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UNCOVERING THE HIDDEN LITERACIES OF "HAVE-NOTS": A STUDY OF COMPUTER AND INTERNET USE IN A LOW-INCOME COMMUNITY

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THESIS

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Library and Information Science
in the Graduate College of the
University of Illinois at Urbana-Champaign, 2002

Urbana, Illinois

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APRIL 2002

(date)

WE HEREBY RECOMMEND THAT THE THESIS BY

CECELIA BRIDGET MERKEL

ENTITLED UNCOVERING THE HIDDEN LITERACIES OF "HAVE-NOTS": A STUDY OF COMPUTER AND INTERNET USE IN A LOW-INCOME COMMUNITY

BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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ABSTRACT

The digital divide is a metaphor used by scholars and policy makers to refer to the problem of a lack of access to technology and the consequences associated with a lack of access for "have-not" groups. While typical digital divide studies are useful in identifying the groups that are likely to lack access to technology, this approach does not adequately contextualize the problems faced by marginalized groups such as the poor as they attempt to integrate technology into their lives. The goal of this study was to develop a new framework, a technology-in-use approach, that views members of marginalized groups as active technology users and that recognizes the real barriers that they experience in trying to adopt new literacy practices. This new model was applied to the study of low-income participants taking part in a computer training and distribution program. This study examined the way that the participants used the computer and Internet technology they received through the program, the technical problems that they encountered, and how technology use fit within the context of their daily lives. The value of the technology-in-use approach is that by looking at the experiences of marginalized groups as they attempt to adopt new literacy practices, we will gain a greater understanding about computer use, literacy, and access to technology. This study expands our notions about computer use and literacy for all people by looking at people, places (home computer use), and activities that are traditionally ignored in dominant discourses about literacy.

ACKNOWLEDGEMENTS

I must begin my acknowledgements by thanking the CNI participants who so generously shared their stories with me and who let me observe their computer and Internet use. It was my great fortune to work with a group of people who had interesting and worthwhile stories to tell and who were willing to share these stories with me. It is not possible for me to express my deep admiration for the creative ways that you brought technology into your lives. In particular, I would like to thank "Suzy" and "Elaine" who were both participants and friends as I worked to complete my dissertation.

This dissertation would not have been possible without my advisor and my committee members who have supported my work over many years. Ann Bishop has been both an advisor and a friend in guiding me through the process of writing a dissertation. I could not have completed this dissertation without her encouragement and faith in the value of my work. She serves as a model of what it means to be an academic in the way that she ties a commitment to social justice to her research, teaching, and service to the community. I owe a debt of gratitude to those who served on my dissertation committee: Chip Bruce, Caroline Haythornthwaite, and Mike Twidale. It was my great fortune to have committee members who not only provided useful feedback but who encouraged me to push my ideas further than I thought that I could. I appreciated the intellectual freedom that I had to try out new ideas and to take risks in expressing ideas that were only beginning to take shape.

I also owe a debt of gratitude to the faculty and students at GSLIS who have supported me over the years. I have received great support from our former dean, Leigh Estabrook, and our current dean, Linda Smith. The process of completing a dissertation would not have been possible, or nearly as fun, without the friends that I have made at

GSLIS. One of the experiences that I value the most about being a student at this school is that I learned more about what it means to be a "learner" than at any other point in my academic career.

I could not have completed my dissertation work without the support of my friends at Prairienet. Paul Adams provided the financial support and encouragement necessary for me to carry out my dissertation research. Rachel Vellenga made each day at Prairienet fun and provided much encouragement and help along the way. It has been a pleasure to work with a group of people who share a commitment to making technology accessible and removing barriers to technology use.

I have also had the support and encouragement of family and friends. I was born into a small family but have many "families" all over the country. In Buffalo, the Bruce and Zadonowicz families have treated me as one of their own. In Akron, OH, the Kist family has provided countless cards and votes of confidence along the way. Dr. Charles J. Wigley III encouraged me to continue my education and to go to graduate school. Without Chuck's encouragement, I probably would not have started this journey towards my Ph.D. I have made many friends while at the U of I. Our "work sessions" at Borders helped to relieve some of the stress involved in completing a dissertation and we occasionally actually did some work. I have also met many new friends such as Austin Dyson who helped me to see the meaningful ways that people connect technology to their lives and the humor in learning to use computers. My dissertation coach, Sheila Dancz, encouraged me to keep moving towards the goal of completing my dissertation.

My significant other, Bill Kist, has also provided great moral support as I have worked on this dissertation. I am not sure that I could have completed my dissertation

without his faith in me and my work. Bill helps me to be a better and more well rounded person. It makes all the difference to have someone in your life to laugh with and who helps you to laugh at yourself.

Finally, this dissertation is dedicated to my mother who sacrificed a great deal in helping me to achieve my goals. I will never know how you saved up the money to send me to a private Catholic school while at the same time meeting our everyday needs. I have learned many important life lessons from you – the need for persistence, the ability to overcome obstacles, the need to work hard – that remain "hidden" in traditional discourses about what it takes to succeed in academia.

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> They don't expect us to own them. We can't afford them and therefore we're ignorant about technology. And if you don't have access to the resources, and if you're not motivated to go and get things that are available or to find the information, and God forbid you're a shy introvert, then you are stuck. Then you are really stuck. You will be without the technology. You will not be involved in programs like this. You will not know about scholarship information or programs to assist you and your family or whatever the case may be. All of this stuff is a stepping-stone. Low-income, call it what you want, I mean you can call me dirt poor, you know. It can be any kind of native stereotype, but I don't have to accept it as that.
>
> — CNI participant

CHAPTER 1

INTRODUCTION

The digital divide is a metaphor used by scholars and policy makers to refer to the problem of a lack of access to technology and the consequences associated with a lack of access for "have-not" groups. While typical digital divide studies are useful in identifying the groups that are less likely to have access to technology, this approach does not adequately contextualize the problems faced by marginalized groups such as the poor as they attempt to integrate technology into their lives. The present study focused on describing the experiences of low-income families as they attempted to integrate technology use within the context of their daily lives. An alternative approach for studying technology use in marginalized communities has been used, a technology-in-use framework, that accounts for the local nature of literacy (Barton & Hamilton, 1998) and the situated nature of technology use and learning (Bruce, 1993; Bruce & Peyton, 1993, 1999; Bruce & Hogan, 1998; Bruce & Rubin, 1993).

The goal of this study was to develop a new framework for studying technology use in marginalized communities that views members of marginalized groups as active technology users and that recognizes the real barriers that they experience in trying to adopt

new literacy practices. The technology-in-use framework developed in this study draws on local literacy and situated technology studies. Local literacy studies seek to describe the vernacular literacy practices that occur in people's homes and communities (Barton and Hamilton, 1998). Situated technology studies seek to describe the way that people use technology and to identify the shifts in practice that occur as people bring technology into their lives (Bruce, 1993). A technology-in-use framework was used to understand how low-income participants in a computer distribution program, the Community Networking Initiative (CNI) project, used the technology that they received through the program, how they solved problems that they encountered, and the barriers that they experienced as they tried to adopt new literacy practices. Through this new way of looking at technology use in marginalized communities, new insights were gained about the complexities involved as people adopt new literacy practices.

Statement of the Problem

In this study, I am arguing that the problem with the use of the digital divide metaphor when conducting research is the way that it frames the problem of technology use in low-income communities. This study starts with the premise that we need to place attempts to address the digital divide within the context of ongoing public policy efforts geared towards dealing with the "poverty problem" in the United States. The "poverty problem" refers to the idea that poverty continues to exist despite the great wealth and opportunity available in this country (O'Conner, 2001). Tied to efforts to deal with the "poverty problem" is a fundamental faith that social problems can be solved through the application of scientific knowledge. From this perspective, the "poverty problem" can be addressed by accumulating knowledge about the poor – poverty knowledge – and applying

what we have learned in the design of intervention programs geared towards improving the lives of the poor. The digital divide, therefore, can be looked at as an attempt to solve the "poverty problem" and as a particular application of "poverty knowledge" that asserts that we can improve the economic and social conditions of the poor by increasing access to technology and presumably the literacy necessary to use such technology.

The value of viewing the digital divide as an attempt to address the "poverty problem" and as a particular application of "poverty knowledge" is that it challenges us to identify some of the assumptions that we are making in conducting research and carrying out public policy. O'Conner (2001) argues that "poverty knowledge" is both a "product and shaping force in culture – a source of language, interpretive frameworks, even of the stylized rituals of investigation that give expression to broader social understandings of the human condition and of social change" (O'Conner, 2001, p. 14). The implication is that the way that researchers and policy makers construct the "poverty problem" and construct solutions to this problem is not neutral. Poverty knowledge is ideologically embedded within a researcher's beliefs about the poor, his or her vision of the process of social change, and the decisions that he or she makes about the appropriate focus and style of research in examining issues concerning the poor. At the same time, research serves to shape public opinion about the "poverty problem."

The challenge that the "poverty knowledge" concept creates is that we need to find ways to uncover the ideology behind the language and research designs employed in our studies. This involves uncovering the typical "story-line" behind research involving the poor. Research that analyzes public policy efforts geared towards the poor and research that discusses the politics behind classification systems provide a way to understand the ideology

behind the digital divide. This research suggests that the poor are viewed as being deficient and in need of improvement particularly in terms of their need to acquire literacy skills.

There is a tendency is creating public policy and in conducting research about the poor to take a "supply side" view of poverty in which the cause of poverty is attributed to a deficiency in the individual (Katz, 1989, 1995; O'Conner, 2001). Katz (1989, 1995), for example, has traced the way that the poor have been defined in American society since the 1800s. He found that one consistent feature of definitions of the poor is that they are treated as a group that is in need of improvement in some way.

> Most of the writing about poor people, even by sympathetic observers, tells us that they are truly different, truly strangers in our midst. Poor people think, feel, and act in ways unlike middle-class Americans. Their poverty is to some degree a matter of personal responsibility, and its alleviation requires personal transformations, such as the acquisition of skills, commitment to the work ethic, or the practice of chastity." (Katz, 1989, p 6-7)

In taking a supply side view of poverty, researchers and policy makers foreground the need for the poor to transform their lives by overcoming perceived deficits in literacy and life management skills. Other significant issues such as politics, power, resource distribution and equality are often put in the background or ignored completely.

Similarly, work on the politics of classification systems also points to the tendency to treat the poor, as "other." The categories used to classify the poor have changed over time but the view of the poor as deficient has remained constant. In fact, it could be argued that classification systems involving the poor are based on separating people out based on their degree of perceived "deficiency." Katz (1995), for example, argues that in the late 18th and early 19th century the poor were distinguished as "impotent" or "able-bodied" in terms of their ability to work. Later in the 19th century, the poor were categorized as being deserving

or undeserving poor. The deserving poor were people clearly in need of assistance such as the elderly and those who were not physically able to work. Slightly less deserving were people who could not support themselves because of circumstances beyond their control but who showed a willingness to work to receive public and private charity. Similarly, modern day welfare reform tries to separate out those who deserve to be on public assistance from those who do not deserve to be on public assistance.

Bowker and Star (1999) provide a useful starting point in thinking about the impact that classification systems have on people's lives. In discussing the apartheid system in South Africa as a classification problem, they argue that:

> The South African case relates directly to all questions of information system design where categories are attached to people. It is an extreme case, but at the same time, a valuable one for thinking about the ethics and politics of information systems. Not all systems attempt to classify people as globally, or consequentially, as did apartheid; yet many systems classify users by age, location, or expertise. Many are used to build subtle (and not-so-subtle) profiles of individuals based on their filiations to a myriad of categories. In the process of making people and categories converge, there can be a tremendous torque of individual biographies. The advantaged ones are those whose place in a set classification systems is a powerful one and for whom powerful sets of classifications of knowledge appear natural. For these people the infrastructures that together support and construct their identities operate particularly smoothly (though never fully so). For others, the fitting process of being able to use the infrastructures takes a terrible toll. To 'act naturally,' they have to reclassify and be reclassified socially (p. 225).

The great danger, as the apartheid example suggests, is that when we apply classification systems to people we are simultaneously creating profiles about the types of people that are at an advantage or disadvantage in life. For those in the advantaged group, their knowledge and experience seem natural and the infrastructure tends to support their identity. For those in the disadvantaged group, their knowledge and experience is not valued and the infrastructure torques their identities to fit the categories that have been imposed. Being poor, therefore, is

more than just a category; it is a particular orientation towards a group of people that takes on a moral character.

As Bowker and Star (1999) suggest with their apartheid example, the knowledge and life experience of the poor are viewed as strange and threatening. We see this in the language used to describe the causes of poverty. Early nineteenth century scientists and reformers ascribed poverty to individual failures in parenting and family pathology (Katz, 1995). More recently, Katz argues, urban poverty has become associated with disease such as "drugs, AIDS, social isolation, and concentrated poverty into metaphors of an epidemic threatening to leap the boundaries of the inner city" (Katz, 1995, p. 67). We also see this in research that uses "concepts such as 'disorganization,' 'deviance,' or 'dysfunction,'; in metaphors such as the 'vicious circle' or the self-perpetuating 'tangle of pathology'; and in totalizing theories of the 'culture of poverty,' or most recently, the 'underclass,'" to describe the poor (O'Conner, 2001, p. 14). This language foregrounds perceived deficits in the poor and paints a picture of them as being at best different and at worst potentially dangerous. The effect of this language is often to stigmatize, to isolate, and to deny assistance (Katz, 1989, 1995).

There are consequences to viewing people in terms of categories of advantage and disadvantage. As Katz (1989) argues, "by mistaking socially constructed categories for natural distinctions, we reinforce inequality and stigmatize even those we set out to help" (p. 6). From a research standpoint, we put blinders on and only see things that fit the categories that we impose. This means that we miss the ways that people and their experiences do not neatly fit the categories of advantage and disadvantage that are created.

In practical terms, the ideology behind many investigations of the poor presents a story of the poor as "other" – as being inherently different from middle class America, as

being a group that is inherently deficient and in need of improvement in some way. The heroes are those poor people that are working to "empower" themselves by adopting new skills or life habits. In contrast, those that fail to make the changes that are deemed important are perceived as being deficient and unwilling or unable to improve their lives. These investigations ignore the way that a lack of material circumstances can hamper people's ability to acquire new literacy skills. These investigations also fail to see the poor, and other, marginalized groups as active technology users. In terms of this study, this implies that as researchers it is important to notice the judgments and interpretations that we place on people and their use or non-use of technology.

Digital Divide Metaphor

Moving back to the specific focus of this study, we must now apply these ideas more specifically to the digital divide to understand the ideology behind this term. The previous section highlighted an ideology of deficiency that underlies public policy initiatives and research involving the poor. The previous section also argued that this ideology is revealed in the language that is used to talk about the poor, in the classification systems used to define the poor, and the tendency to place the burden on the poor to develop new literacy skills rather than issues of power. When we look at the digital divide research, we see a similar ideology in which the poor are perceived as deficient and in need of improvement. There is an absence of research in the digital divide literature, other than anecdotal reports, that seeks to systematically describe the unique ways that people bring technology into their lives and the real barriers that they experience in attempting to adopt new literacy practices.

Research on the digital divide is concerned primarily with counting and categorizing people that have access to computers and to the Internet in the home and through public

institutions such as schools, libraries, and community technology centers. A series of studies generated by the Department of Commerce is used most often to describe the characteristics of people who are classified as technology "have-nots" (U.S. Department of Commerce, 2002, 1999, 1998, 1995). The Department of Commerce studies examine computer, Internet, and telephone penetration rates across demographic variables for households in the United States. These demographic variables include income level, education level, race, degree of urbanization, and family structure.

The demographic variables identified by the Department of Commerce have been used to create a profile of those that are more or less likely to have access to computer and Internet technology. People in the "have" group — those with a higher income, more education, those from a dual parent home, and usually white (Department of Commerce, 1999) — are more likely to use technology and to reap the benefits associated with technology use. In contrast, people in the "have-not" groups — those with a lower income, less education, from a single parent home, and minorities especially Hispanics and African-Americans (Department of Commerce, 1999) — are less likely to use technology and to reap the benefits of technology use. These benefits include increased educational opportunities, increased job opportunities, and increased access to the information. The Department of Commerce reports have generated a great deal of debate about whether education, socio-economic status, or race is the most important variable in explaining the lack of technology access for have-not groups (Novak and Hoffman, 1998).

The solutions offered from the digital divide perspective are usually stated in terms of increasing access to technology for people who belong to the have-not group. These solutions include calls for: (a) universal access to telephone, computer, and internet technology; (b)

increased access to computers in schools and libraries; (c) tax credits for computer purchases; (d) access through community technology centers; and (e) access through alternative technologies and technology providers such as webtv. While it is certainly important to address access issues, this framing of the problem ignores other issues that may inhibit people from adopting technology into their lives. The access solution assumes that if we can only provide access to technology then marginalized groups will automatically have access to all of the benefits associated with technology use. This solution ignores, for example, the daily realities of people's lives that may inhibit them from actually using the technology or adopting new literacy practices.

Beyond increasing access to technology, digital divide studies also focus on working to increase the literacy skills of have-not groups. Researchers, policy makers and community activists may not always directly use the word "literacy" in addressing the digital divide – they may use words like "information" instead – but their work involves helping people develop the skills needed to cope with new expectations about technology in the work, school, community, and personal spheres (Stuckey, 1991). Many public policy discussions, for example, relate the need for access to technology to information poverty – the inability of those in at-risk groups to access the information needed in daily life (Chatman, 1996, 1992, 1991, 1987; Childers, 1975). The fear is that those without access to technology will also lack access to information. As the Department of Commerce put it, "as we enter the Information Age, access to information resources will be increasingly critical to finding a job, contacting colleagues, taking courses, researching products, or finding public information" (Department of Commerce, 1999, xiii). Similarly, there have been any number of reports that call on schools and other institutions to play active roles in training and

retraining students for jobs in the future that will require computer and Internet skills and abstract thinking skills (U.S. Department of Commerce, 1997; U.S. Department of Education, 1996).

In analyzing the value of the digital divide metaphor, we need to recognize the view of the poor that we are perpetuating through the language that we use and through the process of creating categories of advantage and disadvantage based on people's access to technology. As the Department of Commerce (1999) put it in the their report, Falling Through the Net: Defining the Digital Divide: "In the final analysis, no one should be left behind as our nation advances into the 21st Century, where having access to computers and the Internet may be key to becoming a successful member of society."(p. 97). It is certainly a laudable goal to make sure that no one is left behind as computers and the Internet are being used more within our society. We must also recognize that in classifying people as "have-nots", we are simultaneously creating a profile of a group of people that are being judged as potentially unsuccessful and unproductive members of society. We have to question the implications of using language to define a group of as unsuccessful or unproductive because they lack access to technology. This is a very limited definition of success and it reduces the dimensionality of people's lives to a single data point. There is also a danger, as Bowker and Star's (1999) suggest, that when we classify people we sometimes torque their identities to fit our categories and hide the real barriers that they face in trying to use technology.

We also must recognize the way that categories of advantage and disadvantage locate disability in the individual. As Bruce and Hogan (1998) point out, shifts in literacy practices are often accompanied by shifts in our judgments about people and their inherent abilities or disabilities:

> This process is one of the crucial ways in which all literacy technologies — slate tablets, typewriters, word processors, networks, computer interfaces, databases, the Web – are ideologically embedded. Effective use of the dominant reading and writing technologies then becomes the defining characteristic for new forms of literacy (Bruce, 1995). Lack of such ability can be conceived as an inherent disability, located in the individual, which might or might not be alleviated through various measures, such as providing more time, easier texts, skill training, tutoring, help features, donations of equipment, and so forth.

As technology becomes enmeshed with our daily lives, what counts as literate behavior also changes in our school, work, personal, and community lives (Bruce & Hogan, 1998). For example, as word processing has become a part of every day life, there is an expectation that students will turn in assignments that have been produced using a word processor. There may also be shifts in the way teachers judge students who either do not use a word processor to produce assignments or who do not use the word processor effectively. The implication is that we need to notice the ways that our constructions of literacy are ideologically embedded and have the impact of create abilities and disabilities.

The goal of this study is to offer an alternate framing to the problem of technology use in marginalized communities that seeks to place technology use within the context of people's lives. This framework borrows from the work of Taylor and Dorsey-Gaines (1988) who argue that you cannot treat a family's "low-income" status as a simple contextual variable that can be accounted for and then dismissed. Instead, a family's low-income status should be treated "as a metaphor for the lives that we live and the lives of those whom we study in our research" (p. xix). Taylor and Dorsey-Gaines carry out their research by describing the reading and writing activities that occur in people's homes in a low-income neighborhood. The value of their approach is that they start from the premise that the "poor" people that they are studying are worthy and interesting and successful readers and writers.

Based on this approach, they caught literacy activities that might be missed because those who are poor are often not perceived as being successful and because their experience is often not directly studied.

Taylor and Dorsey-Gaines' (1988) work is also valuable because they take a more balanced view in which their participants are not reduced to one-dimensional characters whose experience is summed up by the category "low-income." This meant that in each person's life there were experiences that tended to support or failed to support the development of literacy practices. This also meant that the families that they studied differed in terms of the literacy activities that occurred in their homes.

Technology-in-Use Approach

This study took a technology-in-use approach with the goal of better understanding the way that low-income families integrate technology into their daily lives. The research setting for this study was a computer training and distribution program designed to put computers in the homes of low-income families in Champaign County, Illinois. The Community Networking Initiative (CNI) project was a partnership between Prairienet, a community computer network in East Central Illinois; the Graduate School of Library and Information Science at the University of Illinois; and the Urban League of Champaign County designed to address the digital divide in the community. The CNI project provided computer training, recycled computers, and Internet access to over 700 low-income families. The goals of the project were to increase computer and Internet use among low-income residents in Champaign County, Illinois and to better understand the social context surrounding computer and Internet use and information exchange in low-income communities.

Two lines of research were used to develop the technology-in-use framework used to study technology use in the homes of the CNI participants. The first line of research was the local literacy approach that studies the reading and writing literacy practices that occur in people's homes and communities (Barton & Hamilton, 1998). The second line of research was work that takes a situated approach to the study of technology use in a variety of settings (Bruce, 1993; Bruce & Peyton, 1993, 1999; Bruce & Hogan, 1998; Bruce & Rubin, 1993).

Both the local literacy and situated approaches are working against skill-based and functional approaches to literacy that treat literacy as being abstract, context-free, and neutral (Barton & Hamilton, 1998; Bruce, 1993; Bruce & Peyton, 1993). Skill-based and functional approaches tend to argue for a core set of skills that one needs to exhibit to be considered literate across different situations. In contrast, the local literacy and situated approaches assumes that literacy skills are applied differently depending on the situation. This reflects a view of literacy in which differences between settings are not caused by differences in the scripts that people have but in differences between people's cultural practices and the value they place on literacy activities (Klassen, 1991). In this sense, there is no one unified literacy but multiple literacies that are relevant to be studied across different domains.

Rather than focusing on technology skills, the local literacy approach and the situated technology approach center their analysis on describing the literacy practices operating in a given setting. The local literacy approach focuses on identifying the literacy practices that occur in people's homes and communities (Barton & Hamilton, 1998). Situated technology studies have identified the literacy practices in on-line and in network-based educational settings (Bruce & Peyton, 1993, 1999, Bruce & Rubin, 1993) and in work settings (Nardi & O'Day, 1999).

Once the literacy practices have been identified in a particular setting, the goal is to understand how these literacy practices are supported and the barriers that people encounter as they adopt new literacy practices. In explaining how literacy practices are supported, Barton and Hamilton (1998) focus on the development of expertise and the way that expertise is shared within a person's social network. Because literacy practices are situated within people's social networks, adopting new literacy practices is often accompanied by shifts in identity, changes in relationships, and changes in people's roles within their social networks. When these changes are supported, the process of adopting new literacy practices is encouraged. When these changes are not supported, the process of adopting new literacy practices is more difficult.

Studies that take a situated approach also try to identify the barriers that people face as they attempt to adopt new literacy practices. The focus of a situated approach is to understand how people construct the meaning of technology in their lives through their use of the technology and the way that people's use of technology is shaped by features of the technology. From this perspective, the goal is to understand how factors like characteristics of the users, features of the technology, institutional roles and norms, and the set of practices surrounding use help to account for the differing ways that people bring technology into their lives (Bruce & Peyton, 1993).

