight the structural inequality that humans with a disadvantageous start in society endure and this inequality extends to the digital world. With access to information in various spheres of life moving into digital formats, digital literacy has taken an important role in reaping the economic and social benefits of the digital revolution as well as in making informed decisions in civic and political spheres. Hence, many scholars frame the concept of digital divide as a social justice issue (Duff, 2011; Eubanks, 2011). Lack of digital skills prevents the disadvantaged from reaping
the benefits of the information revolution be it in the economic area or in the more active use of technology in political action or in social networking. This divide can be traced back to Rawls’ concept of starting position as those who are disadvantaged have to overcome considerable obstacles in order to gain the digital skills necessary to enjoy the benefits of technology if they so choose.

When digital divide is viewed as an information divide, important economic, political, and social information required for active participation and advocacy in a democratic society could be considered as primary goods. With advances in technology, such information is increasingly available in digital formats due to ease of dissemination and are easily accessible for those with the necessary digital skills and access. While there may be traditional alternatives to such digital information at present, the trajectory of the information revolution points to an increasingly digitized world where the digital have-nots may lose out on critical digital information to function well in the economic, social, and political realms mediated by such technology. Moreover, with the monetization of digital technologies, the enormous wealth created resides in a very small percentage of digital technology producers and a few benefits have trickled down to the common technology user. But the extent of benefits to the disadvantaged are not widespread enough to satisfy Rawls’ second principle. Taken together, the lack of access to critical digital information in a democracy may point to a future where such a situation may lead to the violation of Rawls’ first principle and the current lopsided distribution of the benefits of the digital revolution would, in my opinion, constitute violation of Rawls’ second principle.
The discussion above raises some important ideas but the details of the mechanisms to address digital divide still need to be expanded upon. For example, while Rawls’ theory read in conjunction with the idea of information as primary good provides a mechanism to examine the case for access to digital information being considered under the two principles proposed by Rawls, it does not give us any guidance as to how to categorize different types of information in the fast changing technological world under the first and second principles. Additionally, in terms of digital literacy, while a major part of inequality can be attributed to lack of resources, there are groups such as older users and persons with disabilities who may suffer from want of skills not directly attributable to resources. Rawls relies on the social-contract tradition where citizens are considered as equals benefiting from cooperation but Nussbaum (2001) refines this view further and acknowledges the diversity of learning abilities among humans:

Instead of picturing one another as rough equals making a bargain, we may be better off thinking of one another as people with varying degrees of capacity and disability, in a variety of different relationships of interdependency with one another. (p. xx)

Nussbaum ‘s acknowledgement of the importance of differences in capacity and ability among learners provides a way to adapt Rawls’ principles of justice while also acknowledging that Rawls’ application of these principles to primary goods may not be sufficient to address questions of inequality in the digital world that go beyond just access to resources. Nussbaum’s critique is also seconded by van Dijk (2005) who has defined the Rawlsian approach to the digital divide as mainly a goods-based approach that is insufficient to study a complex, multi-layered phenomenon such as the digital divide. Rawls’ Theory of Justice as Fairness provides a broad framework through which to view the phenomenon of the digital divide and access to
digital information as a social justice issue but it does not provide direction for what information/skills are valuable to different users or groups of users. In order to develop a public policy to address digital divide guided by the theory of justice we can turn to Amartaya Sen’s capability approach to help us in articulating such a policy.

**Capability Approach**

When confronting the question of equality, according to Sen, we have to deal with the basic diversity of human beings as well as the different variables on which equality can be judged. Human beings are diverse in terms of external characteristics such as inherited wealth, natural, and social environments as well as personal characteristics such as gender, age, health, physical and mental abilities, and any assessment of inequality has to necessarily include these variations as not doing so would be deeply inegalitarian. In order to assess inequality, Sen goes beyond human diversity and fleshes out the distinction between achievement and freedom to achieve as an important aspect of inequality. Sen also critiques the resource-oriented approach of Rawls and advocates what is called a capability approach which is a broad, normative framework for evaluating and assessing individual well-being, assessing social arrangements, and the design of social change policies in society (Robeyns, 2005). Sen’s capability approach takes into account functionings and the capability to function which falls in the realm of well-being whereas more traditional approaches such as Rawls’ primary goods approach deal with instruments to achieve well-being and hence are more resource-based rather than providing for specific ways to achieve well-being.

While the capability approach proposed by Sen (1992), a developmental economist, distinguishes between capabilities which indicate ability to achieve and functionings referring
to actual achievements, it also takes into account the human ability to make choices that can enrich their lives where education can play a role in increasing an individual’s human capital. Individual differences in capabilities and choices may lead two persons to make two very different choices in using their freedoms (Sen, 1992). Sen’s approach does allow for consideration of what Rawls called the “starting location” for each individual but Sen’s approach is more multi-dimensional as it takes into account human capability as well as freedom to make choices. It highlights the difference between substantive freedoms or capabilities and outcomes or achieved functionings (Robeyns, 2005).

The capability approach (CA) is not an inequality theory but it is a tool that can be used to evaluate or conceptualize the phenomenon of digital divide. CA seeks to move the discourse away from the current discussion of economic growth and development to a different space that focuses on freedoms for people to achieve what is valuable to them in their lives. The importance given to well-being and development and the highlighting of freedoms or choices for individuals encapsulate the main principle of individual differences as Sen states:

Two persons with the same actual capabilities and even the same goals may end up with different outcomes because of differences in strategies or tactics that they respectively follow in using their freedoms (Sen, 1992, p. 82).

Thomas and Parayil (2008) have also used Sen’s capability approach in their field research that involved conducting sample surveys in rural India on the subject of the digital divide. They found that bridging the digital divide requires policies that encompass understanding the social as well as the economic contexts of the people on the wrong side of
the divide, acknowledging their capabilities and the limiting factors in their environments. Zheng (2009), in an article dealing with theoretical reflections on e-development, uses CA to reflect on the relationship between ICT and development moving beyond the focus on economic prospects of ICT to meaningful opportunities for technology users to achieve what they consider to be of value in their own lives.

Sen’s capability approach takes into consideration a combination of factors such as means to achieve and the freedom to achieve that makes actual achievement possible. The means to achieve depends on the availability of commodities and when this is applied to questions of digital skills acquisition, could relate to tangible items such as physical access to computers as well as intangibles such as social capital. The notion of capabilities or potential functionings applies to physical and intellectual abilities that may help a person generate benefit from commodities available to her such as the physical and mental faculties needed to learn complex digital skills. The actual achievement of a person is dependent on the means to achieve and the freedom to achieve subject to personal preferences and decision-making capabilities.

CA is particularly suited to address the phenomenon of digital divide where it can be contextualized to users’ abilities and needs and can be connected to their particular environments. Using this approach, Gudmundsdottir’s study of digital divide in four primary schools in South Africa (2010), refocuses attention on how individual differences influence learners skills, capabilities, and freedoms. Using CA, Zheng (2009) approached the issue of digital education through a critical pedagogy perspective and proposed that users of ICT not be viewed as passive receivers of technological knowledge but rather as active participants.
connecting their needs and expectations to their social, cultural, and historical environments. I agree with Zheng that active participation of technology users’ results in their situated agency, providing space for them to participate in the digital world.

While policies based on the distributive paradigm have not really solved the issue of the digital divide, using CA would help address digital divide issues at the individual and/or community level and help users make free choices on what they consider to be of technological value in their own lives. But, in her theoretical survey of the capability approach, Robeyns (2005) highlights the drawback of CA as only accounting for the opportunity aspect of freedom and justice, and does not provide any specific procedure to address inequalities. I agree with Robeyns but I also recognize that CA provides a broad normative framework to deal with inequalities in digital technologies by acknowledging diversities in the capabilities and needs of learners. With Sen providing a general direction for my digital divide framework, I apply the work of Horton, Freire, and Eubanks to operationalize CA for the phenomenon of the digital divide. In my opinion, Horton’s cultural education, Freire’s conscientização, and Eubanks’ critical technology education provide a blueprint for designing effective policies and programs that address the digital divide. In the section below, I explicate on how the work of Horton, Freire, and Eubanks can be used as a basis for an equitable digital inclusion framework.

**Freire, Horton, and Eubanks: Critical Digital Literacy**

Freire’s criticism of the use of science and technology “as unquestionably powerful instruments for the maintenance of oppressive order” (1970/1996, p.42) seems prescient now with the breakneck speed at which technology has changed all facets of our lives benefitting those with the necessary skills to leverage the power of technology but disadvantaging those
who do not possess the knowledge or the wherewithal to use technology. The continuing narrative of bridging the digital divide through programs that help the have-nots gain the digital skills required for the purpose of employment and economic opportunities reinforces and attempts to integrate them into the existing power structures. Freire advocates dialogue with the oppressed as the most effective instrument in humanizing pedagogy. A more transformative methodology would be a dialogical process recommended by Freire where the oppressed are part of the praxis in humanizing the effects of technology and making it their own so that it lends meaning to their lives. The current system of imparting technological knowledge to the have-nots seems more like the “banking system” and does not truly allow them to participate in the knowledge creation process or develop critical consciousness. A banking system of learning would only be a snapshot of technology at the particular point of time and may get outdated in a short span of time, whereas if individuals can approach the acquisition of digital skills critically, they can gain a better understanding of technology and its role in their lives and this may lead to a lasting set of skills.

Technology education particularly for non-traditional learners needs to acknowledge them as historical beings as Freire advocates, as these learners are likely to have been left out of the benefits of the technological revolution and weighed down by other socio-economic and age-related variables that affect their abilities to adapt to technological innovations. A more humanist and liberating approach would be to take their historicity as the starting point and encourage a dialogical problem-solving learning process that allows critical reflection, allowing them to be subjects in the learning process rather than mere objects. Freire’s concept of science and technology at the service of revolutionary humanism is based on the premise that
the oppressed are not ignorant and cannot be reduced to the status of objects to be analyzed but that they must become subjects in the process of humanization of technology. Applying this idea to the phenomenon of digital divide, we can value the empirical knowledge of the digital have-nots, of what they value in their own lives, and how technology impacts their values. Any program that seeks to alleviate the problem of digital divide has to necessarily involve the participants in a relationship of discovery and open dialogue in order to be a truly liberatory education.

Another aspect of digital divide alleviation programs is the focus on training participants to reach a certain skill level in areas which are valued by the employment market which merely reiterates the economic power structures. While economic empowerment is important, the increasing role of technology in our lives requires a more holistic technological education. Instead of treating labor as something to be bought in units, giving people the power “to create their world and create it with their transforming labor” (Freire 1970/1996, p. 126), is the most liberatory form of education. Freire coined the term conscientização to refer to an engaged learning process that provides the learner the skills to perceive social, political, and economic contradictions in her life and to take action to overcome such contradictions. Applying Freire’s concept of conscientização or critical conscious in the field of technology education, a dynamic and continuing cycle of action and reflection can provide a true learning experience. Critical consciousness is particularly important to digital learning as technology is constantly changing, due to improvements in hardware and software as well as due to market forces that guide its adoption and use. When learners use the lens of critical consciousness in technology learning, they can understand how the changes in technology impact their own lives and can identify and
overcome oppressive elements of such changes through their actions. In Freirean terms, policy actions that address digital divide issues should start with a dialogue with the ultimate beneficiaries and enable them to generate their own action which reflects their situation otherwise it fails to be critical education with the learners merely consuming materials presented by the “teacher”.

Myles Horton’s observation on community-based adult education programs can also be applicable to community-based digital literacy programs and they are generally targeted towards adult learners. According to Horton, adult learners could benefit from a learning process that they can identify with and is rooted in their social and cultural lives. He calls for “cultural education” of adults:

“The spreading of knowledge through a large group is a difficult task, but the widespread understanding of the social forces which will enable the masses to assume social control is essential to the welfare of our country. This means that adult education must be cultural rather than vocational. (2003, p. 212)

Horton’s statement has specific applicability to my study of digital learning among adult learners as I have situated my study in a community technology center and used participatory methods in an attempt to collaboratively identify the technology issues that adult learners face and to overcome obstacles to digital learning through action. Horton’s ideas also parallel Freire’s concept of transformative learning and critical consciousness as lasting change can be achieved only when learners understand the social and cultural forces that shape their own lives. Horton’s experience in establishing and running the Highlander Folk School (now the
Highlander Research and Education Center) and its work in educating adults in the area in matters ranging from union organizing, to voting rights, and overcoming segregation is an example of how adult education can be directed to the current social and economic issues that are related to “situations that affect their total lives.” Digital literacy programs that aim to bridge the digital divide can also be strengthened if they provide an alternative perspective that speaks to the situations that affect the lives of the participants to help them identify with and perceive the value of digital knowledge as a means of empowerment in their lives in addition to the knowledge to be acquired mainly for employment purposes.

In his critique of technology as being a mechanistic device, Horton lays out a vision of technology as a positive force:

We have got to take over technology. We have got to find a way to make technology man’s servant instead of man technology’s servant. Instead of allowing it to go on like it is, it could be used to free mankind from drudgery, allow for a higher standard of living, give us more leisure, more quality in life; it could be used for society’s interests. (2003 p. 225)

Horton was not necessarily against technology as much as he was against the use it was put to. He does lay out an ideal of technology as man’s servant. Sen’s capability approach that values an individual’s capabilities and needs combined with Horton’s concept of technology as man’s servant and Freire’s critical consciousness provide an inclusive and contextual way to frame the digital divide issue as their ideas help place the individual at the center of the learning process, acknowledging the capabilities and needs of the learners, providing a
framework for addressing the educational needs of the learners through meaningful digital learning experiences.

Adapting the ideas of Freire and Horton, I believe that critically conscious, transformative technology learning, rooted in the social and cultural contexts of learners’ lives is required to address digital inequality. Such policies would help create digital environments where learners are not merely consumers of knowledge but are critical users and creators of digital content that reflect their life experiences. This idea is also reflected in the work of Eubanks who coined the terms “popular technology education” and “critical technology education”.

As Eubanks has found (2011), the technology experience can be dehumanizing for persons not in a position of power in the economic system, technology merely being used as surveillance or as a means of control. According to Eubanks, the existing models of technology education, while providing much needed vocational training, do not give importance to “human experience, agency, and decision-making” (2011, p. 154). She calls for popular technology education based on three concepts: popular education proposed by Myles Horton based on the idea that knowledge grows from social experience and critical reflection, participatory action research that prompts social change through ordinary people’s analysis and action and participatory design where people using software play a critical role in the design process. According to Eubanks, popular education helps develop critical consciousness as an alternative to the distributive paradigm of technology education that seeks to impart marketable digital skills. Her concept of popular technology is grounded in the belief that the people closest to problems have the best knowledge about them and are the most invested in coming up with
solutions to the problems. In the course of her work with low-income women at the YWCA in Troy, Michigan, Eubanks and her participants undertook many popular technology projects such as building a community technology lab, designing an online women’s community resource directory, and conducting a workshop on ways to navigate the social service system. These popular technology projects used participatory methods with the objective of creating sustainable technology that is grounded in the participants’ knowledge and social context and aiming for equity, justice, and critical technological citizenship.

Application of the Social Cognitive Theory in the Study of Digital Divide

With Sen’s CA highlighting the importance of the range of learner diversities and Freire’s conscientização underlining the importance of transformative learning for individual learners, I now focus my research lens on the importance of learner characteristics in the process of digital learning. Bandura’s Social Cognitive Theory (SCT) (1986) provided me with a useful lens to study the concept of human agency in digital learning. The Triadic Reciprocal Determinism underlying SCT proposes that behavior, cognition, and other personal and environment influences operate as interacting determinants on human behavior. Bandura acknowledges the importance of self-efficacy as a determinant in human motivation and action within the Triadic Reciprocal system. I agree with Bandura (2002) that the increasing complexities of modern technologies demand high order cognitive learning and intellectual capacities from digital learners. Our current knowledge-based society demands constant learning and self-development and motivational, emotional, and social factors play an important role in how learners can make meaningful use of the vast bodies of digital information available. Recognizing the changes that have resulted from “the dynamic interplay of technological
developments and a variety of psychosocial and structural determinants” (2002, p.2) Bandura proposes the agentic concept of SCT as a framework to examine the impact of technology on society.

I see the application of Badura’s concept of agency as a natural progression of my theoretical frameworks from Sen’s CA to Horton’s culturally rooted education, Freire’s conscientização, and Eubanks’ critical education. Each of these scholars acknowledge the importance of individual characteristics in the educational experience. In my own research project, I acknowledge the value of life experiences that adult learners bring to the digital learning experience and I believe studying the concept of digital divide and digital learning through the concept of personal agency would result in fresh insights into this phenomenon that would ultimately transform and empower adult learners. I believe that Badura’s agentic concept when applied to digital learning of novice technology users, empowers them and provides opportunities for critical learning that can transform the digital experiences of such learners. According to Bandura (2002), beliefs of self-efficacy regulate people’s life choices and their behavior and this belief system is the foundation of human agency. In the realm of digital learning, self-efficacy would empower users to face the challenges presented in learning complex technologies and provide them the motivation to leverage such technologies for their self-development. Such self-efficacy may provide opportunities for learners to view technology not merely as a tool for economic improvement but also as a tool for social and political mobilization to bring about meaningful changes in their lives (Bandura, 2002). Hence, Bandura’s concept of agency applied to digital learning would also have the potential for the realization of conscientização in learners’ lives.
Digital Design as an Equitable Tool

Barzilai-Nahoon (2006) posits that technology is not a neutral artifact but is rather a reflection of the designers’ perspectives with little input from the users of such technology. Eubanks (2011) also acknowledges the inherent bias against disadvantaged users in the design of digital tools and calls for a participatory design process with the active involvement of people who would use such tools resulting in empowerment of the users. This concept of user participation in the design of technology has been discussed by various scholars applying terms such as user-centered design (Norman & Draper, 1986), value sensitive design (Friedman, 1996), and contextual design (Holtzblatt & Beyer, 2015) in conjunction with developing robust and user-friendly information systems. In this section, I explore the connections between the general concept of user-friendly design in literature and its potential to alleviate disadvantaged learners’ obstacles to acquiring digital skills.

Human computer interaction (HCI) is a field of research that is located at the intersection of computer science, behavioral sciences, design, media studies, and many other related fields. It refers to the research in design of technological tools and interfaces that provides optimum user experience (Card, Newell, & Moran, 1983). As humans interact with many digital devices such as computers, cell phones, tablets, and other automated systems in their everyday lives such as self-service kiosks in train stations, banks, and supermarkets, the range and frequency of human computer interactions have increased and so has the importance of user-friendly design. The section below highlights some important aspects of HCI gathered from research literature applicable to my research.
The term “user-centered design” (Norman & Draper, 1986) represents a set of processes where the needs, wants, and limitations of the end-user of a product or service are given importance in the development process. In software design, user-centered design involves engaging the end-users extensively, throughout the software development process, with the product designed around the way it is used. User-centered design has its underpinnings in the Scandinavian tradition of cooperative design and the North American tradition of participatory design giving rise to the more recent contextual design. The cooperative design concept developed in Scandinavia represents the combined efforts of the systems designers and systems users in developing computer systems and combines situated design practices with guided work practices. The technology and systems are centered on how users work rather than the dominant paradigm of technology driving work practices (Napper, 1994).

Participatory design in North America is a design process that is more responsive to users of products and has been used in a variety of areas such as architecture, urban design, product design, as well as software design. The participatory approach focuses on the process of collaboration to create a more user-friendly design rather than focusing on design style, with a view to empowering the user and democratizing the process of design (Schuler & Namioka, 1993). Contextual design proposed by Holtzblatt and Beyer (2015) has its foundations in ethnographic methods that are used to collect data from the field on how work flows and users interact in order to provide a meaningful design of human-computer interfaces. These design approaches may find resonance in the digital tools and interface development arena when the needs of the end-users are used as a starting point for the design procedure. Interfaces designed in this way may be more novice-user friendly, without an expectation that users
would possess higher level digital skills resulting in a more equitable digital interface experience.

While software companies may use some of the participatory methods mentioned in the paragraph above in developing software (Vredenburg, Mao, Smith, & Carey, 2002), there needs to be a concerted effort to include novice technology users in this collaborative endeavor to ensure that the viewpoints of such users are included in the design process. Such inclusive design efforts by software developers and interface designers could be touted as a marketing tool to attract and expand their user base, in addition to creating goodwill for organizations. Friedman (1996) speaks of a value-sensitive design of systems that considers user autonomy. Providing the freedom to change elements of software for individual preferences is a laudable endeavor but she does recognize that this freedom may be meaningless for less savvy technology users. Alternatively, Friedman defines the concept of computer technologies-related bias as an unfair discrimination against individuals or groups if it results in an undesirable outcome to the individual or group. Friedman identifies different kinds of biases such as a pre-existing bias rooted in social practices, a technical bias in the design towards more knowledgeable users, or an emergent bias which is identified after the software has been adopted, as constructs that can be combated with a more inclusive design process.

Newell (2011) calls on engineers, creative designers, advertisers, marketers, and policy makers to play their part in reducing digital divide with creative design practices. In his book on design and the digital divide, he calls for designers to develop a long-term relationship with users and provide them with opportunities to contribute to the design process with their ideas. Meeting prospective users in their own environments would be a worthwhile design endeavor
according to him. He also recommends professional theatre as a valuable means of communication between designers and users during the conceptual stage of design. While his recommendations were made to ameliorate the digital divide for “digitally disenfranchised” groups such as older or disabled adults, I believe such novel and free-form ideas could be employed with other digitally disadvantaged groups in the process of developing user-friendly technology.

Contextual and user-friendly design of digital tools could be a powerful way to address obstacles to digital learning and digital tools usage faced by adult novice learners. Mindful digital design that overcomes any inherent bias on the part of designers by engaging the users of the tools in the design process could level the digital playing field, acknowledging the diversity of ways in which the digital tools are used and providing opportunities for meaningful use of such tools by adult digital users.

**Research Questions Informed by Literature Review and Theoretical Frameworks**

The literature review process and theoretical frameworks discussed above, clarified and synthesized the most important aspects of the phenomena of digital divide and digital literacy. The themes of empowerment and conscientização (Freire, 1970/1996) permeate my research frameworks as I agree with Freire’s (1970/1996) idea that science and technology need to be at the service of humanity. Applying conscientização to this research project would help participants understand the obstacles to their own digital learning and initiate appropriate action to overcome such impediments. For the purposes of my research, I define empowerment as the ability of individual learners to understand and apply digital skills in various spheres of their lives to fulfill economic goals as well as to be engaged with the social
and cultural aspects of the digital world for personal fulfillment, if they so choose. I also draw
upon Bandura’s concepts of agency and self-efficacy as important determinants of human
motivation (Bandura, 1989) to frame my research questions. The use of such personal and
professional agency in a participatory research setting would be most appropriate in achieving
conscientização as learners learn to perceive the contradictions in their own environments and
seek to take action against unjust elements. I present below my research questions that have
been informed by my literature review and my theoretical framework:

1. What do digital skills mean to non-traditional learners? How do non-traditional
   learners define digital skills and perceive their applicability in their own lives?
2. How do non-traditional learners view and understand their personal and
   professional agency in the process of the acquisition of digital skills?
3. What is the role of conscientização in the sphere of digital skills acquisition for these
   learners? What are the obstacles perceived by learners in their quest for “digital
   empowerment” as defined by the learners? How might they take action to
   overcome the perceived obstacles?

Question 1 attempts to examine non-traditional learners’ perspectives of what digital
skills mean in their own lives, directly addressing Sen’s concern that people have meaningful
opportunities to achieve what they consider valuable in their lives (Sen, 1992). Horton’s cultural
literacy also plays a role as learners defining digital literacy would help contextualize the issue
of digital divide and digital literacy in their lives and pave the way for a more culturally and
economically relevant digital literacy policy.
Question 2 applies Badura’s concept of agency to the digital learning process and attempts to understand the role of self-efficacy and motivation in the acquisition of digital skills. These individual characteristics are particularly important in the challenging area of digital learning as learners have to grapple with the constantly changing nature of technology as well as its complexity. Additionally, Freire’s concept of critical consciousness is the foundational idea underpinning the importance of agency in digital learning.

Question 3 expands the research focus from questions of definition of digital skills and agency in acquisition of digital skills to encompass the concept of conscientização; adult digital learners learning to perceive social, political, and economic contradictions in their lives and taking steps to overcome such oppression.