The goal in taking a local literacy and a situated approach is to produce descriptive accounts of people's literacy practices. Both studies call for the use of ethnographic research techniques to study people's uses of literacy and the meanings that technology holds in their lives. A local literacy approach has primarily been used in identifying the reading and writing literacy practices present in people's homes and communities (Barton & Hamilton, 1998).

There is also more of an explicit focus on investigating hidden literacies which involves studying people, places, and activities that fall outside the bounds of traditional academic discourses about literacy. Work that takes a situated approach focuses more explicitly on technology practices and the shifts in practice that emerge as people adopt new technology practices (Bruce & Peyton, 1993, 1999). The two approaches inform and compliment each other. The local approach provides a language to talk about literacy practices in the home and the community and focuses attention on hidden literacy practices. The situated approach provides a language to explore the shifts in practice that are connected to the use and adoption of technology like computers and the Internet.

The lessons learned from both local literacy studies and situated studies were used in developing the technology-in-use framework used in this study. Specifically, this study examined the hidden literacy practices of technology "have-nots" taking part in a computer training and distribution program. The value of this approach is that we will learn more about the literacy practices of low-income users because the assumption is made that there is a logic to their use and non-use of technology and their literacy practices. This approach also expands our thinking about literacy for all people because it recognizes that there are multiple literacies present in a given setting and that people make choices between competing literacy systems.

In using a technology-in-use framework, the analysis in this study centers on: (a) documenting the literacy activities that occur in people's homes and the meaning that technology holds in their lives, (b) describing the problems that the CNI participants experienced as they incorporated the technology into their lives and how they drew upon people in their social network to solve these problems, and (c) accounting for the barriers that

people encounter as they attempt to adopt new literacy practices. This study also tried to account for some of the differing ways that people brought technology into their lives. This study draws on ethnographic research traditions with the goal of studying computer and Internet use in the context of people's lives and the way that people make sense of this new technology in their lives.

Research Questions

The larger goal of this study is to develop an approach to the study of technology use by marginalized groups that takes seriously their experiences. The value of the technology-in-use approach is that by looking at the experiences of the CNI participants as they attempt to adopt new literacy practices, we will gain a greater understanding about computer use, literacy, and access to technology for marginalized groups. This study expands our notions about computer use and literacy for all people by looking at people, places (home computer use), and activities that are traditionally ignored in dominant discourses about literacy. This study also challenges us to think more about the limits of a model that focuses on access to technology and ignores other factors that influence use.

The first question explored in this study involves studying how people actually used the computers that they received through the CNI project. A situated perspective involves explaining technology use in terms of the relationship between people, their practices, their values, and the technology itself. This perspective also assumes that people will construct the meaning of technology in their lives in different ways. This leads to the following research question:

R1. How did the CNI community use and make sense of the computers that they received through the CNI program?

The second research question involves studying the problems that the CNI participants encountered as they used their computers and the ways that they overcame these problems. Looking at points of breakdown is important because they often reveal the way that one's physical and social infrastructure supports or fails to support use. There is also evidence in the social informatics literature that people rely on other people in their social network to help them solve technical problems. This question is relevant given the fact that most digital divide studies ignore the social infrastructure needed to support use and focus only on access issues. This leads to questions about the types of problems that users encounter, the way that these problems are resolved (if they are resolved), and how people learn how to use their computers.

R2. What problems did CNI community members encounter and how did they resolve these problems?

The third research question involves taking seriously the lives of the CNI participants and exploring what they can teach us about technological literacy and programs designed to increase literacy skills. This includes an examination of the barriers that the CNI participants encountered as they attempted to adopt new literacy practices.

R3. What does the lived experience of the community members who participated in the CNI program reveal about computer use, literacy, and access?

Benefits of the Research

This study will help researchers and policy makers to more fully understand technology use of marginalized populations. The technology-in-use framework proposed in this study shifts the focus away from looking at access as the only barrier to technology use. Instead, a messier view of computer use is presented that seeks to understand the relationship

between people, their values, their practices, and the technology (Nardi & O'Day, 1999). The results of this study can provide tools for researchers and policy makers to better understand and address technology-use in at-risk communities.

Further, understanding the context of use for at-risk populations has far-reaching social implications going beyond the implementation of a program such as the CNI project. Technology is not neutral and it is important to understand the goals and values of both the people introducing the technology and the proposed adopters of the technology. For the group introducing the technology, it is relevant to question why this technology is needed, why a particular group was targeted, the expected benefits that will occur, the methods used to introduce the technology, and the extent to which the goals and values of the targeted group match the technology. For the users, it is relevant to question the motives of the people pushing for adoption of a technology, whether the technology should be adopted, how it will be used, how well it fits with existing practices, and potential changes that will result if the technology is adopted.

In studying the technology use of the CNI participants, the technology-in-use framework used in this study sought to describe the unique ways that the CNI participants brought technology into their lives. The goal of this study was to add context to discussions about technology use in low-income communities. When we look at the details of the lives of the CNI participants, we begin to see how the access-oriented approach taken in typical digital divide studies does not capture the full dimensionality of people's lives, the way that people use computers when given the chance, and the complexities involved as people try to adopt technology into their lives.

CHAPTER 2

LITERATURE REVIEW

One of the primary goals of this dissertation is to develop an alternative framework to the digital divide approach that can be used to study everyday uses of technology by marginalized groups. Two lines of research inform the development of the technology-in-use framework used in this dissertation: research that takes a local literacy approach to the study of the reading and writing literacy practices that take place in the home and in the community (Barton & Hamilton, 1998) and research that takes a situated approach to the study of technology use (Bruce, 1993; Bruce & Peyton, 1993, 1999; Bruce & Rubin, 1993). In addition, work that documents the way that computer and Internet technologies are used in the home was reviewed to better understand this unique domain of technology use.

The technology-in-use framework used to study the computer and Internet use of the CNI participants was based on the local literacy approach of the Lancaster group who studied the reading and writing activities that occurred in people's homes and within the community of Lancaster, England (Barton and Hamilton, 1998). The Lancaster group works to tie literacy practices, what people do with reading and writing at home and in the community, to the social practices present in a given setting. This literature is important because it does not privilege literacy activities that occur in school and work place settings. The local literacy approach provides a language to talk about literacy practices that occur in people's homes and communities. It also provides a way to describe the development of expertise within people's social network and the way that people draw on their network to solve literacy

problems that they encounter. Finally, the local literacy literature points to the barriers that people experience as they attempt to adopt new literacy practices.

Situated technology studies describe how people actually use technology and connect people's technology use to the literacy practices implicated in a particular setting (Bruce, 1993). From this perspective, because technology can take on many different forms, it becomes defined through use in a particular setting. The important element to look for is variation in the way that people, groups, or institutions adopt (or fail to adopt) an innovation and to look for shifts in practice that occur as people use technology. Studies that took a situated approach were important in this study because they provided a way to talk about the technology practices that occur in people's homes and communities.

Finally, studies that explore technology use in the home were reviewed. These studies typically involve statistical reports that describe people's use of particular computer applications. These studies also document the problems that novice computer users experience in learning to use computers and the ways that they attempt to solve these problems. This literature is included to sensitize the researcher to the types of computer and Internet activities that might occur in the CNI participants' homes. This literature is also included as a contrast to the approach taken in this dissertation which argues for the importance of understanding the context of computer use rather than focusing on discreet skills and for the study of how literacy activities are sustained in a given community.

Local View of Literacy

The local literacy approach taken by the Lancaster group works to identify and understand the reading and writing activities that occur in people's homes and in their

communities (Barton & Hamilton, 1998). The Lancaster group's approach concentrates on studying vernacular literacies – reading and writing literacy practices that occur in people's everyday lives. The goals of the local literacy approach are to understand: (a) the reading and writing activities that occur in people's homes and communitites and the way that these activities are tied to the social practices implicated in a given setting, (b) the informal learning process that surrounds the use and adoption of new literacy practices and the way that people's social networks support (or fail to support) attempts to adopt new literacy practices, and (c) the barriers that people experience, especially those in marginalized groups, as they attempt to adopt new literacy practices (Barton & Padmore, 1991).

The local literacy approach was used to frame the study of technology use among the CNI participants. The same general approach has been used in this dissertation which explored: (a) the way that the CNI participants used the technology that they received through the program and the way that this use was tied to social practice, (b) the way that the CNI participants drew on others within their social network to solve technical problems, and (c) the barriers that the CNI participants experienced as they attempted to adopt new literacy practices. The goal of this dissertation was to better understand issues of access and literacy for low-income technology users by exploring these three issues.

The local literacy approach works against skill-based and functional approaches that treat literacy as an abstract set of skills that can be applied the same way across settings. In contrast, the local literacy approach focuses on literacy practices, "general cultural ways of utilizing written language which people draw upon in their lives" (Barton & Hamilton, 2000, p. 7). The local literacy approach works to tie literacy practices to the social practices present

in a given community and setting by acknowledging the cultural beliefs, values, and assumptions that people bring with them to a setting. Fishman (1991) provides a useful example of the way that cultural beliefs and values are implicated in literacy activities. Fishman studied an Amish community and was able to tie the writing activities that occurred and that did not occur in the community to Amish values and expectations about life, gender roles, and community standards concerning acceptable behavior. She found, for example, that the children in the family that she studied were not willing to keep personal journals because this type of writing was not typical in their community. In contrast, the children, especially the girls, sent letters with news of their family and community to distant friends and relatives as members of letter circles. Through their literacy practices, the community demonstrated not only what it means to be Amish but also what counts as writing and what does not count.

Because literacy practices involve things such as people's values that cannot be directly observed, the local literacy approach starts with the observation of literacy events where literacy has a role and identifies the texts associated with these events and the talk that surrounds these texts (Barton and Hamilton, 1998). Barton and Hamilton (2000) used the example of cooking pudding to demonstrate an event in which literacy has a role with the recipe serving as the text used to support this activity. In observing a family cook pudding, the researcher might then observe: (a) the reading and writing activities involved in utilizing the recipe (b) discussions surrounding the cooking process and the recipe itself, (c) gender and family roles, (d) the informal learning that take place that supports (or fails to support) the cooking process, and (e) deviations from the recipe. By examining the literacy events,

texts, and talk surrounding texts, the researcher can then begin to tie people's uses of reading and writing to literacy practices and social practices.

After the literacy practices are identified in a setting, the goal is to examine how these literacy practices are sustained within people's social networks. Early research on literacy practices in the home and community focused on creating taxonomies of the reading and writing activities that were occurring in the home (Heath, 1983; Taylor & Dorsey-Gaines, 1988). The local literacy approach tries to go beyond creating taxonomies by examining "how literacy activities are supported, sustained, learned and impeded in people's lives and relationships, and the social meanings they have" (Barton & Hamilton, 2000, p. 12). Certain features of the local literacy approach are especially relevant in terms of the themes being developed in this dissertation and will be discussed in the next section. These features include a focus on everyday literacy practices, the importance of one's social network in shaping literacy practices, and the way one's social network can help sustain and in some cases restrain the development of literacy practices.

Everyday Literacy Practices and Hidden Literacies

One of the more important features of the local literacy approach for this dissertation is the emphasis placed on studying everyday literacy practices in the home and in the community (Barton & Hamilton, 1998). The focus of the local literacy approach is on vernacular literacy practices, those that are rooted in everyday experience. Rather than restricting the definition of what counts as literate behavior to activities that occur in schools or in the workplace, the local practices view focus directly on literacy practices that are rooted in everyday experience. From this perspective, we are surrounded by literacy:

> People deal with shopping lists, television schedules and junk mail. They write and receive personal letters and cards; some keep diaries, some write poems or words for songs; they deal with official letters, bills and forms; they have notice-boards, calendars, scrap books, recipe books, address books; they read local papers, catalogues and advertisements; people keep records of their lives, and read and write to make sense of this complex world; they belong to community organizations and pursue leisure interests bound by a web of newsletters, notices, minutes and messages. Newsletters from local associations, and from national ones, arrive as part of the unsolicited mail which comes through the door, or may be picked up by people from events and meetings (Barton & Hamilton, 1998, p. 149)

Literacy practices are what people do with reading and writing in their daily lives. This perspective assumes that there is a logic to reading and writing in the home and that the study of literacy practices in the home and in the community is a coherent domain of study.

The local literacy approach is different from typical research approaches in the sense that literacy is often secondary and used in performing some other activity. People are not reading or writing to improve their literacy skills, they are reading and writing in the pursuit of other activities such as preparing a recipe, paying bills, or writing a letter to communicate with a distant relative. Reading and writing is part of our daily lives and it mediates activities that occur in the family and in the community.

The local literacy literature also works to expand our notions of what counts as literacy because of its emphasis on describing literacy practices that occur in the home and community rather than more traditional places associated with literacy activities, such as work or school. This allows the researcher utilizing this approach to uncover hidden literacies – reading and writing activities that people perform in their everyday lives that do not count in standard discussions of literacy. This approach is especially important when studying marginalized groups because some of their literacy activities often do not fit standard definitions of literacy. Taylor and Dorsey-Gaines (1988), for example, found that there was a

great deal of reading and writing occurring in the low-income homes that they studied that was not part of standard academic discussions about literacy. These literacy activities included filling out the complicated forms necessary to receive public aid, autobiographical writing, and letter writing. These are literacy activities that remain hidden unless we study naturally occurring reading and writing activities. These activities will remain hidden unless we broaden our understanding of what counts as literate behavior, the locations that count, and the people who count when we define literacy

Hidden literacies have been studied by local literacy researchers in a number of different areas. The literacy practices of specific groups have been studied, including: (a) poor children and working class adults whose home-based literacy practices conflict with those encountered in school (Heath, 1983; Moll, 1994; Moll, et al. 1992; Moll & Greenberg, 1990; Pharness & Weinstein, 1997; Rose, 1989; Shor, 1996; Taylor and Dorsey-Gaines, 1988) and literacy programs (Fingeret & Drennon, 1997; Pharnes & Weinstein, 1997), (b) specific ethnic, cultural, and work groups (Jones, 2000) whose values shape their reading and writing practices including the Amish (Fishman, 1990, 1991), immigrants to the United States (Klassen, 1991; Rockhill, 1987, 1993; Weinstein-Shr, 1993), and ethnic and cultural groups across the world (Lewis, 1993), (c) women and the barriers that they experience as they participate in literacy programs (Gadsden, 1997; Horsman, 1990; Rockhill 1987), and (d) the poor and the way that they come to be defined by institutions such as social service agencies (Taylor, 1996).

Beyond the study of specific groups, local literacy researchers have also identified forms of "counterliteracy" where the very performance of literacy acts is dangerous or

illegal. This includes reading and writing activities that occur in prisons (Wilson, 2000) and in the graffiti writing of gang members (Conquergood, 1997). These studies are interesting because they point to the way a literacy activity that is overlooked and even despised, such as graffiti writing, is systematically produced, embedded in social relationships, and rule-driven. They are also interesting because they point to the way that literacy practices may be used in a way to subvert authority. The idea of literacy as a form of resistance is a useful concept and has been explored in areas such as the literacy practices of teens and preteens and the way that they use reading and writing activities as a form of resistance to authority as they try out new identities (Camitta, 1993).

It is important to point out that while a local approach calls for the study of hidden literacies, it is not operating from a relativist position (Pardoe, 2000). It is not holding up hidden literacies as being more valuable than traditional notions of literacy but instead it is trying to question the assumption that people are lacking in literacy skills. Pardoe (2000) argues that we should not be motivated to do research that accounts for the experience of margnizalized groups because we are trying to be charitable or because it is a matter of being ethical researchers. Instead, "when researching marginalised and unsuccessful writing we should not rule out an analysis of the ways in which these may also be guided by rules, be highly functional and rational in particular contexts, and be guided by practices and understandings that we otherwise regard as 'true' or 'correct'" (p. 159). The point is to open up our analysis to account for the ideas and experiences that people bring into a literacy situation and the way this might conflict with the expectations present in a given setting.

While the emphasis in the local literacy approach is on the everyday literacy activities in the home and in the community, these studies are also focus on the way that the home serves as a borderland between other institutions such as work or school. Barton and Hamilton (1998) gave several examples of the way that reading and writing from the work domain, cross over to the home domain. This included activities such as work brought home from the office, bookkeeping duties for a business that are performed by a spouse, the making of photocopies for friends or relatives, and receiving trade magazines at home. In a similar way, reading and writing from the school domain crosses into the home domain. Barton and Hamilton are not arguing that there is a separate home literacy but rather that the home is a distinct domain where "different aspects of life are negotiated and fitted in with each other. In this process new, hybrid practices are sometimes produced (Barton & Hamilton, 1998, p. 189).

The goal of the local literacy approach is to document vernacular literacy practices and to account for the way that these literacies are sustained within people's social networks. The same general approach has been used in this dissertation to document the vernacular literacy practices that occur in the homes of the CNI participants. The assumption is made that the home and the community are legitimate sites where literacy takes place. The assumption is also made that computer and Internet activities in the home and community remain hidden when we define literacy only in terms of computer and Internet use in work place and educational settings. These assumptions are especially important when we consider the use of technology by marginalized groups such as the poor because they are often not treated as active and successful technology users. The local literacy approach was used to

inform the first research question that sought to understand how the CNI participants made use of the computers that they received through the program and to link these uses to social practice.

Because vernacular literacy practices occur outside of formal institutions, they are learned informally and are rooted in people's home and family lives (Barton & Hamilton, 1998). The next section will examine the way that people rely on their social networks to deal with problems that they encounter and the way that expertise is spread throughout one's social network.

Networks/Roles

A local literacy approach studies the way that literacy activities are carried out in people's social networks. Literacy is viewed as a collective resource rather than as an attribute or a set of skills that resides in an individual. Barton and Hamilton (1998), in their study of the reading and writing activities in the community of Lancaster, England, found that much of people's reading and writing was located in reciprocal exchange networks of friends, neighbors, and families. The people in their study relied on these support networks for support and advice, and they in turn provided support and advice to others in their network.

One of the implications of viewing literacy as a collective resource is that people may rely on others in their social network to do the reading and writing necessary to get things in their everyday life (Barton & Hamilton, 1998; Fingeret, 1983). Fingeret (1983), for example, found that some people thought that it was unnecessary to develop reading expertise on their own, because they could go to someone else in their social network for help. They

determined whom to go to for help based on the nature of the reading task, the nature of their relationship (someone close rather than a stranger), and the nature of the information to be read (if it is highly personal).

People's help networks are flexible, and people participate in them in different ways (Barton and Hamilton, 1998). Barton and Hamilton (1998) found that people's help networks change over time as their relationships and life circumstances change. They also found differences between people in terms of the extent to which they would draw on their social network for help and the extent to which they would help others in the network. People's help networks also varied in terms of the extent to which they included outsiders, especially people associated with institutions such as schools or the medical community. Because people's networks vary, Barton and Hamilton (1998) argue for the idea of negotiated literacies in which the help that people give to each other is not necessarily reciprocal but are worked out within the context of people's relationships.

Related to the use of help networks to solve everyday problems is the way that expertise is developed in these networks. Barton and Hamilton (1998) found that people develop expertise in an area based on changing life events that requires new expertise such as the need to deal with medical emergencies, legal troubles, or when acting as an advocate in a school setting. Shifts in writing activities often signaled shifts in people's identities as they coped with stress and considered making changes in their lives. People also developed expertise to pursue hobbies, to keep up with world events, and to satisfy their own curiosity as they encountered new ideas. Barton and Hamilton also found that people developed expertise because of their role in the family as record keeper or historian. As people

developed expertise, they became a resource to others in their social network as they encountered problems in their daily lives.

There have also been local literacy studies that try to document the coping strategies that people develop to deal with new situations or situations in which a person cannot perform reading and writing tasks on their own. One strategy used to deal with unfamiliar text is to rely on memory and experimentation to complete everyday tasks (Fingeret, 1983; Klassen, 1991). Fingeret (1983), for example, found that one strategy used to deal with forms that have a standardized format, such as employment forms, is to memorize the form's layout and format so that the appropriate response can be provided in the appropriate space. Klassen (1991), in her study of Spanish speaking newcomers in Toronto, found that memorization and experimentation were used to pay bills, manage banking tasks, deal with bureaucracies such as hospitals, and deal with a host of other issues unique to the community such as immigration issues.

Another strategy that people use to deal with unfamiliar or difficult situations is to rely on sympathetic people who are willing to provide help. Klassen (1991) found that family members, friends, and even sympathetic people that work at institutions are potential sources of help. For example, two of her participants always went to the same bank teller because she was friendly, she spoke Spanish, and she was able to provide the help that they needed. In some cases, this person may act as a mentor as a person learns to join a discourse community (Rose, 1989). Others have documented the important role that people in one's social network can play by acting as an intermediary between an individual and an institution (Barton and Hamilton, 1998; Weinstein-Shr, 1993). Weinstein-Shr (1993) gave the example of a person

with more advanced reading and writing expertise helping others in his social network decipher the often complicated forms that people encounter when dealing with bureaucracies such as public aid offices.

The point should be made that it may be difficult to make generalizations about people's expertise, about the strategies that they use to solve problems, and the characteristics of their social networks because of the situated nature of literacy practices. Weinstein-Shr (1993) presented case studies of two Hmong refugees she met in a college class that she taught that illustrates the misunderstandings that occur if we do not take into account the situated nature of literacy. One of the participants seemed to do very well in the class while the other student struggled, eventually dropping out of school. In her study, she found as expected that the "successful" student was able to help others in his network to solve problems involving reading and writing tasks. She was surprised to learn, however, that the "struggling" student was widely perceived in his community as an expert whose traditional knowledge could help people solve conflicts and problems. She also found that people's help networks varied based on their ties to clans that characterized life in Laos and that carried over to their life in Philadelphia. The "unsuccessful" student was actually very well connected in his clan and was able to delegate some problems that required reading and writing expertise to others. The "successful" student was less connected in the clan so he had to develop literacy skills because there were few clan members that he could draw on to help him solve the problems that he encountered. The "successful" student also deliberately cultivated relationships with Americans, expanding his social network and taking more risks outside of his network, so he could draw on their expertise when he encountered a problem

he could not solve. Weinstein-Shr's (1993) study helps to make the point that the goal in taking a local literacy approach is to understand the way that social networks can constrain, enhance, or lead to the development of new literacy practices. A local approach recognizes that, when another group or context is studied, different features of the network may be salient and for different reasons.

People make use of their social networks to solve problems that they encounter in their daily lives and to handle unfamiliar literacy situations. People have networks of friends, family members, and outsiders upon whose expertise they can draw to solve problems. This view of literacy as a collective resource was used to frame the second research question that sought to understand the problems that the CNI participants experienced and the way they overcame these technical problems. This literature suggests that one legitimate strategy for solving technical problems is to draw on the expertise of those who know more about computers. This literature is especially salient for people who volunteered with the CNI project because they were often in the position to learn more about computers and the Internet and to help others in their social network to solve technical problems.

Despite people's reliance on their social network to solve problems, sometimes people's social networks are not helpful and can even constrain one's ability or willingness to participate in literacy activities. This is especially true when people are trying to make changes in their lives (Barton & Hamilton, 1998). The next section considers limits to people's ability to draw on their social network for help and the difficult process of adopting new literacy practices.

Limits to One's Social Network and the Difficulty of Adopting New Literacy Practices

Fingeret and Drennon (1997) provide one way of looking at the difficult process involved in adopting new literacy practices. They studied the lives of 5 people participating in the Literacy Volunteers of New York City program and developed a model to explain the change process that they observed. They found that the change process involved several steps: (a) students encounter prolonged tension as they began to see a difference between the way they were living and the way they could live if they adopted new literacy practices, (b) a turning point occurs that "loosens the tie of obligation and tradition" such as a retirement, the end of a relationship, or a job loss, (c) the students often go through a period of working to find educational opportunities where they can gain reading and writing expertise, (d) they often encounter changes to relationships as they adopt new literacy practices, and (e) finally, the students go through intensive continuing education. They argue that prolonged tension and a turning point are required for people to start adopting new literacy practices, that people may stop and start the process many times returning to previous stages, and that people may quit the process at any time.

More than learning a set of abstract skills, developing new literacy practices is embedded in the realities of people's daily lives. Many studies point to the difficulties that people encounter in their daily lives as they adopt new literacy practices including: (a) shifts in identity, (b) changes in relationships, (c) the way gender, race, and family roles may limit access to literacy opportunities, and (d) the role of institutions in perpetuating a view of marginalized groups as deficient and the ways that people reject this "discourse of stupidity."

Identity. The local literacy literature points to the difficulties that people encounter as people take on the identity of a person who performs particular literacy practices (Cazden, 1993; Rose, 1989). As Fingeret and Drennon (1997) express it:

> When adults aspire to new literacy practices, they also are aspiring to the images of literate adults that are promoted in the larger society, and to the society's values of independent action. Literacy practices, because they are socially situated, imply not just doing tasks, but doing them as other people do them in the same situation. The new literacy practices they envision are not discreet goals; they are examples of the ways that adult learners would like to "fit in", to do the things the way others do them without drawing attention to themselves and without feeling uncomfortable. Even when adults talk about their goals in terms of social and economic mobility, they are aspiring to act like people act at other rungs of the social ladder. This includes, but is by no means limited to, technical reading and writing abilities (p. 63).

It is not just that a person makes a decision about adopting a new way of speaking in the abstract, it is that in making choices among competing ideologies a person signifies who he or she is at a given moment in terms of identity. Cazden (1993) gave the example of a student who answered a question correctly in a classroom but in broken English so as to take on the role of being a good student but still remain part of a particular social group. It is a difficult process to balance taking on a new form of speaking while still respecting old genres of speech. Similarly, Camitta (1993), studied vernacular literacy practices among high school students. She talks about how the students that she studied modified and created new texts as they tried out new identities and as they challenged the authority of adults.

Rose (1989) documented the loneliness and emotional toll that children and adults face as they attempt to take on new literacy practices, especially in school settings. Rose argues that it is important to acknowledge the way that students are trying to adopt new literacy practices even if they are not successful. We also need to understand better the set of expectations and literacy practices that they bring with them into a school setting. Once we

look closely at the student's "failure", then " you'll find knowledge that the assignments didn't tap, ineffective rules and strategies that have a logic of their own; you'll find clues, as well, to the complex ties between literacy and culture, to the tremendous difficulties our children face as they attempt to find their places in the American educational system" (p. 8). Moll's research on the need to tap into the "funds of knowledge" that families possess suggests a way to tie home-based literacy practices to those encountered in school settings (Moll, et al. 1992; Moll & Greenberg, 1990).

Adopting literacy practices and changing relationships. As people take on new literacy practices, the relationships around them also change. Fingeret and Drennon (1997) suggest that positive relationships can help people adopt new literacy practices. The availability of a sponsor to help someone adopt literacy practices appears to be important (Brandt, 1999; Rose, 1989) as well as the opportunity to use one's new skills within one's network (Gardener, 1991). At the same time, sometimes people quit literacy programs because of the stress involved in changing relationships and crossing boundaries. Gardener (1991) argued that when you learn to write you are socially and psychologically resituating yourself. Sometimes participation in literacy programs is not enough to sustain change in people's lives because other things in people's lives have not changed. The social context in which they live has not changed and they may not be asked to display their new skills.

Several studies have pointed to the shifts in people's relationships that occur as people adopt new literacy practices. Threats to relationships are sometimes most evident people's access to places where they might learn new literacy practices are restricted. Rockhill (1987), in a study of immigrant Hispanic women in Los Angeles, found that the

women that she studied were more likely to develop new literacy practices when they became divorced or separated from their husbands. Their husbands controlled their access to literacy classes and to places where they could informally learn English. The husbands perceived the desire of their wives to develop reading and writing expertise as a threat because it lessened their control over the family. Some of the women were encouraged by their own family members to be obedient to the wishes of their husbands.

Shifts also occur in terms of how one is perceived in one's network as one gains expertise in an area. This includes expertise in the ability to read and write and also one's knowledge in a particular area gained through reading and writing. Weinstein-Shr (1993) documented how one of the refugees she studied became a resource to others in his community who needed help with certain reading and writing tasks. As people gain expertise, their statuses may change within their social networks. Help giving is "closely connected with feelings of identity and self-worth within a significant community, participating in these relationships can be a practical way of expressing solidarity and common purpose within the community" (Barton & Hamilton, 1998, p. 254-255).

Gender, family roles, culture and race. There have been some studies that try to document the way that gender and family roles can limit a woman's ability to acquire new literacy practices. Horsman (1990) studied a group of women in Nova Scotia, Canada who were participating in a literacy program. Horsman talked about the social "dis/organization" of the women's lives and the way that this influences their abilities to adopt new literacy practices. Some of this disorganization included abuse, the need to work to support the family, and a family and support system that emphasized child care and de-emphasized

schooling. Horsman points to the way that the lives of women disappear in the sense that explanations about why they lack reading and writing expertise and quit literacy programs often ignore these difficult life conditions. She also discussed the way that attempts to go to school were sabotaged by males. This was achieved, in part, through the control of resources such as a car which might be necessary to attend the literacy classes.

Some studies document the pressure that women experience when attempting to adopt new literacy practices. Rockhill (1987) found that the women that she studied stopped and started attending literacy classes many times. They stopped attending classes because they were usually primarily responsible for work in the home and taking care of the children, because of sickness in the family, and because of changes in work schedules and living arrangements. Rockhill (1987) argued that when women are required to do the bulk of the work to maintain the family, that there is not a lot of time left over to pursue change in their lives. Similarly, Klassen's (1991) found that it was often the female in immigrant families that she studied who dealt with situations that required English proficiency. The mother often took on this role because it was deemed more important for other family members to go to school or work and to learn English. Taking on this role is double-edged because, while they are furthering the interests of other family members, they do not have the time to pursue these same opportunities for themselves.

Brandt (1999) brought together the themes of literacy, gender, and economic change in her study of the literacy practices of women from two generations. She studied two women – an older woman more tied to the farm-based lifestyle of the past, and a younger woman facing changing economic conditions in which her community has lost its economic base.

She presented case studies of the writing practices of the two women and found that their writing practices were shaped by characteristics of their communities and their social network. The older woman she studied belonged to "a cultural majority with a stable and at times expanding economy" This social structure provided the "forms of sponsorship, invitation, and access" for her to "learn and practice literacy." The younger woman she studied lived in an area in economic crisis with no school or commercial base. For her, there were few opportunities for sponsorship, invitation, or access to utilize and develop literacy practices.

Gadsden (1997) focused on intergenerational literacy among African-American mothers and daughters as they wrote letters to each other. She looked at how issues of race, gender and culture were brought up in the letters and in the discussions occurring in the family. She makes the point that often when we talk about literacy issues, African-American women are implicated but their stories and history are often not brought up in these discussions. Gadsden found some themes that were especially relevant to this community including:(a) individual and family persistence to overcome obstacles and the need for (b) reconciling past hopes and present fears. She argues that for African-American women, "so embedded in the definition of woman is the concept of cultural uplift that the women find it difficult, if not impossible, to separate their identities from the struggle" (Gadsden, 1997, p. 384). She points African-American women's special role in the family to nurture children in an apparently "race-unfriendly world."

Role of institutions and rejecting "discourses of stupidity". Finally, there has been a great deal written about the role of institutions in perpetuating myths about learners.

Horsman (1990) argues that the way that literacy programs typically define the learner is disempowering because they are typically seen as deficient, outsiders, incompetent, and stupid. She argues for a negotiated view of literacy that recognizes the way that people make choices about adopting new literacy practice. People make choices about how to bring new literacy practices into their lives, the learning process, and the value that literacy classes hold in their lives. They make decisions about whether or not to ask for help with some people refusing to ask for help because of embarrassment.

Horsman (1990) argues that literacy programs can provide women the opportunity to reject discourses of stupidity and functionality if they are given the space to do this in the programs. She relates this to women's participation in a literacy program that she studied and the value that the program held for them versus the functional and skill-based approach taken by traditional literacy programs. The women thought that the literacy program was important because of the social aspect of the program and the space it afforded them to interact with other women. The program gave them a space to think of something other than the everyday and a chance to succeed at something where previously they had failed. Horsman charges that we need literacy programs that treats women as "knowers," so that they can really take advantage of literacy programs.

There have also been a number of studies about the way that schools marginalize students that struggle (Connell, 1994; Lofty, 1990; Pardoe, 2000; Rose, 1989; Shor, 1996; Taylor and Dorsey-Gaines, 1988). Rose (1989) argues that schools and other institutions, particularly through testing, assessment, and labeling, tend to reinforce the children's and adult's position in society. Similarly, Shor (1996) points to the way that schools fail to

account for the experiences of its students. Students adopt dual strategies of accommodation and resistance. "Given the outlaw status of their home dialects and community cultures in school, they construct themselves as subordinates who can't escape authority but won't cooperate fully with it either" (Shor, 1996, p. 14).

There have also been studies about conflicts that the poor face in dealing with social service agencies and other bureaucracies (Taylor, 1996). Taylor (1996) forcefully ties together the issues of power, poverty, and literacy in her discussion of the way that social service agencies dominate and control the poor through texts. For the poor,

> Personal codes are replaced by identification numbers that are called out by case workers who carry files filled with papers that their clients rarely see. Bureaucratic texts are used to control the circumstances in which politicals live their everyday lives. They are forced into configurations of literacy that adversely affect their identity, erode away their personhood, and cripple their ability to survive. They suffer public humiliation and personal violations as official documentation takes away their rights and privileges and leaves them powerless to protest because they have no access to the text (p. 10-11)

Official texts are used in making decisions that affect the day-to-day lives of the poor but they often do not have access to this official documentation.

The literature reviewed in this section is useful in considering the work that the CNI participants are doing in trying to adopt new literacy practices. It can be painful to be in the position of learning new skills and having people make judgments about you as you attempt to adopt new literacy practices. This literature is especially important in answering the third research question that seeks to understand the barriers that the CNI participants experienced as they brought the technology into their lives. We can better appreciate the complexity of access and literacy when we understand that the CNI participants are doing more than acquiring a set of technology skills. The adoption of new literacy practices is often

accompanied by shifts in identity, relationships, and family roles. It can by especially difficult for members of marginalized groups to adopt new literacy practices when they are confronted with literacy programs and institutions that do not value their life experiences or treat them as "knowers." This suggests the importance of acknowledging the ways that the CNI program did not always meet the needs of its participants and make them active participants in the learning and decision-making process.

While the approach of the Lancaster group is useful in understanding reading and writing literacy practices in the home and community, the role of computers in people's lives tends to be underdeveloped in this literature. There have been studies that seek to expand the local literacy perspective. Gee (2000), drawing on Latour (1987), focuses attention on the enactive and recognition work that people do in creating and sustaining literacy practices. Other studies focus on the way that people and artifacts interact in a setting and how this influences people's interactions with texts (Hamilton, 2000; Ormerod & Ivanič, 1990). There have also been some studies that account for the emergence of new literacy practices and the way these new practices interact with old practices as new technologies, such as electronic discussion groups are used (de Pourbaix, 2000). Research that takes a situated approach to the study of technology use is a useful compliment to the local literacy approach, because it focuses explicitly on how people use technology and the literacy practices present in a given setting.

Situated Technology Studies

Several researchers have proposed a situated approach to understand technology use by a particular group (Bruce & Hogan, 1998; Nardi & O'Day, 1999; Star, 1995). This

approach focuses on identifying the system of relations between people, their practices, their values, and the technology that is used (Nardi & O'Day, 1999). A situated approach is grounded in studies that examine artifact use and in studies that examine technology practice in various contexts including work, educational, and scientific settings. A situated perspective is also grounded in studies that look at the ways that representations of processes, such as categories, reveal conflicts between people and practices (Bowker, & Star, 1999).

This approach to studying technology use provides philosophical grounding for this study. It provides a way to think about the technology practices that are occurring in the homes of the CNI participants. It also highlights the importance of understanding the shifts and blending of practices that occur as the CNI participants adopt new literacy practices. Situated technology studies highlight the social nature of technology use (Nardi & Miller, 1991; Nardi & O'Day, 1999). This is true in the sense that the specific way that a technology is used in a given setting and its meaning are tied to the values and cultural norms present in that setting. This is also true in the sense that people use technology with others in a given setting and they rely on others in their social network to solve technical problems. This way of thinking about technology use was utilized in this study to understand the way that the CNI participants used technology and the meaning that it had in their lives. The purpose of this section, therefore, is to articulate what it means to take a situated approach to understanding technology use in a given setting.

A situated approach is working against the positivism or fatalism that characterizes many discussions about technology (Bromley, 1998; Bruce & Hogan, 1998; Nardi & O'Day, 1999). In many of the debates about the effects of technology, the authors take the position

that either technology in and of itself will bring about revolutionary change or that the use of a technology at best will result in no change but at worst will result in dire consequences. Instead, a situated approach shifts the debate away from positivism or fatalism to a consideration of the way that a technology is constructed in a particular setting. "We see an innovation as a process - the meeting ground of various interests and practices. What we need to investigate is the meaning in this broader sense of the innovation for the social systems in which the innovation is used" (Bruce, 1993, pg. 10). Bruce & Hogan (1998) provide examples of the way that one can look for ideology in a given setting including a technology's design, distribution, and use.

A situated approach looks at how people actually use a technology and for shifts in practice that occur as people integrate the technology into their lives (Bruce, 1993). A situated model focuses on describing how people actually use an innovation, the different ways that an innovation can be implemented across situations, and the way that people are both shaped by and are shapers of technology (Bruce, 1993) This approach is user-centered in that the focus is not on technology in its idealized form as the developer intended it to be used, but on the way that people actually use technology to meet their own needs in situationally relevant ways. From this perspective, the meaning of technology is negotiated and comes to be defined through use in a particular setting.

Bruce and Peyton's (1999) study of the use of networked resources in a writing program provides a useful illustration of the way that a situated study is carried out. They found that the classrooms they studied used the same writing technology in very different ways. In accounting for these differences in use, they described the set of relationships that

existed at each school and how these relationships impacted use. The factors that they found to be important included the institutional norms and practices at each school, characteristics of the teachers and students, and features of the technology.

A situated approach has been applied in a number of ways including research that: (a) examines technology use in educational settings (Bruce & Peyton, 1993, 1999; Bruce & Rubin, 1983; Feldman & Nyland, 1994; Grosshandler, 1997; Hogan, 2000), (b) attempts to bring technology use to at-risk communities (Bishop et. al, 1999; Choksi, 1997), and (c) evaluates the design and use of computer interfaces and repositories (Bishop, et. al, 2000; Feldman & Nyland, 1994; Twidale, Nichols & Paice, 1996). On a broad level, what these studies have in common is an attempt to account for context, but they differ in terms of the resources and the structuring of the resources that were highlighted in each study.

The work that takes a situated approach to studying technology use in at-risk communities is especially relevant to this dissertation. These studies suggest some of the potential barriers that the CNI participants may face as they attempt to adopt new literacy practices. Choksi (1997) evaluated two technology initiatives put forth as part of the East Saint Louis Action Research Project (ESLARP). The first initiatives involved the implementation of two web sites that provided information about the ESLARP project and that made geographic information about the region such as maps available to the public for planning purposes. The second innovation was the introduction of three public access sites where people in the community could access computer technology. Choksi examined the extent to which these initiatives were used and barriers to use. Her study suggested that access to technology is not enough to ensure the adoption of the technology. Other factors

were important in explaining use including: (a) the extent to which the potential adopters are made an active part of the decision making process, (b) institutional roles, requirements, and policies, (c) people's knowledge about the technology and their ability to use it, (d) the practices surrounding technology use, and (e) the usability of the technology, itself.

Early research on the Community Networking Initiative project also reveals some of the complexities that people face as they begin to integrate technology into their lives (Bishop, et. al, 1999). Bishop, et. al. (1999) reported on the results of a telephone survey designed to study how people made use of the computers that they received through the CNI program. They found that there was no one use for the computers. People reported using a wide range of computer applications for information seeking and for communication purposes. The study also emphasized the importance of making low-income residents an active part of the information exchange process.

For the purposes of this dissertation, research that takes a situated approach is important because it centers its analysis on describing how people use technology, the new literacy practices that emerge, and the factors that account for the way that a technology was used (or not used) in a given setting. This helps to counter the tendency in the digital divide literature to make assumptions about people's use or nonuse of technology based on their categorization as technology "have-nots." The digital divide views technology as dichotomous; people either use technology or they do not use technology. The digital divide literature also makes preconceived value judgments about what activities constitute a "good" use of technology.

Rather than making assumptions about use or nonuse, the focus is on describing actual use and the factors that account for the way that the technology was used. A situated approach also helps to counter the tendency in the digital divide literature to locate blame in the individual for failing to adopt new literacy practices. This approach suggests that a number of factors may inhibit a person from adopting a new set of practices such as institutional norms and values, the attributes of the technology, and the extent to which people are made an active part of the decision-making process. This opens up the idea, for example, that it is relevant to examine how the CNI participants' use of their computers was influenced by the operating procedures of the CNI program and the attributes of the computers that were distributed. This approach also suggests that it is important to notice the ways that the CNI participants used their computers in ways that went beyond the expectations of the program. The CNI participants are capable "knowers" who make decisions about how to bring technology into their lives and how to adapt a particular technology to their information ecology.

There are very few studies that take a situated view of technology use in the home and in the community. The next section reviews literature that describes technology use in the home and technology use in low-income communities.

Computer Use in the Home

Some research focuses on the ways that people typically use a computer in the home. Much of this research describes the extent to which people make use of a particular computer application and the activities that they engage in on the Internet. These studies also report the difficulties that people experience as they attempt to use computer and Internet technologies.

Finally, there is some literature that focuses on technology use by marginalized groups. While much of this literature focuses on technology skills rather than technological literacy practices that occur in people's social networks, this literature is relevant to this study because it highlights some of the issues faced by technology users in home settings.

Home Computer and Internet Use Studies

Several studies have documented people's use of computer and the Internet in their homes. The HomeNet project was a longitudinal study of home computer and Internet use (Kraut, et al., 1998a). The 93 families participating in the study received a new computer, software, a telephone line and Internet access over the course of one or two years depending on when they participated in the study. In return, the families agreed to let the researchers track their computer and Internet usage, to answer questionnaires, and to participate in at-home interviews. The researchers selected families to participate in the study across a range of demographic categories including race, education level, and income level. They found that people's primary use of the computer was for communication and for entertainment (Kraut et al., 1998b, 2000). Over time, communication became more important with e-mail predicting people's likelihood of using other Internet services.

Similarly, The Pew Foundation (May 10, 2000) found that email is the most popular on-line activity followed by searching for hobby information, browsing for fun, buying something online, searching for health information, using the Internet for a work-related activity, reading news, and looking up financial information. Wealthier and more experienced users tended to use the Internet for work related reasons and wealthier users tended to use the Internet more to look up financial information. The UCLA (2000) report on

Internet use found that the most popular on-line activities were web surfing, e-mail, finding hobby information, reading news, and finding entertainment information.

Two groups of home users have received attention by researchers: teens and seniors. Orleans & Laney (1997) observed teens and the way that they used computers in the home. They found that the teens often talked with each other and their families about the computer. The computer became a center for social activity in the sense that it became a topic of conversation in their peer group and in their families, and the teens shared their knowledge with less advanced computer users. Other studies suggest that teens may be more likely to use communication technologies such as instant-messaging (Pew, June 20, 2001).

While teens are described as more active technology users, there is some research that suggests that seniors are less likely to have access to the Internet. The Pew Foundation (September 9, 2001) found that fewer seniors go on-line; only 15% of American seniors (defined as those over the age of 65) have access to the Internet. They also found that many of the people they surveyed who said that they would never go on-line were over 50 years old. One important difference between seniors and other groups is that their desire to go on-line was not related to work or school. They were encouraged to go on-line by a family member.

A few studies attempt to describe the technology practices that occur in people's homes. These studies suggest some issues that may be important to consider in studying computer use in the homes of the CNI participants. Venkatesh (1996) proposed a model of looking at home computer ownership that looks at both: (a) the social space of the household and its activities and (b) the technological space that ties activities and people to a particular

technology. Interestingly, he found that technology use was situated and that not every household used technology in the same way. Use was influenced by things such as the activities themselves, the lifecycle stage of the family, and the priorities and circumstances of the family. He also reported that new activities emerged that were not performed before such as creating family archives or medical histories. In a similar vein, Davenport, Higgins, and Somerville (2000) looked at technology use from the point of view of the user by looking at the reoccurring narratives that surround technology use and household practices.

There are also some design studies that argue for the importance of understanding the way that technology use in the home is related to social practice. These studies tend to argue that the home is a unique domain of study and that technology needs to be designed to take into account the unique features of home settings (Hindus et al., 2001). O'Brien et al. (1999) suggested that the design of technologies for the home must support people's routines in the home such as their use of technology to mark time, mark ownership of space, and in parenting activities. Similarly, Crabtree et al. (2001) examined the way that technology is implicated in organizing the day-to-day relationships involved in the household.

While there are few studies that tie technology use to the social practices involved in home settings, there are more studies that document the social nature of computer use especially as people attempt to solve technical problems. This is relevant to this dissertation which seeks to understand the technical problems that the CNI participants encountered in using their computers and the ways that they overcame these problems.

Solving Technical Problems and the Development of Expertise

Some research on home computing suggests the importance of one's social and work networks in introducing people to Internet technology. Katz and Aspden (1997), in a national telephone survey, found that people were originally introduced to the Internet most often through their social and work networks. They also relied on these social ties for advice when they encountered technical problems. Despite the importance of these networks, Katz and Aspden (1997) found that users who were taught to use the Internet by friends or family were more likely to quit as compared to people who gained these skills at work or through their own efforts. This ties to the issue of people's initial commitment and motivation to learn about computers and the costs involved in using computers. Most people who stopped using the Internet were on-line only a short time with 38% of the people dropping out after being on-line for only a month and 72% of dropouts being on-line for six months or less. People who were more likely to drop out were the young and those who were not married, including teens. They suggested that one reason that this might be the case is that there are other activities and people competing for the time and attention of the teens and young adults.

There are other studies that document the difficulties that new users experience in using the Internet. The Homenet project (Kiesler, et al., 2000; 1997; Kraut, et al. 1998 a, b, 2000) found that new users have to be very committed to get their problems resolved and to overcome the learning curve associated with a new technology. Kiesler, et al. (2000) reported that 89% of the 93 families participating in the Homenet project had contact with the technical staff at some point during the study. They found that the families first turned to local resources such as computer savvy friends and family members to solve technical

problems. They turned to more formal sources of support, such as the project's help desk, when these local resources could not solve a problem. They also found that those with more computer knowledge and those more involved in using the computer, often teens in the families, were more likely to call the help desk and to help others in their family solve computer problems.

This role of the teen as family guru can be double-edged in the sense that the teens may not always share their technology knowledge with other family members. Franzke and McClard (1996) found that teens sometimes did not share their knowledge because they became frustrated in dealing with novice computer users, and they were not always patient teachers. They also found that the rhythm of family life may not allow teens to share their expertise because the adults they studied tended to use the computer in the evening when the computer was free after the teen had gone to bed. It should be noted that some of this information is anecdotal and that the authors did not directly analyze data but instead discussed in a general way some of the things that they observed of people participating in their project.

Another issue that has received some recent attention is whether or not Internet use is harmful to family relationships and with others in one's social network. A report from the Homenet project created a great deal of debate about whether the Internet had negative impacts on the family. In an early report, they found that, as Internet use increased, there was a decline in the amount of time that people communicated with other family members in the household and a decline in the size of people's social network. They also found increased depression and loneliness as people used the Internet more (Kraut et al., 1998a). Kraut et al.

(2000) have since modified this finding slightly in a subsequent study suggesting that many of the negative findings that they reported previously dissipated, except for stress, as people used the Internet over time. Kraut et al.'s (2002) recent study is interesting because they make the connection between personality characteristics such as introversion and extroversion and the amount of social support that people have and their levels of community involvement. They suggest that their findings support a vision of computer use in which the "rich get richer." Those who are extraverted and who have greater social support reap more of the benefits of Internet use as compared to intraverts and those with less social support.