The inclusive approach of some researchers (Eubanks, Kvasny, and van Dijk) to the issue of the digital divide that goes beyond the economic realm and attempts to examine the impact of technology on the social, political, and cultural aspects of learners’ lives has influenced my own thinking on this phenomenon. Rawls’ principles of justice provide the overall social justice lens through which I view my research. While Rawls’ work provided the overall umbrella to build my frameworks, I acknowledge that Rawls’ theory of justice as fairness is resource-based and does not address the specificities of individual needs and capacities. Hence I have adapted Sen’s capability approach as a foundation to understand and acknowledge human diversity and the individual motivations of non-traditional digital learners. With Sen’s CA providing a normative model to understand the phenomenon of the digital divide, I turn to critical pedagogy proponents such as Horton, Freire, and Eubanks to operationalize CA and build specific recommendations for an inclusive digital literacy policy to address the digital divide.
The figure below represents my theoretical frameworks beginning with the broad umbrella of Rawls’ principles, progressively narrowing with Sen’s CA speaking to the specificity of individual learners, and ending with what I consider as specific critical pedagogical approaches of Horton, Freire, and Eubanks as a model for the way forward in critical technology education:

![Diagram showing theoretical frameworks]

Figure 2 - Theory Informing Research
Summary

In this chapter, my exploration of the literature on the digital divide helped me understand the multi-dimensional nature of the phenomenon that includes the economic as well as the socio-cultural, and the political dimensions that have a deep impact on how learners use technology in different spheres of their lives for their self-development and well-being. The literature review of the digital divide led me to explore how different scholars define digital literacy and helped me understand and define digital skills as the ability to use technology in intelligent and strategic ways by users to maximize the benefits of technology in their lives. The depth and persistence of digital inequality called for a social justice framework that provides a strong lens to explore this phenomenon. With Rawls’ principles of justice as fairness providing a social justice umbrella for exploration of how adult digital learners perceive obstacles to digital learning, Sen’s capability approach enabled me to include the critical aspect of learner diversity as an important theoretical framework in my research. The critical pedagogy concepts of Horton, Freire, and Eubanks helped me fashion an integrated set of theoretical frameworks that framed the issue of the digital divide as a social justice issue, acknowledged the importance of learner diversity in digital technology education, and provided a critical education lens as a tool to understand the importance of critical consciousness in the digital learning process. In the next chapter, I provide a rationale for my use of action research methodologies and my decisions regarding research site, participants, data collection and analysis used in this research project.
Chapter 3

Methods

This chapter provides an overview of the rationale for and application of the research methods chosen for this study. The Institutional Review Board (IRB) approval process, selection of participants, and the research setting are also described. Information about the research questions, the data sources, collection protocols, and data preparation are presented. Finally, the ethical implications of the research and the researcher positionality are also examined.

Overview

As my research questions attempt to understand the contextual and situational aspects of the acquisition of digital skills, an action research oriented approach using certain qualitative data tools are best suited my study. Qualitative and action research by their very nature allow for fluidity and change depending on the context and circumstance of the phenomenon being studied. Such flexibility was invaluable in my research as it involved working with non-traditional adult learners in community-based settings. Participatory action research methods such as photovoice combined with specific qualitative research tools such as interviews allowed me the flexibility to accommodate and value the time constraints of my participants while providing me ample opportunities to pursue my research questions. The three stages of research were:

1. Photovoice - A participatory action research method was used.
2. Participants from step 1 were interviewed using a semi-structured interview format. The content and nature of the questions in the interview were based on the data analysis from step 1.

3. The findings from step 1 and 2 were presented to a larger group of participants for a Group Level Assessment.

In the sections below, I provide the rationale for the use of the action research framework and an explanation of the specific tools and methods planned for the research project.

**Action Research**

Action research is not just another methodology but also an orientation to inquiry that has been used in a range of research contexts from classrooms to communities, and has different ways of knowing and building of knowledge derived from practice (Bradbury & Reason, 2003). Action research is a participatory and democratic process that brings together members of a community to engage in action and reflection, theory and practice, in working towards practical solutions to issues important to the members of the community. Action research values the knowledge and abilities of participants of the research to evaluate their problems and formulate solutions that improve their lives. Apart from the collaborative nature of action research, the wider goal of increased well-being of individuals and communities providing a just and equitable framework, sets it apart from other forms of research.

A primary purpose of action research is to produce practical knowledge that is useful to people in the everyday conduct of their lives. A wider purpose of action research is to contribute through this practical knowledge to the increased well-being – economic, political, psychological, spiritual – of human persons and communities, and to a more
equitable and sustainable relationship with the wider ecology of the planet of which we are an intrinsic part. (Reason & Bradbury, 2001a, p. 2)

My own understanding of action research is that it is a reflective process that tries to understand the problem and attempts to solve it using a collaborative, inquiry-based approach that includes the researchers and the stakeholders as participants. It can be situated in a classroom, organization, or a community.

Brydon-Miller, Greenwood, and Maguire (2003) succinctly state the basic values which underlie the practice of action research as “a respect for people and for the knowledge and experience they bring to the research process, a belief in the ability of democratic processes to achieve positive social change, and a commitment to action” (p. 15). When applied to my research questions dealing with digital divide and digital literacy in a small community of adult learners, the action research cycle is represented in the following modified model from MacIsaac (1995):
The above figure represents the cyclic nature of planning, action, observation, and reflection engaged in by the researcher and adult technology learners at the community-based center. While other stakeholders such as funding agencies, software designers, and governmental agencies were not directly involved, the figure depicts the flow of the research findings to such stakeholders. The figure also depicts the relationship between the participants and the researcher as well as the relationship between each stakeholder and the action research cycle.

The Rawlsian social justice lens in my theoretical framework led me to adopt the action research methodology with its focus on democratic process and its objectives of individual and societal betterment. While in my own study, I engaged with adult digital learners in the action

Figure 3 - Action Research Cycle (Adapted and modified from MacIsaac, 1995)
research process, I believe that each of the stakeholders included in the figure above have an impact in understanding the phenomena of digital divide and alleviating its problems.

**Participatory Action Research (PAR)**

Freire’s PAR (1970/1996), with its emphasis on the liberatory and emancipatory aspects of education for social change, resonates most with me and was appropriate for my quest to study adult digital literacy education. PAR provides the space for a diversity of views from digital learners and is the most appropriate approach to interrogate the needs and functionings of individual learners as required by the capability approach in my theoretical framework. PAR’s central concept is the empowerment of participants in the process of knowledge creation to improve their lives. It acknowledges that knowledge creation does not reside in institutions such as universities alone and places the individual and community with their practical and lived experiences at the center of a critical knowledge generation process that empowers and emancipates them. These powerful ideas played an important role in my study of digital divide issues among adults as it helped me approach the issues in a co-operative manner paying particular attention to the engagement of participants in the inquiry process.

According to Freire, PAR offers people the “power to perceive critically the way they exist in the world with which and in which they find themselves; they come to see the world not as a static reality, but as a reality in process, in transformation” (Freire, 1970/1996, p. 64). When this idea is applied to the concept of the digital divide, PAR can help situate learners’ perceptions of technology within the digital world and help them identify and understand what aspects of technology are valuable to them. Thus, Freire’s idea of needing to value people’s
knowledge and historicity in the sphere of adult education is equally valid in the sphere of technology education.

The participants in my PAR research process have the opportunities for engaging in a critical process regarding their digital experiences, as required by my theoretical frameworks in the form of Freire’s conscientização and Eubanks’ critical technology education. The PAR process, rooted in the learners’ life experiences also speaks to Horton’s cultural literacy concept that is part of this study’s theoretical frameworks.

**Relevance of Action Research to Digital Divide Issues**

Literature on the digital divide highlights various aspects of the divide from mere physical access to issues of motivation, usage, and skills (van Dijk, 2005). While each aspect reflects a part of the nature of the divide, such complexities make it a difficult topic to study using a single methodology or tool. The dispersed nature of the digital divide, the gap between the information rich and information poor (Norris, 2001) calls for approaches that can study the problem with different perspectives and lenses. While there has been a vast amount of quantitative research in the study of the digital divide there have been fewer research projects of a qualitative or action research nature (van Dijk, 2005; Gudmundsdottir, 2010; Hendrix, 2005) in general and PAR studies on digital divide in particular (Eubanks, 2011; Mehra, Peterson, Bishop, Bazzell, & Smith, 2002). Previous research in digital divide indicates the underlying social inequality as a very important factor in the phenomenon (Norris, 2001; van Dijk, 2005) which cannot be highlighted merely through quantitative research. It is precisely because of the range of varying causes of digital divide from physical access to motivational,
skills, and usage issues that indicate that a more localized and specific approach to the study of this issue would help in creating specialized solutions to local problems.

Eubanks (2011) recognizes the value of participatory research approaches for localized and contextual problems as having high relevance and usability as they focus on the democratic process of community participation. In her work with low-income women on the issue of digital divide she used multiple research methods, among them the participatory action research methods that sought input from the women through the different stages of research design, identifying research questions, choosing methods, collecting and analyzing data as well as decisions regarding the use of research findings. In discussing the need for flexibility and responsiveness in a participatory project, she found that the agenda of the community group broadened very quickly in the research process to encompass social justice issues which she did not initially view as technological. Her experience with the women participants helped her understand the embedded nature of technology in existing institutions and structures.

The examples cited above illustrate PAR and encapsulate the essence of the collaborative nature of inquiry to benefit the participants and value their knowledge and experience in working towards social justice and democratic principles. As PAR is also well-suited for adult education as elucidated by Freire, it was applicable for my research in the area of the digital divide among adults and community-based digital literacy programs that aim to alleviate this divide. PAR helped situate technology within a small community and helped members develop a critical consciousness about technology and to take action that raises the possibility of a more emancipatory experience in the digital world.
Research Techniques

Photovoice. Photovoice is an action research process in which community participants use photography to identify and highlight the strengths and weaknesses of a community phenomenon (Wang, 1999). Photovoice is used as an action research tool that is part of the process of inquiry, reflection, and action (Lykes, 2006). Photovoice has its theoretical foundations in feminist theory and documentary photography as well as in the Freirean method of problem-posing education that starts with identification of issues that are viewed as important by the community-participants. Wang and Burris (1997) used photovoice in their research into the health care needs of poor Chinese women and helped promote critical dialogue among the women. Participants were trained in the use of cameras which allowed them to overcome barriers of language and social class and helped them narrate their stories in the health care needs assessment process. The photographs were used as an advocacy tool when they were shared with health officials to highlight women’s health care issues.

Lykes (2001) has used photovoice with Guatemalan Maya women that helped capture their stories from the women’s perspectives which led to discussion and analyses among the women. While photovoice has its origins in feminist theory and documentary photography, it could be used with any marginalized or disempowered group to highlight their specific needs and promote a dialogical and collaborative process of needs assessment and problem-solving.

The explosion of easy-to-use digital tools such as webcams, digital cameras, and cell phone cameras provided new tools for research participants to capture their own perceptions of digital divide and digital learning. Studying the phenomenon of digital divide and digital literacy using digital technologies may seem counter intuitive but this approach highlights the
positive uses of technology as a tool to bring about meaningful change in participants’ lives as well as removes the aura of the “undecipherable technology” that cannot be easily adopted and reinforces Warschauer’s (2003) idea of socially rooted technology. Additionally, there is the issue of participants not having sufficient working knowledge of digital devices to use them effectively for the purposes of photovoice. But this problem can be overcome by providing a short training session on the use of devices such as digital cameras on cell phones or single-use cameras. Warschauer believes that the relationship between technological and social contexts is complex and mutually evolving and that “technological and social realms are highly intertwined and continuously co-constitute each other in a myriad of ways” (p. 205). Thus, using every day tools such as digital cameras on cell phones for the purposes of identifying many facets of their digital lives helps highlight newer, more empowering ways of using technology within the social realms of the users.

**Interviews.** The research questions relating to learner perceptions of technology and feelings of economic and social empowerment engendered by acquisition of digital skills called for research tools that would provide a rich and comprehensive understanding of the phenomenon of digital divide. Interviews provided valuable data that illuminated the gaps in learner perceptions not highlighted through the photovoice process. With action research methodologies providing a sense of how learners as a group or cohort feel about digital skills, interviews helped distinguish specific individual experiences thus providing a rich picture of the phenomena of digital divide and digital literacy.

As the interviews were the second stage of the three research stage research process, I made the decision to adapt a semi-structured interview format that allowed me to build on the
findings of the photovoice stage of research while also allowing me the flexibility to follow-up on any new threads of discussion that might emerge from the interview process. During design and execution of semi-structured interviews of participants, I was guided by Miles and Huberman’s (1994) caveat regarding the huge time commitment required for a highly inductive, loosely designed study as well as Maxwell’s caution about the need to be aware of the trade-offs, “not just in the amount of prestructuring, but also in how prestructuring is used” (Maxwell, 2013, p.89), to strike a balance between a highly structured and a loosely structured interview design. Hence, while I used the participant interview protocol (Appendix E) as a guide in the interview process, I did not restrict myself exclusively to the list of questions in the protocol but rather used it as a starting point for a more exploratory conversation with each participant. The modified interview format immediately following the photovoice stage allowed me to focus on individual digital experiences through follow-up questions from the photovoice stage as well as through questions directed at specific, individual user experiences. With the photovoice stage providing the opportunity to establish familiarity with the life history of participants as well as highlighting the commonalities of participants’ experience with digital technologies, I could work with a modified interview format to focus on digital issues that mattered to individual interviewees. Being cognizant of the participants’ time, I met with each participant for a single interview of 90 minutes in length to provide sufficient time to cover focused life history, the details of experience and reflection on the meaning of digital literacy skills for individual participants. The semi-structured interview format also provided the space and time for participants’ to speak of digital issues that were not raised in the questions. In addition, the interviews highlighted the meaning that users constructed of their experience in
more of its complexity and helped provide the space to the digitally-disadvantaged in constructing their world view of the phenomena under study. The interviews enabled me to achieve the objective of providing a means for participant learners to critically understand their own learning processes. It is my hope that when these research findings are published, it would draw the attention of program providers and policy-makers to possible problems and obstacles to such learning.

**Group Level Assessment (GLA).** GLA, a participatory process, was the third stage of the research, based on the findings of stage one and two of the study. GLA is a group level activity that brings together a group of stakeholders, providing them with prompts that generate data through participant responses to prompts and through discussion amongst the group on an issue that is important to them. The goal of the GLA is to enable participants to view and interact with the data, reflect on its meaning, and provide their perspective as feedback (Vaughn, Jacquez, Zhao, & Lang, 2011) as a group. It provides the space for the stakeholders to define the phenomenon and provide the group’s perspective. GLA involves the following steps:

a. the facilitator provides a safe climate for participants in the assessment process besides providing a warm-up session, guiding the participants through a simple GLA process,

b. the facilitator starts the GLA session, by placing flip charts containing prompts on the issue being discussed, on the walls around the room and the group members respond to the flip chart topics,

c. the participants view the data written on the wall charts,

d. the participants spend time reflecting individually on the data they have viewed,
e. the participants discuss the prompts and responses generating ideas, reflecting, understanding, selecting, prioritizing, and deciding on the appropriate set of actions for the issue under discussion.

As it applied to my study, the GLA was not the preliminary assessment and evaluation tool but rather a tool to reflect and expand on the findings of the initial stages of the study. The visual nature of data generated from the initial stages using photovoice and the contextualized data gathered from interviews illuminated and generated ideas for the group to reflect on the issues of empowerment and obstacles to digital skills acquisition during the GLA process.

**Grounded Theory as a Guide for Analysis**

Glaser and Strauss (1967/2009) first proposed grounded theory as “the discovery of theory from data systematically obtained from social research” (p. 1), requiring iterative and in-depth study of the data to inductively generate theory in constant interaction with the data. Glaser and Strauss (1967; Glaser, 1978; Strauss, 1987) defined the key components of grounded theory as including the collection and analysis of data simultaneously, constructing of analytic codes and categories from data using constant comparison method during each stage of analysis, and engaging in theory development at each stage. Defining relationships between categories and identifying gaps were also critical components of this theory.

Studies completed using grounded theory in digital literacy (Herring, 2011; Lewis, 2009) and digital divide (Kvasny, 2006; Mahrer & Krimmer, 2005) provide evidence of the suitability of grounded theory as a tool for analysis. In particular, Kvasny’s use of thematic coding of data (Glaser & Strauss, 1967/2009) collected through participant observation of a community-based, digital literacy class for disadvantaged learners, provided a model for me in my research which
was similarly situated in a community-based, digital literacy program. Herring’s (2011) use of grounded theory in a study that examined the views of students and teachers in the transfer of information literacy among students helped me understand how grounded theory could be applied to evaluate critical learning in digital literacy programs.

In my research project, I adapted and modified Glaser and Strauss’s (1967, Glaser, 1978; Strauss, 1987) grounded theory practice in the following manner:

1. I engaged in simultaneous data collection and analysis through the three stages of research: photovoice, interviews, and GLA. At the completion of each stage of research I analyzed the data and constructed themes and categories that were grounded in data and were not from preconceived hypotheses.

2. I used the constant comparison method, comparing the data analysis results of each stage of research to the previous stage. This helped in building an increasingly rich picture of the phenomenon through the three stages of the research.

3. In the final analysis of the findings I have connected the data in the three stages of the research to specific theories in my framework as well as used the results of the data analysis to build a model of an ideal digital learning environment (Chapter 6 – GLA).

As the research design for this study provided for three stages of research, I considered the continuous process of data analysis and discovery, coding, and on-going theory-building to be well suited for my research. My use of the modified grounded theory approach helped examine learners’ perception of the digital divide and digital literacy as well as their experiences with digital technology.
During the first stage of data collection and analysis, photovoice was used as a needs assessment tool, and the participants' photographs and the group discussion of the photographs together represented the data collected. In the second stage, transcripts of personal interviews with each of the 7 participants represented the data collected while the data in the third stage was the result of the GLA performed by the participants. The figure above illustrates the process of data collection and the arrows highlight the iterative nature of grounded theory analysis, with the backtracking arrows indicating the data analysis results of earlier stages informing the research process in the later stages.
Ethics and Community-Based Participatory Action Research

Action research more than any other research paradigm has this unique ethical issue where the researcher has to reflect and clearly articulate his/her position vis-à-vis her collaborators in the community, keeping in mind the inherent power usually vested in the researcher. Each research situation is unique and participants are diverse and there is no pre-defined formula that can draw the boundaries of power in a community-based research environment. Hence the interrogation of power structures in the relationship between stakeholders has to necessarily be on-going. Many action researchers have attempted to grapple with ethical issues in PAR (Cahill, 2007; Minkler, Fadem, Perry, Blum, Moore, & Rogers, 2002). Brydon-Miller (2008) defines convenantal ethics as an ethical stance that is revealed through a co-operative relationship with and commitment to working for the good of others and includes a broader set of questions around power relationships, contributions made to the welfare of the researched community, and ownership of the research. According to Brydon-Miller (2008) action research is a values-imbued practice and it is politically engaged in its commitment to working with others towards achieving social change. Action research is a participatory and socially engaged research methodology to achieve the empowerment of the disadvantaged through relationships based on respect and responsibility. I believe community-based action research among vulnerable populations in particular, needs extra attention from the researcher in making space for the voices of vulnerable groups to be heard in a process that is truly collaborative and inquiry-based.

In discussing ethics in action research, Hilsen (2006), cites human interdependency, cogeneration of knowledge, and fairer power relations as the three pivots of the argument for
the idea that human life is relational. Hence an action researcher engaged in human practice, needs to be explicit in her actions and reflections. Hilsen argues that “because what we do matters, we have an ethical responsibility for the consequences of what we do and what we do not do” (p. 34). This resonates with my own view of an ethical action research practice as an exercise that needs a continuous process of reflection on one’s own intentions and practice.

**Researcher Positionality**

My positionality as a researcher vis-à-vis the phenomenon of digital divide and digital literacy is represented below:

![Figure 5 - Researcher Positionality](image)

Prensky (2001) defines digital immigrants as “those who were not born into the digital world but have, at some later point in our lives, become fascinated by and adopted many
aspects of the new technology” (p. 2). His contention is that such digital immigrants learn and use technology in ways that are very different from younger users who were raised in a ubiquitous digital environment. Understanding the ways in which different groups of learners adapt to digital environments may provide an important perspective in examining issues of digital divide and digital literacy.

While in my position as an educator I have always been interested in how learning happens in different contexts, my identification as a female of Indian origin and a digital immigrant i.e., a person who came of age before the digital revolution, provided me with a unique, intersectional perspective of experiencing not being the norm. This insider/outsider perspective I believe, helped me identify with digitally excluded groups and understand the experiences of the research participants. Additionally, my role as a technology educator informs my deep interest in the research on digital divide and digital literacy.

During the research process, I was mindful of how my own background as a digital immigrant i.e., as a person who came of age before the digital revolution but has subsequently adapted to technology (Prensky, 2001) with positive feelings about technology and good experiences with technology as a force of good in people’s lives would affect my perception of the impact of technology on other lives.

**Ethical Reflection Process**

In my role as an outsider with higher status (Herr & Anderson, 2005) engaged in collaborative research with disadvantaged communities, I adopted a structured ethical reflection framework (Brydon-Miller, 2012). The core values of action research: respect for
participants, respect for the knowledge and experience they bring to the research process, belief in the democratic process to achieve social change, commitment to action (Brydon-Miller, Greenwood, & Maguire, 2003) call for an ethical reflection process that acknowledges the values of action research. The traditional human subjects review process has been designed in a way that privileges the knowledge and experience of the researcher over other forms of knowledge including the knowledge and experience of the human subjects. Brydon-Miller (2012) has proposed a structured ethical reflection process during the eight stages of the research process—constructing research questions, planning project, recruiting participants, collecting data, analyzing data, member checking, writing and going public—to address the ethical challenges arising from the unique nature of action research. Adopting this framework helped me identify the values that are of importance to me as a researcher and provided a structured way of approaching my work through reflection. My own positionality informed the values that I consider important such as critical thinking, democracy, and social justice and that helped guide me in the process of working with community members in developing and constructing research questions, identifying sources of data, gathering, analyzing, and disseminating findings (Appendix H).

The structured ethical reflection process helped me to critically examine my own positionality as a reflective practitioner, during the entire research process. It helped me develop a sense of mindfulness of my own positionalities and how they may influence the research process while also helping me engage with others in questions that were important to the group. As action researchers we accumulate and synthesize our learning over the period of the research project as well as in future projects over the years as each researcher builds a
framework that works best in her research areas, being cognizant of the overall principles of social justice informing action research work. Such a long-range view, I believe helped me to better understand the multiple positionalities I occupy in this research process, to be mindful of the resulting intersectional ties while also leveraging such a unique position to highlight the importance of digital inclusion.

**Research Ethics**

The participatory nature of action research requires researcher engagement with the issues important to the community and the process involves attention to “relationships between researchers and participants, as well as their respective subjectivities” (Tolman & Brydon-Miller, 2001, p.5). Based in large part on a set of publication guidelines laid out in the journal *Action Research*, Stoecker and Brydon-Miller (2013) highlight eight specific criteria for evaluating action research projects: articulation of objectives, partnership and participation, contribution to action research theory/practice, methods and process, actionability, reflexivity, research ethics within an action research framework, and significance. These criteria touch on theory and practice as well as processes and outcomes. I examine the application of each of these criteria to my research below.

The first criterion is a clear articulation of objectives that speak to researcher goals and community concerns in an action research project as well as meaningful contributions by the researcher to the current project and future practice. My literature review discussion and examination of the process by which I arrived at the research questions provide a clear articulation of the project goals as a combination of my research goals along with the concerns of the adult learners. The second criterion is the importance given to partnership and
participation as these attributes distinguish action research from other forms of research. In my current project, the three stages of research and the analysis of data reflect the steps I have taken in recruiting and engaging with the adult learner community and the extensive participation of these learners in the research process. As required by criterion three and four, I have clearly articulated the theoretical frameworks of my research and I have highlighted the methods and processes used during the entire research process. The fifth criterion dealing with actionability requires critically examining the research process and sharing insights and actionable reporting. This dissertation provides specific actionable items for different stakeholders in the digital literacy area from individual learners to community learning centers, software designers, and governmental agencies in the context of the current project while also providing general actionable items that are transferrable to similar learning environments. Stoecker and Brydon-Miller’s next criterion of reflexivity is evidenced in the examination of my positionality as a digital immigrant, a woman, a person of color, and an educator and its influence on my approach to this research project. My use of the structured ethical reflection process presented in the previous section speaks directly to the criterion on research ethics within the action research framework. With regard to the final criterion of significance of the project, my multi-dimensional approach to the phenomena of digital divide and digital literacy has, I believe, provided space for the voices of the adult learners to be heard. It is my hope that my endeavors to publicize this work would highlight the needs of adult digital learners and engage the research community in further work in this area.

Using the lens of democracy and social justice that infuses many action research methodologies, I worked collaboratively with participants to generate knowledge that, I
believe, contributed to personal and social transformation of participants and to the generation of a theory of digital learning for adult learners. During the recruitment process, I aimed to recruit a diverse group of individuals for the research project to help me understand the phenomenon of digital divide from multiple perspectives (Miles & Huberman, 1994). The three-stage research design enabled me to meet participants multiple times and contributed to a richer, complementary, and more comprehensive understanding of the phenomenon of digital divide as experienced by the participants of the research. The data collected in varied formats such as interviews, photovoice, and GLA provided a clearer picture of participants’ perceptions on their digital experiences. Member checks were undertaken to ensure that participants could provide feedback on the data collected through the different stages of the research project (Lincoln & Guba, 1985).

**Human Subjects Protection**

I applied for and received human subjects approval in October 2014 from the Institutional Review Board (IRB) at the University of Cincinnati. I sought and received a letter of support from the Director of Tech-Reach at Elder High School and included it in the review application.