In contrast to the Homenet studies, other research reports suggest that the Internet does support community and family relationships. The UCLA Internet report (2000) found that the computer became a shared activity in people's families. The UCLA report found that the families in their study reported spending about the same amount of time with each other as compared to the time spent before the computer was introduced into the household. People also reported using the computer to create and maintain friendships and increased contact with friends and family members. Similarly, the Pew organization (October 10th, 2001; October 31, 2001) found that people use the Internet to support and participate in local communities. They found that people used the Internet to plan meetings and to organize activities for organizations such as churches and fraternal organizations. They also used their computer to find local information about community events, news, and organizations.

Other studies document the way that computers and the Internet can enhance local ties and the way that computer use is enmeshed within people's daily lives (Hampton & Wellman, 2001; Wellman & Hampton, 1999; Wellman, et. al., 2001;). Wellman and

Hampton (1999) provide examples of the way that the computer is used to support people's ongoing social relationships at home, in the workplace, and in their neighborhoods. People used the computers in their study to remind a spouse to bring home milk, to arrange meetings with co-workers, and to organize around an issue of importance to their neighborhood. Family members helped each other solve problems and shared discoveries about the computer. They used the computer together and engaged in new rituals like gathering around the computer together at a set time. Their study supports the idea that computer use and Internet use is embedded within the context of family and community life.

In terms of this dissertation, the research reviewed in this section suggests that, since many of the CNI participants are novice users, they are likely to encounter significant technical problems as they attempt to integrate technology into their lives. They will probably rely on friends and family members as a first line of defense in solving the technical problems they encounter. Some will then turn to Prairienet to solve the computer problems they experience. The studies described above do not document the way that people gain computer expertise. The local literacy approach suggests that it is important to understand how people develop expertise and the way that this expertise is distributed through one's social network. These studies do not document the situated nature of technology use. Technology is not neutral so people will bring technology into their lives in different ways and the impact of having access to technology is situated. Having access to technology can enhance or degrade social ties or can be empowering or disempowering depending on the situation because technology use is embedded in social context. The studies documented

above also do not document some of the difficulties that low-income families may experience as they attempt to adopt new literacy practices.

Computer Use by Low-Income Families

Some studies examine computer use in low-income households. Bier et al. (1996), for example, examined the impact of home computer access in a low-income community. Low income was defined for the purposes of the study by the number of children who participated in government-sponsored free or reduced price lunch programs. People that participated in the study were trained and were given computers and Internet access for the duration of the study. The study found that the computers were used: (a) as a productivity tool (reports, histories, cookbooks), (b) for information gathering (medical, economic/governmental information, current events, hobbies/recreation), (c) for communication/logistics (e-mail with school officials, listervs), (d) for virtual field trips, and (e) to build relationships and a sense of community.

Bier et al. (1996) also reported that the people who participated in the study were impacted in terms of identity, education, and community. They began to see themselves differently based on their interactions with the computer, because they became people who knew about technology and could help their family and others use the computer. The computer also opened up the possibility that they could find information about topics relevant to their own lives. They could, for example, look up medical information on-line to treat problems such as diabetes. Computers allowed them to connect with others in their own communities, such as school officials, via e-mail. It also allowed them to find new communities related to their own needs and interests.

Beyond home access to technology, much of the literature about low-income technology users suggests the importance of providing avenues for public access to technology by have-nots groups. Community networks (Beamish, 1999; Chapman & Rhodes; 1997; Lillie, 1997; McInnis, 1997; Schuler, 1996; Shaw & Shaw, 1999) and community technology centers (Chow, et al., 1998; Lentz et. al, 2000; Rose, 1997; Williams, 1998) provide inexpensive or free computer and Internet access and training. Some other community groups have worked to provide Internet access including churches and outreach groups such as Fourth World Movement (Tardieu, 1999). Computer clubhouses also provide children in the community with access to advanced technology and mentors to help them use the technology (Teicher, 1999; Resnick, Rusk, & Cooke, 1999).

A number of studies have identified barriers experienced by low-income users as they attempt to use technology. One potential barrier that has been raised is a lack of on-line information that is relevant to low-income groups (Children's Partnership, 2000). This includes material that is topically relevant, accessible to those at lower literacy levels, available in multiple languages, and that reflects the cultural values of a particular group. In interviewing low-income groups, the Children's Partnership (2000) found that these groups wanted access to life information such the availability of services such as health care, financial assistance, housing, transportation, education, and childcare. This information is often the most difficult to find on-line according to their analysis.

The Benton Foundation (1998) suggests that there are a number of issues surrounding access to technology in low-income communities. These communities do not always have the physical infrastructure in the form of updated telephone lines or fiber optic cables to support

technology use. In addition, institutions such as schools and libraries in low-income communities often do not have computers or the most up-to-date technology. Similarly, Amsden and Clark (1999) argue that low-income communities may lack the human capital (education and job experience) and social capital (membership in peer networks, contacts) to move into technical careers.

The studies presented so far provide insights into some of the barriers that the CNI participants may encounter as they attempt to integrate technology into their lives. Some of these barriers include a lack of relevant on-line content and a lack of physical infrastructure in the community to support use. At the same time, another barrier that low-income users experience is in our thinking about them as "have-nots" – as passive people who are awaiting training to improve their literacy skills rather than as active technology users who are "knowers" and who are contributors to society. This points to the ideological nature of research involving the poor and their technology use.

In contrast, there have been some studies that seek to identify the capacity and assets within marginalized communities and that see low-income people as active technology users. Pinkett (2001, 2002), for example, studied technology use in Camfield Estates, a low-to-moderate income housing development in Boston. As part of the project, various technologies were made available to residents including a desktop computer, software, and high speed Internet access. A community technology center was also created where residents could access technology. Finally, community content was developed through a community-based web system. One of the unique features of the Camden project is that the residents generated content for the community-based web-system. The residents were not viewed as

passive recipients of computer training and technology. Instead, they generated content of interest and made it available to other residents.

Similarly, Alkalimat & Williams (2001) examined a community technology center in a predominately African-American populated section of Toledo, Ohio. Their research points to the need for community technology centers to connect with organizations in the community such as churches and schools when planning programming and conducting outreach efforts. They also point to the important role of community networks in increasing capacity within the local community by cultivating and sharing power (individual, social, and ideological) with its users.

In a similar vein, The Afya Project is a participatory action research project funded by the U.S. Institute of Museum and Library Services working to remove the barriers that African American women face in accessing health information (Bishop, et. al, 2000). An outcome of the project will be a set of culturally appropriate web-based resources that bring together the different expertise of health professionals and black women. Women participating in the project will be directly involved in actively developing the content for the web site, in the outreach efforts, and in the research process itself. SisterNet is primarily driving this project and Prairienet is a partner working with SisterNet to provide computer and Internet training to the project participants.

Conclusion

In contrast to typical digital divide studies, this dissertation proposes a new model, a technology-in-use approach, for the study of technology use and barriers to use for marginalized groups. Typical approaches to the digital divide categorize users into have and

have-not groups based on their access to computer and Internet technology. People that are members of have-not groups — the poor, minorities (especially African-Americans and Hispanics), those with lower education levels, and single-parent families — are less likely to have access to computer and Internet technology. These groups are also perceived as lacking network literacy and being in danger of information poverty. Based on this starting point, the digital divide literature works to describe the demographic characteristics of have-not groups, suggests potential solutions, and discusses the problems experienced by particular have-not groups.

While typical digital divide studies provide a useful starting point in identifying the groups that typically lack access, they do not adequately contextualize the problem of technology use. Three areas of research were reviewed that aided in the development of the technology-in-use framework used to study computer and Internet literacy practices among CNI participants: research taking a local literacy approach to reading and writing practices, research that takes a situated view of technology use, and research on computer use in the home. These areas were reviewed with both an eye towards presenting the state of the art in each area and in drawing out themes relevant to the framework developed in this dissertation.

The local literacy research pointed to the importance of studying everyday literacy practices in the home and the community and the way that these literacy practices are sustained (or fail to be sustained) through people's help networks. In addition, this literature points to the difficult process of integrating new literacy practices and the barriers that people encounter. These challenges include the way that adopting new literacy practices are associated with: (a) life changes and the taking on of new identities, (b) changes in people's

relationships, (c) gender, family roles, and race, and (d) the role of institutions in perpetuating negative stereotypes about marginalized groups and the way that people reject "discourses of stupidity."

Situated technology studies expanded the local literacy approach by focusing explicitly on technology literacy practices. One can see parallels between the local literacy approach and the situated approach in terms of the focus on practice and on understanding the way that technology use is embedded in relationships within one's social network. Both approaches also seek to identify the barriers that people encounter as they attempt to adopt new literacy practices.

Finally, studies of home computer use suggested some of the ways that the CNI participants may use their computers, the difficulties experienced by novice computer users as they attempt to use computer and Internet technology, and some of the specific barriers experienced by low-income users. The studies reviewed that presented a picture of marginalized groups as active technology users are especially important to this dissertation. These studies suggest the importance of seeing the CNI participants as active technology users, a vision that underscores each of the research questions considered in this dissertation. The CNI participants are active in the sense that they are making decisions about how to bring technology into their lives. The CNI participants are active as they try to solve the technical problems that they encounter and as they help others in their social network to solve technical problems. They are also active in the sense that they are trying to figure out how technology fits within the context of their daily lives.

CHAPTER 3

METHODS

This dissertation explored technology use of low-income participants taking part in a computer training and distribution program. The Community Networking Initiative (CNI) project offered free computer training, a recycled computer, and Internet access to people participating in the program. The project was administered by Prairienet, a community computer network in East Central Illinois. The CNI project provided an ideal setting to explore technology use in an at-risk community and to explore issues of technological literacy. The CNI program also provided a useful setting to broaden our understanding of the issues involved in encouraging people to use technology that go beyond the access model taken by typical digital divide studies.

This study draws on ethnographic research traditions with the goal of studying computer and Internet use in the context of people's lives and the way that people make sense of this new technology in their lives. In this tradition, the ethnographer enters "a social group to examine the practices that members need to know, understand, produce, and predict to participate in socially and culturally appropriate ways" (Green & Bloome, 1997, p. 182). Because this study is limited to the study of people's technology literacy practices rather than detailing the larger set of cultural practices that make up people's lives, it may be more accurate to say that this study adopts an "ethnographic perspective" rather than being a comprehensive ethnography in the traditional sense (Barton & Hamilton, 1998; Green & Bloom, 1997).

In taking a technology-in-use approach, this dissertation sought to understand how the CNI participants used the computer and Internet technologies that they received through the CNI program. The first research question focused on describing the unique ways that people brought technology into their lives and how they learned to make sense of the technology. The second research question focused on understanding how people solved problems that they encountered during use and how they used their friendship and acquaintance networks to get help. The last research question focused on understanding the experiences of the CNI participants and what their lives and computer use can teach us about literacy and programs designed to teach computer literacy skills.

The constant comparative method was used to collect and analyze the data gathered for this dissertation. Data were collected using a number of methods including interviews, observations, and focus groups. Additional data were collected by the research team involved in evaluating the impact of the CNI project and was used to triangulate the findings in this study. This additional data includes surveys administered during the CNI classes, a telephone survey of participants that completed the CNI training, and documents such as problem logs that were kept by the CNI tech staff to record interactions with CNI participants.

Research Setting

Organizational Profile

Prairienet is a community computer network that was founded in 1993 as a research and service effort of the Graduate School of Library and Information Science at the University of Illinois. The mission of Prairienet is to ensure that all members of the Champaign-Urbana community have access to the local and global resources available

through the Internet and to the potential that these resources offer. Prairienet is supported by the university through grants, small member fees, and revenue generated through partnering with local organizations in community projects.

Prairienet's mission (http://www.prairienet.org/about/) is to:

- Strengthen community organizations by helping them provide and retrieve networked information.
- Empower individuals by providing access to networked information and by teaching the skills necessary to access and use this information.
- Facilitate information and resource sharing in support of community development efforts.
- Promote equity in access to computer resources for everyone in the community.

In order to achieve this mission, Prairienet has focused on both providing people with access to the Internet and on providing a venue for organizations in the community to put their information on-line. Recognizing that a lack of computer and network literacy skills can be a barrier to technology use, Prairienet has also offered computer and Internet training to individuals, groups, and organizations within the community.

Some of the projects that Prairienet does:

- Help community organizations create websites in our Community Directory and in on-line publications such as those collected in HelpSource.
- Provide individuals with free or low-cost Internet access so that they are able to make use of the local and global resources available on-line and through Prairienet.
- Provide computer and Internet training and consulting to local organizations and individuals.
- Foster communication and participation within the community through newsgroups, e-mail, and other tools.

CNI Project

The CNI project was a collaborative effort between Prairienet, the Urban League of Champaign County, and the Graduate School of Library and Information Science. The project was funded through grants from the Department of Commerce and the Kellogg

Foundation. The CNI program sought to address inequities in access within the Champaign-Urbana community by providing free recycled computers, computer and Internet training, and Internet access to low-income members of the community (CNI Final Report, 1999).

The overwhelming number of participants in the program were African-American women. The program has served a diverse age range from those right out of high school to senior citizens. In the initial stages of the program, the primary way participants were recruited was through the Urban League. As more people learned about the program, information about the program was received via word of mouth. In addition, the project also received referrals from other agencies in the community. People wishing to participate in the program filled out an application and provided documentation of income level. The CNI program based their income requirements on those used by the local Urban League that were based on poverty statistics in Champaign County. Once the application was filled out and the income verification was provided, the participant's information was entered into a database. Participants were called to attend classes based on their application date. In many cases, participants had to wait a year between the time that they filled out the application and when they received training.

The training program for the adults and the characteristics of the computers given out has changed over the course of the program. The first round of training occurred in the summer of 1998. Participants went through 14 hours of training and received computers with the Windows 3.1 operating system. In later rounds of training, the adults were placed into 6- or 12-hour training classes based on their prior computer experience. Once they completed their training they received a computer with the Windows 95 operating system. While the

operating systems for the computers differed depending on when one was trained, the computers that the community members received were basic machines without multimedia capabilities such as CDROM drives or sound cards.

The training consisted of teaching basic computer and Internet skills and specific information about how to connect to the Internet using Prairienet. The training classes were typically held over the course of a two-week period. Classes were either held in the evening or all day on Saturday. The classes covered: (a) computer hardware and software terminology and working in the Windows environment, (b) e-mail, (c) navigating the world wide web, and (d) using a word processor and spreadsheet program. Because so many topics were covered over 12 hours, the class was really an introduction to using computers. For many of the participants, this was not enough training to actually become proficient at using a particular program.

The adults also had other opportunities for training after they completed their basic computer classes through open labs and topic-centered classes. In open labs, there was no set curriculum and community members could attend the classes to get any questions that they had resolved. Topic classes involved training around a particular topic and included a range of subjects from e-mail to finding web sites for kids. In general, the open labs were not well attended by the community members. The attendance at topic classes varied depending on the subject being taught.

The adults who completed the program were able to volunteer to earn upgrades for their computers. People were able to earn volunteer hours by attending topic classes and open labs. They were also able to earn volunteer hours by helping out during CNI classes, during

computer distributions where computers were given out to people completing the classes, at special events that Prairienet was involved in, and at the Prairienet office. People earned an hour for each hour that they volunteered or attended training classes. These hours could be applied towards upgrades including sound cards, speakers, more memory, bigger hard drives, CDROM drives, and additional software.

My Role with the CNI Project

One issue that I was faced in this study is my dual role as a researcher and as a staff member at Prairienet. Chiseri-Strater and Sunstein (1997) suggests that the researcher as a participant observer must explicitly acknowledge the way that he or she is positioned relative to the data. This is important to the reader so that he or she can adequately analyze the strengths and limitations of the analysis.

I have been involved with the CNI project since the summer of 1998, serving as an instructor when training for the adult participants began. In the fall of 1998, I became the Curriculum Coordinator for the CNI project. My job responsibilities included: (a) revising the curriculum for the classes, (b) preparing training material for the classes, (c) handling some of the administrative duties involved in organizing the classes, (d) preparing the trainers to teach community members going through the program, and (e) supervising the training staff. Prairienet also works with other not-for-profit groups in the community, so I do some training and curriculum design for these groups.

Through working at Prairienet, I have been immersed in the issues involved in this dissertation and in the workings of the CNI program. These issues include community networking, providing training geared towards increasing computer skills, working to help

people overcome problems that they encounter in using computers, and the issues involved in working with low-income families. I have been involved in a day-to-day way with fellow staff members in working on the project. This has put me in a position to become familiar with the policies and procedures at Prairienet and the changes that have been made to these procedures along the way.

Through my staff position, I have gotten to know several community members who have gone through the CNI program. My early contact with the adults was through my role as instructor and my later interactions occurred through my role as Curriculum Coordinator. I have had ongoing contact with CNI participants who have served as volunteers for the program. I have also had contact with CNI participants who have either called Prairienet or have stopped by Prairienet with questions. I have been in a position to observe many of the community members over the course of several years as they have gone through the program, as they experienced problems along the way, and as they have integrated the technology into their lives. My role as a participant-observer has allowed me to form relationships with participants in a way that would be harder to create if I were in a traditional researcher role.

The danger in being involved with the project is that I may have blind spots because I have served as a staff member of the project. I may miss things that an outsider to the project might pick up, because I am so familiar with the project. Because I am a staff member, for example, it might be possible for me to miss the ways that the CNI project or its curriculum did not serve the participants well. There is also the danger that I might interpret the experiences of the participants more favorably so as to make the CNI project appear to be successful. Because I have ongoing relationships with many of the participants, there is a

danger that they might not want to tell me negative things about the project so as not to hurt my feelings.

One of the biggest issues involved in my dual role as researcher and staff member is that I may be, in a sense, influencing the outcome of the study since I provide technical assistance to a few of the participants on a semi-regular basis. I have become part of their social network upon which they can draw to make sense of the technology in their lives and to resolve technical problems they encounter. From my experience helping the participants, however, I think that the assistance that I have offered has contributed to their short-term use rather than their on-going use of a particular technology. I have helped people overcome problems that they may have been experiencing as they were trying to get something accomplished. It is really the ongoing day in and day out support that is provided by people's social networks that really influences long-term use.

Another significant issue with my dual role in this study that it can be difficult to draw a clear line between my role as researcher and my role as Curriculum Coordinator for the CNI project. One issue that has came up in collecting data is when to treat a conversation as part of an ordinary discussion that one might have with someone you know well versus a conversation with the primary goal of collecting data. Sometimes the participants would say things in ordinary conversation that was revealing about their lives or their technology use, that was obviously relevant to this study, but that occurred outside the context of a formal interview. This issue is not unique to my study and would happen in any study where the researcher is in an observational role. This issue was relevant particularly for those who served as key informants in this study and those who volunteered with the project. I have

tried to make it clear to the participants when I am in my role as researcher and when I am in the role of CNI staff member. The reality is that it is not always easy to keep these roles separate.

My dual role as researcher and CNI staff member has also put me in a position to hear about issues that are highly personal and that the participants might not wish to make public. This is especially true because this study deals with people who have limited incomes. I had access to information such as income levels and participation in government assistance programs because participants had to provide income verification to participate in the program. Because participants might have things that were personal in situations where my role as researcher is not clear, I was careful about the information that I revealed in this dissertation. I needed to weigh my need to reveal information to provide context in my study with the need to be sure to protect the dignity and privacy of my participants.

The poor especially are often required to reveal very personal things about themselves such as their income level and amount of savings, and they are subject to scrutiny and inspection in ways that many people that have higher incomes do not have to endure. They often have little control in deciding whether or not to reveal this information because to not reveal information or to be caught hiding something can jeopardize the level of assistance that they receive. I do not want my dissertation to put the people participating in my study in the same position of feeling as if they do not have any control over the very personal information that might be presented about their lives.

The best way for me to deal with my dual role as researcher and staff member was to give the participants a chance to read what I have written about them and to negotiate with

them about the events that I have described and the interpretations that I have placed on the data. This was important to ensure the accuracy of the stories that I told about the lives of the participants. Member checking also ensures that the participants have some control over the personal details of their lives that are revealed in this study. Through member checking and through the collection of data via multiple methods I have attempted to address the bias involved in my dual role in the project.

The potential weakness of being very familiar with the project and its participants is also a strength in the sense that it has given me greater access to the participants and an ongoing familiarity with their experiences in the program. It has also given me greater knowledge about the day-to-day events that have happened in their lives and the way that this relates to computer use.

Research Approach

Situated Approach

This study was guided philosophically by work that takes a situated approach to the study of technology use in various contexts. The goals of a situated approach are to clearly describe different incidences of use across settings and to understand how differences in technology use are tied to the relationship between people, technology, institutional roles and norms, and the set of practices surrounding use. The purposes of a situated approach include: (a) explaining how and why an innovation is used in a particular way, (b) predicting the results of using an innovation, (c) identifying similarities and dissimilarities across settings, (d) finding ways to improve the use of the innovation, (e) finding ways to improve the innovation itself, and (f) identifying important elements to study at a later point (Bruce &

Rubin, 1993). The outcome of a situated study is usually a descriptive account of the differing ways that a technology is used with the results being presented in the form of an ethnographic description.

It is appropriate to take a situated approach to understanding technology use by CNI participants in this dissertation because of the difficulty of predicting ahead of time how people will actually use their computers and the set of relationships that will be important in explaining the way that the participants use their computers. A situated approach gives the researcher the flexibility to discover the relationships that exist between people and their use of a technology and to select participants based on the characteristics that emerge from the data.

A situated approach also seems appropriate given that the goal of this study to understand computer use within the context of the lives of the CNI participants. The CNI project was designed to put computers in the homes of families that are low-income. The commitment to taking seriously the lives of the participants I am studying necessitates an approach that does not make assumptions about people based on their "low-income" status, that explores how they are actually using and making sense of the technology, and that explores the relationships that emerge from use. These goals are achieved by taking a situated approach.

Constant Comparative Method

A situated approach is not a procedure for data collection; instead, it is an iterative process of discovering relationships (Bruce & Rubin, 1993). The procedure that was used to collect and analyze data for this dissertation was the constant comparative method developed

by Glaser and Strauss (1967). "In this method, data collection, analysis, and eventually theory stand in close relationship to one another. A researcher does not begin a project with a preconceived theory in mind (unless his or her purpose is to elaborate and extend existing theory). Rather, the researcher begins with an area of study and allows the theory to emerge from the data" (Strauss & Corbin, 1998, p. 12).

In practical terms, the constant comparative method closely links data collection and analysis through theoretical sampling. "The researcher begins with an initial sample chosen for obvious relevance to the research problem. The data leads the investigator to the next documents to be read, the next person to be interviewed, and so on. It is an evolving process guided by the emerging theory" (Merriam, 1998, p. 63). At the same time that data is being collected, analysis is occurring that leads to further theory testing and data collection. Through this iterative process the researcher looks for instances to test the emerging findings. Merriam compares the process of conducting this type of research to a funnel in which a researcher starts broadly and then narrows focus through analysis and interaction with the data.

The constant comparative method was used to analyze the interviews and observations collected as part of this study. In using the constant comparative method, theory is developed by considering hypotheses from many different angles and by continuously checking hypotheses against incoming data. The goal is to open up the inquiry into a particular issue through the process of coding by looking for instances in the data that support, fail to support (negative case analysis) or that add qualifiers to the interpretation of the data (discrepant case selection) (Merriam, 1998).

The theory that emerges is "a set of well developed categories (e.g., themes, concepts) that are systematically interrelated through statements of relationship to form a theoretical framework that explains some relevant social, psychological, educational, nursing, or other phenomena" (Strauss & Corbin, 1988, p. 22). In using the constant comparative method, coding is used to open up the data to reveal the way that the categories are related to each other. Theory is developed through several different coding procedures (open, axial, and selective coding) and through techniques such as writing memos and drawing diagrams that represent the developing theory. At the end of the analysis, one category should emerge as most important with the other being related to the central category in some way.