**Research Location**

My interest in digital literacy stems from my background as an educator and more particularly, my interest in adult learners acquiring digital skills stems from my own adoption of technology as an adult learner. With my research interests focusing on non-traditional learners, I explored many of the community-based digital literacy courses offered in the area. The social justice focus of the research questions that aim to understand the question of the digital divide
and methods used for its alleviation naturally led me to seek digitally-disadvantaged adult learners attempting to improve their digital skills. Hence in my search for locations the criteria I sought were that the location should serve non-traditional learners seeking to enhance their digital skills in a community-based location, open to all, with few to no obstacles to enroll in terms of minimum skills requirement or high tuition charges. I visited four different locations in Cincinnati and surrounding areas and finally settled on one location, Elder High School Tech-Reach, as it satisfied the criteria I identified above in addition to working well with my schedule as well with the schedule of the location Director. Tech-Reach, a community outreach of Elder High School has as its mission “to improve quality of life for the people of Price Hill and surrounding communities through enhanced access to technology education and technology-enhanced learning opportunities”


Elder High School is an established leader in the revitalization of the neighborhood of Price Hill, where the school is located. The Tech-Reach program supports adult learning in the neighborhoods surrounding the school. The adjacent community of Lower Price Hill’s demographics is majority White with median household income considerably less than that of the City of Cincinnati with approximately 23% of households headed by single mothers. About 54% of the population of Lower Price Hill is below the poverty level. It has a higher crime index compared to the national average (Neighborhood boundary data, 2011). The Tech-Reach program aims to provide learning opportunities for disadvantaged local populations in order to open up opportunities to improve job prospects and to acquire digital skills for academic and personal enrichment for local community members.
Participant Selection and Characteristics

The community-based Tech-Reach program at Elder High School offers a range of workshops and courses from Basic Computer Skills to Word, Excel, PowerPoint, and basic Internet skills workshops. There are many returning students who attend multiple workshops to build their skills and as such this location leant itself well to my multi-stage research process.

To familiarize myself with the program and attendees’ learning characteristics, I attended the twice weekly classes at Tech-Reach for a period of three months, embedding myself in a range of classes from a Basic Internet Skills course, to courses in Word, Excel, and Power Point. I also attended a GED course offered at Tech-Reach and a Basic Reading Course as these courses used computers and digital tablets extensively. In particular, the GED course was of interest to me as the students in this course were attempting to master the material for the GED exam while also learning to take the exam on the personal computer, as this is currently the only method of attempting the GED. Over the period of three months, I presented details of my research project to each of the classes that I attended, along with distributing information sheets on the project (Appendix A). Occasionally, I was able to lend my technical expertise to the instructor of the course as well to the participating students. At the end of the three month period, there were 12 participants who expressed interest in participating in the research and they were invited to attend an orientation session at Elder High School, out of whom 8 participants actually attended the session. I discuss the details of the orientation session in the next chapter on photovoice.

All participants were over 21 years of age, actively interested in furthering their digital skills for personal and/or professional development. Participants’ educational backgrounds
spanned the range from those seeking a GED to those with a high school diploma and at least one with a college degree. The one common underlying characteristic was the need to acquire more digital skills.

A total of 7 individuals participated in my research project consisting of three stages: photovoice (5 individuals), interviews (7 individuals), and GLA (5 individuals). Below is a Venn diagram that illustrates the patterns of participation as well as the overlap of individual participation in the three stages of research:

![Venn diagram](image)

Figure 6 - Participation Information

During the photovoice and interview data collection stages of the research, participants were individually identified during interactions and in transcriptions but such information is not part of this dissertation as I do not believe that such identification would necessarily add any
value to our understanding of the phenomena under study. Instead, pseudonyms have been used for participants. The GLA process involving responses to prompts, discussions, and recommendations were collaborative and spontaneous and individual participants were not identified.

Here I present details of the characteristics of individual participants that helps readers understand the context of participants’ experiences with technology highlighted over the three stages of research.

Table 2- Participant Characteristics

<table>
<thead>
<tr>
<th>Participant Pseudonyms</th>
<th>Characteristics</th>
<th>Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane</td>
<td>Female, intermittently employed, looking for a full time job, out of job market for an extended period to raise children</td>
<td>Yes Yes No</td>
</tr>
<tr>
<td>Lynn</td>
<td>Female, retired as Operating Room nurse after 38 years. Looking for other employment opportunities. Little to no interaction with technology in the nursing job.</td>
<td>Yes Yes Yes</td>
</tr>
<tr>
<td>Rita</td>
<td>Female office worker, enrolled to improve excel skills for new job</td>
<td>Yes Yes Yes</td>
</tr>
<tr>
<td>Rachel</td>
<td>Female, employed in non-technology job for 20 years, improving technology skills in preparation for plans to go back to school</td>
<td>Yes Yes Yes</td>
</tr>
<tr>
<td>Nestor</td>
<td>Male, employed in factory job, enrolled in classes for GED, immigrant from Guatemala, wishes to improve English skills</td>
<td>Yes Yes No</td>
</tr>
<tr>
<td>Julie</td>
<td>Female, 24-year old office worker, has learning disability, high school graduate wishing to go back to college</td>
<td>No Yes Yes</td>
</tr>
</tbody>
</table>
Harry
|
| Male, pastor with a Bachelor’s degree, retired after 30 years of work experience at DHL, currently looking to improve digital skills for his pastoral work |
| No |
| Yes |
| Yes |

**Summary**

In this chapter, I examined the suitability of an action research framework to address my research questions centered on agency, empowerment, and conscientização with regard to digital learning by adult learners. The collaborative, inquiry-based approach of action research is particularly well-suited to address issues of power and agency as it provides the space for the voices of the digitally disadvantaged to be heard, addressing Freire’s concept of critical consciousness. Within the broad action research framework, I adopted three specific tools, photovoice, interviews, and GLA, to understand adult digital learners’ perceptions of technology. Participatory methods such as photovoice and GLA provided opportunities for participants to identify what technology means to them, to identify specific strengths and problems with technology in their personal and professional lives that are important to them. Interviews helped participants speak to specific digital experiences they identified as having an impact on their personal and professional lives. Each of the tools used within the action research framework touched on specific insights as well as highlighted overlapping areas of discussions, providing a rich picture of the phenomenon of the digital divide.

I have also presented the ethical reflection process I pursued during the project that included covenantal ethics, the structured ethical reflection process (Brydon-Miller, 2012), and the application of criteria for a robust action research process (Stoecker & Brydon-Miller, 2012).
that guided and informed my research process. I concluded the chapter with details on the location, participation recruitment, and selection process for the research project. In the next three chapters I provide the data analysis process and discuss the themes generated during photovoice, interviews, and GLA stages of the research.
Chapter 4
Photovoice

In this chapter, I discuss the process of photovoice, the methodological tool used in the first stage of research. I identify the major themes of the photovoice stage based on the participant group discussion of photographs, their connections to the theoretical framework laid out in Chapter 2 and conclude the chapter with a presentation of a few photographs that support each identified theme together with the group discussion on these photographs.

Over a period of 3 months that I was attending the various digital literacy classes offered at Tech Reach, I shared details of my research project with many classes and had several class attendees express interest in participating. Finally, there were 12 participants who were invited to attend the photovoice orientation event, and 8 of those participants actually attended the event. During the orientation, I presented the attendees with background information on photovoice as well as the guidelines, as given below, for taking/interpreting the photographs/images (Wang, 1997):

S- What do you SEE? (Observation)

H- What is really HAPPENING? (Interpretation)

O- How does this relate to OUR lives? (Contextualization)

W- WHY does this problem/condition exist? (Politicization)

E- How could this image EDUCATE policymakers/decision makers? (Action)

D- What can we DO about it? (Action)
In addition to highlighting the photovoice process (Appendix C), I presented a few sample photovoice projects including one of my own that was centered on the benefits and challenges of recycling to provide an overall framework for the group to move forward with the current project. In the ensuing discussion, I requested the participants to follow a similar exercise with regard to their experiences with digital technology, the benefits and drawbacks of technology in their lives as they perceive it, together with any aspect of technology that they consider significant or worthy of discussion. The process was participatory in nature, with the participant group deciding a set of objectives for the photovoice project that included collection of photographic data to address the research questions of the project. The research also resulted in accrual of some benefits for the participants in their quest to acquire digital skills, namely:

- Determine what works and what can be improved in the technology learning process
- Increase dialogue between participants in this group on the topic
- Develop group-based recommendations for improving technology-based learning
- Inform key stakeholders and decision-makers through visual impact

The participants determined that they would take 5 weeks to take the photographs based on the guidelines provided. At the conclusion of the 5 weeks, I met with the 5 final participants of the photovoice project at the Tech-Reach center of Elder High School. Three of the 8 participants who attended the initial meeting could not continue in the research process due to personal reasons. The familiar location and the circumstance of some participants being acquainted with each other through the computer classes at the center helped provide a conducive environment for open discussion. While some of the participants used disposable
cameras I had provided, others used their smartphone for the photovoice process which indicates a range of access and/or comfort level with technology among the participants. The first item on the agenda at the meeting was to review the photographs taken by all participants. The classroom at the Elder High School was equipped with a projector and a computer which enabled me to display the digital photographs on the screen for easy viewing. The participants who opted for the disposable camera, had developed the photographs prior to the meeting and circulated them through the room for viewing. As participants hailed from low income backgrounds, to avoid any cost incurring to them, I provided the funds to meet the cost of developing the photographs to participants who used disposable cameras. The group decided that each participant would select 5 photographs representing important benefits, drawbacks, or significant aspects of their own digital learning experience and speak about their thoughts on the selected photographs as this would provide a more focused discussion. After each participant’s presentation, the group discussed main ideas and shared experiences with each other exchanging their different perspectives. The photovoice group discussion was recorded and transcribed.

The discussion generated some in vivo themes/codes that I used in my analysis while the other themes were generated by me using focused coding and constant comparative analysis with a view to “generating a theory that is integrated, consistent, plausible, and close to the data” (Glaser, 2008, para. 4).

In keeping with the foundational principle of grounded theory, I present here the process of constructing analytic codes and themes inductively from the photovoice data, advancing theory development as a continuous process rather than arising from a priori theory
using the constant comparative method (Glaser & Strauss, 1967). The transcript of the focus
group discussion on the photographs was analyzed for initial coding. The main themes were
identified by reviewing the coding along with the photographs. The subjects of the photographs
taken by the group and presented for discussion show a range of phenomena and issues that
the group considered important, from concrete problems such as safety and privacy issues, to
pressure of outside forces such as marketing pressures and transition/change due to changes in
technology. While the group acknowledged the many benefits of digital resources there was
also a recognition of the complexities that novice digital users confront and have to overcome.
The most fascinating theme, Cultural Transformation, was an in vivo theme, coined by one
participant and enthusiastically supported by other participants. The participant group showed
an awareness of the larger, more intangible issues involving digital technology that affect their
lives in many ways. The participants took a bigger perspective, beyond their digital lives, taking
a critical view of how certain practices and behaviors were triggered and encouraged by the
digital revolution and how they affect society at large.

The infographic below is a visual representation of the major themes arising from the
data generated by the photovoice project. As can be seen, the size of the circles for different
themes represents the frequency of occurrence of the theme in the photographs and
discussions relating to the photographs.
Figure 7- Major Themes of Photovoice
The identified themes from the photovoice process: Cultural Transformation, Privacy, Complexities of Digital Life, Safety and Security, Transition, Marketing, Digital Resources and Benefits were also viewed through the lens of personal, professional, or societal dimensions in order to draw a more comprehensive picture of the digital divide. The complexity of the studied phenomena and the nuanced views of the participants has resulted in some themes being placed in more than one dimension. Additionally, viewing the identified themes and dimensions through my theoretical lenses of agency, empowerment, and critical consciousness highlighted the connection between my theoretical frameworks and the results of data analysis of the photovoice stage of the research. I present in the table below the mappings between the themes, dimensions, and theoretical concepts, along with individual participant comments that exemplify these classifications:

Table 3- Major Themes

<table>
<thead>
<tr>
<th>Themes</th>
<th>Comments</th>
<th>Dimensions</th>
<th>Applicable Theoretical Concepts</th>
</tr>
</thead>
</table>
| Cultural Transformation- In vivo | • Interaction  
  o Interruption to family time  
  o People not calling nowadays (FB/text)  
  o “Preoccupied with themselves”  
  • Addictive  
  • “Takes away from what is really important”  
  • “I need every bit of energy I have to live in the 3D world.” | • Personal  
  • Societal | • Presence/Absence of agency |
| Don’t have any to spare for digital world”  
| “So many devices. Put one down and pick up another” |
| Privacy | • Wearable tracker devices – health related  
| o Affects insurance coverage  
| o Infringement on privacy HIPAA  
| • Being tagged on Facebook  
| • Others posting your pictures on media  
| • Set-top Box – “Are they watching us? I actually covered it up one time”  
| • Permanence of information on the Internet  
| • Easy to search for information on people  
| • No expectation of digital privacy at work |
| Complexities of Digital Life | • “Mastery over technology” – achievable?  
| • Having to re-learn complex tech – Ex dashboard of newer cars  
| • Difficulty accessing customer service due to automated voice systems |
| • Personal  
| • Absence of Agency  
| • Personal  
<p>| • Lack of empowerment/Absence of Agency |</p>
<table>
<thead>
<tr>
<th>Difficulty manipulating advanced features of smart phones</th>
<th>Difficulty using apps such as kindle, iCloud</th>
<th>Connecting the dots/big picture – not even technicians are able to do it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety/Security</td>
<td>Physical Safety</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Driving while texting/talking</td>
<td>Lack of empowerment/Absence of agency</td>
</tr>
<tr>
<td></td>
<td>Use of technology in workplace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Digital Safety</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal Health Records</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal Financial Records</td>
<td></td>
</tr>
<tr>
<td>Transition/Change</td>
<td>Change forced upon us due to acceleration of technology (flip phone to smart phone)</td>
<td>Personal</td>
</tr>
<tr>
<td></td>
<td>Smart TV – Time and technical knowledge required to figure out</td>
<td>Professional</td>
</tr>
<tr>
<td></td>
<td>Interfacing and compatibility issues due to multiple pieces of technology</td>
<td>Societal</td>
</tr>
<tr>
<td>Marketing</td>
<td>Little choice – users pushed into upgrades</td>
<td>Lack of empowerment/Absence of agency</td>
</tr>
<tr>
<td></td>
<td>Forced to buy more than they would like</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contextual/situational marketing based on browsing patterns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Selling more products to consume – may not be necessary</td>
<td></td>
</tr>
</tbody>
</table>
The themes of Privacy and Safety were clearly identified as having an immediate impact on participants’ lives. Safety referred to physical as well as digital safety. For example, texting/speaking over phone while driving presented immediate physical safety concerns whereas digital safety may not affect one’s health but does have an impact on one’s life. Privacy related to concerns about being tracked online, permanence of information on the Internet, and how that may affect a person’s ability to get/keep a job thus straddling the personal and professional realm. Transition/Change is perceived by the participants to have an effect on their personal and professional lives. The Complexities of Digital Life theme represents everyday difficulties that participants face in their personal lives ranging from difficulties with working with smart phones to grappling with automated voice response systems. The theme of Cultural Transformation represents a wide-ranging commentary and critique of the effects of digital technology in the personal, professional, and societal realms.
As can be seen from Table 3 above, participants’ photographs/discussions have generated themes that clearly fall across the three realms, with some benefits along with many challenges. The three themes: Complexities of Digital Life, Safety/Security, and Marketing fall mainly in the personal realm, demonstrating participants’ lack of empowerment and inability to act with agency in these areas. For example, the Safety/Security theme primarily highlights participants’ experience with digital technology where they have little to no control over their personal or financial information in the digital world. This lack of empowerment or agency may be attributable to rapid changes in technology as well as to participants’ lack of awareness or knowledge to manage the changes that directly affect their lives. The theme of Marketing also highlights the market forces beyond participants’ control that push them into products/services that they do not need. The overall picture of digital technology uses show benefits for various groups of users but users with higher education, skills, and other forms of social and cultural capital appear to benefit more than users with lower levels of education with many of the technological changes due to market forces leading to corporate profit. This imbalance in diffusion of digital benefits merely leads to a perception of disempowerment and lack of agency in the case of the participants who are novice digital learners.

The photovoice/discussion data that represent the theme of Complexities of Digital Life highlight non-traditional digital learners’ challenges with technology in their everyday lives signifying disempowerment. One participant raised the question of her inability to attain mastery over technology. This comment encapsulates the tensions between an older way of thinking about employment where mastery of specific skills were required for a job and the current expectation of a fluid job market that requires different skills at different points of time
with the only common denominator being the ability of the employee to adapt to newer technologies. This paradigm shift in the employment market in the last two decades due to technological advancement has disproportionately affected workers who were educated before the advent of the digital revolution.

The theme of Privacy permeates the personal as well as the professional realm as participants grapple with how to maintain their privacy in a world of multiple social platforms driven by users’ private information posted voluntarily. Navigating a digital world that is seemingly free of financial cost but with a high cost to privacy requires continuing vigilance and a high level of critical awareness.

The effect of transition/change brought about by technology has the highest impact in the personal and societal realms as evidenced by Table 3 above that shows the most incisive participant comments in the personal and social dimensions. The speed of technological innovation presents unique challenges in users’ personal lives whether it is keeping up with changes in cell phone technology or the usage of multiple devices that give rise to interfacing problems. Here again the need to constantly keep up with changing technology indicates a lack of agency for users. At a societal level, transition and change leads to more electronic waste and reduced value for current skills of workers.

Cultural Transformation represents a combination of participants’ experiences and perceptions of how technology affects their personal lives as well as a critique of how society has adapted and coalesced around technology. In the discussion of this theme presented
below, we will see a critical consciousness of the situation on the part of the participants as defined by Freire.

**Group Discussions on the Photographs**

In the sections below, I trace the identified themes in the group’s discussions of the photographs taken as part of the photovoice project along with presenting some of the photographs that best represent these themes.

![Photograph 1](image)

Photograph 1-“I want to devote more time to my life than to technology”

**Cultural transformation.** This in vivo theme was generated as a result of very lively discussions where each participant had something of importance to contribute. One participant, Jane with teenage children said:

> After moving to smartphones I notice that my kids can’t go through a dinner without looking at their phones. I tell them put your phones away, we’re talking to each other.

> Another discussant, Rita was concerned that it affects conversation with non-family interactions: “people sit in the same room and do not interact with each other……that is deeply troubling to me.”
Rita also called it the “Cultural Transformation” of society where people interact less with each other and more with devices. This phrase aptly captured the changing nature of cultural interactions due to technology, perceived by many participants as a negative. As recommended by Charmaz (2006) I retained the phrase “Cultural Transformation” as a major in vivo code in my analysis to “preserve participants’ meanings of their views and action” (p. 134).

Rita succinctly captures the essence of ubiquitous technology, “that's precisely why I do not have a Facebook account. I have steadfastly refused all these years because honestly, it takes every bit of energy and time I have to live in the 3D world.“ Her photograph of a clock pictured above represents, according to her, the value of her time in life and the need to balance digital usage with actually wanting to live her life.

The Facebook platform was discussed by the group in terms of its merits as well as demerits. While the group was concerned about the information posted on the platform, particularly by young people, without a thought to consequences, they did acknowledge that it was a way to keep in touch with family and friends. Lynn, while commenting on how younger members of her family send invitations to parties via text/Facebook, says that “Nobody calls anymore.” Discussion of Facebook also led to Lynn, a retired nurse, characterizing the younger generation as being, “preoccupied with themselves.” The nature and type of information that particularly the younger digital users post online was discussed by the group with a general consensus that many of the younger users are not really concerned with the potential consequences of publicizing their lives. The participants talked about the transition or learning
curve involved in executing simple tasks due to the move to smart phones such as accessing voice mail or accidentally keying in the wrong characters due to highly sensitive touch screens.

All participants in the photovoice stage of the research were adult learners, working or looking for work and have adopted technology later in their lives. Their discussions reflect a good grasp of how technology affects their personal lives as well as those of others around them. The many concerns they have cited above show a critical understanding of technology’s role in society and the transformative nature of many digital tools in users’ lives.

**Privacy.** Another oft-repeated concern with technology was on the topic of privacy. The photographs taken by the participants falling under this theme reflect a range of concerns arising due to the increasing use of technological tools in their personal and professional lives. The group discussed privacy in terms of the cable box. One comment was: “I look at the set-top box for cable and wonder “Are they watching me?....one day I actually covered it up.” Another concurred: “You never know. Maybe they are watching you.” While this was mainly a humorous exchange, it might indicate underlying concerns with technology that is not directly in their control.
In photograph 2, participant Lynn has captured an image of her Kroger bill with savings possible due to her Kroger Plus Card. While she cited this as an advantage allowing her to go online, download coupons, and check for sales, participant Rita was concerned regarding the amount of information that a company could collect and store about its customers. She stated that it may be worth paying more and not have coupons than to give out her information to a company as “it’s none of their business what I buy.” However, she did acknowledge not all would feel the way she does and that companies do give very good discounts for returning customers in rewards programs as that is one way of tracking customer purchases. Rita displays a good understanding of how information tracking systems provide knowledge of customers to
corporations while the return for giving up such privacy may be too high a price to pay for some.

Participant Lynn captured a photograph (No. 3 above) of a magazine article detailing wearable tracker devices for fitness. With the devices loading the user’s data directly, she was concerned about the data being hacked: “people have to be aware. Because everybody puts everything out on the Internet. And that was just why I took a picture of that because it mentions tracking devices.” Her immediate concern:

I know employers are going to start looking at that stuff, and I know for a fact that they are charging you more or less for the kind of health habits you have in your insurance. And that's just another way they can watch you. I'm not being paranoid. I know this happens.

Participant Rachel raised the question that it might be a HIPPA law violation. In the ensuing discussion some in the group highlighted that if one posted information voluntarily then it was not an infringement of HIPPA. This captured a moment of learning from each other in the group setting.

The group next discussed the use of tracker applications on smartphones. While such applications are useful to provide location-based services, the accidental side effect is “that people can find out where you are in your car.” While there were no specific photographs capturing this concern, a very strong thread in the discussion, particularly among those with children, was their concern with the information that young people post on Facebook and other
social media without being aware of its long term impact on their career and employment prospects.

Participant Rachel talked about two of her colleagues browsing the web during their lunch time getting on “Facebook and find out everybody’s information. It’s like a game. One does the searching then the other one will look up different things – I think this is a negative because you stay out of people’s business.”

One male participant, Nestor, narrated his experience with friends posting his picture from a party on Facebook without his permission resulting in questions from his spouse that he was compelled to answer. While this experience was narrated in a humorous tone, the underlying issue the group recognized was that some information or photographs about us may find their way to social media without our permission and may lead to unintended consequences. The ubiquity and ease of use of smartphone cameras may lead to many awkward situations not of our own seeking.

The participants discussed concerns that ranged from the trivial such as the cable box to more serious questions of managing the line between private life and public digital space as evidenced by the concerns relating to trackable devices, location tracking systems, as well as the aggregation of private data on Facebook. Participants appeared to be aware of the abundance of private information on the Internet but did not know how to protect their privacy. This indicates a gap in their digital education and a need for educating novice users on ways to protect their privacy online.
Complexities of Digital Life. Acceleration of the rate of change in technology and its permeation into daily life had various levels of impact on adult novice digital users and changed the way they normally worked with traditional systems like television remotes or car dashboards. In commenting about the plethora of devices and the complexities of digital life, participant Jane captured the essence of this frustration through the photograph (Photograph 5) above. She said “So all these remotes and all the knowledge we have out there, we can’t combine everything into one.. It is not a big issue but it’s always one of those things with all the technology out there….After a while, you’re saying forget it. I will just use the two remotes.” Another participant commented “Life is complicated enough. If I want to watch a show, I just want to watch a show.” A third participant, Rachel, was more reconciled to the complexities of technology: “I think it’s going back to the theme of we are all trying to keep up with all the newer things that are coming out in technology. Don’t complain. We used to actually have to get off from the couch....”

One participant expressed her frustration with the cloud storage program, iCloud, “I can’t figure out iCloud. Can anybody?” I was able to help the discussants with this particular
concrete issue which led to a discussion on getting the right help for their technical problems. While I could offer my expertise and provide help with such specific problems, other larger problems were more systemic such as the automated voice response systems when calling help lines that participants identified as technology being deployed in an unhelpful way.

When we switched over to Time Warner and it was a nightmare. I was getting the message that did not change (Photograph 4) Once again, I spent hours. We did not have telephone or Internet for five days and five different technicians came out to my home telling me different solutions. Finally, one technician fixed it by changing the cable box......I guess my biggest thing is all the technology we have out there and the cost of what it cost Time Warner to keep sending all these people out, my time having to stay home and it was just the one person that knew what was going on..

Another insightful and relevant topic of discussion was the increasing complexities of car dashboards and many in the group felt there was a learning curve involved when upgrading to a newer car. While commenting on her experience driving a new car, participant Jane said the following:

With my old car I know I can press the button as soon as I turn it on but all this is different. It has got the screen there and you have to press the button for this, the button for that and you have to do it before you take it out of park. I’m trying to keep my eyes on the road and be aware and even just to change the radio station... I was like you got to be kidding me.
Participants displayed a nuanced understanding of the complexity of technology tools in their lives, particularly in identifying the embedded technology in cable boxes and cars which were till recently, relatively easy to use tools. While there are no easy answers to some of the problems raised, a common understanding/identification of this issue provided a sense of community. I believe the photovoice discussion process among participants may set them on a path to critically thinking about solutions to identified issues with technology.