Participant Selection

Theoretical sampling is used to guide the participant selection in carrying out the constant comparative method. Theoretical sampling requires the researcher to identify some initial criteria for selecting a sample and a willingness to shift the criteria for sample selection as data is collected and analyzed. The focus of the study was to understand how the CNI participants were actually using the computer, how they leaned to solve technical problems, and to look for ways that their lives inform us about acquiring computer and Internet literacy skills. The CNI participants themselves were selected as the primary foci of the study rather than the families of the CNI participants because of the way that the CNI program was structured. The goal of the CNI program was to get computers in the homes of low-income families but the structure of the CNI program itself was geared towards individuals. Only one person per family was allowed to attend the training sessions and only

one computer was distributed per household. By focusing primarily on the CNI participants, I was better able to understand their motivations for completing the program and how they used the computers.

The CNI participants were also selected as the primary foci of the study because they were often the primary adults in the home and the primary adult computer users. Most of the people I interviewed in the preliminary stages of my research were the heads of their households at the time that they went through the CNI program. They were each the primary person with whom the CNI program had a relationship, and I drew on these relationships in selecting participants for my study. In practical terms, however, I often was in a position to observe computer use by other members of the family.

It is also relevant to note that I focused on computer use and Internet use in many different contexts rather than just with the CNI computers that the participants received through the program. For example, some of the participants used their computers at home differently because they had access to a computer and the Internet at work. Again, this allowed me to talk more broadly about the complexity of access when you take into account people's lived experience.

Initial Selection Criteria

Guided by the constant comparative method, I set some initial criteria in selecting participants for the study guided by my experience working with community members and through data collected in focus groups conducted in the summer of 1999. The initial criteria used in selecting participants for this study was their status as a CNI volunteer and my impressions of the their computer skill level. This section will explain the reasons why these

criteria were selected for choosing participants for the study. The next section will discuss how participant selection changed over the course of the study as I worked more with the data.

Volunteers. The CNI program had a relatively stable set of people who volunteered with the program. Their volunteer activities included serving as helpers during training sessions, occasionally co-teaching training classes, helping during the times that computer were distributed to the community, answering phones in the office, and doing clerical work. In return for volunteering, the community member was able to earn upgrades for his or her computer based on the number of hours worked.

Volunteers were chosen as a target group because they had a unique relationship with the CNI program as compared to nonvolunteers. The volunteers had an ongoing relationship with the CNI program and the staff through their volunteer activities. Through my staff position at Prairienet, I was in ongoing contact with the volunteers and we talked often about their use of the computer, the problems that they encountered, and how they thought about the role of computers in their lives. This was an advantage because sometimes it can be difficult in an interview setting for a participant to reveal the many different ways that he or she is using the computer or the technical problems experienced during use. My position also made it easier to ask the volunteers for interviews and to do observations in their homes because I had an ongoing relationship with them.

From the focus groups, it was also apparent that the act of volunteering itself was important and was something that should be tracked in this study. The volunteers talked about the benefits of volunteering, including the ability to continue their learning. Because

they were often in a position to hear the curriculum again, this helped them learn material that they missed the first time. Acting as a volunteer also put community members in the position of helping to solve other people's problems. This gave them more confidence and incentive to learn the technology. Finally, through volunteering, community members were able to ask questions of staff members when they encountered technical problems or when they were interested in exploring a new use for their computer. This seemed like an important group to study because they seemed more engaged with the technology that they received and they were part of a social network upon which they could draw to get technical programs resolved.

Expert versus novice computer users. In addition, an attempt was made to make sure that the study participants represented a mix of skill levels. It was clear from the focus group that a person's level of experience with a computer coming into the program affected how they evaluated the program. Beginning computer users often talked about the difficulties they encountered once they actually worked with their computers at home. They used a variety of strategies to get help including calling the CNI staff, asking friends or family members for help, or soliciting help from people who had gone through the CNI program previously. It seemed important to include a range of skill levels in the study to account for some of these differences. Skill level was assessed based on my observations of participants during training classes and the observations that I made over time as the participants volunteered with the program. In addition, some of the more expert users took the advanced version of the CNI curriculum. People were placed in the expert class based on the answers that they gave on the application to the program regarding previous computer experience.

Expanded Selection Criteria

Because data collection is tightly coupled with data analysis when using the constant comparative method, some new criteria emerged that guided the selection of additional participants. As I began to analyze the initial interviews, some new questions arose which guided my selection of additional participants for the study. The expanded criteria included: (a) those who did not volunteer with the CNI program, (b) people with varying family structures, and (c) gender.

Nonvolunteers. While the volunteers were the primary focus of this dissertation, some interviews were conducted with people who had not volunteered with the project. As the study progressed, I began to wonder about the differences that existed between those who volunteered and those who did not volunteer. Specifically, the volunteers had an ongoing relationship with the CNI program and were in a position to get their questions answered by CNI staff through their volunteer activities. This left open the question of how people who were not involved with the CNI program solved technical problems. It also led me to renew my focus on the different strategies that volunteers used to solve problems outside of the CNI program and their volunteer work.

Family structure and life stage. Another difference that seemed important to explore was the way that family structure influenced computer use. The first few interviews I conducted were with single women who were of retirement age and living alone. In later interviews, I talked with women who either had children in their family or who had grandchildren living in the household. This alerted me to the way that family structure and life stage (e.g. younger participants with families versus those of retirement age) might

influence computer use. In the families with small children, the participants talked about using the computer to teach their children life lessons such as sharing or taking care of one's property. These participants also talked about restricting the use of the computer because they wanted to keep their children safe, and they talked of withholding the use of the computer as a disciplinary action for poor behavior. In later interviews, I talked with people from a range of backgrounds that including families with young children, families with older children, single parent families, dual parent families, and senior citizens..

Gender. The overwhelming number of people who participated in the CNI program were women. Based on this, I thought that it was important to interview some men for this study. I interviewed a man who participated in the program and I also talked with men who took part in an all-male CNI training class to discuss their participation in the CNI program.

Overall profile of participants. The overall profile of the 11 participants that were interviewed for this study is contained in Table 1:

Table 1: Profile of CNI Participants Interviewed for Project

Name	Description	CNI Volunteer work	Prior Computer Experience
Suzy	In her 50's, single, single, white, unable to work since cancer diagnosis and a work-related injury, does quite a bit of volunteer work in the community	office work, helped at some CNI classes	None
Sassy	In her 50's, married with an adult child and 3 grandchildren (9, 10, & 11) living in her home, left family during the course of the study, white, did not work	office work, accompanied Suzy	Owned computer, used to fax friend and for crafts, did not connect to the Internet prior to participating in the CNI program

Table 1 Continued

Name	Description	CNI Volunteer work	Prior Computer Experience
Gund	In her late 60's to early 70's, single, African-American, works through the Urban League's senior job placement service & has acted as an aid to elderly people in the community who need help in conducting their daily affairs	some volunteer work, office work, accompanied Suzy	None
Carla	In her late 20's, married, 3 children (10, 8 ½, & 5), Hispanic, works in a family business	computer distribution, Spanish version of training, general training classes	None
Angela	In her 40's, single mother when participating in the program, two children (5 & 15), African-American, office work at the University of Illinois	None	Prior data entry job, current job uses computer for record keeping, e-mail, web access
Sharon	In her late 60's – early 70's, single, African-American, retired	None	Limited, used at work before retiring - entering grades in computer
Connie	In her 40's, married, 4 children (11, 9, 7, 5), African-American, works in K-12, works for Prairienet	Helped during teen training, later hired by the project to deliver training	Experience with early programming languages like Pascal, had access to Internet at the schools that she worked at but did not know how to use the computers
Paul	In his 30's, single when he took CNI classes, children living in the home, married during the course of the study, works in K-12	Helped during adult training, taught special CNI classes like e-mail and web searching with researcher	Borrowed Macintosh computer from work to play games and make labels, Internet access at work, took advanced CNI class
Sissy	In her 20's, single, 3 children under 8 years old, does not work	Helped during adult training,	Used computer in school for specific tasks

Table 1 Continued

Name	Description	CNI Volunteer work	Prior Computer Experience
Elaine	In her 40's, single, adult children and grandchildren living in her home, has own childcare business, works for Prairienet	Helped during computer distribution, adult training, later hired by the project to deliver training	Limited, used at work, data entry
Ruby	In her late 50's to early 60's, single, African-American, secretarial and office work for a Church	None	Used computer at work, record keeping, typing bulletins, producing financial records using spreadsheets

Overall, the participants selected to participate in the program covered a range of ages, family types, and computer experiences. A variety of ages were represented including young single mothers, middle-aged participants, and older participants including retirees. A variety of family types were represented including single women, single women with children, married participants with children, multigenerational families, and a single father. A range of skill levels were represented including those with no prior experience, those with limited experience at work such as for data entry, those who used the computer as part of their daily work life, and those with greater computer experience. Finally, many of the interviewees volunteered for the program but some nonvolunteers were included to get a sense of their computer use and their ability to solve technical problems.

Data Collection

The research plan developed for this study involved conducting interviews, observing computer use in the home and through CNI activities, and integrating the results of

previously collected data. I have summarized the data collection efforts that have taken place in Table 2.

Table 2: Summary of Data Collection Efforts

Data Collection Effort	**Work Done**	**Responsibility for Data Collection**	**Time Line**
Interviews	11 Interviews Completed	Conducted by Researcher	May 2000 to present
Observations – Home Visits	Observations of 9 participants in their homes	Conducted by Researcher	May 2000 to present, plus ongoing observations during the course of the CNI project
Observations – Volunteer Activities	Observations of the volunteer activities (8 of the 11 participants in the study volunteered)	Conducted by Researcher	Summer 1998 to present
Observations – Class Activities/ Prairienet Activities	Observations of CNI classes through my experience as a staff member at Prairienet	Conducted by Researcher	Summer 1998 to present
Focus Groups	Conducted with 4 groups: (a) Windows 3.1 users who took the basic class, (b) Windows 95 users who took the basic class, (c) Windows 95 users who took the advanced class, (d) volunteers	Conducted and designed by Researcher	Summer 1999
Collateral Documents	Collateral documents related to the CNI program (ex. Income level, method of providing income verification, information provided on application to program)	Collected by CNI Research Team and by CNI staff members	Ongoing documents related to the application procedure for the project

Table 2 Continued

Data Collection Effort	Work Done	Responsibility for Data Collection	Time Line
Previously Collected Data	Phone Survey of People Who Completed CNI the Program	Collected and designed by CNI Research Team	Spring 1999
	Computer Experience Survey	Collected and designed by CNI Research Team	Ongoing part of the application procedure for the CNI program – Summer 1998 to Spring 2000
	Classroom Experience Survey	Collected and designed by CNI Research Team	Ongoing part of the training classes – Summer 1998 to Spring 2000
	Problem logs	Collected by CNI Research Team and by CNI staff members	Fall 1998 to Spring 1999

New Data Collected for the Dissertation

There were three data collection techniques that were conducted for the purposes of this dissertation. These data collection efforts included interviews, observations, and a series of focus groups that were designed to better understand the experiences of the CNI participants in the program. I was primarily responsible for these data collection efforts.

Interviews. 11 interviews were conducted using the selection criterion outlined in the previous section. Each interview began with a brief explanation about the research process, the data collection procedure, and a discussion about privacy and anonymity in participating in a research study. The participants were asked to sign a human subjects form (Appendix A)

indicating their willingness to participate in the study. I used semi-structured interviews to elicit the point of view of participants taking part in this study, with each interview lasting roughly 1 hour.

The interview questions were centered around three issues: (a) understanding how the CNI participants were using their computers and the meaning this held in their lives, (b) problems they encountered and their way of solving the problems, and (c) their life experiences and the way that this impacted use. The question guide that was used during the interview can be found in Appendix B. Of special interest for this study were moments of breakdown that occurred when using their computer. As Star and Bowker (1999) have noted, a useful strategy in trying to uncover the way that infrastructure functions in a setting is to look for points of breakdown. It is here where people and activities we take for granted when things are operating normally become apparent. This is particularly salient given the studies on home computer use that point to the many problems that new users face as they try to integrate technology into their homes (Franzke & McClard, 1996; Katz & Aspden, 1997, Kiesler, et al., 1997, 2000).

Observations. I conducted observations in people's homes and during CNI activities. Of the 11 interviews that I conducted, I visited four homes at least two times and I visited five homes one time for the interview. There were two participants whose homes I did not visit. At the end of each formal interview session, I asked the interviewee to show me where his or her computer was located. This often lead to further discussions about how the participant used the computer and problems that were encountered. These sessions were important, because I could get a sense of people's computer use and it provided me with an

opportunity to give back to my participants by trying to help them resolve problems they were experiencing. For example, one participant's keyboard was not working, so I brought a keyboard to the interview for her to use. In a different case, a participant had received a printer from another family member, so I downloaded the drivers she needed to make the printer work.

As a staff member of Prairienet, I was in a position to observe how people used computers and the problems they encountered. I had ongoing contact with many of the volunteers and they often told me about how they were using their computers or about problems that they were having. In addition, I was able to observe them asking other staff members for help and also their interactions with other community members in the training classes and during distributions. I also had contact with people who did not volunteer with the program but who called Prairienet for help. I took notes on these activities and observations.

I also did some informal observations of computer use in the home of people whom I did not directly interview for this study. One of the participants of the study, Elaine, often went to people's homes to help them with technical problems that they encountered. I went along with Elaine (a pseudonym) on two separate occasions to observe the types of problems people encountered and how she worked with the community members who were experiencing problems. The first time I went out with her, we went to three different homes to help community members with problems that they were encountering. The second time I went out with her, we went to two homes. I took extensive notes during the observations. These home visits were important because they gave me a sense of the complexity of

computer use in the home, the difficulty of providing technical assistance, and some about the start and stop nature of computer use, computer learning, and help giving.

I did more extensive observations for two of the participants, Suzy and Elaine, who served as key informants for the study. I went to Elaine's house several times to watch her use her computer. I was also in a position to observe Elaine's computer use, because she was hired as a staff member at Prairienet. I also visited Suzy several times at her home to observe her use of the computer. I did an extended observation of her use of the computer to prepare for Share Foods, a food coop that she runs. I also spent time working with her to figure out her scanner.

Focus groups. The focus groups that were carried out as part of this study involved CNI community members who had already completed their training. These focus groups served to assess how participants were using their computers, the types of technical problems they encountered, and how they solved technical problems. Focus groups were conducted with: (a) participants who completed the first round of training offered by the project and who received Windows 3.1 machines, (b) participants who participated in later rounds of training and who received Windows 95 machines, (c) people who volunteered with the CNI program, and (d) participants who had more experience with computers and the Internet and who went through a shortened CNI training program. These groups were chosen because each had a unique experience with the program. I was primarily responsible for all details of the focus groups. I recruited participants to take part in the focus groups, set up the meetings, drafted the question guide that was used during the focus groups, administered the focus groups, and provided summary reports to the research team.

Previously Conducted Data Collections

In addition to the data collected through for dissertation, the research team for the CNI project collected other data that were drawn upon to answer the research questions. I was not involved in the design of the instruments used in collecting this data nor was I, in most cases, primarily responsible for collecting the data. These data collection efforts included a telephone survey of participants that completed the CNI training, surveys conducted as part of the CNI training classes, and documents collected to track the problems that CNI participants experienced with their computer equipment.

Telephone survey. A telephone survey was held in the Summer of 1999 that was designed to assess the CNI participants' use of the CNI computes that they received, the problems that they encountered, and the degree to which they shared and received computer help. The results of this survey were useful in understanding, in a broader way, the issues involved in this dissertation. The results of this survey were also useful to triangulate the findings in this study so that I could see if the types of helping behaviors I observed among those that participated in my study were also present in the larger CNI population. Some of the results of this survey are available in Bishop et al. (1999).

Computer experience survey. As part of the application process, CNI participants filled out a computer experience survey in which they provided their assessment of their familiarity with particular computer programs. This survey was designed by the CNI research team and was part of the application procedure. This data was used by the project in a limited way to assign people to CNI training classes. This data may be useful to get an overall sense

of the knowledge and skill levels of the participants entering the program. It was also used to understand the participants' goals in participating in the CNI program.

Survey of classroom experience. The CNI research team designed a survey that was administered at the end of each training class to capture people's evaluations of the CNI training program. The survey included questions about the participant's goals for going through the program, how he or she heard about the program, evaluation of the training received, and suggestions for ways to improve the program. The research team designed the surveys, but I was involved in distributing the surveys in my role as Curriculum Coordinator for the project. I made sure that the trainers were aware that they needed to administer the survey, and I collected the completed surveys. In addition, I entered the data from the survey into SPSS and provided summary data to the research team from the surveys.

Problem logs. Another source of data used in this dissertation were problem logs that were maintained by the technology staff for several months during the project. These logs contain a record of the staff's contacts with the CNI participants, the nature of their problems, and the attempts that were made to help solve the problems they were experiencing. This will not catch all problems that people encountered, but it should provide an overall sense of general problems people faced. The information the logs provide is limited because it only represents interactions with the people that chose to work through the CNI program for help. Kiesler, et al., (2000) suggest that these types of logs only pick up certain kinds of problems and miss other problems such as not being able to change the wallpaper or move icons around a screen.

Collateral Documents

Some collateral documents were useful in understanding the circumstances of the people participating in the CNI program. In order to take part in the program participants were required to fill out an application and to provide income verification to establish eligibility to participate in the program. A database was maintained by the Member Services Coordinator that contained information such as the participants' names, addresses, income levels, the CNI classes that they took part in, and the ways that they proved they were eligible for the program. It also contained information about people who either dropped out of the program or those who could no longer be contacted to participate in the program. This data was useful in understanding in a broad sense some of the characteristics of the participants completing the program. This data was also used to understand the specific circumstances of the participants I interviewed and observed for my dissertation.

Key Informants

Two of my participants have proven to be very important in helping me understand computer use and learning. I have spent more time with each of these participants than with other participants and have observed their use of the computer on multiple occasions. These community members were selected partially based upon my relationship with them in that they were regular volunteers with Prairienet. These community members were also selected because they had strong connections to other people who went through the program. In some cases, they suggested other people that I might interview, and I drew upon their relationships with people to set up the interview.

Elaine was a key informant who went through the CNI training program and often went to other people's homes to teach them how to use their computers and to help them with problems that they encountered. I visited Elaine's house three or more times with the express purpose of working with her on her computer. I had regular contact with her, because she was hired by the project to deliver the training.

Suzy was another key informant with whom I had weekly contact through her volunteer activities. During my first home visit with her, she showed me how she used her computer in volunteer work unrelated to the CNI program. She runs Share Foods, a food coop in the local area. I helped out at a Share Foods distribution to see how the things she produced using her computer were actually used. I visited her home a second time to show her how to use her scanner, and I regularly talked with her about her use of the computer and provided technical help to her during her volunteer activities.

Data Analysis

The constant comparative method requires a procedure for handling and retrieving the data. The interview data (in the form of transcripts) and the observational data (in the form of field notes) were transcribed as soon as possible after the data collection Data was backed-up on a regular basis. I have used data analysis software to code the data. The software that I have used is Nvivo, a product from the company that produces the Nudist line of qualitative software. All of the interview and observational data along with the memos have been imported into this software package. This software enables me to code the data I am working with, to quickly call up the data related to a particular code, to recode data easily, and eventually to create and test models.

Establishing Trustworthiness of Results

In performing a qualitative analysis, Lincoln and Guba (1985) suggest that the standard used to assess a qualitative study is trustworthiness – the ability of the researcher to show that the results reported are worthy of attention. They suggest that this standard can be met through: (a) activities that make it more likely that the findings are credible (prolonged engagement, persistent engagement, and triangulation), (b) external checks on the process of inquiry (peer debriefing), (c) ways of checking working hypotheses (negative case analysis), (d) ways of checking preliminary findings against data (referential adequacy), (e) and ways of testing for discrepancies between a researcher's interpretation and the perspective of the people studied (member checking).

One of the larger issues in this study is my role as a researcher and participant in the project. One of the advantages of being in this role is that I have been deeply involved in the issues involved in working with people as they attempt to integrate technology into their lives. I have been consistently working on the project for the last three years. It is important to address the potential weaknesses involved in being so close to the project and the participants.

One way that I addressed the potential conflict of being a participant observer in this project is by triangulating my findings through data collected by other people using different methods. "Triangulation has been generally considered a process of using multiple perceptions to clarify meaning, verifying the repeatability of an observation or interpretation (Stake, 1994, p. 241). Triangulation is an important way of achieving trustworthiness. This can be achieved in many different ways: (a) through data source triangulation, which assesses

the extent to which the case remains consistent across time and space, (b) investigator triangulation in which other researchers are used to verify findings by having them examine the same scene, (c) theory triangulation, which is the extent to which people describe the same event in a similar way, and (d) methodological triangulation, in which multiple methods are used to gather data. Because this dissertation is part of a larger data collection effort, I have the advantage of being able to triangulate my findings with previously collected data, some of which I did not collect. These data sources include surveys about the training that CNI participants received and a telephone survey related to the way that people actually used their CNI computers and the problems they encountered. Multiple methods were used to gather data including interviews, observations, and a previously conducted focus group. These additional data sources helped to verify my findings.

Another useful approach in establishing trustworthiness in a study is through "member checking." As Williams (1996) points out, there are many difficult ethical issues involved in working with participants. In conducting research and disseminating the results of the researcher participants can feel "hurt, embarrassed, outraged, or deceived" (p.46). Newkirk (1996) raises a similar issue about the way that researchers can seduce and betray participants in the course of doing research. As researchers, we want people to believe that we are well meaning, because this attitude is also important in gaining entry into a research setting. This seduction hides the betrayal than can happen when a researcher writes about something negative that happened or when a person is portrayed in a negative way. Researchers often do not prepare participants for the "bad news" that can be involved in a

research study. Newkirk suggests the importance of discussing this issue with people as part of the consent process and through member checking.

Member checking is a way to test out a researcher's interpretations by asking participants to read portions of the final research report and interim reports. This opens up the possibility for greater accuracy in one's findings and the chance for participants and the researcher to negotiate the interpretation in a study. I asked my participants to read the sections of the research report that pertain to the data that they provided to check the accuracy of my analysis.

Addressing issues of privacy and anonymity is also a way of ensuring the accuracy of one's results. To ensure anonymity, people's names and identifying characteristics of the participants were changed in order to ensure their anonymity. No one's name or identifying features were used in any reports published about the project. This method is not perfect, because the CNI community is close-knit so it may be impossible to ensure people's anonymity within the local community. As many have pointed out, the downside to stripping names out of research reports is that people do not get the credit that they deserve for participating.

Another way of ensuring trustworthiness and accuracy is by being aware of some of the particular issues that are relevant to the group that is being studied. There is concern in the community about the way that researchers have misrepresented the views of African-Americans in the Champaign-Urbana community. For example, one of the participants in a class I taught e-mailed me about her concerns about the research side of the project. Her

concern was with the way that the experiences of her people have been misrepresented in past research projects.

Brueggemann (1996) talks about this problem in terms of colonizing the voice of the other. Some have suggested the importance of self-reflection to avoid the problem of colonizing the voice of other. Brueggemann points out that turning the lens inward does not really address whether or not the interpretation being presented is accurate from the point of view of the participants. She suggests a collaborative research process in which the participant is able to comment on and critique the interpretation that is being presented by the researcher. These comments should become a part of the final report that is presented. This is a valid concern that required me to spend time in the initial meeting with participants talking about the research that I am conducting and the steps that I intended to take to make sure that my results are accurate. This includes giving people the ability to read portions of the research report to ensure accuracy.

Summary

The focus of this study is to understand the way that the CNI participants are using the computers they received through the CNI program and how this fits in the overall context of their lives. The first research questions ask how the CNI participants actually used the computers that they received and how they made sense of this new technology in their lives. The second research question asks how they solved technical problems they encountered. The third research question asks what the lives of the CNI participants can teach us about technological literacy and programs designed to teach literacy skills.

In this chapter, I have outlined the situated approach that is the philosophy underlying the approach taken to answering the research questions. I have described the constant comparative method used to interpret the data and to guide participant selection in this study. A variety of data collection techniques were used in this study including interviews, observations, and focus groups. In addition, I described data collected by the CNI research team and how it was used to triangulate the findings of this study.

CHAPTER 4

COMPUTER LIFE STORIES

This chapter begins where many digital divide studies begin, by profiling the demographic characteristics of the CNI participants. The purpose of this profiling is to show that the CNI participants fit standard definitions used to describe "have-nots." I argue, however, that we need to move beyond these categories to understand the context of use for marginalized groups as they attempt to bring technology into their lives. This chapter describes the experience of six of the CNI participants, the ways that they used the technology, the meaning that technology held in their lives, and the barriers they encountered as they attempted to integrate the technology into their lives.

Profile of CNI Participants

The CNI project was a computer distribution and training program aimed at increasing access to computer technology and the Internet for low-income residents of Champaign County, Illinois. The demographics of people participating in the CNI program were similar to published reports that detail the characteristics of "have-nots" – those with lower income and educational levels, those from single-parent families (especially female-headed households), and minorities (especially African-Americans and Hispanics) (U. S. Department of Commerce, 1999).

Several sources of data have been used to draw a profile of the CNI participants. These data sources include: (a) a voluntary affirmative action form filled out as part of the application process, (b) information that the participants provided during the application process that was compiled into a database used to track the participants as they moved

through the CNI program, (c) statistics from the Census Bureau and other agencies that paint a profile of residents of Champaign County, and (d) data collected by the CNI research team to evaluate the project (Bishop, 2000).

The first source of data was a voluntary affirmative action form that asked each participant to disclose race, age, and gender. This information was added to the CNI database for program participants. The second source of data was a database maintained by the Member Services Coordinator of Prairienet that contained information for each participant, such as yearly income, participation in other income-based aid programs, contact information, and whether or not each had completed the CNI training. It is relevant to note that this database was not created for research purposes but was created for in-house use to track the participants as they moved through the program. This means that at times there were inconsistencies in the database in terms of how records were kept. These inconsistencies are noted along the way to assist in the interpretation of the data. In drawing a profile of the CNI participants, only those who completed the program and for whom income data was available in the database are part of the analysis in this section. The third source of data were statistical reports that detail the demographic characteristics of residents of Champaign County. This included data from the 1990 and 2000 censuses, supplemental reports to the census, as well as resources that compile economic data from census reports such as the Kids First Report compiled by the Voices for Illinois Children Organization (2002). Finally, data collected by the CNI research team was used to paint a more complete picture of the profile of the participants (Bishop, 2000)

Income. Income level is used most frequently in defining technology "have-nots." The Department of Commerce defines "low-income" in their first three digital divide reports as families with yearly earnings below $20,000 (U.S. Department of Commerce, 1999, 1998, 1995) and in the fourth and most recent digital divide report as families earning below $15,000 (U.S. Department of Commerce, 2002). The income level of the CNI participants falls well below the low-income definition used by the Department of Commerce in their digital divide studies. The income level for most of the CNI participants was recorded in the project database. There were 505 names in the database that contained yearly income information. For these participants, the median income level was $10,692 per year (mean=$11,719.47, range = $807 to $35,013). In interpreting these figures it is relevant to note that it is possible for a person to fail to report all of their income, and the CNI program had no way to verify this information. In addition, these figures do not necessarily include all income sources such as child support. I also compared the income level of the CNI participants to other residents of Champaign county to see how they fare locally. The median income level of the CNI participants falls well below the median income for Champaign residents which was $38,245 in 1997 (Voices for Illinois Children, 2002).

Another way to get a sense of the income level of the CNI participants was to examine their use of other aid-based income programs. People could qualify to participate in the CNI program if they participated in programs such as the government-sponsored free and reduced price school lunch programs, public aid, energy assistance, or Medicaid. It is not possible to determine, across the CNI program, the extent to which the participants made use of these programs. To place the income level of the CNI participants in perspective, Table 3

compares the CNI guidelines to federal poverty guidelines. The CNI guidelines are the same figures used by the local Urban League to determine eligibility for aid-based programs they administer and are based on poverty statistics for Champaign County. The CNI guidelines have changed over the course of the program; the figures presented here reflect the most current guidelines.

Table 3: CNI Program Guidelines Versus Federal Poverty Guidelines

Family Size	2002 CNI Guidelines/ Annual Household Income	2002 Federal Guidelines/ Annual Household Income (48 states & D.C.)
1	$12,525	$8,860
2	$16,875	$11,940
3	$21,225	$15,020
4	$25,575	$18,100
5	$29,925	$21,180
6	$34,275	$24,260
7	$38,625	$27,340
8	$42,975	$30,420

Since the guidelines used to determine CNI program eligibility are roughly similar to the federal poverty guidelines, it appears that the program is tapping into the "low-income" population in Champaign County. In Champaign County, about 30% of children enrolled in schools are considered "low-income" which means that either their families receive public assistance, they are eligible for free or reduced price school lunches, they are in foster care, or they are in homes for delinquent children (Work, Welfare and Families web site). About 31% of students in Champaign County qualify for free or reduced price lunches (Voices for Illinois Children, 2002). These figures are summarized in Table 4.

Table 4: Participation in Aid Based Programs and Poverty Statistics in Champaign County

Program	Average
Children in families that receive public assistance, eligible for free or reduced price school lunches, children in foster care or in homes for delinquent children (Work, Welfare, & Family web site)	30.14%
Children eligible for free or reduced price school lunches (Voices for Illinois Children, 2002)	31.4%
Children living in Poverty, 1997 figures (Voices for Illinois Children, 2002)	16.8%

Education. Technology "have-nots" are also defined in terms of their education level, with those who lack a four-year college degree being less likely to have access to computers and to the Internet (U.S. Department of Commerce, 1999). The CNI program did not collect education data for all participants so it is not possible to make precise statements about the educational attainment of those participating in the program. Demographic data were collected for the CNI participants who participated in early CNI training sessions. These data suggest that a majority of the participants did not have four-year degrees (Bishop, 2000, see Table 5). The education level of CNI participants, however, roughly corresponds to the education level of residents in Champaign county (Table 6).

Table 5: Educational Level of CNI Participants (Bishop, 2000)

Education Level	CNI (N=)	CNI Percentage
Have not completed High School	7	6.36
High School Graduate	24	21.82
Some College or vocational training	53	48.18
College Graduate	19	17.27
Completed a Graduate or Professional Program	6	5.45
Missing	1	0.91
Total	110	100

Table 6: Educational Level in Champaign County, 1990 Census Data

Education Level for people 25 and older	Percentage
Less than 9th grade	4.60
9th to 12th grade, have not completed high school	7.90
High School Graduate	26.27
Some College, no degree	19.93
Associates degree	7.23
Bachelor's degree	16.30
Graduate or professional degree	17.76
Total	100

Bishop (2000) also provides additional information that helps to paint a profile of the educational level of the participant. Bishop reported that the majority of the CNI participants in the early classes had "pink-collar" jobs such as secretaries or teachers (Bishop, 2000). A majority of the participants identified themselves as either students or homemakers. About 25% of those taking part in early CNI training courses reported themselves as being unemployed.

Race. Race is often used to define "have-nots" with minorities, especially African-Americans and Hispanics, often having less access to computers and the Internet. About two-thirds of the CNI participants were African-American (Table 7). We can see that the population served by the CNI program differs from the overall population of Champaign County (Table 8) which is predominately white (United States Census, 2000).

Table 7: Race Statistics, CNI Program Participants

Race	Count (N=)	Percentage
African-American	423	66.72
White	134	21.14
No answer provided	45	7.10
Hispanic	23	3.63
Two races listed	5	0.79
Other	4	0.63
Total	634	100.00

Table 8: Race Statistics, Champaign County, 2000 Census

Race	Percentage
White	78.8
African-American	11.2
Asian	6.5
Two or more races	1.3
American Indian or Alaska Native	.2
Hispanic/Latino origin (separate question in the Census)	2.9

Gender. Family composition is used to define "have-nots" with single-parent families, especially those headed by a female, being less likely to have access to computer and the Internet. About 81% of the CNI participants were women (Table 9). These figures differ from the profile of Champaign County which is 49.7% female (2000 Census data).

Table 9: Gender of CNI Participants

Gender	Count (N=)	Percentage
Female	513	80.91
Male	53	8.36
Not provided	68	10.73
Total	634	100.00

Family Composition. Family composition is also used to describe technology "have-nots" with single-parent families headed by females being less likely to have access to computers and the Internet (U. S. Department of Commerce, 1999). Information about family composition was not collected from CNI program participants. Anecdotally, the Member Services Coordinator, who had contact with many of the CNI participants, reported that a significant number of the CNI participants were single mothers (Bishop, 2000). From the interview and focus group data collected as part of this dissertation, it is also apparent that besides single-parent families there were also many multigenerational families with either grandparents raising grandchildren or adult children living in their parents' homes with their own children. It is also relevant to note that there were other family configurations such as people living as singles, especially seniors. The Voices for Illinois Children Organization (2002) provided statistics for the family composition of Champaign County based on census data (Table 10). They reported: (a) 67.7% of children are being raised in married households, (b) 19.8% are being raised by single mothers, (c) 4.4% of children are being raised by single fathers, (d) 4.4% of children are being raised by grandparents, (e) 1.3% of children are being raised by other family members, and (f) 2.8% have some other living arrangement.

Table 10: Family Composition for Champaign County (Voices for Illinois Children Organization, 2002)

Family Composition	Percentage
Children raised in married households	67.7
Children raised in single female-headed households	19.8
Children raised in single male-headed households	4.4
Children raised by grandparents	4.4
Children raised by other family members	1.3
Children raised in some other living arrangement	2.8

Age. More recently, age has been used to define technology "have-nots" with seniors (over 60 years old) being less likely to have access to computers and to the Internet (Pew, September 9, 2001). The age of the CNI participants was collected for early CNI participants during focus groups (Bishop, 2000) and across the program as part of the voluntary affirmative action form which was part of the application procedure (Table 11). The data collected across the CNI program represents only a rough estimate of the ages of the CNI participants because many people chose not to reveal age on the form. Some versions of the affirmative access form also did not ask the participants to reveal age. The majority of the CNI participants were between the ages of 20 and 49. While the project did serve some seniors, they did not utilize the program as heavily as other groups. The CNI age statistics are not directly comparable to the age statistics for Champaign county (Table 12), because the program restricted participation to adults aged 18 or older. In addition, age was categorized differently in the two data sets.

Table 11: Ages of CNI Participants

Age	Count – CNI database across entire program	Percentage - CNI database across entire program	Count - First Round of Training (Bishop, 2000)	Percentage - First Round of Training (Bishop, 2000)
not provided/ missing	211	33.28	20	15
less than 20	5	0.79	1	1
20-29	124	19.56	31	23
30-39	148	23.34	43	32
40-49	85	13.41	31	23
50-59	36	5.68	5	4
Over 60	25	3.94	5	4
Total	634	100.00	136	100

Table 12: Ages of Residents in Champaign County, Census Data

Age	Champaign County - Percentage
Under 5	5.8
5-9	5.9
10-14	5.9
15-19	11
20-24	15.6
25-34	14.7
35-44	13.5
45-54	11.4
55-59	3.6
60-64	3
65-74	5.1
75- 84	3.4
85+	1.3

The CNI participants clearly fit most standard definitions used to describe technology "have-nots." The CNI participants were overwhelmingly: African-American woman, aged 20 to 49, who had lower levels of education, and who would be classified as "low-income" based on federal poverty guidelines. There is also anecdotal evidence that a large number of the women who participated in the program were single mothers. In looking at the statistics for Champaign county, the CNI participants earned less than other residents in the county. Also, the composition of the county is overwhelmingly white while the demographics of the CNI project have been overwhelmingly African-American.

When we look at the stories of the CNI participants, we can begin to understand what is missing when we only focus on demographics. The digital divide approach is flawed because it goes no further than identifying the demographics of "have-nots" as if these categories somehow carry with them the reasons why people lack access to technology. The

digital divide approach paints a picture of marginalized groups as passive people who do not use technology. In contrast, when we look at the experience of the CNI participants, we see a group of active technology users who brought technology into their lives in meaningful and diverse ways. The digital divide approach also misses the real barriers that people experience as they attempt to bring technology into their lives.

On a broad level, we can see some of this diversity by looking at the stories of those interviewed for this study. These stories are described in Table 13. The CNI participants used the computers and Internet access that they received through the program in many different ways. This diversity of experience mirrors the findings of other situated technology studies that point to the way that people use the same technology in different ways (Bruce, 1993).

Table 13: Examples of CNI Participants' Uses of Computers and the Internet

Name	Description	Use of Computer/Internet
Suzy	In her 50's, single, white, unable to work since cancer diagnosis and a work-related injury, does quite a bit of volunteer work in the community	Suzy has 3 computers in her home: her CNI computer, a computer that she purchased on her own, and a notebook computer that someone gave her. She uses her computer in her volunteer work with Share Foods, a food coop, word processing signs and forms to run Share Foods and sending e-mails to the local newspaper to inform people about the program. She uses her computer to stay in contact with friends and family by sending pick-me-ups in the form of e-mailed jokes, stories, and web cards.
Sassy	In her 50's, married with an adult child and 3 grandchildren (9, 10, & 11) living in her home, left family during the course of the study, white, did not work	Sassy used her computer to pursue her interest in crafts, to play games with her grandchildren, and to communicate with others. She used her computer to create needlepoint designs and the computer became the topic of craft items that she produced. She purchased a computer for her grandchildren that they could use to play games and in their schoolwork. She was very involved in chatting with people that she met on-line, eventually leaving her family to live with friends she met in a chatroom that she visited

Table 13 Continued

Name	Description	Use of Computer/Internet
Gund	In her late 60's to early 70's, single, African-American, works through the Urban League's senior job placement service & has acted as an aid to elderly people in the community who need help in conducting their daily affairs	Gund used her computer, until she lost phone service, to e-mail relatives who did not live near her. She was quick to see the potential of the computer in her life even if she could not always figure out how to use her computer. Gund wanted to use her computer to do genealogy research so that she could produce a family tree. This genealogy research was important to her so that she could find some missing information about her life and to create a link between the generations of her family. Gund also saw the potential of the computer to organize her craft related business.
Carla	In her late 20's, married, 3 children (10, 8 ½, & 5), Hispanic, works in a family business	Carla used her computer to relax, to look up information of interest to her, to e-mail distant relatives, and with her children. Carla would play games on her computer as a way to relax when life was stressful. Her computer was used by her children to play educational games and she used the computer to teach her children life lessons like sharing and taking care of their belongings.
Angela	In her 40's, single mother when participating in the program, two children (5 & 15), African-American, office worker at the University of Illinois	Angela's CNI computer was used mainly by her son to play games and to look up information. Angela had access to a computer through her job and used her computer at work to look up information of interest and to e-mail friends and family. Angela's son also had access to computers and the Internet at school. They both found the CNI computer to be slow compared to their access at home and school.
Sharon	In her late 60's – early 70's, single, African-American, retired	Sharon had many problems with her CNI computer once she took it home. The system had to be replaced because it was not working correctly. Sharon also had trouble using the computer to connect to the Internet through Prairienet. She eventually gave her computer to her niece whom she felt would use the computer more

Table 13 Continued

Name	Description	Use of Computer/Internet
Connie	In her 40's, married, 4 children (11, 9, 7, 5), African-American, works in K-12, works for Prairienet, has a four-year college degree	Connie uses her computer to e-mail distant relatives, to look up information of interest, and with her children. She closely monitors her children's access to the Internet and does not allow them to get on-line if she is not present, so that they do not get into anything inappropriate. The computer is also used to find information for her children's research papers. She uses the computer to e-mail distant relatives, to look up information from on-line newspapers, and to look up information of interest. Connie works for the CNI program and teaches others how to use the computer.
Paul	In his 30's, single when he took CNI classes, children living in the home, African-American, married during the course of the study, works in K-12	Paul uses his computer to look up information for himself and for other family members. He bought a new computer and loaned his CNI computer to a friend who was trying to decide if he should buy a computer. His children use his computer to look up information about favorite musicians and song lyrics. He installed a CD burner in his new computer and makes some money copying CDs for people that he knows. He also uses his computer to e-mail friends and family.
Sissy	In her 20's, single, 3 children under 8 years old, does not work	Sissy uses her computer to communicate with distant friends and to look up information of interest. Her friend who also participated in the CNI program moved away, so they e-mail back and forth. She enjoys visiting different web sites and discovering new things she can do with her computer. She also wants to use her computer more with her children.
Elaine	In her 40's, single, adult children and grandchildren living in her home, has own childcare business, works for Prairienet	Elaine learned how to fix and upgrade computers through her own efforts, the help of a knowledgeable friend, and her work at Prairienet. As a volunteer, she would often go to the homes of friends, family members, and others who went through the CNI program to fix and upgrade their computers. She continues this work as a staff member of Prairienet. She also uses her computer to e-mail friends and family members, to play games, and to organize her life. Her family is very important to her so she has made sure that each of her grandsons has a computer of his own to use. She has purchased educational software and games for their computers and has shown them how to use the computer.

Table 13 Continued

Name	Description	Use of Computer/Internet
Ruby	In her late 50's to early 60's, single, African-American, secretarial and office work for a Church	Ruby used her CNI computer mostly to play games. She was working two jobs when I interviewed her, so she played games when she came home from work as a way to relax and to regulate time. Before losing her phone service, she used the Internet to look up information of interest and to find people. She uses a computer at work at a church producing financial reports and word processing letters and the church's bulletin. She has Internet access at work that she could use to do e-mail or get on the web but she only uses these resources for work related purposes.

When we look at the demographic profile of each of the participants, we see how each fits the technology "have-not" category. Moving beyond these demographics characteristics, the snapshots of use provided in Table 13 also reveal how the participants were actively engaged in learning about and using the technology. This suggests that "success" with computers is situated, just as is technology use in a given setting is situated. For example, even though Sharon gave away her computer, she was successful in the sense that she provided a needed resource to another family member. For Ruby, who worked two jobs and who lost her telephone access, "success" meant that she could use her computer to relax after a busy day. This does not imply that the CNI participants did not want to do other things with their computers. The point is that before we make judgments about their worth as people or the worth of their technology use we need to understand the details of their lives.

The next section details the experiences of some of the CNI participants as they worked to integrate technology into their lives. Their stories are being told based on interviews conducted with each participant and based on observations of computer use during

their classes, their volunteer activities, and in their homes. This allows us to move from the snapshots of use described above to a more detailed examination of how people connected their use of technology to the context of their lives. This allows for a deeper consideration of the way that the CNI participants' lives and experiences are not adequately represented by the "have-not" categorization. We can begin to notice the unique ways that people bring technology into their lives, the meanings that technology holds in their lives and the new technology practices that they develop.

Computer Life Stories of Selected CNI Participants

Suzy's Story: Computer as Therapy and Volunteerism

Suzy is a white woman in her mid-fifties who moved to east central Illinois in 1968, because her husband was stationed at a local military base. She and her husband have since divorced and she now lives on her own in a trailer home. She does not have any immediate family living in the area; her son lives out of state. She was working two full-time jobs until about five years ago when she suffered some health problems and became unable to work. She cut herself on the job and suffered a staph infection that put her in the hospital for a month. Suzy had to apply for public aid to support herself because she was denied worker's compensation for this injury. She still suffers from the after-effects of this injury, finding it difficult to walk for long periods of time because of the severe swelling that she experiences in her legs. Soon after her job injury, Suzy was diagnosed with cancer and was undergoing chemotherapy right before she participated in the CNI program.

Suzy heard about the CNI program through the community service center in her town where she went to sign up for energy assistance. Someone there told her about the CNI

program and said that if you qualify for energy assistance then you would qualify to participate in a program to get a free computer. As she expressed it:

> Originally, because I had worked two full-times job and then all of a sudden due to my loss of my health then I was really just housebound. I did it because I thought it was an avenue that I could be still be productive and be in contact with the outside world and not have to leave the house or, you know because I couldn't leave the house at that time very much both for financial reasons and health reasons.

Suzy talks about computers almost as a form of therapy both for herself in dealing with her health problems and for others in her social network whom she has encouraged to use computers because they are ill or need something productive to do

Prior to participating in the CNI program, Suzy had never used a computer. She received a 386 computer with Windows 3.1 after completing her CNI training. Over the last three years, she upgraded the CNI computer she received and has purchased new computer technology. Suzy has two computer set-ups in her home partially because of her health problems. The first set-up is in her living room where she uses a laptop a friend purchased for her. She uses the laptop seated in a reclining chair because the chair helps to reduce the swelling in her legs. She also has a home office where she has two computers – an upgraded computer she received from the CNI program and a new computer she purchased after participating in the program. She was able to upgrade the original CNI machine she received because of the volunteer work that she performed with the CNI project.

Suzy uses her computer a great deal to communicate with friends and family who live across the United States. She often sends "pick-me ups" in the form of e-mail jokes, stories, and web cards to her friends and to her son. She also occasionally sends chain e-mail letters to people in her social network. She has an instant messenger program installed on her

computer so that she knows when her friends and relatives are on-line so she can chat with them.

Suzy also uses her computer for social participation as a volunteer coordinator for the Share Foods program – a nonprofit food cooperative run by volunteers that tries to get low cost food into people's homes. Anyone can participate in the program, but it is used most heavily by seniors, diabetics, and low-income families who are trying to extend their food dollars. Suzy is in charge of organizing all aspects of the food distribution and handles the business end of the program: recording people's payments, putting in the order for the food, arranging for the pickup of the food, and doing the banking for the program. She uses her computer to organize the day-to-day activities of the Share Foods program.

In addition to her volunteer work with Share Foods, Suzy also donates her time to organizations and individuals in the community. She does volunteer driving, transporting people to Champaign for doctor's appointments. She performs countless acts of kindness for friends and neighbors in her social network. This commitment to volunteerism has carried over to a new activity – encouraging people to use computers and helping them to solve problems that they encounter. She volunteers at Prairienet several times a month where she answers user questions, answers the phone, and does other office work. Through her volunteer work at Prairienet, she has gained an understanding about how the organization works. She has served an intermediary role between people in her network and the CNI program by telling people about the program, bringing applications for them to fill out, delivering computers to them after they have completed the program, and even driving people to classes.

Suzy's story is important because her experience highlights a motivation for using computers that is not readily apparent when one focuses on discrete skills like e-mail or word processing. Suzy wanted to use the computer to remain productive and to maintain a connection with people despite the limits placed on her activities by illness and the economic hardship she experienced. She was an active computer user and she contributed to other people's knowledge about computers through her volunteer efforts.

Gund's Story: Computer as Life-Line Between the Generations

Gund is an African-American woman in her late 60's or early 70's who is originally from Mississippi. She left school after the eighth grade to work in order to help support her family. She lived in Atlanta before moving to East Central Illinois to care for an elderly aunt. She lives alone in the same town as Suzy in a house that she rents. Gund has a sister who lives near her and some nieces. Gund makes ends meet through governmental assistance, working at a non-profit in her town through a program offered by the Urban League geared towards finding jobs for older workers, and by caring for an elderly woman who paid her a small salary.

Gund found out about the CNI program from Suzy whom she has known for four or five years. They are friends who spend time together and who share news about the community and the details of their lives. They engage in joint activities like their volunteer work at Share Foods, and they help each other cope with life's every day demands. When they met, Suzy was going through serious health problems so Gund helped to care for her, attending many of her chemotherapy sessions. The help giving has gone both ways with Suzy helping Gund as she experienced her own health problems.

Gund's desire to use her computer has shifted over time and, in reality, she is still learning how to use her computer. She at times goes through long periods where she does not use the computer at all. Some periods of nonuse were caused by problems with the first computer system she received. She had to bring the computer in to be repaired which meant time away from the machine, and she lost some of the work that she had saved on the system. Her use is also influenced by the seasons in the sense that during the summer she likes to go fishing and so she does not have time to use the computer. Her life is very busy with her jobs and volunteer work, so it can be difficult to find the time to sit down and use the computer. Her use is also limited in that she has never used a computer before so she is learning a whole new set of literacy practices. There have been periods of times, for example, when she has stopped using the computer, because she was afraid of getting a computer virus.

Even if she cannot always carry out her vision, Gund connects potential uses of the computer to the events going on in her life and her desire to document her life and to leave a legacy for her family. During the summer I interviewed her, she was scheduled to attend a family reunion. She tied her desire to learn how to use her computer to her preparation for this reunion.

> My goal was that by July of this year, my family reunion, I wanted to know how to use the computer because I want to leave something for my children and that is and for my family. I want to do a family tree and because I for myself, I have a, there's certain things I don't know. I have like two ages so I don't know which one is right, which one is wrong.