Photograph 7- "I caught my son on camera, talking while driving"

**Safety/Security.** This theme ran through many of the narrations of the participants in terms of the physical safety of technology users as well as the safety of others around them. Safety and security issues relating to technology were highlighted by participants with children. In particular, the danger of texting or talking while driving seem to be a common concern. Participant Jane captured a photograph of her 17 year-old son talking on the cell phone while driving. She said:
I told my son that if you have to make a phone call, pull over, but do not talk/text while driving. I said no, there’s nothing that’s that important. When you’re out there driving and you see how many people are distracted by being on the phone. They’re slow driving. Everybody’s honking at them because it’s a green light. So, he was told I catch him again, the car is taken away.

Another participant, Lynn, volunteered that she has texted while driving though not very often “So it’s not just the teenagers. It’s everybody.” The discussion continued on, highlighting the role of the cell phone as a lifeline for parents/children to stay connected while also being a tool of distraction.

Another issue was the use of digital technology for private use at the workplace. Participant Lynn who had worked as an operating room nurse for 38 years, noted that “people were devoting more time doing personal stuff than performing their duties. In the operating room there’s somebody going to sleep and my colleague just stood there looking up his gas and electric bill.” When questioned, the colleague replied “because I can.” The group discussed how technology made it easy to get distracted even in the workplace.

The pervasiveness of technology and the need to always stay connected seemed to play a part in actions that lead to safety concerns. I perceive connections between this theme and the theme of Cultural Transformation as being two sides of a coin, with the changes taking place in the personal and professional realms of our lives. Under the theme of Cultural Transformation, participants had commented on the effect of technology on human interaction, in terms of the type and amount of interaction. The ubiquity of technology has
influenced the patterns of usage of the tools of technology in the socio-cultural realms. Under the theme of Safety, participants identified the need of technology users to be constantly in touch with others in their social network. This has led to use of technology in unsafe ways such as talking or texting while driving. Thus, the prevalence of technology has affected the behavior of users in the socio-cultural realm and has also led to unsafe use of technology.

Transition and Change. While many of the narratives reflected the experiences of users caught in a world of accelerating technological change without the required abilities to manage the change, participant Rita’s specific experience warranted a standalone theme representing this change. She captured the stages of transitioning from an old phone to a new phone via photographs shown above. She stated that she was perfectly happy with her flip phone and its uses but her carrier would no longer support them. Hence she had to move to a smartphone. She states “That was not my choice. It’s something I was forced into basically. It’s nice to be able to take pictures and get your email all that kind of stuff, but I never wanted to be one of
these people whose face was always in front of a screen.” Another participant, Jane, concurred that her provider gave her a better deal moving to smart phones for the entire family.

Photograph 11 - QR Code - "Source of Information"

The Quick Response (QR) code depicted above is generally displayed with many products in store displays. Smart phone users could capture this QR code and have a program pull up corresponding detailed information on the product. Lynn, the participant who captured this photograph was concerned that those without smartphones would have less information on hand to make good buying decisions. She pointed out to the group, “If I don’t have a smartphone, then I’m losing out on good information. If I don’t have a smartphone, then I’m dumb.”

Transition and change are the hallmark characteristics of the digital world and the group’s discussions were centered on individual, conflicted experiences with transitioning to newer technologies as well as the awareness that such technologies may open up pathways to new information though such transitions were not necessarily of their seeking.
**Marketing.** The constant change in technology has provided space for marketers to pitch upgrade tools and software but in some instances the inexorable movement of market forces appear to make the decision for upgrade in place of the customer’s agency. One participant, Jane said that she loved her flip phone but the providers would “give me a better deal if we turned in all our phones. It was going to cost less for my kids to be on. Verizon made it too easy with the cost and I moved to smart phones. It was going to cost me more to have flip phones.” The group discussed the pressures of marketing whereby service providers were providing better pricing packages and encouraging users to move to smart phones even if they had evinced no interest in them.

Photograph 12."Recipe web sites with links to grocery shopping - Contextual Marketing"

Lynn narrated her experience with a recipe website which displayed links to locations and stores that were close by, where the ingredients for a particular recipe can be purchased. This kind of situational/contextual marketing while useful also led to the comment “it’s a little too weird.” The tracking of user actions on a website and the linking of such information to the
user’s location to provide location-based services might be useful but the group did appear to be aware that it may infringe on their privacy.

One of the effects of technological advances is the empowerment of marketing forces as technology enables easy gathering of information on user browsing patterns. Information collected in this manner is then used for targeted advertising. The web works on an ostensibly free economy model but in reality, information, particularly customer browsing patterns is monetized via targeted advertising. While this model may not necessarily be considered a drawback by all users, being aware of this model may help users negotiate the extent to which they would like to share their information in return for the conveniences afforded by the Internet. Knowledgeable technology users may comprehend and use the trade-off between information and digital affordances for their benefit. An informed user is an empowered user. But digitally-disadvantaged users may not understand the complexities of this trade-off. Hence, digital users’ individual agency and knowledge of technology influence the extent of the benefits they derive from technology.
**Digital Resources/Benefits.** The group identified many benefits of technology in the personal, professional, and social realms of their lives. A photograph of a Smart TV (Photograph 13) showing the interfaces with other devices was captured by participant Lynn as an example of how technology provides her a way to watch Chromecast. She states “This was a happy thing. It is the side of my Smart TV. For Christmas my husband received Chromecast as a gift.
and now we use it to watch Netflix, particularly ‘House of Cards.’ I didn’t know it but they had already uploaded the whole season.”

Photograph 14 depicting a wireless printer represented one of the benefits of technological advancement for Jane and this was seconded by another participant whose school-age children were able to share the family wireless printer.

Logging into store websites to download coupons was another benefit that was discussed by the group. One participant commented that a store like Kroger’s was sending fewer coupons by US mail due to the convenience of online access but the group recognized that such access is not available to everyone. A counter comment from another participant, Rita displayed a more nuanced view of this benefit: “the downloading the coupons to your phone and things like that, I agree with what you’re saying about the lack of privacy. Is it worth more - to pay more and not have the coupon?”

The third picture (Photograph 15) shows participant Rachel using her tablet at the store to look up information on her shopping products to make informed decisions. She listed some of the other benefits, “I use voice speak and just speak to tell what I want and it just pulls it right up.”

The last picture in the table above (Photograph 16) shows a woman reading from her kindle during her lunch hour. The ease of purchase/borrowing of books from the library for the kindle was a huge advantage according to the group. Participant Lynn commented on her comfort level in downloading books, media from the library website, renewing/reserving books, and checking for new library materials online. While the group acknowledged the convenience
of carrying multiple books in one device there were a few readers that occasionally preferred
the tactile comfort of reading a book and this feeling was encapsulated by Lynn who said
“There’s something about holding it in the hand and sometimes the screen you got has to be
set in a certain way and the light doesn’t get it.”

The photovoice group members discussed easy accessibility to “how to” videos on
YouTube. One comment by Jane: “my husband was out of town and my son needed to wear a
tie. I never thought I would have to help my kids with tying a tie. So, my son got online, looked
it up and figured out how to do it.” Another group member, Lynn, mentioned that she looks up
yoga poses on YouTube but did also state that she gets drawn into spending more time that she
had planned online.

Participant Nestor who had family in Guatemala commented on technology allowing
him to “talk with my family face to face” with tools such as skype. Many in the group agreed
that software tools help create what one participant called “a visual connection with family
faraway.”

Summary

The results of stage one of the research project turned the spotlight on the tensions
apparent in participants’ experiences with technology as a useful tool while also highlighting
multiple challenges they face due to the complexities of technology. This phase also focused on
the rapid changes technology has wrought on our society. The main themes identified during
the photovoice stage, supported by the photographs taken and discussions undertaken by the
participants are: Cultural Transformation, Privacy, Complexities of Digital Life, Safety and
Security, Transition and Change, Marketing, and Digital Resources and Benefits. My analysis of participants’ discussion on the data generated in the photovoice stage of research in the preceding sections present a nuanced view of participants’ experiences with technology, beginning with identified themes, followed by generated categories, and concluding with the mapping of such themes and categories to theoretical concepts underlying the research questions. The work of resolving these differences and building upon the theory constructed in this stage of the research in order to get a fuller picture of the phenomenon of digital divide and digital learning is continued in stage two and stage three of the project.

Photovoice has been a window into non-traditional adult learners’ experiences with digital technology. Analysis of the group discussion of the photographs taken by participants has given rise to emergent themes and concepts that will be revisited in the personal interviews and GLA stages of the research, in the following chapters. In keeping with the tradition of grounded theory, an iterative strategy of moving between data and analysis has been adopted in subsequent stages of research that are discussed in the following two chapters.
Chapter 5

Interviews

Background

The personal interviews formed the second stage of the research process to elicit a clearer picture of the phenomena under study, with the initial analysis of the photovoice forming a basis for the design of the interview protocol (Appendix E). The results of analysis of the photovoice and interview stages of research informed the design of prompts for the third stage of the research, the Group Level Assessment that is presented in the following chapter. All participants from stage one were interviewed in stage 2 along with two new participants for a total of seven participants. One new participant was Julie, a recent high school female graduate with a learning disability, planning to pursue a college education. The other participant was Harry, a male college graduate with over 30 years of work experience. The characteristics of the two new participants’ added variety to our diverse participants from stage one.

Seidman (1998) suggests an interview model that provides for an in-depth, contextual understanding of the meaning of participants’ experience of the phenomenon under study. As the interviews for this project formed the second stage of a three part research project, I had established a certain level of familiarity and comfort with the participants at the time the interviews were conducted. Hence, no specific time was required to be allocated during the interview stage. As a result, the interviews were 60-90 minute single, in-depth semi-structured interviews with each of the seven participants. The questions started with gathering specific information about interviewee’s experiences and progressed towards a more open-ended
format with interviewees asked to elaborate on their answers or speak on related topics that I did not initiate (Appendix E).

As noted in the methodology section of this dissertation, the intent of the interview stage of research was to highlight any gaps that may exist in the photovoice data analysis and examine specific, individual technology experiences that may influence participant perceptions of technology that were not discovered in the previous stage of the research. However, on completion of data analysis of interviews I found that though there were some aspects of the individual experience that were captured by the interviews, many of the vignettes shared by participants were more specific details of the themes generated in the photovoice stage of research. Hence, the data generated by the interviews provided a more comprehensive and rich description of the phenomenon of the digital divide, as experienced by the participants.

**Analysis of Interview Transcripts**

All interviews were recorded and transcribed for analysis. According to Charmaz (2006, p. 113) the approach to coding in grounded theory is critical as coding is the link between data and an emergent theory that explains the data. Through the choice of codes the researcher defines the data and begins to build theory which may direct further data-gathering, acting as an analytical framework. The constant interaction of the researcher with the data, guides the research further in terms of building emerging theory. Being open to different theoretical possibilities is the hallmark of the initial, line-by-line coding while the second stage of focused coding acts as a bridge between data and emergent theory. I adopted Charmaz’s two-step process of an initial line by line coding involving naming each word, line, or segment of data followed by a focused, selective coding, that uses the most frequent or significant initial codes,
to sort, synthesize, and organize the interview data. The two-stage coding process allowed me to interact with the data on a continuous basis, once during the interview and subsequently through multiple iterations of coding. I used initial codes to reflect action, to focus on what is happening in the data rather than to reflect analysis and to prevent what Charmaz calls “conceptual leaps to adopt extant theories” (Charmaz, 2006, p. 117) before completing the analysis. Initial coding with gerunds had the advantage of highlighting processes, grounded in the data (Glaser, 1978) and aided me in maintaining participants’ experiences via codes. I reproduce below a sample of iterations of coding for one interview:

Table 4 - Example of Initial Coding of Personal Interview

<table>
<thead>
<tr>
<th>Initial Codes</th>
<th>Focused Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telling children to be careful what they post</td>
<td>Concern for children-Safety</td>
</tr>
<tr>
<td>Biggest concern about their posts</td>
<td>Concern for children – boundaries</td>
</tr>
<tr>
<td>Data never going away</td>
<td>Concern for children – family time</td>
</tr>
<tr>
<td>Wanting to understand the how and why</td>
<td>Permanence of data</td>
</tr>
<tr>
<td>Having a mac instead of pc</td>
<td>Wanting to understand</td>
</tr>
<tr>
<td>Computer crashing</td>
<td>Impediments to learning/understanding</td>
</tr>
<tr>
<td>Not using computer every day and tending to forget</td>
<td></td>
</tr>
<tr>
<td>Children growing up with technology</td>
<td>Compared to younger learners</td>
</tr>
<tr>
<td>Tech coming naturally to them</td>
<td></td>
</tr>
<tr>
<td>Being aware of info available</td>
<td></td>
</tr>
<tr>
<td>Prefer going slow while learning</td>
<td></td>
</tr>
<tr>
<td>Liking visual software</td>
<td></td>
</tr>
<tr>
<td>Searching on the Internet</td>
<td></td>
</tr>
<tr>
<td>Looking up info for work</td>
<td></td>
</tr>
<tr>
<td>Amazing</td>
<td></td>
</tr>
<tr>
<td>Looking up scam telephone class</td>
<td></td>
</tr>
<tr>
<td>Looking up info on entertainment</td>
<td></td>
</tr>
<tr>
<td>Looking up something I don’t know</td>
<td></td>
</tr>
<tr>
<td>Doctors office putting info into a system</td>
<td></td>
</tr>
<tr>
<td>Hope they back it up</td>
<td></td>
</tr>
<tr>
<td>Being caught in data breach</td>
<td></td>
</tr>
<tr>
<td>Getting in touch with husband via skype</td>
<td></td>
</tr>
<tr>
<td>Checking bank balance online but still paying by check</td>
<td></td>
</tr>
<tr>
<td>Permanence of data</td>
<td></td>
</tr>
<tr>
<td>Wanting to understand</td>
<td></td>
</tr>
<tr>
<td>Impediments to learning/understanding</td>
<td></td>
</tr>
<tr>
<td>Compared to younger learners</td>
<td></td>
</tr>
<tr>
<td>Awareness of info available</td>
<td></td>
</tr>
<tr>
<td>Needing to learn slowly</td>
<td></td>
</tr>
<tr>
<td>Using Internet for various types of information</td>
<td></td>
</tr>
<tr>
<td>Concern for data security/backup</td>
<td></td>
</tr>
<tr>
<td>Using Internet for various types of information</td>
<td></td>
</tr>
</tbody>
</table>
Peace of mind is more important
Useful in keeping an eye on my bank a/c
Easy to search for and apply for jobs online
Viewing feel good videos
Addicting
Time consuming
Fantasy games
Mature content on Internet
Love/hate
Have to know when to say when
Winter weather increases screen time for kids/adults
Setting boundaries for kids
Turning off devices during homework
Kids spending time on phone/text
Got to know when to stop
Bad language on the Internet
Takes away from people having conversations
Easy couponing by downloading to phone
Not being afraid to play around with computer
Not afraid to try
Can always delete
Understanding iCloud
Getting help from family
Figuring out Gmail by myself
Try to work around problems
Looking up tech problems
Frustration with tech problems in time crunch
Knowing what the computer can do
Learning together and learning from others’ questions
Nice to call/get calls, listen to others’ voices
Intruding on family life
Interaction with others
Nobody really stays at home anymore
Scary getting back to work after a long gap
Receptionist jobs need word/excel skills
No consistent job
Tech changes
Fortunate to have learned from my kids
Long way to go

Using tech to stay in touch
Wary of financial transactions online
Using Internet for job search/applying
Internet for entertainment/drawbacks
Replacing human interaction?
Learning to not be afraid to try
Figuring out
Seeking help - from others
Seeking help – via Internet
Learning from others
Fear of getting back to work after a break
Tech requirements of entry-level jobs
Learning
Transcripts for all 7 interviews were analyzed and coded using line-by-line initial coding. Initial coding attempted to capture actions in the data rather than apply any analytical or pre-defined categories to the data. Initial codes for all interviews were reviewed and compared to identify ones that contain greater analytical power to form the basis for focused coding which was in turn employed to categorize and synthesize data. The idea behind focused codes is to identify codes that best represent your data in an analytic form without losing out on the essence of the data. Iterative processes of coding required repeated examination of focused codes to identify any overlap in focused codes and to merge codes if necessary. This type of coding led to formation of categories that were the basis for an emergent theoretical framework.

I present below a table with an overall view of the categories under which the focused codes fall, followed by a discussion of each category in detail. Additionally, I present an exploration of its mapping into the personal, professional, and societal dimensions together with an analysis of the category through the lens of agency and consciousness as defined in the research questions.
<table>
<thead>
<tr>
<th>Concerns</th>
<th>Socio-Cultural</th>
<th>Usage</th>
<th>Tech Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concrete</strong></td>
<td><strong>Socio-Cultural</strong></td>
<td><strong>Usage</strong></td>
<td><strong>Tech Learning</strong></td>
</tr>
<tr>
<td>Children</td>
<td>Frustrations</td>
<td>Access of information</td>
<td>Seeking help from</td>
</tr>
<tr>
<td>- Safety</td>
<td>Addiction</td>
<td>Entertainment</td>
<td>others</td>
</tr>
<tr>
<td>- Boundaries</td>
<td>Replacing human interaction</td>
<td>Professional development</td>
<td>Internet</td>
</tr>
<tr>
<td>- Family time</td>
<td>Fear of cultural change</td>
<td>Job search</td>
<td>help</td>
</tr>
<tr>
<td><strong>General</strong></td>
<td>Loss of language of description</td>
<td>Applying for jobs</td>
<td>button</td>
</tr>
<tr>
<td>- Data Security</td>
<td>Generating a culture of ADD/ADHD</td>
<td>Staying in touch</td>
<td>Start over</td>
</tr>
<tr>
<td>- Data backup</td>
<td>Feelings of helplessness</td>
<td>Tool of empowerment</td>
<td></td>
</tr>
<tr>
<td>- Safety of financial transactions</td>
<td>Drawing energy away from physical life</td>
<td>Tool to overcome disabilities</td>
<td>Learn to not be afraid</td>
</tr>
<tr>
<td>- Different ways of doing</td>
<td>Discomfort</td>
<td>Tool to overcome language barrier</td>
<td>Preferred in small groups</td>
</tr>
<tr>
<td>- Eliminating jobs</td>
<td>Takes away personality</td>
<td></td>
<td>To not be treated as stupid</td>
</tr>
<tr>
<td></td>
<td>Lost in translation</td>
<td></td>
<td>Refresher classes</td>
</tr>
</tbody>
</table>

**Impediments**
- Needing to learn slowly
- Tech moving too fast
- Less advantaged not prepared
- Time consuming
- Extensive job application process
- Tech requirements for entry level jobs
- Fear of going back to work after a break
- Time limits in library
- Poor connectivity at home
Concerns

The iterative coding process gave rise to a category named “Concerns” denoting participants’ wide-ranging apprehensions in their interaction with digital technology. The various dimensions of this category gave rise to defined sub-categories such as concerns regarding children’s use of technology in general and the Internet in particular as well as non-child related concerns which are grouped under the general sub-category.

Concerns – Children. There were many concerns that participants expressed with reference to the interaction of children with the Internet. Some concerns were very concrete in terms of the effect of technology use of children’s future career prospects. Here is Jane who speaks from experience:

Yes, I have children that age in the range from 26 to 15. I have five children and I know right now being on the Internet in any form, whether it's Snap Chat, Facebook, Twitter, whatever they're doing, my biggest concern is because you can - it never goes away, that as they get older and they graduate from college that the information can be pulled up by a future employer.

There were also social and psychological concerns relating to use of technology by children as evidenced here by Rita, who has grown children:

Well, my biggest concern, I think, or fear, whatever you want to call it, as far as cultural changes, socio- - I don't know if it's sociological, but is that it seems to me children nowadays are growing up with fewer opportunities to learn how to interact face-to-face with people. So, and - another concern of mine is that - that they also, because of the
instantaneousness of photography, photographs, pictures, Instagram, all that kind of stuff, that they'll also kind of lose the language of description. And it - it - it just seems to me - and - and this could be - I don't know, just silly, slippery slope kind of thinking on my part, but that if they're always seeing things and not knowing how to picture it in their heads and describe it from that, I don't know. That - to me, that seems like a big loss as far as literacy in general.

There were many comments along the lines of concerns for children in the digital age but the above two comments represent a continuum of issues with specific concerns in one end and a general critique of the loss due to technology use on the other hand. In my opinion, specific concerns can be addressed through educating children on judicious use of technology.

Analyzing the critique of technology’s impact of children reveals multiple threads such as loss of social interaction, loss of language, and literacy. Each of these threads may merit in-depth exploration on their own, but taken together, they reveal underlying anxieties on the issue of early adoption of technology by children. Placed in the context of the heavy push to use technology in the educational sphere, these concerns have more immediacy and in my judgement, need to be addressed by policy makers.

**Concerns – General.** Many participants highlighted concerns relating to the safety of their financial transactions due to well-publicized breaches in technology. Participant Jane had this to say in relation to the recent data breach into the Anthem and Target computer systems.

My friend was caught up in - in the Anthem. And now they're - she said oh, we've got all kinds of protection stuff that Anthem has given us now. But we got caught up in that
Target thing. I wasn't using my credit card and just decided - it was right before Christmas and I ran in and I didn't have enough cash. I didn't want to write a check, [use] my debit card. And I'll just - Use the Target card. And [when] - it was right then.

And so, the bank that I use said you're better off closing out that account. So we did.

A majority of the participants were wary of performing any financial transactions online, with some of them experiencing having their credit card misused online. Lynn commented:

Yeah, I do look online - your - the Fifth Third account is there, and I look at the balances and stuff but I will not - it's just me and my husband - do any kind of online banking.

Of the 7 interviewees, the two youngest interviewees, Julie and Nestor were very comfortable with online buying and completing financial transactions via the Internet. Julie who is 24 years old, conducts most of her banking online and had this to say:

I don't like to give my social out, but as far as online banking, as long as nobody has my phone I feel comfortable because I need to look at it that many times a day just to make sure my money doesn’t - doesn't disappear. That's how I track my money. I don’t - I don't wait for the phone call saying that somebody stole all this money. If I notice it first, then I can tell the bank. Then I can get on them because that - to me, that makes more sense.

Her level of comfort and confidence in technology provides opportunities to acquire personal agency in her interactions online and allows her to leverage communications technology for her own benefit. In the recent past, high profile breaches of security cases highlighted by the media would provide little confidence to those users who are wary of the security of their financial data online. While the very real problem of online security of data has
to be addressed by financial institutions as well as by governmental regulatory agencies, there is still the question of personal agency of individual Internet users. It is still possible to mail in a check for a bill but the market pressures that force individuals to adapt to new applications of technology might provide less choice for such individuals in the near future. In these particular concerns in the personal realm discussed above, participants seem aware of the specific difficulties but are not in a position to overcome them as they were structural difficulties beyond their control. For example, the security of the information system of the bank or the store the user conducts business with, is not under her control and the assurances regarding data security offered by these organizations have to be accepted at face value. But we continue to hear about large-scale breaches of information security in many businesses such as banks and commercial stores.

**Concerns – Socio-Cultural.** The many ideas from the nuggets of information shared by interviewees such as addiction, loss in translation, loss of focus on life, supported by quotes from participants listed below, had the common strain of a low-level of anxiety that there may be a social and cultural cost to the rapid adoption of technology by individuals, organizations, and social groups. Here is Lynn with her comments:

> It’s addicting because you can sit there. My husband's one of the worst ones, and he does a lot of work on his computer. But he's terrible. I said how can you go from sitting on your laptop at the table and doing work and then he'll go sit at the family computer. Because the screen is bigger. And then he'll just sit and go through YouTube. He's a - he's a big music person and he'll [INAUDIBLE] don't you get tired of it? And I - I do have to say, I do get - I can spend so much time and then I'm done.
Commenting about the multiplicity of text messages and the various topics that are covered fleetingly in such exchanges, Rita commented “It’s like it’s generating a culture of ADD, ADHD. Just not being able to stay on topic for very long.”

Participant Rita fashioned the term “Cultural Transformation” in the photovoice stage of the research when discussing technology’s impact in many aspects of our lives. During the personal interview stage, she had another interesting critique of technology as it pertains to individual lives:

I’ve said before that it takes all of my energy and concentration to - to just live in real physical life, the 3-D world. And so, to devote the time to - to - to learn digitally, to be on Facebook and all that, even - even my daughter thinks that Facebook is a big time suck for her because she - she works full-time and has a life.

Such critiques of technology in the social and cultural realm were interestingly raised primarily by the older participants. Harry, a 57-year-old pastor, with a general critique of technology despite being an enthusiastic user, had this to say:

But what bothers me the most about it, the technology takes away the personality....... Nothing happens without people. We can move information, but when we send information... So sometimes, we can get lost in the translation of it. And the thing about email, to communicate via email - and I like the real-time, obviously - but you lose the human personality.