Gund was born into a sharecropping family. She does not know her exact year of birth because one relative remembered that she was born in one year and another relative thought

she was born in a different year. She saw the potential of the computer to learn more about her own life and to create a family tree for her family

I did two home visits with Gund to watch her use the computer. In reality, much of our time was spent trying to resolve technical problems she was having and to review some tasks that she was having trouble doing. On my first visit, we spent a lot of time on e-mail. Gund was eager to use e-mail so we went through how to use the Pine e-mail system, and I showed her how to use Outlook. She had purchased some piano music on CD, so we spent time trying to figure out how to hook up speakers to her system. One of her relatives had given her a used printer, so we tried to get the printer to work with her computer. She was missing a printer cable, so we were not able to get the printer working on that visit.

The second time I visited Gund was similar in that we spent a lot of time trying to figure out problems she was experiencing. While I was there, I helped her install the drivers for the printer that her relative had given her and we removed some debris that had jammed the printer and prevented it from working. We also changed some settings in her e-mail program (Prairienet had undergone an upgrade that required the users to change settings in their computer to get e-mail.) While I was there, she retrieved an e-mail message that her sister had sent to her. Her sister had subsequently asked several times if she had received it. The e-mail turned out to be a story about how we always send jokes to friends but not religious stories. I showed Gund how to print the e-mail that she received. She said that she wanted to put it into a book so that she could look at it when she needed inspiration. On this visit, I also wanted to make sure she knew how to get on the World Wide Web. Gund said that she wanted to learn how to find a relative with whom she had lost touch, so we looked

for that person using the white pages on-line. I left Gund's home not knowing for sure if she would be able to do things that we went through.

Most recently, Gund has started taking a GED class, so she was interested in learning how to use her computer to complete school assignments. During one of my visits, we spent some time using her word processor to start an assignment – "Why I Am So Brave" – and learning to print it out. Since interviewing Gund, she has lost her phone, so she no longer uses the computer to connect to the Internet. Having access to a computer has been mixed for Gund. She is quick to see the potential of the computer, but she still has trouble achieving her goals.

Sassy's Story: Computer as Communication and Crafts

Sassy is a white woman in her fifties who is originally from Michigan. She moved to the Champaign area 25 years ago to marry her husband who has lived in this area his whole life. Prior to being married, Sassy lived in Florida, Portland, and Texas. When I met Sassy, her daughter and three grandchildren were living in her home. Sassy learned about the CNI program from her friend Suzy. Sassy and Suzy were friends and had multiple points of contact. They knew each other through a local CB club and through Share Foods where Sassy served as a volunteer.

Sassy did have some computer experience before taking part in the CNI program. She bought a computer several years before participating in the CNI program but never used the computer to get on the Internet even though the computer had a modem. She did not get on the Internet until she started coming to Prairienet with Suzy. Suzy brought Sassy with her when she volunteered to give Sassy something to do and so that she would have company

when driving to Prairienet. Sassy was afraid to get on-line because she had heard that people could find out a lot of information about you on-line. After she volunteered at Prairienet, she decided that she wanted to learn more about the Internet and applied for the CNI program.

Sassy originally purchased her first computer to communicate with a friend that lived in Springfield. Her friend bought a computer, and she wanted Sassy to get one too. She told Sassy that she should get "anything IBM compatible," so Sassy shopped around for about three months and then bought a computer. She and her friend used their computers to fax each other back and forth. The advantage to this was that they could communicate with each other without tying up the phone for long periods of time and without disturbing other people in their families. Sassy later bought software such as Print Shop, American Greetings, and clip art for her computer. When Sassy received Suzy's CNI computer, she traded her old computer for a Macintosh that her grandchildren could use. She wanted them to have a system similar to what they used in school, and she wanted them to have their own system so they would stop asking to use hers.

Sassy used computers in her life to pursue her hobby, craft making. She used her computer to produce crafts and she also produced computer-themed crafts. She is responsible for making the curtains in the Prairienet office that have pictures of computer objects on them such as computer disks and the names of popular web sites such as Yahoo. She has made clocks and coasters made out of CD disks. She occasionally visits craft-related web sites and has created patterns for needlepoint using her computer. She also enjoyed looking at web sites that friends sent her, some of which contained religious themes.

Sassy also used the computer quite a bit to chat back and forth with friends that she met one-line. She was very involved in a website called Firetalk where people could talk to each other using microphones connected to their computers. She used Firetalk with her ex-sister-in-law. She also played Bingo on-line and chatted with other people as they played the game.

> Sassy: Cause I have met quite a few people on the net (laugh)
>
> Researcher: really?
>
> Sassy: Yeah
>
> Researcher: How do you, how do you do that? You just go to the chat rooms?
>
> Sassy: Well no, I go to this Bingo. There's several people there in Bingo that I talk to every day. And one of them is from Australia. One of them is from Canada. One of them is from (laugh) England. I talk to them every day

The connection with the people that she met on-line seemed very important to her. She enjoyed getting to know different types of people from all over the world.

Sassy moved away from the area during the course of the study. She left her family and moved in with a friend that she met chatting on-line. She and her husband have since divorced. The only details I have about her current situation are from Suzy who occasionally hears about what she is doing through Sassy's husband and children who still live in the area.

Carla's Story: Computer in Child Rearing and Family Pleasure

Carla, in her late 20's, currently lives in a trailer in East Central Illinois with her three children aged 10, 8 ½, and 5, and her husband. She is originally from Mexico and moved to California with her family when she was five years old. When she was 10 years old, her family moved back to Mexico for about a year. She found it difficult in Mexico to keep up in

school because she did not speak Spanish well enough to do the homework. When she moved back to California, she felt as if she could never catch up with her English-speaking classmates. She reported that she has felt as if she is stuck between not knowing enough English and not knowing enough Spanish. She attended school in Los Angeles but struggled in school and was not able to finish her GED. She moved to Illinois about seven years ago with her husband who had a job here. She misses California but thinks that the school system in this area gives her children more opportunities.

Carla heard about the CNI program from a family counselor at a school in town where Spanish speakers can work towards their GEDs and improve their English skills. She wanted to participate in the CNI program to open up job opportunities and to keep up with her children who are increasingly being exposed to computers in school:

> Because I was interested in learning more, I get to know how to work in there, for, like for a better job, or just to use it here, because the kids, now they use it a lot. Sometimes, they ask and I'm like I don't know. I just stand there, so now, even, they go to preschool, they at least know how to move the mouse or what the word exit mean. Now I know more than I used to.

The main barrier to having a computer before was the cost and not knowing how to use the computer. "You can go buy it, I mean you could spend your money, but for what it's for what you're going to have a computer if you don't even know how to use. The advantage is in here I mean you get the computer but they teach you how to use it." She is happy with her computer and does not see herself getting a new one in the near future.

Carla went through one of the first CNI classes receiving a 386 computer with Windows 3.1. She later volunteered for the program earning an upgrade to a 486 computer with Windows 95 and multimedia capabilities. She liked the Windows 95 computer, because

it was much easier to use the World Wide Web using a graphical browser versus the text-based Lynx browser that the students were taught in early CNI classes. She learned more about using Windows and getting on the Internet through an adult education class she took after completing her CNI training. She also learned more about Windows 95 by volunteering through the CNI program.

Carla uses the computer to help organize her household and to communicate with her children and other family members. Carla uses the computer to organize her family by keeping track of their budget using a spreadsheet program. She also uses her computer to record and to look up addresses in the community. Carla also uses the computer to communicate with her children, making cards for their birthdays or when she wants to tell them something. She uses her computer to e-mail her brother who lives in California. Her sister told her about chatrooms but she has no interest in using them. She also uses the computer sometimes just to relax or to play fames.

Carla's story is interesting because it highlights the way that computers are related to childrearing practices in the home. She monitors her children's use of the computer carefully, limiting their computer time to 30 minutes a sitting. She has a timer that she uses to monitor the children's computer time, and the children lose their computer privileges if they do not behave. She monitors their computer time, because she does not want them to get involved with chatting on-line and she is afraid that they might accidentally damage the machine. She already has had the experience of having one of her children accidentally delete something and having to spend time figuring out how to fix the computer. She does not allow other people to use her computer, because she is afraid that others may break it.

Beyond using the computer to reward her children for good behavior, she also uses the computer to teach them life lessons. She feels that the presence of the computer in their home is important because it teaches her children lessons like how to share and take care of their property. Her children are not aware that Carla received the program through the CNI program, and she wants to make sure they learn to take care of their things and to respect property. She also uses the computer to teach them how to share and work together by limiting their use of the computer.

The computer is also used by the children to complete their schoolwork and for educational purposes. Carla goes to the library and gets educational CDs for her children to learn the alphabet and to learn skills appropriate for each grade level. Her children's teachers have also given her web sites that her children can use to do homework or to complete projects. She feels that one of the advantages of having access to the Internet is that sometimes web sites explain things better than you might find in a book and you can sometimes save the expense of purchasing a book. Her children also enjoy visiting sites like Nickelodeon and Disney.

Carla has volunteered with the CNI program during the computer distributions and during a CNI training session that was offered in Spanish. She thought it was useful to see other people's problems and how to fix them. She has had contact with several of the students that have gone through the Spanish training, seeing them at birthday parties, baby showers, or at the place where works. Because she is with her children in the evening, it is difficult for her to go to other people's homes to help them solve problems. Sometimes she is able to help people by phone, and she encourages them to call Prairienet with problems.

Angela's Story: Computer as Resources for the Family and Work

Angela has two children, one five years old and the other 15 years old. She heard about the CNI program from a woman at work who was thinking about going through the program. Her motivation for participating in the CNI program was for her older son. Michael, who wanted a computer. When she applied to the program, she was a single mother and she could not afford a computer for him:

> For Michael. He wanted, He's been wanting a computer for so long and I (was) never able to buy one. I was a single parent of course, and I was never able to buy one. So I thought, well, if you just need to go through this program and get a free computer, I mean, OK. And I did. I just went thorough it. But some of the things that they were teaching, you know, and pretty much, you know, I knew because I work on the computer all the time, but I understand, that you know, some people, you know had never even turned on a computer.

Angela said that she never uses the CNI computer that she received through the program. Her son was the primary user of the computer. It was located in his bedroom, and he had even customized it putting a picture of his favorite rap star as the background picture on the computer. When Angela gets home, she does not have the time or the desire to use the CNI computer, because she is caring for her children. She said that if she did not have access at work, she might use the computer more. She also noted that the computer she uses at work is much faster than her CNI machine. She talked about having to wait until the CNI computer connected to the Internet and that it was slow getting to a web site.

Even though Angela did not use the CNI machine, she used a computer at work. She works in an office setting at the University of Illinois using a database and word processing software to keep records for students taking a professional certification exam. Her use of the computer for work purposes is limited to the programs that she needs to get her job done. She

knows of other people in her office who use a word processor, for example, to type letters, but she does not have to use the computer in this way. She sees little need to learn skills like using a spreadsheet, because if she does not use it for her job she will not get a chance to use the skills that she learned.

One of the benefits of her job, however, is that her boss has allowed her to attend some computer classes, and she has been able to draw on the infrastructure of her office to access and learn about computers and the Internet. The people in her office use e-mail for planning purposes, so she has gotten an e-mail account. She also uses her e-mail account to send messages to friends and relatives. She enjoys sending jokes to her girlfriends and she also e-mails a sister that lives out of town. She uses her computer at work to send web cards to friends and family members. Her computer at work does not have a sound card, so she cannot hear the music on the cards she sends or receives. She is hopeful that she may get a sound card and speakers on her machine at work in the near future.

Some of Angela's coworkers have also showed her how to use web sites and how to bookmark them on her work machine. One of Angela's coworkers also helped her find a girlfriend with whom she lost contact over the years. She uses her Internet access at work to look up specific information such as the current weather forecast, and travel information. She used the computer to look up information about her paycheck on the university system.

Angela's use of the computer also related to childrearing and family practices in the home. Angela's son is older than Carla's children, so she does not monitor his computer and Internet use as closely. The computer has served as an avenue for her and her older son to do things together. Angela and her older son reported using the computer to look up information

about events that were in the news such as details about the trial of a rap star or the death of a professional basketball player. The information that they found on-line became the topic of discussions that they had in their home. Michael sometimes accompanied his mother to work and used her computer there. Angela teased him about finding pictures of female wrestling stars and putting them on the walls of his bedroom.

Her son Michael mostly used the CNI computer for games such as Solitaire and occasionally to get on the Internet. I was able to ask him some questions about his use of the computer while interviewing Angela. He used the computer at school most of the time because he found the CNI computer to be slow and he was getting error messages when surfing the web. Michael, rather than Angela, is the one that set up the CNI computer once they took it home, and he tried to configure it to connect to the university system. At school, Michael uses the computer to type up papers and to look up information for school reports. He talked about creating a PowerPoint presentation for one of his classes at school. At school, he also learned how to use the computer and what to do if the computer crashes.

The other members of Angela's home either do not use the computer or use it in a limited way. Since participating in the CNI program Angela has gotten married, but her husband does not use the computer. She says that he feels the computer is not for him. Her older son talked about letting his younger brother use the computer sometimes to play games and to use the paint program. Angela does not plan on renewing her Prairienet account because she has access to the Internet at home through the university.

Sharon's Story: Computer Troubles and Providing Resources

Sharon is a retired African-American woman who is originally from East Central Illinois. She lives in a low-income senior housing complex. The rent for these apartments is based on one's income level and savings with the rent being a certain percentage of one's total income. She has a daughter living in the area and three grandchildren. She had very little computer experience prior to participating in the CNI program and there are no publicly available computers at her apartment complex. She had participated in a senior work program through the Urban League and reported learning how to turn a computer on and off and how to enter some basic information into the computer.

Sharon originally decided to participate in the program because different people in her family were using computers and she wanted the computer for her grandchildren whom she baby-sits. The barrier to owning a computer before participating in the CNI program was its cost. She heard about the CNI program through a friend and decided to participate so that her grandkids could use the computer.

Sharon found it very difficult to use the computer and experienced hardware failures with the system that she initially took home. She knew Elaine, one of the CNI instructors (and a former CNI program participants), who came out to her house and replaced her first system. Sharon also reported having trouble with the keyboard that Elaine had replaced. She felt that the computers that the participants received could have been in better shape.

Sharon found the CNI training classes to be overwhelming. She enjoyed learning to go to different websites like Yahoo and doing e-mail but saw little use for other skills such as

doing one's budget using a spreadsheet. Overall, she reported that she would have liked more training and for the classes to be simplified.

> I wanted it more or less, you know, so that my grandkids could really use it, and whatever, but then again, after it didn't work out and I had to have people come over here and try to work it. I just said god, this thing and then you, oh lord, I said gosh, it was really complicated for me, so. They need, now they got a simplified computer now and it's called a I-opener, but you have to get it on a QVC or one of them shopping networks. It is wonderful. You can punch your e-mail, punch the key, do the e-mail, you can punch the key, you can do your shopping. You can order up everything. It's more simplified. It's for people like me, but ...

Sharon continued to have trouble connecting to the Internet to do e-mail or to go to various web sites Besides Elaine, other friends and family members tired to help her. Sharon seemed to take great pride in the fact that her daughter, her grandchildren, and her niece knew how to use computers and the Internet. Sharon used her computer very little and eventually gave her computer to her niece whom she felt would use it more. Sharon thought the computer was too hard to use and longed for a less complicated machine like the one she had seen on television.

Conclusion

One of the values of looking at the experiences of people defined as "have-nots" is that it forces us to acknowledge the way that our categories capture and fail to capture their experiences. When we look at the stories of the CNI participants, we can see connections between their lives and the demographic characteristics of technology "have-nots." Suzy was not working because of the health problems that she experienced. Angela was a single African-American mother raising two children when she participated in the CNI program. Carla was a Hispanic woman raising her three children and could not afford to buy a computer. Sassy's adult child and her grandchildren were living in her home when she

participated in the CNI program. Gund's and Sharon's stories highlight the problems faced by older people as they learn new technology skills.

When we look at the stories of the CNI participants, we can see the diverse ways that they brought the technology into their lives and the new technology practices that were emerging. Suzy used the computer in her volunteer work. Gund saw the potential of the computer to document her life. Sassy used the computer to pursue her crafts and to communicate with others, eventually leaving her family. Carla used the computer to relax and to help her raise her children. Angela did not use her CNI computer; it was used mainly by her son, but she did use a computer at work. Sharon became frustrated by hardware breakdowns and the complexity of using the computer and gave her computer to her niece. What is striking about these stories is how hard the participants worked to learn to use the technology, to solve the technical problems that they encountered, and to integrate the technology into their lives in meaningful ways. This portrait of the CNI participants as being active technology users and learners is not adequately captured by the term "have-not."

The first research question of this study asks how the CNI participants used their computers and tries to connect these uses to literacy practices and social practices. The stories of the CNI participants provide a basis for identifying the technology activities that occur in people's homes and communities. Barton and Hamilton's (1998) work was used to connect these activities to the literacy practices that occur in the home and in the community. They identified a number of literacy practices that were used to frame the response to this research question, including: organizing life, personal communication, documenting life, private leisure, sense making, and social participation. In working with the stories of the

participants, the next step was to take their technology activities and to connect them to the literacy practices occurring in the home.

The second research question tries to identify the problems that the CNI participants encountered and the way that they drew on their social networks to solve these problems. This question involves understanding how expertise develops in one's social networks and how people share this expertise with others in their social network. In looking at the stories of the participants, we see that they encountered some problems as they attempted to integrate technology into their lives. One of the more common problems mentioned in these profiles was the difficulty of connecting to the Internet. Some of the problems that they experienced were related to faulty hardware such as a broken computer or a broken keyboard. Other problems can be linked to computer inexperience and the intimidation of learning a new set of practices. As we shall see, these problems exist not only for the six participants profiled in this chapter but across the CNI program.

The stories of the CNI participants also reveal the work that must be done to support literacy practices within one's social network. The work of those who volunteered, such as Suzy and Carla, highlights the type of informal help-giving that supports technology use. Suzy played an important role in encouraging others in her social network to use technology. Suzy also acted as an intermediary between her social network and the CNI program. Similarly, Carla helped people that she knew who went through the program to solve problems with their computer.

The third research question seeks to understand the meaning that the CNI participants attach to their computers and the barriers that they faced as they attempted to make computer

and Internet technology part of their lives. It can be difficult for a new user to learn to use the mouse and the keyboard. When one lacks transportation, it can be difficult to attend classes. Even when people have access to computer hardware, they sometimes cannot figure out how to use it. Gund had difficulties getting a printer that a relative had given her to work, and Suzy had trouble getting a scanner that she purchased to work.

The lives of the CNI participants suggest that it is not adequate to talk about the adoption of computer technology in terms of simple categories of use or non-use. It is more accurate to say that the adoption of computer technology is better understood as a series of stops and starts often dictated by events and changes in the participants' lives and by their understanding of what the technology could do for them. Participants in this study used the technology, stopped using the technology, discovered new uses for the technology, and rediscovered the technology over time. They would move back and forth between these stages as their lives and their understanding of the technology changed. The next chapter tries to paint a more complete picture of the technology practices that occurred in the homes of the CNI participants.

CHAPTER 5

MAKING SENSE OF THE TECHNOLOGY

The research questions in this study can be looked at as different slices of the larger question of how computer and Internet technology is connected to people's everyday lives. Rather than privileging literacy activities that occur in the workplace or in schools, this study views home and community settings as legitimate sites for the study of technological literacy. By studying the "hidden literacies" that occur in people's homes and communities, we catch computer and Internet activities that are missed when we restrict our definitions of literate behavior to those activities that take place in formal institutional settings. The previous chapter provided many examples of the types of literacy activities that can be missed when researchers only concentrate on activities that occur in the workplace or in schools. When we "count" the activities that occur in the home and community when defining literate behavior, we begin to see the CNI participants as active technology users who brought technology into their lives in personally relevant ways. This new way of looking at the problem of technology use in marginalized communities may lead to new understanding about issues of access, technology use, and literacy.

Situated technology studies seek to go beyond just describing the way that a technology is used to understanding how technology is connected to the literacy practices occurring in a particular setting. Because this study investigates technology use in the home, this chapter draws on the work of Barton and Hamilton (1998) to move beyond the descriptions provided in the previous chapter to link the technology activities occurring in the CNI participants' homes to vernacular literacy practice. Interview, observational, and focus

group data are used to provide examples of the vernacular literacy practices occurring in the homes of the CNI participants.

Vernacular Literacy Practices

A central question that many of the community members struggled with once they took their computers home is deciding what they should do with the technology. Sissy's comments point to the work that the community members were doing in terms of making sense of the technology and connecting it to their lives:

> Researcher: Was the main barrier to getting a computer before, just the cost of it, was that?
>
> Sissy: Yeah, basically I couldn't afford it. And really I didn't know, really didn't know too much about it, didn't know what to do with it, so.
>
> Researcher: And how, you found out what to do with it how?
>
> Sissy: When I took my class, you know, other than what I had learned in school, but when we had to take the class in school, there was something specific that we was doing. We were either typing or we were either doing U.S. history or we were doing math. But with the CNI program, I was able to, it was kind of left up to me to do what I wanted to do. So, I learned different things and I took advantage of it. So, I got my little computer and I'm happy.

Sissy's comments are useful in thinking more explicitly about the importance of access to computer technology in the home. The CNI participants' experiences with the computers that they received through the program were different from their experiences with using technology in other settings. If we turn back to Table 13, we can see that many of the CNI participants did not have very much computer experience or they had jobs in which their use of the computer was limited, such as data entry positions. Having "access" to a computer in their homes meant that they had the freedom to explore what they wanted to do with the computer and to see what the computer could do for them. At the same time, Sissy's

comments point to the idea that not knowing what to do with technology may be a barrier that interferes with the adoption of new technology practices. In linking the computer activities described in the previous chapter to vernacular literacy practices, we can better appreciate the work that the CNI participants were doing in connecting their technology use to their lives.

In taking a technology-in-use approach in this study, the goal is to link the computer activities that are occurring in people's homes and communities to vernacular literacy practices. Barton and Hamilton's (1998) work is useful because they tie people's reading and writing activities to the vernacular literacy practices occurring in people's homes and communities. Vernacular literacy practices are "rooted in everyday experience and serve everyday purposes. They draw upon and contribute to vernacular knowledge. Often they are less valued by society and are not particularly supported, nor regulated, by external social institutions" (p. 252). The point is not that vernacular literacy practices are more important than those that occur in schools or communities or that they are more pure or natural forms of literacy because they occur "in the wild" outside the bounds of formal institutions. Rather Barton and Hamilton are arguing that vernacular literacy practices may be learned and supported in ways that are different from those that occur in formal institutions.

According to Barton and Hamilton (1998), vernacular literacy practices are learned informally and supported through one's social network. People develop expertise in areas within their social networks in ways that are different from traditional academic learning or schoolwork. In informal settings, people often engage in reading or writing activities in the pursuit of some other activity such as cooking a meal or fixing a car. The point is not to learn

a new literacy practice but to get something done in one's everyday life. Vernacular literacy practices also do not have some of the formal characteristics that govern behavior and relationships in organizations such as schools or the workplace. Even though vernacular literacy practices tend to be more informal, they are still subject to regulation through the pressures of the "intimacies of day-to-day interactions, attitudes, humour, traditions and routines" (Barton & Hamilton, 1998, p. 253).

Given evidence from the social informatics line of research, there may be more similarities between the informal learning styles associated with vernacular literacy practices and those occurring in the workplace or in schools than Barton and Hamilton (1998) present in making their case. Orr (1996), for example, has shown that copy machine repair technicians learn their trade through swapping stories about problem machines rather than through the formal training offered through the company. Similarly, Timmermans and Berg (1997) looked at the ways that medical personnel deviate from medical protocols to account for unforeseen events and unworkable practices that they encounter in the field. Nelsen (1997) studied emergency medical technicians (EMT) and the informal rules that they developed concerning how closely to follow a doctor's order and other formal rules when responding to an emergency call. There are both formal and informal learning mechanisms in the home and in organizations. Nevertheless, Barton and Hamilton's (1998) point that these types of informal learning activities may not be supported or even valued within an organization still holds true.