Harry also shared a humorous and enlightening exchange: “One of my members in her 90s and I asked her, I said do you have cable TV. She said no. I said well, with cable TV, you
could see people anywhere in the world. She said that may be true, son, but how do you know they can't see you.”

In the vignettes cited above the participants look beyond their individual concerns and take a long range view and present a critique of the impact of technology at a societal level that is still very rooted in their individual lives. In particular, in the area of personal concerns relating to safety of financial information participants display a strong grasp of concerns that are caused by structural forces beyond their control as evidenced in the General Concerns section. In the area of Socio-Cultural Concerns, participants acknowledge the changes brought about by technology in society at large.

**Using Internet**

All the interviewees recognized the value of the Internet as a source of important digital information that provides easier ways of being and doing in their personal and professional lives, from purchasing airline tickets, to accessing/downloading library materials, searching and applying for jobs, staying in touch with family and friends, and many other benefits. Harry, who is a pastor by profession, narrated the following vignette, demonstrating the influential changes that technology has wrought in the way he serves his parishioners:

I was in Memphis. One of the church members called me and said [his dad's] in the hospital. He's gravely ill. I'm in Memphis. I was able to set up a distribution list on my phone and I went in, sent the message. I didn't have to type it. I pressed the little -- microphone, and I put it in there and I sent it to 16 people and I [says] can you please go see Mr. Frank. He's gravely ill. Give Ms. Francine a call, da da da da da, and it was taken
I didn’t have to make - I would have had to make 16 phone calls. And they all got back with me and say I got it or what have you.

Digital technology and the tools that enable instant communications have provided opportunities for their innovative consumption by users. Technology has been an empowerment tool to participant Julie who has a learning disability. She declared that she loved to write but was a very poor speller due to her learning disability and that computer software helps her spell and in turn, write better. Another participant, Nestor, for whom English is a second language, mentioned using the Internet to look up phonetics for English words. Here is participant Lynn narrating the use of Internet in the acquisition of cultural capital, “for example, today it came into my head that CCM, you can go to their - a lot of their stuff free and order tickets and I was online this morning looking stuff up and I - you had to call, so at noon - I got home at noon. I went to ballet this morning and got home and I was on the phone, sitting on hold to get tickets for one of their free things coming up -...... I found out about it online.”

The discussion above highlights participants’ sense of personal and professional agency in using technology and the Internet for empowerment. When juxtaposed with the concerns regarding technology that were discussed above, the participants display a nuanced view of the impact of technology on society in general and their lives in particular in terms of its advantages and disadvantages.

**Tech Learning**

Participants identified multiple ways that facilitate their learning, from specific, tangible methods of learning to a critical consciousness of approaches to overcome socio-cultural
barriers to learning. Here is one participant, Jane, clearly articulating her reasons for enrolling in digital literacy classes:

That was - I've had - I'm somewhat self-taught. My kids try to teach me and my husband, but the problem being is they want to do it for me and I want to learn to understand why I'm pressing this button, what this does, and they just say it doesn't matter, just do it. And that's why - I knew the classes were offered at [Elder] High School and I decided to start taking them because I wanted to understand the computer and how it works, not just to go in and play on it and I wanted to be able to improve my skills so eventually - a lot of the jobs that I was looking for, just even basics, they wanted you to have certificates in Word, Excel, and I didn't have any of that. And so, that was my main reason I wanted to learn what it was about without just saying just do it.

Jane is articulating the value of understanding what she learns, setting herself on the path to a deeper learning experience. While she is identifying the importance of acquiring digital skills as a way to enter the job market, she is also acknowledging that truly understanding how technology works is important to her. In identifying how she would like to learn and making the decision to enroll in technology classes, Jane displays conscientização.

Harry provided an important insight into technology that may be valuable for technology learners. He stated, “in life, there are no - there are few absolutes. But the thing about the computers are - it's the same thing all the time.” Through this comment, participant Harry demonstrates an understanding of the limits of computers as very powerful machines that only operate on specific instructions through the execution of software programs created by humans. There is a certain predictability to how computers work whereas the challenge lies
in the interaction between novice users on the one hand and the combination of hardware and software on the other hand.

Experiences with technology at work encouraged participant Julie to consider going back to school to pursue higher education. Here she is in her own words:

Amazon, just back in January I was doing a lot on my - my job was to sit on a computer and watch trucks come in all day long and to register that they were here or what was going on with them. So I had to take cliff notes on each truck that came in. I had to work on Excel to see when the trucks were coming. I did a lot of Word documents and Excel spreadsheet...... - the more I did it, the more I was interested in going back to school, being on the computers, doing all these little Excel spreadsheets. I think that was really when I started to - wanting to go back to school because I saw how much it affected my job and there was so much more that I could do or maybe I could eventually help them fix the program if I knew how. So back in December, January is really when the computer kind of opened my eyes to technology.

Some of the language that indicated personal agency and initiative in the digital learning process was repeated in a few interviews: “I just started playing around with stuff and figured there was always a way to get out” (Jane), “there is always the delete button (Rachel),” “I thought let’s give it a whirl and see” (Lynn), “you see the kids working with the computers. You know nothing’s going to happen if you try (Jane).” These comments were made by Jane, Rachel, and Lynn when discussing their approach to learning and problem-solving in the course of using technology. These participants showed initiative and self-efficacy in working with technology,
acknowledging the probability of making mistakes as well as learning how to recover from such mistakes.

Some inspirational and metacognitive comments in relation to digital learning were “You have to want to do it!” (Participant Rachel) and “Embrace failure” (Participant Harry), indicating that the adult learners were under no illusion as to the level of effort required and the likelihood of failures that need to be overcome.

Impediments

The cohort interviewed were adult learners and other than one participant, they were not exposed to digital technology in the course of their traditional education. Being digital immigrants (Prensky, 2001) the obstacles that the learners identified were unique to each while also sharing some commonalities. Here is an older participant Harry speaking about missed opportunities in learning:

I just wish I would have embraced it earlier. But like most older people, I was working 60, 70 hours a week, and to get off from work and then go to class is difficult. And plus I was working 30 years in transportation. I probably worked evenings 22 of them. So you get off at midnight, you're just too tired to get up and go to class.

Specific comments on barriers to learning related to teacher attitudes and the adverse impact of such attitudes on learning. One participant stated that “one of the biggest detriments to learning is when the teacher makes people look stupid. That - that - people just shut down with that” while another said “I like a lot of feedback, but I feel like a lot of people
go about feedback negatively. You can give negative feedback but you have to do it in the right way” (Participant Julie).

Technology has made it easy for employers to give extended online psychological tests to weed out candidates who do not match their criteria. Here is Rachel commenting on her experience:

Well, see, at the same time when you're applying for the job, they are giving you a interview at the same time because you have to take this kind of psychological test, and they kind of - they ask you like a hundred questions, maybe two....for a regular job at Kroger’s.

This hiring practice by Kroger’s was seconded by another participant, Julie, for whom the length of the test proved to be a problem to complete as she did not have reliable Internet connection and depended on the public library for computer access:

Psychological tests, just themselves take a half hour to an hour, and I think that - yeah, there's like a hundred and 20 pages, so many questions. I think that's why people get so aggravated because they're trying to - when they do the applications, they're trying to knock off the people who are not the best with customer service or something. But in the end, it just makes everybody else frustrated because it - they just want to apply for a job and it's taken them over two hours to complete one application.

Participant Julie also brought forward the issue of the one-hour limit to Internet access provided at public library branches at the end of which the users are kicked out of the session. If employer websites do not have a save and return feature then the applicant has to start all over again. Due to a confluence of such circumstances, the service that is provided for people
with lack of such access proves inadequate for the purpose of completing a job application which could be a step forward in acquiring economic empowerment. Julie’s technology access issue reflects the impact of the lack of reliable access to technology on such disadvantaged users. She had critical awareness of the importance of network connectivity for her professional development. She said “A while back the public library was up for vote. I voted for it because if they take away the public library from me, I don’t have computer access at my house,” epitomizing conscientização, being aware of obstacles and taking political action to maintain the status quo in this case.

Participant Jane commented on the requirements of Word and Excel certifications for an entry-level job such as a receptionist which demonstrates how digital knowledge requirements have increased due to digitization of many business processes. Having taken a long break from employment to raise her children her comment that “No one stays at home anymore,” in combination with the increased requirements for entry level jobs highlight the specific difficulties she faces in her attempts to get back into the job market.

The domination of the English language on the Internet was underlined by the ESL participant (Nestor) who uses the Internet to look up English words. He mentioned that since his spelling was not very strong, often he had to make multiple attempts in order to obtain the information he needed using Google. There are many search engines that have predictive text suggestions, a message such as “Did you mean…” where the software could not understand the search query. While this may be a useful tool for native English speakers, it may prove less useful and pose more challenges for non-native English speakers.
The Impediments category provoked strong feelings on the part of the interviewees, showing an awareness of their own learning and obstacles thereto. The issues raised by the participants in this category are concrete with specific solutions that can be addressed at the group, organizational, and societal levels whereas issues raised in the Socio-Cultural category such as addiction, fear of cultural change, loss of language, feelings of helplessness to name a few, are more difficult to address as they may not be amenable to technocratic solutions.

**Mapping Connections between Photovoice Themes and Personal Interview Categories**

The broad categories gathered from the personal interviews are mapped to themes identified in the photovoice stage of the research showing connections and patterns between the themes from stage one of the research and categories from stage two of the research. With all 5 participants from the photovoice being interviewed in stage two along with 2 new interviewees, the direct, sustained contact with participants helped build trustworthiness in the data and research process as well as provided opportunities for building on and modifying the foundations from stage one.

In the following paragraphs I discuss some convergences and gaps after iterative analysis of stage one and two of the research. The concrete concerns of participants in the interview stage such as concern for safety, data security, and data backup can find echoes in the themes of Privacy, Safety/Security, and Change as represented by some of the photographs taken in the photovoice stage: photograph of a teenaged driver talking over phone while driving (Photograph 7), photograph of wearable tracker devices (Photograph 3), and photograph of a recipe website (Photograph 12). The safety of health and financial transactions
online was discussed in the photovoice session and was elaborated upon by many participants in the interviews.

The category of Socio-Cultural concerns is reflected in many of the issues voiced under the “Cultural Transformation” theme in the photovoice discussions. The comments in the photovoice discussion such as, “Addictive,” “Takes away from what is really important,” “I need every bit of energy I have to live in the 3D world,” have been mirrored and extended in the interviews. The comprehensive, one-on-one nature of the interviews provided me the opportunity to explore the theme of Cultural Transformation with the interviewees and here are some important ideas that portray their perceptions: “addiction,” “replacing human interaction,” “Loss of language of description,” “Feelings of helplessness,” “Drawing energy away from physical life,” “Takes away personality.” These social and cultural concepts brought out through interviews helped provide a nuanced view of individual experiences in this realm while also falling under the broad theme of Cultural Transformation identified in the photovoice stage of research.

The benefits of digital resources that the photovoice group identified were reinforced by individual interviewees as they related the many ways in which technology is useful in their lives. YouTube was identified by many research participants as a “go to” tool to acquire knowledge in such varied areas such as tuning a piano, learning to tie a tie, or looking up yoga and ballet poses. The interviews yielded information on particular ways in which participants used the Internet: as a tool to overcome disabilities, to overcome a language barrier, and as a job-search tool. In this respect, all participants related positive experiences with digital technology and the Internet in the realms of personal and professional improvement.
The category of Impediments to learning map in many ways to the theme of Complexities of Digital Life in the photovoice stage, as participants identify very specific issues that are problematic for them in the realm of digital learning such as: difficulty with automated systems, trouble with advanced smartphones, and more specific issues such as poor Internet connectivity. The interview stage revealed specific obstacles for some participants such as limited, timed Internet access at the public library, and extensive job applications that deter the time-constrained. Additionally, there were very precise comments on impediments such as “needing to learn slowly,” “technology moving too fast and less advantaged not prepared,” and “fear of going back to work after a break” that speak to participants’ experiences of the obstacles they face.

In the area of technology learning, the approaches to learning was a category that revealed important, individual attitudes to technology learning that were not put forward during the photovoice discussion. Phrases such as “learn to not be afraid,” “you need to want to do it,” “embrace failure,” and “need motivation/drive” highlight important meta-cognitive, critical consciousness on the part of participants that may be important for their learning. Specific teaching environments and tools were identified such as “prefer small groups,” “to not be treated as stupid,” “refresher classes,” “more practice,” are clear identifications of what would work for them.

The individual interviews provided valuable insight into particular concerns of participants as narrated above. While many of the concerns expressed in the interview stage could be mapped to the themes of the photovoice stage of research, the narration of specific experiences of individual participants provided a rich and in-depth picture of technology use in
their lives in its many facets. The descriptive nature of the interview data also helped in identification of categories representing more specific and in some cases, concrete concerns under the general umbrella of the photovoice themes.

**Conclusion**

Analysis of data from the photovoice and interview stages of research provides a stronger picture of the phenomena of digital divide and digital literacy in terms of the benefits and obstacles technology creates in their individual lives as well as a more nuanced view of the cultural and societal impact of technology. The issues and concerns highlighted by the participants covered a range of digital experiences and resulted in the identification of the following categories during analysis of interviews: Concerns – Concrete and Socio-Cultural, Usage, Tech Learning – Approaches and Impediments. The interviews served a two-fold purpose, to build on the themes identified in the photovoice stage of the research and to capture specific user experiences to draw a rich picture of the phenomenon of digital divide. Data from group discussions of photographs have been augmented by specific details of individual experiences providing the foundation for the Group Level Assessment that I will discuss in the following chapter.
Chapter 6

Group Level Assessment

Background

The third and final stage of research brought the participants together for a Group Level Assessment (Vaughn & Lohmueller, 1998, 2014) to reflect on their group and individual concerns, perceptions, and experiences on the phenomena of digital divide and digital literacy. GLA, a participatory, data-generation tool, is useful in generating timely and valid data collaboratively for evaluation or needs-assessment purposes. In the context of my research project, GLA was used in the third stage of research, providing a forum for stakeholders to generate, analyze, and prioritize data on the phenomenon of the digital divide. Whereas, photovoice provided an environment for capturing different aspects of the digital divide and the follow-up interviews were a platform for highlighting individual participant experiences of the phenomenon, GLA built on the earlier stages of research and provided space for participants to collaboratively identify needs and issues that were relevant to them. The most important and value-added aspects of GLA for this research project are the co-identification of needs and the collaborative generation of actionable items for all stakeholders in the digital divide arena. In this three-stage research process, GLA was timely, contextually relevant, and helped participants build on their experiences from the photovoice and interview stages of the research in order to generate participant-driven data, to analyze and prioritize the data, and to determine suitable actions to overcome obstacles and oppressive aspects of their digital environment.
Five (Lynn, Rita, Rachel, Harry, and Julie) of the seven participants from the interview stage participated in the GLA. The pattern of each participant taking part in at least two of the three stages of research provided for the repeated interaction with research members that grounded theory requires to facilitate the gathering of rich data. A modified version of the GLA process (Vaughn, Jacquez, Zhao, & Lang, 2011) was followed in this stage of research with the participants being taken through the following steps:

1. Climate Setting -> I provided an overview of the GLA process and followed it up with a small warm-up exercise.
2. Generating -> Group worked at responding to prompts written on flip charts placed around the room.
3. Appreciating -> Group looked at data written on the wall charts.
4. Reflecting -> Participants spend time alone thinking about what the data means.
5. Understanding/Integrating -> I facilitated a discussion with the group with the objective of attempting to understand the prompts and responses.
6. Selecting -> Group prioritized data and identified main themes.
7. Action -> Based on the previous steps, the group determined actions that can be taken by individual users as well as recommendations for institutions/government to improve the digital learning process.

Based on the initial analysis of data from the photovoice and interview stages of the research, I generated the prompts for the GLA stage. The questions were a mix of direct questions and open-ended, semi-structured questions to provide participants a flexible forum for the exchange of ideas and generation of themes. The prompts were written on flipcharts.
and placed along the walls of the room. Participants were first asked to walk around the room, view, and enter their comments on individual questions in the sheets. During this process, the participants were not asked to specifically identify themselves as the intent of the prompts was more to generate a lively discussion and to identify themes for action rather than to follow individual participant threads. Subsequently, participants viewed responses from all participants to the prompts and spent a few minutes reflecting on their readings. The complete list of prompts and participant responses are provided in Appendix G. The table below provides the GLA prompts and some of the participant responses for each of these prompts:

Table 6- GLA Prompts and Responses

<table>
<thead>
<tr>
<th>GLA Prompts</th>
<th>Participants’ Comments</th>
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</table>
| 1 What are digital skills?   | a. “Adding my skills to technology (Often it is not a hand in glove (poor fit)”  
                                  b. “Everything is digital: such as banks, stores, food, water, gas”  
                                  c. “Anything involving technology, knowing/learning how to use computers etc.” |
| 2 What do they mean to me personally? | a. “Sometimes exciting and sometimes intimating, frustrating, feel good about self when I learn and remember”  
                                  b. “The better skills I have the more I am able to do better my future since everything is becoming digital”  
                                  c. “We are in 2015. In the 70’s, 80’s and 90’s it was said that it is coming. Now it is here. If you do not get it you will be lost”  
                                  d. “I think you need to compartmentalize your mind in order to use these skills successfully” |
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</table>
| **3** | When I work with technology at the workplace I feel......... | a. “Having to learn whole new way – feeling intimidated at times – can I figure out by self or have to keep asking and how does that make me look to supervisors, fellow workers especially younger ones”  
   b. “Upset because many of my peers come in with technological skills and no experience while I come in with experience and no technological skills. Perhaps the 2 could mesh”  
   c. “Empowered: I can successfully do what I was hired for. Frustrated when the Internet is down I can’t do anything!” |
| **4** | When I use technology personally I feel | a. “smart, it can be very helpful when it works for you”  
   b. “It can be fun and exciting! Sometimes it takes a lot more time than I planned for”  
   c. “Excited, accomplished something ‘good for me!’” |
| **5** | The main difficulties I face when working with technology are.... | a. “Not able to ask a human questions when I don’t understand. Ex. applications online”  
   b. “I get frustrated because I am alone”  
   c. “when walking into SS office – no signs anywhere – no people at that instant-just a screen – felt idiotic”  
   d. “Pushing button. Fingers are too big” |
| **6** | When I have difficulties with technology I feel.... | a. “Angry, upset”  
   b. “Intimidated/helpless/frustrated”  
   c. “Get it right/not to give up”  
   d. “Sometimes overly motivated to learn, sometimes not”  
   e. “Hopeless, I want to give up and do things the old-fashioned way” |
| **7** | When I successfully use technology I feel... | a. “good, because I learn something”  
   b. “Aha moment, good about self, proud”  
   c. “Like I’m ‘Keeping up with the Jones’s’” |
| **8** | I can pinpoint structural problems in how adults learn to use technology such as... | a. “They were not raised with it; it’s totally new and foreign to a lot of older (and not so old!) adults”  
   b. “Things happen too fast. Technology doesn’t have much of a ‘muscle memory’ component”  
   c. “There isn’t just one way of doing anything->word, excel, etc. This can be overwhelming and cause some to give up” |
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<tr>
<th></th>
<th>9</th>
<th>My feelings about rapid changes in technology….</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>“Some are good, some are not (changes are too much)”</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>“As technology changes, it ought to build in that many of us did not grow up with the www nor did we have parents that stressed education (perhaps technology ought to have tiers) advanced, intermediate, beginning”</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>“Not happy. I am upset that everything is becoming based on technology. Although I think some things will be better on technology as well”</td>
<td></td>
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<td>d.</td>
<td>“Sometimes moves in better technology are too fast to keep up with across the board and is sometimes difficult to figure out what is best for you. Some people talk to you like you are an ‘idiot’ because you forgot something. That’s demeaning.”</td>
<td></td>
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<tr>
<td>e.</td>
<td>“At the same time, seeing changes (and then just filing away) are amazing to see, especially in the last 10-15 years. In talking to my mom and step-dad - they are flabbergasted considering what they have seen”</td>
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<tr>
<th></th>
<th>10</th>
<th>I believe I can learn better if….</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>“In a hands on interactive environment”</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>“Hands-on, smaller class size, class is controlled so someone doesn’t take over class”</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>“Hands on learning works best for me. Also small class sizes with a class full of people who want to learn vs people in high school who just have to be there”</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>“clear head, lots of rest and time”</td>
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</table>
In the discussion that followed, we went through each prompt and responses to the prompt to get the main themes there. The group progressed through the GLA process, viewing and reflecting on the prompts, understanding, and analyzing the generated data through discussions. The group then identified the following initial themes during the understanding and integrating stages of the GLA: meaning of digital skills, technology at work, technology for personal use, difficulties with technology, future of technology, and how we can do better. Finally, based on the initial findings, the group came up with a set of themes representing possible actions that would make acquiring digital skills easier: Contextual Instruction, Awareness of Diversity, Awareness of Learner traits, and Satisfaction of Basic Needs.

Analysis of GLA-generated Data and Generation of Themes by Participants

Meaning of Digital Skills. During the discussion stage of the GLA process, participants tended to merge responses to questions 1 and 2 relating to digital skills. The conflicting emotions triggered by the digital world with the recognition of the need for digital skills on the one hand (Table 6 - 1a, 1b) and the anxiety regarding acquisition of such skills (2a, 2c) to meet employment market needs on the other hand, were visible in the responses. The main points the group generated as a result of discussion of questions 1 and 2 are:

- Integrating
  - Education with technical skills
  - Work ethic with technical skills
  - Older workers with younger workers
- Anxiety that there is an expectation that the employee should know everything
  - Under Prepared
• Difference between Training & Education

The more senior participants with many years of experience raised the idea of integrating their work skills with newer technical skills. Participant Harry (57 years old) commented on the possibility of combining older employees’ experience with younger workers’ technical skills in work environments. Discussions on integration shed light on participants’ identification of the importance of digital skills in the context of the world they live in (Item 1.b. from Table 6 above) as well as an awareness of how the work environment for older employees can be improved. The identification of anxiety and awareness of being under-prepared underpinned the interchange and resulted in an in-depth look at how each participant fared in the work place. The older participants were also cognizant of the difference between training and education. Harry identified the importance of education in technology in addition to training. This reflected his understanding of the role of training in improving performance of digital work vis-à-vis education that helps in understanding the context and significance of technology use and its future trajectory.

Technology at Work. As prompt numbers 3 and 5 dealt with technology at the work place, the participants discussed the responses in combination. The responses consisted of feelings of frustration, intimidation, as well as feelings of empowerment and they are discussed in detail below.

• Mismatch between skills of employee and expectations at work
• Prior knowledge affects learning
  o Another level of cohesion
  o Prohibits thinking outside the box
The strong theme of workplace expectations discussed in the previous paragraph is expanded here, emphasizing its importance to the participants and their discussions. While the majority of the participants, being older, talked in terms of not having the skills required at work thus leading to a mismatch, Julie (24 years of age) mentioned the fact that she was much faster at technical work and had to wait for the computer processing to catch up with her. Rita, with more than two decades of work experience commented that “we were raised to aim for mastery whereas technological mastery is difficult to achieve.” In the subsequent discussion, participants coined the phrase “Prior knowledge affects learning,” referring to how they were taught when they were in school and distinguishing it from today’s learning which is diametrically different. Participants commented that knowledge of multiple aspects and tools of technology is valued over mastery over a single piece of technology and that learning technology required another level of cohesion. Here, participant Rita further elaborated on her use of the term “cohesion” to refer to the process where newer skills such as digital skills had to be integrated with earlier knowledge acquired through education and experience. Rita was the only participant who commented that technology prohibits thinking outside the box and this may be an indication that she has trouble integrating technology with her work skills. Participants’ discussion on prior knowledge affecting learning was identified in the GLA stage and not earlier. I believe the carefully crafted prompts of the GLA, specifically prompt number 8, relating to structural problems in adult technology learning may have contributed to a more in-depth reflection on the connections between prior education and the current process of acquiring newer digital skills. This insight could be a demonstration of the value added to the research process by GLA.
Technology for Personal Use. Responses to prompt number 4 relating to personal use of technology, ranged from being excited, feeling smart, and experiencing fun to an acknowledgement of the time it takes to use such technology (4 a-c). In contrast, participant responses to prompt number 6 on the difficulties with technology, show an ambivalence towards technology as demonstrated by comments such as being “angry/upset,” “intimidated/helpless/frustrated,” and “hopeless,” tempered by more positive attitude-oriented comments such as “Get it right/not to give up,” “sometimes overly motivated to learn, sometimes not” (6 a-e). Following are some of the main ideas put forth by the participants:

- Usefulness of YouTube
- Hacking – security problem, even in brick and mortar stores
- Low level anxiety regarding digital footprint
- Affordability of computers and software
- Time consumption

In speaking of the multiple uses of technology, participants were very effusive in their praise for YouTube as a source of useful information that enriches many facets of their personal lives, from tuning pianos, to learning basic ballet poses. Participant Harry recounted his use of YouTube to listen to sermons as well as to listen to rock highlighting usage of technology for work and relaxation. The group’s awareness of the many-faceted uses of a technology tool, such as YouTube, showcases conscientização as they are able to see the benefits of technology in the different realms of their lives while also being aware of the difficulties that technology poses in other aspects of their lives as detailed throughout this research process.
In the realm of personal use of technology, specific issues were discussed by the participants. The possibility of hacking of personal data through computer systems was in the news media and seemed to cause deep concern to the participants echoing the Security theme from the photovoice and concrete security concerns from the interview stage. One participant, Rachel, mentioned that choosing not to shop online does not protect one as the brick and mortar stores input transaction information into an online system, which is also likely to be hacked. This situation highlighted the lack of agency on the part of users of technology. Awareness of the possibility of hacking does not give users the tools to protect themselves due to their information being stored in organizational systems not under their control.

Another concern of the group was the digital footprint resulting from extensive use of digital devices. While acknowledging the benefits to the environment in terms of reduced paper use, many participants were concerned that the plethora of devices that are available raised questions of the resulting digital footprint. The group discussed the lack of options for an environmentally safe way of disposing of devices and the likelihood of an increase in the number of devices in the world, worsening the environmental impact. This acknowledgement of lack of agency by the participants reflects the theme of the impact of Transition and Change from the photovoice and Socio-Cultural Concerns from the interview stage.

Participant Rita was of the opinion that the high rate of obsolescence was planned and financially driven by the market. That the accelerating rate of obsolescence of hardware is a hallmark of the digital world was recognized by the group. While one can make a conscious decision not to upgrade to the latest in hardware technology, the continuous development and improvement in software may force users to upgrade hardware. For example, newer operating
systems such as Windows 8 need newer hardware for installation and operation. The adoption of newer hardware drives software choice and purchase and vice versa. Likewise, files created in commercial productivity software can be opened and read only by the recipient who has the same software installed in his/her computer. That the race for faster and better hardware and software appear to lead to faster obsolescence was discussed by the group along with the awareness that market forces seem to be shaping their experiences. While the users had specific difficulties due to the rate of change in technology, I observed that such experiences were a by-product of technological advances and the need for faster and better technological experience drove such advancement rather than a specific need to create obsolescence. Though the topic of obsolescence was a newly identified issue in this stage of the research project, it does reflect the “Transition and Change” theme from the photovoice stage, indicating a certain lack of agency for users in determining when they would like to upgrade their hardware or software.

**Difficulties with Technology.** Feelings of frustration and loneliness dominated the responses to prompt number 5. The pervasiveness of technological interaction in place of human interaction is captured by responses 5a and 5c. Lynn’s experience at the social security office with no human assistance and only a touch screen to help her, leading her to feel like an “idiot” epitomizes her frustrations with automated systems. While participants exchanged frustrating experiences regarding technology, the theme that permeated the discussion was the idea that “they cannot give up as the stakes are high.” The responses to this prompt in conjunction with the responses to prompts 1 and 2 are testaments to the tenacity and resilience displayed by the participants in not giving up on technology.
Future of Technology. This theme was generated by the group as a result of discussion on prompt 9 regarding participants’ feelings about technology as well the overall GLA process. Here are the themes generated by the group:

- Fascination
- Anxiety of unknown
- Mesh energy of the young with experience of the old
- Lack of interpersonal relations

The comment that “changes are amazing to see especially in the last 10-15 years” by Lynn is tempered by the comment that “it is sometimes difficult to figure out what is best for you” and touches on themes 1 and 2. The specific issues for adult learners is captured by this response to GLA prompt number 9 relating to participants’ feelings on rapidly changing technology:

As technology changes, it ought to build in that many of us did not grow up with the www nor did we have parents that stressed education (perhaps technology ought to have tiers) advanced, intermediate, beginning

The comment above indicates a need for more situated and contextualized educational activities for adult digital learners.

Another aspect of adult digital learning is the anxiety of the unknown. Participant Harry commented that many Internet users use what he called “Internet speak” and that not everyone would know what they mean. Other participants chimed in with their own experiences of not understanding how younger digital users communicate via text using short
acronyms that they are not familiar with. Ways of digital communication led to a discussion about the loss of interpersonal interactions as they know it.

The discussants provided an alternative to the current situation by suggesting that the energy and knowledge of the young digital learners should be combined with the experience of the old to create an optimum work environment that would be beneficial to both groups. This commentary and recommendation echoes and endeavors to address the cultural critique reflected in the theme of Cultural Transformation in the photovoice stage of the research.

**How Can We Do Better?** This theme encapsulates how the learner and teacher can do better and was generated in response to prompt number 10. The following are the key findings of the group during discussion that fold into the theme of how to do better:

- Patience/understanding/non-judgmental instruction
- Awareness of racial, cultural, and ethnic differences as well as age-related differences
- Teach the teacher – integrating the teaching methods
- Relatable teaching (Example: fantasy baseball)
- Better security
- Personal traits of learner – needs to want to learn
- Basic needs of learner to be met before learner can pay attention to learning

The GLA culminated with a discussion of how the learning and teaching of digital skills can be improved. The many feelings of frustration, being out of one’s depth, and “feeling like an idiot” in the responses to prompts underpin the first recommendation of needing patience, understanding, and non-judgmental instruction from instructors. Another recommendation was that there should be an awareness of the differences in learners based on race, culture,
ethnicity, and age as the group was of the opinion that differentiated teaching was required for optimum learning. Training of teachers on different aspects of adult digital learning was a third recommendation followed by a very specific suggestion of adopting relatable teaching. Participant Harry suggested teaching technology in a way that relates to adult learners, drawing parallels to engaging in a game of fantasy baseball or fantasy football.

The persistent concern of participants throughout the three stages of research was digital security. The plea for better security is the group’s identification of an optimal digital environment as they were aware that there were multiple players such as individuals, organizations, groups, and governments that influence the security scenario in the digital world and there is no single solution to this issue.

Finally, as a participant aptly stated in her response to prompt 10, a “clear head, lots or rest and time” are required to provide an optimum learning environment. Hence, the recommendation of meeting the basic needs of the learner is an ongoing issue in any learning environment where learner circumstances are less than ideal.

**Participants’ Identification of GLA Themes**

The strength of GLA is in its ability to produce negative and positive data as well as actionable items (Vaughn & Louhmeller, 1998, 2014) and this has been demonstrated by the final, condensed themes generated by the participants during the GLA process: Contextual Instruction, Awareness of Diversity, Learner Traits, and Satisfaction of Basic Needs of Learners. The initial GLA themes relating to teaching with an awareness of racial, cultural, ethnic, and age-related diversity are aggregated into the theme of Awareness of Diversity as they are
different facets of diversity. The themes of need for non-judgmental instruction, relatable teaching, and concerns relating to training and education as well as mismatch of skills and expectations call for differentiated teaching methods and are aggregated into a major theme of Contextual Instruction. The identification of the importance of individual Learner Characteristics of motivation as well as Satisfaction of Basic Needs are retained as themes generated from the final GLA analysis. I present below the process through which the participants identified, analyzed, and mapped their initial concerns, comments, and themes into the four main GLA themes.

Under the themes such as technology at work and personal use, participants underlined the positive and negative elements of technology use in the personal and professional realms displaying an in-depth understanding of the multiple dimensions of technology use. The feelings of frustration as well as tenacity were shared by all in the group. It is in the final two themes of future of technology and improving ways of teaching that the power of GLA comes into play. The progression of the group from identification with applications of technology in their own lives and how their learning can be improved through personal agency (attitudes, personal life circumstances) as well as through institutional/teaching methodological improvements (non-judgmental, relatable teaching) situated in context (awareness of racial, cultural, and ethnic differences) exemplifies a process-oriented approach of understanding and integrating the results of the GLA. Through GLA, the participants explored what Freire calls the “dimensions of a totality” (Freire, 1970/1996, p.122) rather than a “focalized view” of the problem. The participative GLA process here represented a cultural action that drew participants together to view the phenomena of digital divide and digital literacy from different
points of view, assimilating its various benefits and drawbacks in sketching the status of digital technology in their lives and attempting to craft a path forward with recommendations for improvement.

Integration of Themes and Categories from Three Stages of Research

At the conclusion of the photovoice stage of research, I identified seven major themes from the analysis of data: Cultural Transformation, Privacy, Complexities of Digital Life Safety/Security, Transition/Change, Marketing and Digital Resources and Benefits. On completion of data analysis of interview data, I identified the following major categories: Concerns – Concrete and Socio-Cultural, Usage, Technology Learning – in terms of Approaches and Impediments, mapped them to photovoice themes and presented them in the conclusion of the interview analysis chapter. In the course of the GLA, participants generated, analyzed, and prioritized data and arrived at the following themes: Contextual Instruction, Awareness of Diversity, Learner Traits, and Satisfaction of Basic Needs. Here, I present the mappings between photovoice themes, interview categories, and GLA themes and explain the process of mapping in the sections below:

Table 7 - Themes and Categories across the Research Stages

<table>
<thead>
<tr>
<th>Photovoice Themes</th>
<th>Interview Categories</th>
<th>GLA Themes</th>
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<tbody>
<tr>
<td>• Cultural Transformation-</td>
<td>• Concerns</td>
<td>• Contextual Instruction</td>
</tr>
<tr>
<td>In vivo</td>
<td>o Concrete</td>
<td>• Awareness of Diversity</td>
</tr>
<tr>
<td>• Privacy</td>
<td>o Intangible</td>
<td>• Learner Traits</td>
</tr>
<tr>
<td>• Complexities of Digital Life</td>
<td>• Usage</td>
<td>• Satisfaction of Basic</td>
</tr>
<tr>
<td></td>
<td>• Tech Learning</td>
<td>Needs</td>
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</tbody>
</table>
Some of the mappings between the three stages of research were easily identified such as issues of Safety/Security in the photovoice stage were reflected in Concrete Concerns category of the interview stage and the identification of Contextual Instruction in the GLA stage acted as a possible solution to such issues. Other themes such as Cultural Transformation in stage 1 mapped to Socio-Cultural concerns in stage 2 such as addiction, fear of cultural change, feelings of helplessness that were in turn identified with alleviation measures such as better instruction based on Learner Traits and Contextual Instruction in the GLA stage. There were also threads that could be tracked from the Transition/Change and Complexities of Digital Life themes to specific concerns in the interview categories such as changes to workplace, elimination of jobs, and need to learn newer ways of working with technology. Again, the GLA stage themes such as Awareness of Diversity, Learner Traits, and Contextual Instruction were identified as means of dealing with Transition/Change and Complexities of Digital Life. On the more positive side, the theme of Digital Resources/Benefits directly mapped to Technology Usage category in the interview stage as these constructs reflected the positive aspects of technology identified by the participants.

There were some ideas generated in the interview stage such as: “Needing to learn slowly,” “Less advantaged not prepared,” “Fear of going back to work after a break.” The nature
of the interaction allowed the participants to be more personal in their views. While such personal views were not put forth directly in the GLA stage, participants did speak about the need for non-judgmental instruction, showing critical awareness of how their fears can be overcome with appropriate instruction.

The many themes and categories gathered from the three stages of research are distilled into the benefits of technology and impediments that adult users experience in an environment that is mediated by the following structural characteristics of the digital environment: constant change, complexity of technology use, privacy issues, and security issues. In this setting, participants’ identification of the factors that can improve their learning are condensed into elements such as contextual learning, instructional approaches that are aware of learner characteristics as well as diversity of learners. These constructs are placed within a framework where the basic needs of the learners need to be met to prepare them to learn well. While novice digital users such as the participants have little to no control over structural factors such as change, complexity, privacy, and security, being more aware of the nuances of these issues can provide them with more agency to control their digital lives and to advocate for themselves. A supportive learning environment that provides contextual instruction that is informed by their individual needs, and diversity among the learners would help them better navigate the digital world. The following figure encapsulates the results of the grounded theory approach to the analysis of the three stages of research:
Figure 8 - Grounded Theory Results
In the figure above, I have diagrammatically represented the main themes arising out of the analysis of the three stages of research. Throughout the research process, participants acknowledged the clear benefits of technology as well as the impediments that affected their digital learning. The benefits and impediments were placed in the center of the figure to indicate that they operate in an environment marked by the major technology-related concerns of the participants—privacy, complexity, and security. These concerns can be directly traced to the different issues identified by participants in the three stages of the research and they are continuing concerns that all digital users grapple with. I have also placed constant change in technology in the diagram as technological change is perpetual in the digital environment and underlies many of the concerns identified by the participants. Thus, the inner circle in the figure above is the current digital environment, mediated by concerns of privacy, complexity, security, and change, within which the adult digital learners enjoy the benefits as well as work to overcome impediments. I propose my theory, grounded on the research findings, that the digital learning environment can be made more supportive to novice digital learners with instruction that is contextual, aware of learner diversity and learner characteristics, and acknowledges that the basic needs of the learner need to be met before meaningful learning can happen. The outer circle is my proposed support system that can be built around the existing digital environment to help users navigate the digital world with personal and professional agency.
Summary

The final stage of the research process was the collaborative GLA process that yielded participant-driven data, through collaborative identification of needs and priorities by the group. The data generated were analyzed and prioritized by the participants and resulted in a set of recommendations and actionable items such as, Contextual Instruction, Awareness of Diversity, Learner Traits, and Satisfaction of Basic Needs. The themes and concerns reflected in the different stages of research acknowledge the benefits of technology as well as the impediments to learning technological skills. This constant effort to leverage the benefits of technology while attempting to overcome impediments to learning, happens in an environment mediated by persistent change, and issues of complexity, security, and privacy. Building on the data analyzed in the three stages of the research process, I recommend a supportive learning model that provides instruction that is contextual, cognizant of the diversity of learner experiences and characteristics, and acknowledges that the basic needs of the learners must be satisfied before deep learning can happen.

In the following chapter, I will present the connections between my theoretical frameworks presented in chapter 2 and the results of the three stages of data analysis, and draw conclusions.
Chapter 7

Analysis of Findings through the Theoretical Lenses

The research project has placed the questions of the digital divide and digital literacy in the context of social justice in a democracy and attempted to understand the underlying causes of the digital divide. It has endeavored to move the discourse away from economic empowerment rhetoric that merely contributes to an existing economic structure to a more critical approach to digital skills learning driven by learners, situated in their context, and empowering them in all spheres of their lives. In this chapter, I examine and interpret the research findings from the three stages of research, highlighting the findings that support my theoretical frameworks as well as examining the findings that do not validate my frameworks. I conclude with specific recommendations to alleviate the issue of digital divide among adult learners and to increase the effectiveness of digital literacy instruction.

Connecting theory and research

Applying the definition of information as a primary good (van Dijk & Hacker, 2003; Fallis, 2004) I used Rawls’ fairness and difference principle as an overall umbrella to ground this study in the realm of social justice and applied Sen’s capability approach as a lens through which to view the issues of digital divide and digital literacy. Based on this foundation, I applied Eubanks’ critical technology education, Horton’s cultural learning, and Freire’s critical learning approaches as specific pedagogical tools to analyze the findings of the research and to provide recommendations for building technological capital. I present below the connections between my theoretical frameworks and the findings of my research.
Interpretation of Research Findings through the Work of Rawls & Sen

I view the ideas of Rawls and Sen as a broad umbrella to understand the need for a just digital world for novice adult users (Rawls’ fairness and difference principles and Sen’s CA) and to identify optimal ways in which individual technology users can learn (Sen’s capabilities and functionings). Since these two concepts provide two different perspectives, with Rawls providing a social justice lens and Sen providing a rationale for the need to consider the specific contexts and challenges of learners, I examine them together in this section.

The democratization of information access has been enabled by rapid technological innovation. This is reflected in the finding that the participants did not identify problems in accessing critical (electoral, legal rights, and citizenship information) as well as non-critical (domestic news, scientific, and technical news) digital information as defined by Duff (2011) apart from one participant Julie, who did have concerns with Internet access and spoke at length about the limitations of Internet access at public libraries (See Chapter 5 –Interviews). When this finding is viewed through Rawls’ fairness and difference principle, it appears to indicate that access to digital information is not an obstacle in participants’ digital experience. However, Julie’s experience as related in the interview stage of the research process may violate the difference principle as her experiences are diametrically different from those of the other participants. One could make an argument that the provision of access to technology in public libraries could be considered an institutional action under Rawls’ difference principle, to spread the benefit of digital information to the disadvantaged. But the specific obstacles cited by Julie indicate that the differential benefits of technology access has not materialized in her
case indicating a need for more robust and sustained action on the part of such societal institutions.

Though issues of access were not raised extensively by participants, their concerns were related to an excess of digital information and the consequent difficulties with controlling privacy and security of users. In this respect, the results of the research indicate that access to digital technology may no longer be a problem for the research participants enrolled in the digital literacy classes at Elder Tech-Reach. However, the Rawlsian differential principle seems to apply to interpretation and consumption of digital information. Thus, the nature of the digital divide is more in terms of concerns with effective use of technology than in terms of access to technology. This indicates a need to address the digital divide as represented by the different ways in which users struggle with evaluation and use of technology.

The question of evaluation of technology for effective use is represented by many themes across the three stages of research relating to management of information in complex environments for productive use by participants. In my opinion, the issues relating to evaluation and use of complex technology lay a strong foundation for the applicability of Sen’s capability approach in the form of a more differentiated educational pedagogy that is cognizant of the capabilities and functionings of individual users and provides them with capacity to understand the complexity of specific technology that is relevant to them. I believe that the themes of Cultural Transformation, Privacy, Security, and Complexities of Digital Life that surfaced in the photovoice stage and were then reiterated in the Socio-Cultural and Concrete Concerns of participants in the interview stage of the research represent various facets of evaluating and managing technologies by novice adult learners. These themes and categories
from the photovoice session and interviews provided the foundation for me in the careful construction of GLA prompts that resulted in participants discussing these issues at length. During the GLA stage, in addition to discussing how technology affected the personal and professional realms, the participants discussed specific difficulties with using technology that encompassed the issues of security, privacy, and change. The discussion led to identification of an important aspect of technology use and learning: “How can we do better?” During the course of this discussion, participants identified the need for patience and understanding on the part of the teacher, need for non-judgmental instruction, relatable teaching, acknowledgment of personal traits of learners, and importance of addressing the basic needs of the learner (Chapter 6 – GLA). These group-identified, prescriptive approaches to technology teaching speak to the applicability of Sen’s CA, highlighting the need to acknowledge diversity of humans in functionings and capabilities. The analyses of the participants on the topic, “how can we do better?” helped me identify the importance of the pedagogical approach of contextual instruction which considers learner diversity and specific learner traits in my model of the ideal technology learning environment (Chapter 6 - GLA).

The many comments of the participants demonstrating their awareness of individual agency and its importance in the learning process (“Embrace failure,” “You have to want to learn”) and as a complementary aspect of learning, that basic human needs must be met before learning can take place, can be viewed through the lens of capability approach. With its balance between needs and wants as well as capabilities and functionings (the physical and mental faculties needed to learn complex digital skills), CA can help learners balance their capabilities with achievements they seek in the digital sphere. The comments of the learners
cited above, reflected an in-depth understanding and awareness of the intellectual effort to acquire technology knowledge. This understanding extended to the GLA stage where participants clearly identified how technology learning can be improved through non-judgmental instruction, awareness of diversity of learners, acknowledgement of personal traits, and relatable teaching and learning.

In the discussion above, I have laid out the importance of Rawls’ differential principle in addressing the questions of digital divide via the experience of participant Julie. Additionally, due to the increasing complexity of technology I have expanded on the importance of Rawls’ difference principle in addressing the digital divide in terms of novice adult learners managing this complexity. With Rawls’ principles providing an overall social justice framework, I have used Sen’s CA to provide the overall framework for addressing different forms of digital divide through contextual instruction allowing for the spectrum of human diversity in learner characteristics, matching capabilities with needs to provide meaningful learning in digital technology. Combining a social justice lens through Rawls’ principles and acknowledging the importance of learner diversity through Sen’s CA, my research provides a unique framework for addressing the digital divide that encompasses the general need for a just digital environment and more specific need for programs that are cognizant of learner diversity for meaningful and lasting digital learning, driven by the learners. In order to operationalize the social justice view of the digital divide addressed through Sen’s CA, I will now analyze the research findings through the work of Horton, Freire, and Eubanks that I expand upon in the following paragraphs.
Practical Applications of Critical Educational Pedagogy

Horton’s cultural rooting, Freire’s critical education, and Eubanks’ critical technology learning concepts are echoed in many themes and categories of the research project and are discussed together in the following paragraphs.

During analysis there were many instances where research participants indicated that they would rather interact less with technology, specifically under the theme of Cultural Transformation in the photovoice stage and under the Socio-Cultural Concerns category in the interview stage. In the photovoice process, participant Jane described the process of her cell phone service encouraging her, through better service terms, to move to a smart phone in addition to providing good deals to purchase multiple smart phones for her family. The push of market forces seems to have reduced her freedom to make decisions as it made it less expensive for her to move to smart phones though she would have preferred to continue using her flip phones. Rachel, in her interview made the comment “does this control me or do I control it?” as a culmination of her narrative on the impact of technology in the personal and professional realms of her life. Jane and Rachel’s experiences indicate the oppressive nature of economic and market forces that appear to push users to make decisions that are not in line with their own preferences. But both participants display Freire’s idea of critical awareness about these market forces and such an awareness constitutes the first step in a self-realization process that may empower these users.

Participant Lynn, in commenting about a digital technology instructor had this to say, “He was a great teacher. He was funny. But the level at which he goes at it, I’ll never be there nor do I want to,” demonstrating the mismatch between capabilities and functionings on one
hand and the lack of a localized, rooted instruction relevant to the learner recommended by Horton and Freire, on the other hand. Horton’s cultural education for adults could be more effective in technology education for adults such as Lynn, to enable them to make connections between what they learn and how such learning can be used in their daily interactions with technology. Additionally, as recommended by Freire (1970/1996), engaging the learners in the learning process would enable them to be active learners, identifying what is relevant and useful rather than passive objects taking in information without understanding the context or the relevance to their own lives.

The coining of the term “Cultural Transformation” by participant Rita (Chapter 4 – Photovoice) and the many related threads contributed by participants under the category of Socio-Cultural Concerns such as addiction, frustration, and cultural change in the interview stage (Chapter 5 – Interviews) are examples of an unrooted technological learning that would benefit from a more situated and contextual instruction. Many themes identified in the GLA process such as need for non-judgmental instruction, awareness of diversity in terms of age, race, cultural and ethnic differences highlight learner awareness of their demographic characteristics and life experiences influencing their experience with digital technology. This maps to Rawls’ concept of starting location and Eubanks’ (2011) social position that speak to the influence of users’ location within the prevailing digital structures, coloring how they perceive their digital experience. Freire calls it the historicity of learners and recommends a dialogical process involving problem-posing to help “people develop their power to perceive the world with which and in which they find themselves; they come to see the world not as a static reality, but as a reality in the process, in transformation” (Freire 1970/1996, p.64).
photovoice themes (Cultural Transformation, Privacy, Security, Change, Complexities of Technology) and the specific feelings identified under the Socio-Cultural category in the interview stage (frustrations, addiction, feelings of helplessness) and GLA themes (non-judgmental instruction, personal traits of learners, awareness of diversity) together with the theory that supports them discussed above, point to the need for technological education that is sensitive to the context and characteristics of individual learners/groups. Thus, the GLA provided the process-oriented, reflective environment that helped learners identify transformational themes that have no simple solutions but rather require an on-going interrogation of the status-quo that is continuous and continuing, taking into account the idea that learners are historical beings.

Participants identified learning as a continuous process through interaction with technology in the GLA stage. This finding helped me arrive at the integrated theme of Contextual Instruction by applying the socio-cultural theory concept of situated learning and learning as a product of the “activity, context and culture in which it is developed and used” (Brown, Collins & Duguid, 1989, p. 32). Brown et al., argue that based on cognitive research, learning happens in a situation where the concept, activity, and culture come together to provide a meaningful experience for the learner. Technology applications manifest themselves in multiple modern tools and interfaces and Brown et al., state that “our understanding both of the world and of the tool, continually changes as a result of their interaction. Learning and acting are interestingly indistinct, learning being a continuous, life-long process resulting from acting in situations” (1989, p. 33). Their situated learning theory is apt for adult digital learners
attempting to make sense of the tools of technology and how such tools can be applied to their own lives in a manner that is beneficial to them.

According to Eubanks (2011), the goal of popular technology should be “to create a space in which a wide variety of people can collectively consider our shared technological present, to open up a conversation about how to be more critical technological citizens” (p. 132). Eubanks’ popular technology education has its basis in popular education grounded on the belief that the people closest to the problem have the best information to develop solutions to the problems. In applying Eubanks’ popular technology education to the current research findings, I found the themes of Cultural Transformation and Complexities of Digital Life revealing incisive and critical thinking by participants of specific technological difficulties that they identify while also demonstrating the many instances of personal and professional agency showing participants to be critical consumers of technology. Participant Julie’s experience with Internet access in the public library system (Chapter 5 – Interviews) led her to take specific political action of voting for the library levy to improve her access to digital technology demonstrating critical education and conscientização as defined by Freire.

Though Horton’s culturally rooted education predates Eubanks’ popular technology education, both concepts have as their foundation the role of human experience and individual agency in developing a critical consciousness as a social force for transformation. Participants’ negative experiences with digital technology underlie some of the specific fears relating to the themes of Security, Privacy, Safety of financial transactions, and Socio-Cultural Concerns such as frustration, addiction, and cultural change. Digital literacy programs that aim to bridge the digital divide can also be strengthened if they provide an alternative perspective that speaks to
the situations that affect the lives of the participants in order for them to identify with and perceive the value of digital knowledge as a means of empowerment in their lives in addition to the knowledge to be acquired mainly for employment purposes. In the recommendations section, I propose specific remedies for inclusion in digital literacy programs that aim to allay specific fears and concerns that novice adult learners identify in technology use.

An identification of the role of technology in their own lives has helped the research participants develop critical awareness of the value to their learning instead of trying to catch up with the latest skills “in demand” by employers. Such critical awareness would truly empower them in a fast-changing technological environment. In this context, the diagram below highlights the connections between the ideas of Freire, Horton, and Eubanks and a more critical education approach for digital skills learning I advocate represented by the terms “Situated Technology” or “Contextual Technology”:
I present the term “Situated Technology” as an amalgam of the recommendations of the participants from the GLA stage augmented and guided by critical education theories proposed by Freire, Horton, and Eubanks. It is contextual instruction as a pedagogical approach that is cognizant of the diversity of learner characteristics and specific historicity of learners, providing relatable digital learning experiences that empower users, with personal and professional agency. My contention is that situated technology represents a more humanistic and liberatory form of technological education that is meaningful to learners and helps them navigate the complexity of the digital world. I present below the mappings between specific research themes and situated technology.
Situated technology could help alleviate concrete concerns of technology users (Interview stage) with regard to specific privacy and security issues (Photovoice stage) through contextual instruction that helps users understand and navigate the digital sphere in terms of security and privacy. Guided digital exercises that replicate users’ technology usage patterns would help situate technology and help them navigate the security and privacy issues with contextual guidance. It is my contention that situated technology is more than just a pedagogical tool. Through grounding relatable instruction in a contextual environment that considers the learner traits and the range of human diversity, this critical approach would make space for learners with varying digital skill levels to make sense of the role of technology in their own lives.

Situated technology approaches would also help improve positive learner experiences with technology as identified in the themes of Digital Resources/Benefits (Photovoice stage) and Technology Usage(Interview stage) as it would provide a context for each positive digital experience for the user, setting them on a path to life-long learning. The many ways that participants have used technology for their benefit in their daily lives from using YouTube to acquire knowledge (participants Lynn, Jane) to using the devices of technology to managing a learning disability (participant Julie) or a language barrier (participant Nestor) is evidence of critical thinking and agency in their use of technology. Supporting such learning in digital literacy programs would strengthen this learning approach to digital skills acquisition.

While other themes from the data analysis such as Privacy, Security, Transition, and Marketing do not find direct mapping to the theoretical framework, when they are viewed as different manifestations/results of complexities and evolution of technology then the
connections to theory become clear. The advancement in technology and resulting complexities of its use encompass many of these themes listed above. These advancements benefit the highly educated and digitally-skilled immediately but the trickle-down effect put forth by the S-curve proponents (Compaine, 2001) does not benefit the least advantaged for a very long time. In the meanwhile, newer advancements and digital tools are constantly being introduced in the digital world and in the on-going race to keep up with advancements, the disadvantaged are left behind. When Rawls’ difference principle is applied to this situation, inequality in benefits of technology can exist provided the benefits of such inequality reach the least advantaged. In the context of this study, there is a need to redress the inequality in access and effective use of technology among the adult learners according to the difference principle. Sen’s CA acknowledging diversity and needs of learners, Horton’s culturally relevant education, Freire’s critical consciousness, and Eubanks’ critical technology education provide a broad set of guidelines for ameliorating this digital inequality through situated technology.

Summary

In this chapter, I examined the connections between my theoretical frameworks and the results of the data analysis of the three stages of research highlighting particular scenarios from the research that support my theoretical frameworks. Specifically, Julie’s experience with variable access to technology at the public library combined with the difficulties many participants related in terms of evaluation and use of technology make a strong case for the applicability of Rawls’ difference principle in identifying a social justice basis for addressing the digital divide. Viewing the findings of the research through Sen’s CA also enabled me to identify the need for contextual instruction in digital technology that acknowledges the diversity of
adult learners’ characteristics and life experiences for a meaningful learning experience. The specific participants’ learner experiences with complex technology confirmed the need for Horton’s cultural education, and Freire’s critical consciousness as a situated and transformative learning experience to bridge the digital divide through critical technology education programs advocated by Eubanks. In the next chapter, I provide detailed recommendations for users, educational organizations, and governmental agencies to help overcome obstacles to digital learning. I also provide useful guidelines for creating well-designed and effective digital literacy programs and conclude with implications and limitations of my research, and the possibilities of future research pathways in this area.
Chapter 8

Recommendations for Action

Relatable Teaching and Learning. The three stages of research and related methodologies used in each of these stages provided a snapshot of particular benefits of digital technologies in users’ lives as well as impediments and problems with acquiring digital skills. The photovoice and interview stages set the context of the digital learning of these adults and identified their individual concerns and the GLA provided a platform for the group to discuss and arrive at some conclusions as to what would help them. Non-traditional adult learners would generally come into the classroom after a demanding day at work or home, with many claims on their energies and attention. Coming to technology later in their lives, they would need instructional methods that they could relate to their own lives and thus make lasting connections to this body of knowledge. Community organizations and institutions offering digital education to adult learners may benefit from taking a more holistic approach to teaching digital skills to adult learners.

Situated learning is supported by research in a range of educational fields. Brown et al. proposed the concept of situated cognition with its key idea being that “learning and cognition are fundamentally situated” (1989, p. 32). Hence, teaching technology situated in the context in which users live and work would create a more authentic learning experience that is meaningful to the learners. Ala-Mutka, Punie and Redecker (2008) endorse lifelong learning strategies as a response to the need for continued digital competence. They recommend learning within context for learners, and learning to use digital tools creatively and critically in
evaluating the validity of online information. The term authentic learning (Donovan, Bransford, & Pellegrino, 1999) or authentic instruction involves learning that happens when learners are engaged in exploratory tasks that are of interest to them and that are closely connected to their own lives beyond the classroom. This theme was touched upon by the research participants in the GLA stage when one of them mentioned relatable teaching with examples such as use of fantasy football or baseball in teaching computer skills.

The use of authentic learning tasks in teaching digital skills may provide the necessary context for deep learning. For example, many research participants mention using the Internet to search for information. One situated learning task would be to assess the reliability of information on the web. Given a task to search for information on a topic of their personal interest, learners can then be guided through the process of evaluating the credibility of the information with criteria such as assessing the credibility of the organization hosting the website, the currency of the information, additional resources provided by the website together with evaluating the strengths and drawbacks of using information clearing-houses such as Wikipedia. Engagement in such activity by the group of learners would create a sense of common learning purpose as well as provide individual learning experiences relevant to how each learner uses the Internet.

Another recurrent theme in the data analysis stage was the issue of security of financial information indicating a common concern among novice adult digital learners. Instructors could use a test case and demonstrate the various measures that a user can adopt in order to protect herself from theft of financial data that may range from reading the privacy policy of the financial institution, to specific actions such as choosing a strong password, never writing
down the password on a piece of paper, and never giving out the password to any other person. An additional authentic activity would be to ask learners to research ways by which they can recover in case of breach of their financial data. Such an activity would encourage critical thinking skills vis-à-vis technology and a sense of personal agency. It is to be noted here that such activities place the learning within the context of users’ technology experience while also promoting critical thinking on the strengths and concerns of technological applications that they use. Due to the changing nature of technology, the nature of security and privacy threats also evolve and authentic learning tasks need also to be reviewed and revised accordingly.

**Managing Digital Complexities.** The question of complexity of digital technologies has been discussed in the collaborative and individual research stages by participants. The consistent theme of the digital revolution in the last two decades has been the rate of change in the technological realm along with the increasing complexity of the interfacing of humans with technology, particularly for those users who were not exposed to technology in their formal education. Many participants have emphasized their continuous pursuit of technical skills to be productive in their work lives as well as their specific issues with managing their privacy, safety on the Internet, and security. None of these themes can be viewed in isolation as they are all inter-linked to the nature of the change and development taking place in the digital world. The rapid adoption of technological changes by organizations and businesses has added another layer of complexity for adult digital learners wherein they have very little agency in decisions regarding whether or to what extent they want to engage with technology. In this scenario, novice digital users need a blueprint to navigate the intricacies of the digital world. The caveat here is that a single blueprint might not apply to all users and one blueprint might be subject to
change for a user at different points of time in his/her life. Each digital user has to create her
own path in the part of the digital world that touches her life. For example, one participant, Rita
avoids many commonly used Internet applications such as Facebook and is wary of technology’s
cultural impact but works with technology and is willing to improve her skills in her professional
life. In contrast, participant Lynn values Facebook as a connectivity tool with friends and family
while still being aware of some of the problems of the digital social life.

The approach to managing the complexities of technology can be two-fold: relatable
training and critical education. Educational and community organizations that provide digital
skills to novice users can provide more contextual instruction i.e., specific, grounded skills in
evaluation of technology, the role of technology in public and private life as well as hands-on
instruction of how to manage specific privacy and security threats. There is a caveat in this
recommendation due to the constantly changing nature of privacy and security threats with
malicious players looking for new ways of breaking into and stealing valuable information from
digital data repositories. Hence training alone may not be sufficient. As participant Harry
recommended in the GLA stage (Chapter 6), there should be training and education provided in
the use of technological tools to help users situate technology in their own lives as well as to
continue on the journey of managing technologies long after they have left the classroom.
Training provides the hands-on skills necessary to work with technology while education
provides a historical background, context, and critical thinking abilities to manage future
technological challenges. Eubanks(2011), while acknowledging the value of vocational training,
also states that such training alone is not sufficient to “produce the kind of critical
consciousness we all need in order to imagine alternatives to the status quo”(p.154). While a
fair amount of responsibility is placed on the providers of technical training and education, the
novice adult users need also adopt a more comprehensive approach to learning digital skills, to
look beyond the immediate acquisition of skills and endeavor to understand the economic,
political, and social aspects of technology as this would help them navigate the technological
world with personal and professional agency.

**User-Centric and Graduated Design as an Equitable Tool.** In this section, I survey some
of the research on user-centric design geared towards easily-usable digital interfaces and tools
and make a case for the adoption of such design approaches to information systems associated
with social welfare programs, employment programs, and health services that have a huge
impact on disadvantaged citizens.

Users of the Google search engine would be aware that it is a very convenient search
tool. Simple queries can be entered in the search box or a more adventurous or savvy user can
use the advanced search tool to drill-down to provide specific input that can return more
accurate information. If a user knows the exact search word or phrase, this can be entered
directly in the search box and the button aptly named “I am feeling lucky today” could be
clicked for search results. Thus, Google’s approach to design that provides multiple, graduated
ways of completing a task in an inclusive way, serving users with different digital skill levels
could provide a model for interface design of critical social welfare and employment systems
that disadvantaged users commonly interact with.

The specific design approaches to systems design discussed in Chapter 2 form part of my
theoretical frameworks and informed my analysis and recommendations. The theme of
Complexities of Digital Life in the photovoice stage and the category of Impediments to Technological Learning in the interview stage point to specific problems that users had in interfacing with technological tools. Such problems can be addressed through various systems design approaches that take into account the skill levels of users. Norman and Draper’s (1986) “user-centered design” might provide a design methodology that involves engaging the end-users extensively throughout the software development process, with the product designed around the way users would interface with it. Participatory design is another process that may be adopted as it is more responsive to users of products and has been used in a variety of areas such as architecture, urban design, product design, as well as software design. The participatory approach with its focus on the process of collaboration to create a more user-friendly design rather than on design style, would empower the user and democratize the process of design (Schuler & Namioka, 1993). Contextual design (Holtzblatt & Beyer, 2015) with its foundations in ethnographic methods maybe an ideal design method to adopt in a situated learning context where learner characteristics and diversity have a huge influence on digital learning outcomes. Any of the above mentioned design approaches may find resonance in the digital tools and interface development arena when the needs of the end-users are used as a starting point for the design procedure.

Throughout the research process, participants have highlighted the many impediments facing them in the use of technology. Some activities such as applying for social security benefits or applying for a job are increasingly mediated by technology with few alternatives available to the users. While software companies may use some of the participatory methods mentioned in the paragraph above in developing software (Vredenburg, Mao, Smith, & Carey,
2002), there needs to be a concerted effort to include novice technology users in this collaborative endeavor to ensure that the viewpoints of such users are included in the design process. Friedman (1996) speaks of values that emerge from the digital tools we build as well as in how we use them. She identifies user autonomy and freedom from bias as two values that may be the most important for users. While user autonomy needs to balance the ability of the user to manipulate the system to the extent necessary with the requirement for systems to not be unduly complicated as to adversely affect its usability. The characteristic of freedom from bias may be affected by pre-existing bias that has its roots in social practices, technical bias that privileges those with technical knowledge, and emergent bias that has its foundation on particular cultural values that may not be universal such as a competitive game-based activity rooted in American culture may not be the most appropriate for students in a culture that eschews competition in learning (Friedman, 1996).

Recognition of bias as a factor in user experience, has led many software companies to undertake measures to move to a more inclusive design process. The mission and goals of the Archimedes project (http://archimedes.hawaii.edu/Mission&Vision.htm) may provide a blueprint for educational and governmental agencies involvement in encouraging a more user-centric design of interfaces and software tools. The mission of the Archimedes Project at University of Hawaii is to address digital inequalities by “developing technologies that make information appliances accessible regardless of individual needs, abilities, preferences, and culture” (Archimedes Hawaii Project, n.d.). While the project was initially set up to help users with disabilities to use technology optimally, its goal is now extended to research projects that provide solutions to help all users use technology effectively. When the Archimedes project
was moved from Stanford University to University of Hawaii in 2003 it was placed within the Center for the Study of Language and Information. This change signaled a move away from engineering solutions to a more user-centric model for solutions, by the research community.

Organizations adopting technology that interfaces with the public can play an important role in requiring technology vendors to follow a user-centric design process that provides a diverse representative group of users opportunities to contribute to the design process. This design approach should be applied in a critical and iterative fashion for systems that affect human welfare, livelihood, and health, such as systems used in social welfare programs, employment programs, and health services accessed by users who do not possess sufficient technical knowledge to navigate complex systems. In this regard, Byrne and Sahay (2006) have written about the participatory design of a community-based health information system with involvement of users and stakeholders in South Africa that can be used as a model for a more participatory design of large welfare systems that impact users who are not technically savvy.

**Government and FCC Action.** Congressional action through legislation together with rules published by governmental agencies’ have encouraged universal access and inclusive design in the United States. Section 508 of the Rehabilitation Act of 1973 requires that all electronic and information technology developed, maintained, procured, or used by the Federal Government of the United States needs to be accessible to people with disabilities. Likewise, the Department of Justice has published standards under the Americans with Disabilities Act regarding accessible design that require compliance with its standards to make technology more accessible for users with disabilities ([http://www.interactiveaccessibility.com/services/ada-compliance](http://www.interactiveaccessibility.com/services/ada-compliance)). The World Wide Web
Consortium (W3C) is an international organization which is a collaborative effort among the international technology community and the public, that works to develop web standards and its mission is to “lead the Web to its full potential” (http://www.w3.org/Consortium/). The W3C’s Web Accessibility Initiative develops strategies, guidelines, and resources to make the web more accessible for users with disabilities. While the W3C is a voluntary organization with no enforcement authority, its membership consisting of many of the leading technology companies lends some authority to its guidelines that are followed by many website design companies and organizations striving to attract a range of users.

The above initiatives for people with disabilities are commendable and could be a model for technology interface design and use for disadvantaged adult learners. Based on my experience as an adult technology adopter and as a technology educator, I believe that a similar approach may be effective in technology teaching and learning for novice users who lack the skills and knowledge to navigate the Internet and other complex technological platforms.

The Federal Communications Commission (FCC) is an independent U.S. Government Agency that regulates communications by various media such as satellite, cable, and wire in all 50 states of the country. A cursory review of its website (https://www.fcc.gov/what-we-do) would highlight the key functions of the agency such as promoting innovation/investment in broadband, supporting the nation’s economy, encouraging best use of the communication spectrum, and other laudable objectives at the national level that are important to the overall development and advancement of communication technologies. Apart from the function of “Consumer information and education” listed in the site, the FCC does not deal with individual user experiences of technology. The focus of the agency is on action at a more societal
innovation level. Yet, this agency is the rule-making body that controls how communication carriers provide telecommunication access as well as the price they charge consumers and thus impacts how individual users experience different types of communication technologies including access to the Internet. The FCC’s concerns are mainly related to the question of competition, fair pricing, and fair access to communication technologies. Specific concerns regarding user experiences with technologies are left to individual researchers/institutions, universities, and non-profit organizations to provide solutions. The Federal Government and the FCC provide funding through various agencies and non-profit organizations for digital literacy projects that purport to provide the support necessary for learners to achieve digital skills. For example, the Tech Reach program at Elder High School has been funded in part by Connect Ohio which in turn has been funded by a broadband initiative originating from the office of the President of the United States. The current state of the digital divide in the United States is presented by the White House in terms of access issues (https://www.whitehouse.gov/share/heres-what-digital-divide-looks-united-states). Yet, the primary focus on access, competition, and pricing with a secondary focus on how users achieve digital skills indicates a very narrow, technocratic focus adopted by the Government and its agencies. The American Recovery and Reinvestment Act 2009 provided $7.2 billion in investments to expand broadband access nationwide as well as to fund public computer centers and increase Internet capacity in schools, public libraries, and other public buildings. There are many initiatives at the state level as well as public-private partnerships. Many non-profit organizations such as the Gates Foundation have invested in projects providing digital access in public libraries.
While there are a number of well-intentioned efforts in the public and private spheres to ameliorate issues of digital divide, many seem to focus on access issues. Throughout the research process there was very little mention of impediments to access as regards technology apart from user Julie who spoke at length regarding access issues at the public library. It can be inferred that the obstacle of access has been surmounted by the participants of this research project. This is a testament to the good work done by governmental and non-profit agencies in ensuring pathways to access to technology. Yet, recognizing that access is only one part of the equation of digital literacy, the other part being the abilities and means of novice digital users to learn the necessary skills, is critical in order to move forward with a more activist approach to digital education for adult learners. Good work is being done by educational researchers and non-profit agencies such as the Elder High School Tech Reach program in providing a venue for adult digital learners, but a more concerted effort by governmental agencies to move beyond the realm of access and to account for the actual capabilities and functionings (Sen, 1992) of individual digital learners in designing digital literacy programs could go a long way in building digital bridges between what is and what could be for adult digital learners.

Future Research

The narratives of individual participants in the research process provided commonalities as well as unique experiences with technology. In my research, younger participants Julie and Nestor were more comfortable with engaging in financial transactions online compared to older participants, signifying a divide in perceptions of technology based on age. Similarly, college-educated participants Rita (responsible for coining the term “Cultural Transformation”) and Harry (highlighted the difference between training and education in acquisition of digital skills)
had more incisive and meta-cognitive observations on the state of technology in the current socio-economic context indicating application of critical thinking skills which may have been acquired through formal education. These ideas arising out of the research process, speak to the difference in participants’ experiences on the basis of age, gender, education, and technical skills providing rich data for future research. Such research would help in drawing a clearer picture of novice digital users’ experience with technology and may help fashion more useful digital skills acquisition activities.

This project has also highlighted many technical research threads that can be followed up. Extensive research has been done by technology companies as well as academic researchers in the area of human computer interaction (HCI). New technological tools and software are developed with users’ perspectives in mind, but are adult novice digital users represented in this group? While I did not find literature that specifically had an inclusive approach to user-centric design for novice adult users, there are some glimmerings of new ways of thinking about technical design and its impact on users. Socio-technical design, based on a similar tradition in Scandinavia, advocates for the direct participation of users in information systems design (Scacchi, 2004) as opposed to traditional, engineering-oriented systems designs. While much of the approach of socio-technical design was initially prescriptive, with the research in human computer interaction moving towards more grounded, empirical studies, the socio-technical design concept is also evolving to accommodate this change, which is more in line with the critical education approach that I have adopted in my own research. Senger, Boeher, David, and Kaye (2005) call for a reflective design practice with its roots in critical theory that “should support both designers and users in ongoing critical
reflection about technology and its relationship to human life” (p. 50) to create socially responsible technological design. Reflective design draws from the areas of participatory design, value-sensitive design (Friedman, 1996), critical design (Dunne & Raby), and reflection-in-action (Schön, 1983) and in addition, it provides for a fully engaged interaction between designers and users and not merely a separate evaluation of a design system. In commenting on the trends in critical design practices, Bowen (2010) elucidates how such trends reflect some of the important aspects of critical theory in that critical design takes into account contextual factors that both designers and users utilize in understanding the system and provide critiques to challenge understanding and bring about change. Recognizing the criticisms of elitism aimed at critical theory, Bowen has developed a methodology that combines it with participatory design to foster what he calls “human-centered innovation” (2010, p. 1). This understanding mirrors my own research finding on situated technology and contextual instruction and I believe shows the way forward in designing complex systems with users as co-designers. While examining each of these approaches to HCI design is beyond the scope of this dissertation, these approaches may be explored further in future through the lens of social justice and ethics and a spirit of inclusiveness of users with different aptitudes and skill levels in the digital world.

Throughout the research process, participants talked in terms of voluntary engagement with technology such as social media as well as interactions that were driven by professional and economic needs such as the act of applying for a job or applying for social benefits. Voluntary user experiences with technology where the user can walk away when faced with impediments may provide some specific insights into user/technology interaction that may be
worthy of being explored further. Alternately, economic and professional imperatives driving interaction with technology may give rise to specific experiences for the users highlighting a lack of professional or personal agency and could be examined further.

The socio-cultural aspect of digital technology and its impact on human interaction is another rich area of research that could be pursued. The theme of Cultural Transformation identified by the participants could be examined by situating this theme within the lives of adult novice digital users and studying how digital tools and applications mediate their interaction in the socio-cultural arena.

Finally, while there were certain strains of awareness of the possibilities of political action to overcome obstacles in digital learning such as participant Julie voting for the public library levy to ensure continued Internet access, participants did not engage in discussion of what Eubanks (2011) calls the intersectionality of technology, inequality, and politics. The GLA process did reveal specific recommendations for action directed towards instructors and organizations providing digital education but participants did not challenge structural inequalities in the digital world beyond their immediate power structures. The focus on the issues of digital divide and digital literacy during the research process together with constraints on time and resources did not allow for the open-ended exploration that this question requires. This intersection of technological equity and politics is an area of immense importance in our fight “for a just information age“ (Eubanks, 2011, p. 154). A future research project with carefully structured GLA prompts may provide an opportunity for adult digital learners to engage in democratic activity that questions the status quo on structural digital inequality.
There are many research threads that can be followed up by future researchers, from the traditional segmented research of how particular groups perceive technology, to design and engineering solutions grounded in participatory or user-centric design processes, and to the examination of the more socio-cultural aspects of the efficacy of political advocacy to bring about digital inclusion and equity. While these are very important research areas within the larger research environment of digital divide and digital literacy, evaluating the limitations and implications of the current research project listed below might provide valuable pointers for researchers wishing to pursue these research threads.

**Limitations and Implications for Research**

The research participants represent a small set of adult learners who have enrolled in adult digital literacy classes and as such they do not represent the entire range of adult learners with their own specific backgrounds and histories. The nature and process of participative research as well as the time constraints of this project precluded the possibility of recruiting a large number of participants across a range of adult demographics. This is a feature rather than a limitation of this research as the focus on a small number of participants in one location helped create a collaborative and participatory learning experience for the group, with individual user experiences drawn together to sketch a larger picture of the status of digital divide and digital literacy applicable to a particular demographic of participants with the larger themes transferable to similar environments.

The participation of learners in three stages of research using different methods enhanced the data collection process and provided in-depth data analysis opportunities but it was also a drawback as participants had to commit their time for these three stages of research.
over a period of 4 months. Due to time constraints experienced by adult participants, the photovoice process was completed in two meetings, each personal interview was conducted in a single 90 minute session and the GLA process was conducted in a single two-hour session. The trade-off relating to time spent in each stage of research was repeat interactions with the same participants in three consecutive stages of research resulting in the collection of rich snap-shots of participant experiences using three different lenses.

The topics of digital divide and digital literacy are wide-ranging in nature resulting in some of the recommendations for action and future research being necessarily very broad. This research project was initiated based on the perceived need for an expansive snapshot of the status of digital divide and digital literacy among adult learners. My hope and expectation is that there will be continued interest and research endeavors on each strand of the findings such as contextual digital instruction, user-centric design, management of digital complexity, as well as the role of government action that would move the digital world towards a more inclusive environment, allowing for users holding varying technical skill levels to find personal, professional, and social value in the digital world as they see fit.

The recommendation section above lists many ideas for a more inclusive design process for technical systems. Yet, in practice, there are constraints of time, money, and manpower on systems developers together with the culture and policies of the organizations engaged in systems development. Any end-user participation in the design process has to be carefully structured to maximize user involvement and impact on design without appreciably increasing the cost of software development so as to avoid creating disincentives to this participatory design process.
One of the themes identified by the participant group in the GLA process was the need for satisfaction of basic needs of learners to enable them to engage with the learning process to reach self-actualization. This theme was outside the scope of the current project and thus the findings are limited by the omission of such data in the analysis.

Conclusion

In responding to a question about her feelings relating to technology, participant Julie had this to say, “I think it can be a positive thing. I think as far as jobs go, I think the economy needs to slow it down because I don’t think that they realize a lot of people in the middle and lower class are ready for their advancement.” In this comment, Julie is referring to the advancement in technology that, in her opinion, the middle and lower classes are not prepared for. Her comment captures the crux of the conundrum of technology advancement. On the one hand, it has provided real benefits in personal, social, and professional lives of its users while on the other hand, there is this constant need to catch up with its explosive advancement. It requires a continuous learning mode as well as critical thinking skills to understand technology in context in order to negotiate the extent to which a user desires to interact with digital technology. Users without a solid educational foundation struggle with the “keeping up” part of technology. Despite the rhetoric regarding the empowering nature of digital skills, it is technology situated in the socio-cultural context of the users’ lives that has the most enduring impact, resulting in lasting knowledge to help negotiate the digital world. Julie mentions the word “they”, which points to gate-keepers, formal and informal to the digital world, be it prospective employers, instructors, researchers, and important governmental and non-profit players that may have the power to direct funding into different areas of digital learning.
research. In advanced societies such as the United States, the fight for access appears to have nearly been won, which leaves us with the struggle to make digital education meaningful and beneficial to users and a tool of overall empowerment in their lives.

The recommendations for action: relatable instruction, management of digital complexities, user-centric design, and governmental role relate to a call to action for technology instructors, users, digital interface developers, and governmental agencies respectively. These recommendations can be viewed at the individual, community, societal, and governmental levels. The stakeholders in each of these levels have their responsibility and need a supportive environment and resources to move forward in the quest to create a more inclusive and just digital environment. Individual digital users are tasked with managing the digital complexities they face in their personal, professional, and social lives and this task would be made easier with a supportive environment that provides contextual learning opportunities that consider individual traits and the range of human diversity in learners. At the community level, organizations that provide digital education need to fashion technology education that resists marginalization of novice digital learners and encourages critical consciousness, drawing on cognitive and cultural differences as a resource by engaging in participatory processes that involve action and reflection (Eubanks, 2011, p. 155). At the societal level, software developers need to adopt a participatory process in user-centric design by giving voice to novice digital users as stakeholders in the design process. User-centric design is particularly important for information systems that act as a primary medium of interaction for health, employment, and social benefit systems. At the governmental level, agencies that determine public policies with regard to access and use of digital resources must take care that there is no systemic bias
against novice digital users and need to actively seek to redress digital inequalities not just in access but in adoption and use of technology, valuing human experience and agency.

However, there is a recognition that the objective of digital literacy or continuing digital competence is a moving target as advancement in technology is a force that cannot be kept on hold for novice digital learners to catch up. To find the balance in terms of the appropriate level of digital engagement for each user, subject to professional requirements, is the challenge that novice adult digital learners need to overcome. This process of self-realization can be facilitated by a supportive environment with increased critical engagement from instructors, inclusive design by digital tools designers, and acknowledgement and action by governmental agencies to improve the learning process for adult digital learners. Leveling the digital playing field is merely an intermediate objective in the long-term goal of justice and equity in the information age that fosters a democratic conversation on what technology means to us as a society and how we can together move forward.
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doi:10.1007/BF02298175


doi:10.1108/09593840810896028


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   (Original work published 1971)


Appendix A
Information Sheet

Adult Consent Form for Research
University of Cincinnati
Department: Educational Studies, CECH
Principal Investigator: Suguna Chundur
Faculty Advisor: Dr. Mary Brydon-Miller

Principal Investigator: Suguna Chundur

Title of Study: Digital Literacy: Beyond the Rhetoric of Economic Empowerment

Introduction:
You are being asked to participate in a research study. Please read this form to learn about the study and sign this form if you agree to take part.

Who is doing this research study?
Suguna Chundur from the University of Cincinnati is the person in charge of the study. She is being guided in this research by Professor Mary Brydon-Miller of the University of Cincinnati. You may contact the person in charge of the study at suguna.chundur@uc.edu or 513-558-7401 to ask questions about anything you do not understand.

What is the purpose of this research study?
The purpose of the study is to understand the importance of digital skills for learners in digital literacy programs.

Who will be in this research study?
Learners registered in basic digital literacy classes in community locations at Elder High School and Clermont County’s Ohio Means Job locations. The maximum number of participants will be up to 12 and the age range of participants would be 18 and older.

What will you be asked to do in this research study, and how long will it take?
You will be asked to meet with other learners enrolled in the literacy classes. As a group, you will study various results from the research Suguna Chundur has been conducting and talk over how well these findings represent your experiences learning digital skills. You will have the chance to offer your ideas on the findings presented and chat about it as a group.

Are there any risks to being in this research study?
No. There is very low risk to any one taking part in the study.
Are there any benefits from being in this research study?
There are no direct benefits to taking part in this study. The results of this study will be used to better understand how learners link the content of their learning to their personal and professional lives. This knowledge would help learners understand how they learn to use technology and help them acquire new digital skills.

Will you have to pay anything to be in this research study?
No, you will not have to pay anything to take part in this study.

What will you get for being in this research study?
You may be given a flash drive of less than $15 in value in appreciation of your time and effort. Taking part in the study does not result in payment. The flash drive is only a small token of appreciation of your time and effort for this project.

Do you have choices about taking part in this research study?
Yes. You may choose not to take part in this research study.

How will research information be kept confidential?
Information you give will be kept private by storing it in files in a computer which is protected by a password. *No individual data will be made known to others.* Your name will be changed to a false name in all documents connected to the study so your real name will never be seen. While every effort will be made to keep data private, other participants in the study may talk about their own personal experiences. The findings from the individual interviews will be shared in a Group Level Assessment with all participants, but all personal information connecting a person to the findings will have been removed and we will be examining broad ideas, not individual experiences.

What are you legal rights in this research study?
Nothing in this consent form surrenders any legal rights you may have.

What if you have questions about this research study?
If you have any questions or worries about this research study, you should contact Suguna Chundur at suguna.chundur@uc.edu or the project adviser, Dr. Mary Brydon-Miller, Professor, College of Education, University of Cincinnati at brydonml@ucmail.uc.edu to ask questions about anything you do not understand.

The UC Institutional Review Board reviews all research projects that involve human participants to be sure the rights and welfare of participants are protected.

If you have questions about your rights as a participant or complaints about the study, you may contact the UC IRB at (513) 558-5259. Or, you may call the UC Research Compliance Hotline at (800) 889-1547, or write to the IRB, 300 University Hall, ML 0567, 51 Goodman Drive, Cincinnati, OH 45221-0567, or email the IRB office at irb@ucmail.uc.edu.
Do you have to take part in this research study?
No one has to be in this research study. Turning down the chance to take part will not cause any penalty or loss of benefits that you may have. During the Group Level activity, you may skip any questions that you do not want to answer or discussion of any topic that you may not want to join in. You may give your permission to participate in some or all parts of the study and then change your mind and end participation at any time. To leave the study, you should tell Suguna Chundur at suguna.chundur@uc.edu or Dr. Mary Brydon-Miller at brydonml@ucmail.uc.edu.

BY TAKING PART IN THESE ACTIVITIES YOU INDICATE YOUR CONSENT FOR YOUR ANSWERS TO BE USED IN THIS RESEARCH STUDY.

PLEASE KEEP THIS INFORMATION SHEET FOR YOUR REFERENCE.
Appendix B
Adult Consent Form for Research

University of Cincinnati
Department: Educational Studies, CECH
Principal Investigator: Suguna Chundur
Faculty Advisor: Dr. Mary Brydon-Miller

Informed Consent Form for Research Project

Principal Investigator: Suguna Chundur

Title of Study: Digital Literacy: Beyond the Rhetoric of Economic Empowerment

Introduction:
You are being asked to participate in a research study. Please read this form to learn about the study and sign this form if you agree to take part.

Who is doing this research study?
_Suguna Chundur from the University of Cincinnati is the person in charge of the study._ She is being guided in this research by Professor Mary Brydon-Miller of the University of Cincinnati. You may contact the person in charge of the study at suguna.chundur@uc.edu or 513-558-7401 to ask questions about anything you do not understand.

What is the purpose of this research study?
The purpose of the study is to understand the importance of digital skills for learners in digital literacy programs

Who will be in this research study?
Learners registered in basic digital literacy classes in community locations at Elder High School and Clermont County’s Ohio Means Job locations. The maximum number of participants will be up to 12 and the age range of participants would be 18 and older.

What will you be asked to do in this research study, and how long will it take?
There are three different activities in this project. One activity is the taking of photographs that help you understand your problem. The second activity is taking part in a one-on-one interview with the researcher, Suguna Chundur about your experiences in learning digital skills. The third activity is a meeting with other learners enrolled in the digital literacy classes. As a group, you will study various results from the research Suguna Chundur has been conducting and talk over how well these findings represent your experiences learning digital skills. You are requested to
participate in all three activities but you can choose to participate in one or two activities only. You will not be forced to participate in all three activities.

Are there any risks to being in this research study?
No. There is very low risk to any one taking part in the study.

Are there any benefits from being in this research study?
There are no direct benefits to taking part in this study. The results of this study will be used to better understand how learners link the content of their learning to their personal and professional lives. This knowledge would help learners understand how they learn to use technology and help them acquire new digital skills.

Will you have to pay anything to be in this research study?
No, you will not have to pay anything to take part in this study.

What will you get for being in this research study?
You may be given a flash drive of less than $15 in value in appreciation of your time and effort. Taking part in the study does not result in payment. The flash drive is only a small token of appreciation of your time and effort for this project.

Do you have choices about taking part in this research study?
Yes. You may choose not to take part in this research study.

How will research information be kept confidential?
Information you give will be kept private by storing it in files in a computer which is protected by a password. No individual data will be made known to others. Your name will be changed to a false name in all documents connected to the study so your real name will never be seen. While every effort will be made to keep data private, other participants in the study may talk about their own personal experiences. The findings from the individual interviews will be shared in a Group Level Assessment with all participants, but all personal information connecting a person to the findings will have been removed and we will be examining broad ideas, not individual experiences. Agents of the University of Cincinnati may inspect study records for audit or quality assurance purposes.

What are you legal rights in this research study?
Nothing in this consent form surrenders any legal rights you may have. This consent form also does not release the investigator, the institution, or its agents from liability for negligence.

What if you have questions about this research study?
If you have any questions or worries about this research study, you should contact Suguna Chundur at suguna.chundur@uc.edu or the project adviser, Dr. Mary Brydon-Miller, Professor, College of Education, University of Cincinnati at brydonml@ucmail.uc.edu to ask questions about anything you do not understand.
The UC Institutional Review Board reviews all research projects that involve human participants to be sure the rights and welfare of participants are protected.

If you have questions about your rights as a participant or complaints about the study, you may contact the UC IRB at (513) 558-5259. Or, you may call the UC Research Compliance Hotline at (800) 889-1547, or write to the IRB, 300 University Hall, ML 0567, 51 Goodman Drive, Cincinnati, OH 45221-0567, or email the IRB office at irb@ucmail.uc.edu.

Do you have to take part in this research study?
No one has to be in this research study. Turning down the chance to take part will not cause any penalty or loss of benefits that you may have. During the Group Level activity, you may skip any questions that you do not want to answer or discussion of any topic that you may not want to join in. You may give your permission to participate in some or all parts of the study and then change your mind and end participation at any time. To leave the study, you should tell Suguna Chundur at suguna.chundur@uc.edu or Dr. Mary Brydon-Miller at brydonml@ucmail.uc.edu.

BY TAKING PART IN THESE ACTIVITIES YOU INDICATE YOUR CONSENT FOR YOUR ANSWERS TO BE USED IN THIS RESEARCH STUDY.

You will be given a copy of this document. Please keep it your reference.

Agreement:

I have read this information and received answers to any questions I asked. I give my permission to take part in this research study. I will receive a copy of this signed and dated consent form to keep.

Participant Name (please print) ____________________________________________

Participant Signature _______________________________ Date __________

Signature of Person Obtaining Consent ______________________ Date _________
Appendix C

Photovoice Information Sheet

Photo Voice

The goals of the project are to:

- Determine what works and what can be improved in the technology learning process
- Increase dialogue between participants in this group on the topic
- Develop group-based recommendations for improving technology-based learning
- Inform key stakeholders/decision-makers through visual impact

You can take photographs with your camera, and/or collect a newspaper/magazine clipping or a website address that describes or shows a situation or problem that you face in technology learning.

If you have a camera/phone camera that you can use, please do the following:

1. Take 8 – 10 pictures as per our discussion
2. If you are taking pictures of other people, please make sure you get the person’s signature on the “Photo Release form”

If you are using the disposable camera provided for you:

1. Please complete the film role
2. If you are taking pictures of other people, please make sure you get the person’s signature on the “Photo Release form”

Some guidelines for taking/interpreting the photographs/images/videos:

S- What do you SEE?
H- What is really HAPPENING?
O- How does this relate to OUR lives?
W- WHY does this problem/condition exist?
E- How could this image EDUCATE policymakers/decision makers?

D- What can we DO about it?

Questions/Comments? Please email me at suguna.chundur@uc.edu or call me at 513-505 3768
Appendix D
Group Short Consent Forms – Photovoice, Interviews, GLA

Adult Consent Form for Research
University of Cincinnati
Department: Educational Studies, CECH
Principal Investigator: Suguna Chundur
Faculty Advisor: Dr. Mary Brydon-Miller

Informed Consent Form

As part of a Photovoice project for a research project to study different aspects of adults learning use of digital technology, I agree to take part in the opportunity to use photography to tell my side of the story. As part of this process I understand the following:

- All photographs may be used for collecting data, writing dissertation, presenting at conferences, and other such purposes
- I can withdraw from the process/group at any time for any reason
- Photographs that I take may be shown to key community stakeholders

By signing below, I agree that I have read and reviewed, and understand the above listed guidelines and agree to take part in the Photovoice process under these conditions.

Print Name:

Signature:

__________________________________________
Signature of Person Obtaining Consent Date
Adult Consent Form for Research

University of Cincinnati

Department: Educational Studies, CECH

Principal Investigator: Suguna Chundur

Faculty Advisor: Dr. Mary Brydon-Miller

Photo release form

As part of a Photovoice project in connection with the research on adult digital learning, I agree to have my picture taken by _____________________ to help her/him in telling the story of the digital learning process through photographs. I understand that all photographs may be used for collecting data, writing dissertation, presenting at conferences, and other such purposes.

Print Name:

Signature: ______________________________________________________

Photographer Name:

Photographer Signature:
Adult Consent Form for Research

University of Cincinnati

Department: Educational Studies, CECH

Principal Investigator: Suguna Chundur

Faculty Advisor: Dr. Mary Brydon-Miller

Group Level Assessment Consent Form

As part of a digital literacy research project to study different aspects of adults learning use of digital technology, I agree to take part in the Group Level Assessment. As part of this process I understand the following:

- All data collected during the interview may be used for collecting data, writing dissertation, presenting at conferences, and other such purposes
- I can pull out from the process/group at any time for any reason

By signing below, I agree that I have read and understood the guidelines listed above and the information presented in the Informed Consent form for the research project and agree to take part in the Group Level Assessment under these conditions. I will receive a copy of this signed and dated consent form to keep.

Participant Name (please print) ____________________________________________

Participant Signature ________________________ Date _________

Signature of Person Obtaining Consent ________________________ Date _________
Adult Consent Form for Research

University of Cincinnati

Department: Educational Studies, CECH

Principal Investigator: Suguna Chundur

Faculty Advisor: Dr. Mary Brydon-Miller

Informed Consent

Individual Interviews

As part of a digital literacy research project to study different aspects of adults learning use of digital technology, I agree to take part in a personal interview process to tell my side of the story. As part of this process I understand the following:

- All data collected during the interview may be used for collecting data, writing dissertation, presenting at conferences, and other such purposes
- I can pull out from the process/group at any time for any reason

By signing below, I agree that I have read and understood the guidelines listed above and agree to take part in the interview process under these conditions.

Print Name:

Signature:

_________________________________________

Signature of Person Obtaining Consent ____________________________ Date __________
Appendix E

Participant Interview Protocol

1. Can you please share your reasons for enrolling in this _____ literacy course?

2. For what purpose do you use computers? For work, school, personal work?

3. What specific skills have you learned from this course? Has it been helpful at work?

4. Do you have a computer at home?

5. Do you use the Internet to search for information?

6. If yes, what sort of information do you look up?

7. Do you use computers to keep in touch with family and friends?

8. Do you use computers to pay bills, for online banking?

9. Do you use computers to look up jobs available?

10. Have you applied for a job using the computer?

11. Do you have an email account?

12. How often do you use computers for personal reasons?

13. Do you use computers for entertainment? i.e., YouTube, Pandora
Appendix F

Group Level Assessment Steps – Write-up Shared with Participants

Group Level Assessment

(Vaughn, Jacquez, Zhao, Lang, 2011)

1. Climate Setting -> Overview/Warm-up
2. Generating -> Group works at responding to prompts written on flip charts placed around the room
3. Appreciating -> Group looks at data written on the wall charts
4. Reflecting -> spend time alone thinking about what the data means
5. Understanding/Integrating -> Group discussion
6. Selecting -> Group prioritizes data – identifies themes
7. Action

Prompts

1. What are digital skills?
2. What do digital skills mean to me personally?
3. When I work with technology at the work place I feel........
4. When I use technology for personal use I feel.....
5. The main difficulties I face when working with technology are....
6. When I have difficulties with technology I feel......
7. When I successfully complete a task using technology my feelings are......
8. My impression of changes in technology.......
9. I can pinpoint structural problems in how adults learn to use technology such as......
10. I believe I can learn better if.........

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Appendix G

GLA Prompts and Responses to Prompts

1. What are digital skills?
   a. “How to find things out on YouTube”
   b. “Adding my skills to technology (Often it is not a hand in glove (poor fit))”
   c. “Everything is digital: such as banks, stores, food, water, gas”
   d. “I feel digital skills can be harmful in the wrong hands (hackers). Essentially, it is a non-holistic way of dealing with the world, but that can have positive outcomes when selectively applied”
   e. “Anything involving technology, knowing/learning how to use computers etc.”

2. What do digital skills mean to me personally?
   a. “Sometimes exciting and sometimes intimating, frustrating, feel good about self when I learn and remember”
   b. “The better skills I have the more I am able to do better my future since everything is becoming digital”
   c. “We are in 2015. In the 70’s, 80’s and 90’s it was said that it is coming. Now it is here. If you do not get it you will be lost”
   d. “Using advancement in technology to apply to everyday life (I have 2000 books that I cannot carry with me, but I can carry a cell phone or flash drive)”
e. “I think you need to compartmentalize your mind in order to use these skills successfully”

3. When I work with technology at the work place I feel........
   a. “Having to learn whole new way – feeling intimidated at times – can I figure out by self or have to keep asking and how does that make me look to supervisors, fellow workers especially younger ones”
   b. “Mad because it is slower with many users on the Internet. Also mad when it takes a few moments to upload. My hands move faster than the computer at several of my jobs”
   c. “Not working it, but be able to read it, when it is not working right”
   d. “Upset because many of my peers come in with technological skills and no experience while I come in with experience and no technological skills. Perhaps the 2 could mesh”
   e. “Empowered: I can successfully do what I was hired for. Frustrated when the Internet is down I can’t do anything!”

4. When I use technology for personal use I feel.....
   a. “Excited, accomplished something ‘good for me’!”
   b. “smart, it can be very helpful when it works for you”
   c. “It can be fun and exciting! Sometimes it takes a lot more time than I planned for”
   d. Very good that I can finish task

5. The main difficulties I face when working with technology are....
a. “Not able to ask a human questions when I don’t understand. Ex. applications online”
b. “I get frustrated because I am alone”
c. “Pushing button. Fingers are too big”
d. “When making phone call and wading through impersonal operator – just want a human to answer simple question”
e. “When walking into SS office – no signs anywhere – no people at that instant– just a screen – felt idiotic”
f. “It doesn’t work or I can’t figure out how to make it work”

6. When I have difficulties with technology I feel……
   a. “Angry, upset”
   b. “Intimidated/helpless/frustrated”
   c. “Get it right/not to give up”
   d. “Sometimes overly motivated to learn, sometimes not”
   e. “Hopeless, I want to give up and do things the old-fashioned way”

7. When I successfully complete a task using technology my feelings are……
   a. “Good, because I learn something”
   b. “Accomplished and ready to learn more”
   c. “Like I have accomplished a mission that could have been impossible”
   d. “Aha moment, good about self, proud”
   e. “Like I’m ‘Keeping up with the Jones’s’”

8. My impression of changes in technology……..
a. “Some are good, some are not (changes are too much)”

b. “As technology changes, it ought to build in that many of us did not grow up with the www nor did we have parents that stressed education (perhaps technology ought to have tiers) advanced, intermediate, beginning”

c. “Not happy. I am upset that everything is becoming based on technology. Although I think some things will be better on technology as well”

d. “Sometimes moves in better technology are too fast to keep up with across the board and is sometimes difficult to figure out what is best for you. Some people talk to you like you are an ‘idiot’ because you forgot something. That’s demeaning.”

e. “At the same time, seeing changes (and then just filing away) are amazing to see, especially in the last 10-15 years. In talking to my mom and step-dad - they are flabbergasted considering what they have seen”

9. I can pinpoint structural problems in how adults learn to use technology such as......

a. “They were not raised with it; it’s totally new and foreign to a lot of older (and not so old!) adults”

b. “Things happen too fast. Technology doesn’t have much of a ‘muscle memory’ component”

c. “There isn’t just one way of doing anything->word, excel, etc. This can be overwhelming and cause some to give up”

d. “Technology is hard to use and if you don’t learn it as soon as it comes out you are behind for a while until a new way comes out”
e. “If one has never had a typing course they are limited in having to ... the keyboard build the technology from the bottom up instead of top down”

f. “People can learn if they are trained right”

g. “Depending on background, you don’t use (or didn’t) stuff like word or excel for example and then have to learn it can be frustration. One class at Elder superb, other not so much. Many different ways to go about same task and sometimes people think it’s “their way or highway”

h. “So glad took typing on a regular old typewriter in high school”

i. “Have to keep reminding yourself you can’t know/learn everything and keep that in perspective no matter what/how other people know”

10. I believe I can learn better if........

   a. “In a hands on interactive environment”

   b. “If I have the ability to manipulate objects in space (Wii is good for that)”

   c. “Hands-on, smaller class size, class is controlled so someone doesn’t take over class”

   d. “Hands on learning works best for me. Also small class sizes with a class full of people who want to learn vs people in high school who just have to be there”

   e. “Clear head, lots of rest and time”
## Appendix H

### Structured Ethical Reflection

<table>
<thead>
<tr>
<th>Values</th>
<th>Constructing Research Questions</th>
<th>Planning Project</th>
<th>Recruiting participants</th>
<th>Collecting data</th>
<th>Analyzing data</th>
<th>Member Checking</th>
<th>Writing</th>
<th>Going public</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking</td>
<td>Careful thought on research questions</td>
<td>Think through how best to design project</td>
<td>Choosing type of sampling requires critical thinking</td>
<td>Critical thinking required to get exhaustive data on phenomenon under study</td>
<td>Looking at data critically, from different perspectives</td>
<td>Careful reflection on how to handle member checking</td>
<td>Applying critical thinking skills while writing up research findings</td>
<td>Presentations/papers to reflect critical thinking on the study</td>
</tr>
<tr>
<td>Democracy</td>
<td>Have the research questions been constructed in a democratic manner i.e., allows for opportunity for all participants point of view?</td>
<td>Democratic design of project? More of a possibility in an action research project</td>
<td>Have all recruited equal opportunity to participate?</td>
<td>How do I collect data in a democratic manner? Ensuring that each participant is allowed equitable opportunity to be heard.</td>
<td>How do I ensure that my analysis reflects democratic principles and reflects all participants point of view in an equitable manner?</td>
<td>Ensure that I endeavor to complete member checks with all participants.</td>
<td>Writing that truly reflects all findings and not just findings that support researcher point of view.</td>
<td>How do I write/present in a democratic manner?</td>
</tr>
<tr>
<td>Justice</td>
<td>Have the research questions been constructed in a just manner?</td>
<td>Aim for a just research design that allows opportunities for different voices to be heard</td>
<td>To the extent possible, recruitment plan to be just</td>
<td>To ensure justice to all participants in collecting data i.e., collecting data from all participants irrespective of what that might lead to</td>
<td>Analyze data in a manner that is just to all participants</td>
<td>When member disagrees on findings, handling it in a manner that is just to all</td>
<td>Presenting participants points of view in writing that is true to their words and spirit</td>
<td>How do I write/present in a manner that reflects justice to all participants?</td>
</tr>
</tbody>
</table>