The challenge when attempting to answer the question of how the CNI community members used their computers is in trying to discover the connection between home and

community-based computer use and vernacular literacy practices. Barton and Hamilton (1998) identified a number of vernacular literacy practices that occur in the home and community that will be used to frame the results in this section. These literacy practices include: (a) organizing life – the day-to-day literacy activities involved in manage one's life such as managing the household or one's finances, (b) personal communication – literacy activities involving in maintaining one's social network, (c) private leisure – literacy activities that provide relaxation such as in pleasure reading, (d) documenting life – literacy activities that provide a record of one's life, (e) sense making – literacy activities involved in solving problems and pursuing topics of interest, and (f) social participation, literacy activities pursued as people participate in clubs and organizations in the community.

When we look at the way that the community members in the previous chapter used their computers, we can begin to link these activities to vernacular literacy practices. Suzy used her computer to send e-mail to family and friends (personal communication) and in her volunteer work (social participation). Gund wanted to use her computer to research her family tree (documenting life). Sassy used her computer to play bingo (private leisure) and to chat with new friends she made on-line (personal communication). Carla used her computer to organize her family's finances by putting her bills into a spreadsheet (organizing life) and to relax after a busy day (private leisure). Angela's son used the computer to play games (private leisure) and Angela used her computer at work to look up topics of interest (sense making). Sharon had trouble using her computer eventually giving it to her niece (social participation).

Beyond providing a list of vernacular literacy practices in the home, Barton and Hamilton's (1998) work is useful because it provides a method for identifying vernacular literacy practices. They began by observing the reading and writing activities that were occurring in the home and in the community, including when people wrote, what they wrote, and interpretive acts such as the meaning that reading and writing held in people's lives. Based on these observations, they identified a number of literacy practices that occur in the home and community. For example, they noticed that the people they studied engaged in reading and writing activities such as keeping household records and keeping to-do lists. They related these types of activities to the vernacular literacy practice of maintaining one's household. In working with their data, they then related the category of maintaining one's household to the larger social practice involved in organizing one's life. In terms of this study, then, the researcher must notice the ways that the computer and the Internet are used in the home and relate these activities to ongoing literacy practices in these settings.

Because this study focuses on literacy practices rather than discrete skills, a second challenge involved in this study is to notice the shifts in practice that are occurring as people adopt new technology practices. This study is influenced by work that takes a situated approach to the study of technology use in a given setting (Bruce & Hogan, 1998). For example, as computers are used more in a school setting there may be new expectations about what it means to turn in an assignment and in the way that both students and teachers do their work. Because a student can produce his or her assignments using a word processor, there may be new expectations about the level of editing required by a student for a paper to be considered "done." In the same way, using a computer in the home and the community

may bring about changes in expectations about how things should be done and the way that people do their work. A situated approach involves noticing the way that people's literacy practices change, remain the same, and interact with old literacy practices.

Barton and Hamilton's (1998) work provides a starting point for identifying the vernacular literacy practices occurring in people's homes that involve the use of computers and the Internet. The comparison between Barton and Hamilton's work on reading and writing practices that occur in the home and the computer and Internet literacy practices occurring in the CNI participants' homes is summarized in Table 14. The examples of vernacular technology practices presented in this chapter are drawn from interview, observation, and focus group data. This chapter will also point out some of the shifts in literacy practices that are occurring because the CNI participants have access to computer and Internet technologies in their homes. Finally, this chapter will extend Barton and Hamilton's work by discussing some of the ways that the data collected in this study do not fit their model.

Table 14: Vernacular Literacy Practices in the Home

Category	**Definition (Barton & Hamilton, 1998)**	**Examples - Reading & Writing Literacy Practices (Barton & Hamilton, 1998)**	**Examples - Computer & Internet Literacy Practices in the Homes of the CNI Participants**
Organizing life	Literacy activities needed to organize one's daily life, household, and finances	Writing appointments on a calendar, keeping track of addresses/phone numbers, paying bills, maintaining a budget, inventories, things to do lists, leaving messages for other family members	Word processing to do lists, calendars, addresses & phone numbers, budgets, lists of books, lists of beanie babies, tracking 401K information on-line

Table 14 Continued

Category	Definition (Barton & Hamilton, 1998)	Examples - Reading & Writing Literacy Practices (Barton & Hamilton, 1998)	Examples - Computer & Internet Literacy Practices in the Homes of the CNI Participants
Personal communication	Literacy activities that support the maintenance of people's social networks	Writing letters to friends/ relatives/family members, Christmas/birthday/ anniversary cards, photocopied jokes, notes, signs	Sending e-mail to friends/ relatives/family members, web cards, forwarded jokes/ chain letters/religious stories; chatting, finding people, instant messaging
Private leisure	Literacy activities pursued for the sake of relaxation or to pass time	Getting lost in a book, newspaper, map, or catalogue; writing poems or stories; being a fan	Free writing, journaling, playing games, searching for photos of N'Sync & Jennifer Lopez, reading on-line newspapers
Documenting life	Literacy activities involving making a record of one's own life, the life of someone else such as a child	Keeping awards from school or a sport, photos and scrap books, diaries, autobiography, genealogy, recipe books	Writing a book detailing families experience in the prison system, researching family tree, keeping track of school records
Sense making	Literacy activities in which people are researching a topic of interest to them.	Reading instruction manuals to see how appliances are used or to effect repair, devotional readings of religious material, deliberate investigations of unknown topics, becoming local experts, pursuing hobbies	Reading computer manual to solve problems, vacation scouting, researching various topics of interest, writing a fundamentals of basketball book, researching illness
Social participation	Literacy activities in support of social activities connected to a clubs or organization	Writing newsletters, hold raffles, posters, write reports of activities, minutes of meetings, sign petitions, attend meetings	E-mailing newspaper advertising an organization's events; creating signs, sign-up sheet; typing minutes of meetings

Organizing life. Organizing one's life involves the day-to-day literacy activities needed to manage one's life, household, and finances (Barton & Hamilton, 1998). It includes activities such as maintaining household records, writing appointments on calendars, sticking reminders on notice-boards, writing lists of tasks that needed to be done, and leaving messages for other family members. In a similar way, the CNI participants used their computers to make calendars, to organize their daily activities, and to keep track of collections. They looked up information on the Internet to organize themselves and their activities in the home. They planned trips using on-line maps and weather web sites. They used their computer to maintain budgets, to check their bills on-line from local utility companies, and to look up financial information from their banks and their employers.

Beyond just organizing one's day-to-day finances, the computer was also seen as potentially useful in starting up, and maintaining the records for a business. The participants saw the potential of the Internet to market themselves, to find marketing information, or to market a product or service. Gund provided an example of the way that a computer can be used to organize a home-based business. She wanted to use her computer to keep track of the craft items that she produced. The computer is one technology that helps to support the broader social practice of organizing one's life. Gund could use other technologies such as a pen and a paper to do this task, but the computer has affordances that paper organization systems do not. She may be less likely to misplace the information she records in her computer as compared information written on a piece of paper. The reverse is true as well. Pen and paper based systems have affordances that computer-based organizational systems do not, such as ease of use. What is important is understanding how the computer can support

social practices and the choices that are made between technologies and between competing literacy systems. It is also important to notice the shifts in practice that occur as people adopt new literacy practices.

There was considerable variation in the extent to which people used the computer to organize their lives, especially in terms of their willingness to keep financial records on the computer. The use of spreadsheets was taught in the CNI classes, and there were several different opinions offered concerning the value of learning this skill. Some used the computer to keep track of expenses and to maintain a budget. Others did not see the value of learning a spreadsheet, because it was perceived as a business application that they did not need to know. There was also great concern that someone would be able to access one's financial records if they were placed on the computer.

Personal communication. Personal communication involves literacy activities that people engage in to maintain their social networks (Barton & Hamilton, 1998). These activities include sending letters or cards to friends and family members or maintaining Christmas, birthday, and anniversary card lists. Also included are more informal kinds of communication such as photocopied jokes and stories that people pass to others in their social networks. It can include activities such as leaving notes for family members or creating signs. Barton and Hamilton argue that personal communication involves multiple forms of literacy and that the literacy practices involved in this category are wide ranging. It involves communication with people at different relationship stages and in different parts of one's network. People communicate as they form new relationships, maintain old

relationships, and end relationships. People communicate with those that live nearby and those that live far away.

Personal communication was one of the most popular uses of the CNI machines and the Internet in the participants' homes. People sent e-mail to distant and close friends, family members, and coworkers. Web cards, in some cases, replaced paper cards for people in one's network that had Internet access. People chatted on the Internet, forming new relationships with people they met on-line and maintaining relationships with people who had moved away. Photocopied jokes were replaced, to some extent, with forwarded jokes, chain letters, and inspirational stories. People sent pictures to friends and family members through their e-mail accounts.

There was a wide range of opinion about the appropriateness of each form of communication made possible by using one's computer. While most people reported that they e-mailed friends and family members, there were differences of opinion about the value of chatting on-line. Some people saw little purpose for communicating with strangers on-line and thought it was potentially dangerous. Others valued meeting new people and forming new romantic relationships and friendships. In the case of young children especially, Internet use was closely monitored so that the children did not use the chat rooms. This points to the situated nature of computer use and the way that people bring technology into their lives in different ways.

It is important to note that people did not only use technologies that might be considered "communication technology" such as e-mail or chat to maintain relationships with others in their networks. They used technologies such as web pages that might be

considered informational to maintain relationships with distant friends. They also used communication technologies indirectly to maintain relationships with friends and family members. Sissy's friend moved to Florida, so she reported listening to the radio and a scanner over the Internet in the area where her friend moved so that she knew more about the area where she lived. She also looked up housing information on a web site near where her friend lived because she thought she might like to move there. Another participant's mother lived in California, so she reported looking up information about stores and businesses near where her mother lived. The point of these types of activities seemed to be to keep the connection with the friend or family member by learning more about what their lives were like and about the community in which they lived.

Private leisure. Barton and Hamilton (1998) reported that reading and writing in the home were used to relax and to pass the time. This included such activities as writing poems, stories, and journaling. People engaged in these activities for their own enjoyment. Private leisure also included activities surrounding being a fan such as writing a letter to a celebrity or reading a book or magazine article related to a favorite celebrity.

Even if the CNI participants did nothing else with their computers, they used them to play games. Playing games often became a routine part of people's days as they used games to relax and unwind. The CNI participants reported using a wide range of games including games that came with their computes like Solitaire, Hearts, and Minesweeper. It also includes games that people installed on their computer like checkers, chess, a peg game, and "Who Wants to be a Millionaire?"

Sassy and her grandchildren provide an example of the way that families used their computers to play games for private leisure. Playing games on-line opened up new activities because now Sassy's grandchildren can play Bingo – there are no age restrictions on who can play, unlike the Bingo game in their local community. In addition to being able to play Bingo at the web site she visited, people were also able to chat with each other. Sassy described how she chatted with people all over the world while she played Bingo. In evaluating people's use of Internet resources, this example demonstrates the way that people may be engaging in multiple activities at the same time even when "just playing a game." It demonstrates the way that, even in a single household, activities like playing games may mean different things. For her grandchildren, it was a fun activity that they could enjoy. For Sassy, it was a place where she met with friends to chat.

The participants also used their computers to look up information about favorite celebrities and television shows. Angela provides an example of the way the computer was used for private leisure. Angela used her computer at work to visited Oprah's web site to find out more information about her book of the month. She and her son also used their computers to look up information about favorite celebrities. The CNI participants visited a wide variety of sites that might be linked to private leisure. Several of the CNI participants reported that their children visited specific web sites like Nickelodeon or Disney and sites about favorite television characters and shows such as Dragonball Z (an anime cartoon). Using the computer for music was another leisure activity performed as participants looked for lyrics to their favorite songs.

There were few examples in the collected data of writing for enjoyment. This did not come up often in the interviews or focus groups, but the community members were also not asked this directly. One community member described how her son used the computer for journaling. Another community member's daughter enjoyed writing, so that became "her thing" to do on the computer.

Documenting life. Documenting life involves literacy practices geared towards maintaining records about a person such as his or herschool or sports achievements. It also involves keeping diaries, photos, scrapbooks and other collections that document a person's life and family history. Barton and Hamilton (1998) found that the desire to document one's life may be activated at different points in life. Some might keep a journal for a period of years and then stop. Others may decide later in life to investigate family histories. People can become so interested in researching family histories that they eventually become experts at doing this type of research.

Gund provided an example in the previous chapter of the way that the computer and Internet can be used to document one's own life and the lives of other family members. Gund had wanted to use her computer to research her family tree for a reunion that she was attending later in the year. She had some information and pictures saved in a book that she created that documents her family's history. She wanted to use her computer to connect to on-line archives so that she could find some of the information she was missing.

There are some other examples in the data of the ways that the CNI participants used the computer to document their lives. One of the participants in a focus group said that she was writing a book about her family's experiences with the legal system. Her son was on

death row, and she wanted to write about his life but also about her family's experiences. She wanted to write about her son whom she felt was convicted on circumstantial evidence and about the poor treatment that she and her husband received even though it was their son that was accused of committing the crime and not them. Some participants also talked about using the computer to document the lives of their children. E-mails were sent that talked about how the children were doing in school. Interestingly, this often blended on-line and off-line organization systems. One participant, for example, had a folder that she kept for each of her children with things like report cards that she needed to get copied and that she sent to the children's godparents. She also e-mailed this news to the children's godparents.

Sense making. Sense making involves literacy activities in which people carry out their own research in the pursuit of topics that are personally meaningful (Barton & Hamilton, 1998). It includes problem-solving activities such as reading an instruction manual to see how to repair an appliance. It also involves deliberate investigations of unknown topics, explorations of topics of interest, and gathering of information in the pursuit of hobbies. Sense making can also involve the reading of religious or devotional material. Barton and Hamilton found a great deal of diversity in terms of the topics that people chose to investigate. As people investigate these topics, they can become local experts within their social networks.

As in Barton and Hamilton's (1998) findings, there was a great deal of diversity displayed as the CNI participants used the computer and Internet to investigate topics of interest. The participants used the Internet to find information as they contemplated buying items such as a new car or a new house. They used the Internet when scouting vacation spots

and when searching for hotels and airfares. They used the Internet to read job postings and gather information about the local community. The computer and the Internet was used to research already existing hobbies and interests. The topics of interests varied depending on the person looking up the information and ranged from looking up information on a motorcycle to looking up a skin care product seen on television.

Angela provided an example of the way that the computer can be used to gather information to answer a question. She reported that she and her son looked up a recipe she saw on a television program and they made the recipe together. Like many of the other examples, this one demonstrates the way that people can have many different motives for using their computers. In this example, Angela was problem solving in the sense that she needed the recipe, so she used her computer to find the information that she needed. She also used her computer to support an activity that she presumably enjoyed – cooking and trying out new recipes. The cooking itself became an activity that she shared with her son. She also may have been a fan of this particular chef, so this could also be related to private leisure activities.

Beyond just exploring topics of interest, Hamilton (1999) found that unexpected events in people's lives often gave rise to the need for people to gain expertise in new literacy areas. Hamilton found, for example, that unexpected events such as illness prompted people to gain expertise in the treatment of the disease, utilizing reading and writing skills, so that they could assist in the care of the disease. Suzy's battle with cancer is illustrative of this type of use of the computer. The computer allowed her to find information about her medical condition. More importantly, it gave her some measure of control over her treatment, because

she could check to see if the doctor was telling her everything. Finally, this example hints at the way that expertise is shared within one's social network. She used her knowledge about computers and about finding information about cancer to help a neighbor who had been diagnosed with the disease.

Social participation. Social participation involves reading and writing activities that people do based on their participation in clubs and organizations. This includes activities such as writing newsletters, holding raffles, and creating posters. It also includes activities such as writing reports of activities, writing up minutes of meetings, signing petitions, and attending meetings. Barton and Hamilton (1998) found that people can be more or less active in these groups and that they can participate in a variety of ways.

In terms of the CNI participants, many of them participated in community organizations. In the early focus groups conducted by the CNI research team, it was found that 90% of the CNI participants belonged to some local organization (Bishop et al., 1999). Many of these local organizations were religious or social groups. We recall Suzy's story from the previous chapter and the way that she used her computer to coordinate Share Foods, a not-for-profit organization. She used her computer to perform a variety of tasks for the organization, from printing out raffle sheets to creating delivery lists.

There were other examples in the data of people using their computers for social participation. Sassy, for example, used her computer to create coloring books for the children in her church. Another participant's church had a public access site, and she volunteered her services to help others learn how to use the computer. Another of the participants I interviewed worked at her church, so she used the computer quite a bit during the course of

her job to type up church bulletins on the word processor. As the financial secretary for the church, she was also responsible for producing quarterly reports and other financial reports.

Extensions to Barton and Hamilton's Work

There were definitely similarities between the way the CNI participants used the computer technology in their homes and the way that people took part in reading and writing activities in their homes and communities as identified by Barton and Hamilton (1998). Their work captures fairly well the types of computer and Internet activities that were occurring in the homes of the CNI participants. In applying the CNI data to the categories that they developed, however there were some uses of the computer and motivations for computer use that did not easily fit within the categories. It also appears that the categories do not seem to capture the social nature of computer use as well as they could.

Computer Life Stories. There were some motivations for using the computer that did not match up very well with Barton and Hamilton's (1998) categorization scheme. Many of these motivations had something to do with finding a personal connection between the technology that people were using and their own lives. Gund's story seems to illustrate best the way that people make a personal connection between technology and their lives. Gund wanted to use computers to research her family tree. This type of activity would certainly fall under the documenting life category. In talking with her about the importance of this activity, however, it became apparent that her motivation to research her family tree went beyond the goal of documenting her life:

> Researcher: What what's the benefit of knowing?
>
> Gund: The benefit for me is something that my mother and father didn't leave me and I want to leave that for my children. That my children will know, well look, this

is what, which I've already start(ed), I have a book, at home that I've started with photographs and things saying this is your grandfather. This is your grandmother. This is your great great gran. And it go all the way down the list starting from my mother and father, myself, my sisters and brother have pictures, sisters and brothers and that. And I put all this in a book. So that way if something ever happened to me the kids won't be wondering well, you know, what was my grandfather like? What was my grandmother like? I know what my grandmother was like on my mother's side. And I remember her as a young girl, a beautiful lady with long ole' jet black hair. And I know she loved to fish because she taught me how to fish. And I'm the only one in the family that know how to fish

Researcher: Because of her

Gund: uhmm, Because of her

Researcher: Itseems like family is very important to you

Gund: It is. It is very important. Because its like a lifeline. And for the children, especially for my great grans, for them to know, because they always asking me questions.

The goal in doing the family tree was to document the life of her family, but perhaps more importantly, this information provided a lifeline between the generations in her family. We see evidence of this in her linking of research of her family tree to the story about remembering details about her grandmother and knowing who her grandmother was because she taught Gund how to fish. The family tree that she was putting together served a similar purpose, her grandchildren would know who she was and what she was like through the family tree. Gund's weaving of what she would like to do with the computer with the importance her family held and the desire to leave a legacy, along with her fishing story all seemed seamless and easy and connected in some way. She easily shifted between talking about the computer and her desire to leave a legacy.

Gund's eloquent weaving of her reason for wanting to use the computer with her life was not an isolated incident in the data. In most of the interviews, the CNI participants

connected computer use to their lives. Suzy, for example, connected her use of the computer to the illness that she was experiencing in her life. She talked about the computer almost as a form of therapy that could be uses to get one's minds off health problems and other problems that were being experienced. Sassy talked about the disconnect she felt with her husband and the way she used her computer to connect with others in her social network, forming new friendships with people that she met on-line. Carla had young children in her household, so the computer was used to teach them life lessons. Family was important to Angela, so she went through the program for her son, and the computer made possible shared activities like cooking together and talking about the latest celebrity news. Sharon took great pride in the fact that members of her family knew how to use computers, so she provided her own computer as a resource to her niece.

There were also examples of people choosing to limit the way that they brought computers into their lives. Ruby, for example, used the computer at her job working for her church. She stated that she was not that interested in computers, but she was interested in other things:

> Ruby: Yeah, but Elaine, She's real good though. She just like, she like to mess around on the inside on them and stuff. I'm not that interested.
>
> Researcher: Do you think it's not your thing or?
>
> Ruby: I think it's not my thing. It's just not my thing. Everybody has something that they're interested in doing and the biggest thing, the biggest dream I have it to become an inspirational speaker.

Ruby was a breast cancer survivor and she wanted to share her experience and to try to prevent other woman from dying due to their fears of breast cancer. She talked about an experience in which she appeared on the local news speaking about surviving breast cancer.

She wanted to do more of this type of activity. It is not that Ruby did not use computers. Instead, she had a different vision for her life in which computers were not necessarily central. It is interesting to note that Ruby potentially could have used her computer to achieve her goal of being an advocate about breast cancer. There are certainly any number of discussion groups and web sites that deal with this topic. She perhaps did not know about these opportunities, or she preferred to communicate with people in person within her local community.

Some of the more personal reasons that the CNI participants had for using (or not using) the computer do not seem to fit easily within Barton and Hamilton's model. Barton and Hamilton (1998) argue that the personal details of people's lives are important because they serve to structure computer use within the home. I am suggesting that the personal details of people's lives go beyond just structuring people's literacy activities. The personal connection that people make between technology and their lives is actually a broader social practice that people engage in within the home (and other domains). This suggests Barton and Hamilton's "documenting life" category should encompass all the activities that people do to document their lives such as keeping diaries or photo albums. It also should encompass the more personal connections that people make between technology and their lives. This broadened category could account for the personal connections that people make between their own lives and the reading and writing activities that they perform in the home. Barton and Hamilton note, for example, that people often seem to prefer one genre over another when it comes to selecting reading material. It is the personal connection that people make

between their lives and their literacy activities that might account for some of these differences.

Social Nature of Computer Use. Barton and Hamilton (1998) make the point that the categories that they developed are only a first step in understanding vernacular literacy practices in the home. They argue that one needs to go beyond the categories to understand how these practices are sustained within people's social networks. The experience of the CNI participants suggests that we need to recognize that people have both social and task-oriented reasons for engaging in literacy activities. The implication is that we must recognize the social aspects of use within each of Barton and Hamilton's categories. This also suggests that the social participation category could be extended to include the way that people use computers to participate within their friendship, neighbor, family, and colleague networks. This might include activities such as helping others learn how to use a computer, looking up information for others on the Internet, or loaning out one's computer equipment to someone else in one's social network. Barton and Hamilton do discuss shared literacy events such as reading to a child but they do not consider other reading and writing events that are shared by people in a network. This might include events such as reading a book with a friend or family member or jointly producing a newsletter or some other piece of writing.

Barton and Hamilton's (1998) categories also do not seem to capture the social nature of computer use that was apparent in the data collected in this study. Barton and Hamilton's categories seem to be technocentric, whether that technology be a book or a computer. Looking at the action in the categories, a person uses the technology to achieve a particular task-oriented purpose whether the activity is operating on the individual, group, or

organization level. In contrast, there were several examples in the CNI data where a participant's motivation in using computers had nothing to do with the technology itself. The starting point was people's social relationships and experiences, and they used the technology to achieve a social goal.

The experience of the CNI participants suggests that sometimes the point of using technology has nothing to do with achieving a task-oriented goal. People use the technology to achieve social goals such as connecting with people in their social network. There were several examples in the data when the CNI participants used technology in the pursuit of social goals. Paul, a participant interviewed for the study, looked up information for his sister who wanted to buy a Ford Explorer and for his mother who was interested in purchasing a house. There were quite a few examples of people helping others in their social networks to learn computer skills. Beyond just doing something for someone else, sometimes the point of literacy activities was to do something with someone else. Suzy, for example, made a plan to purchase a new computer at the same time as a neighbor so that they could use the computers together. People played games on the computer with others in their social networks.

We can also see the social nature of computer use in some of the examples when the CNI participants chose not to use their computers. Sharon, for example, decided that she did not want to use her CNI computer. She gave it to her niece. Obviously, Sharon decided that she did not want to use the computer because of the complexity of the technology and the computer breakdowns that she experienced. It is, however, relevant to note that giving her computer to her niece was also a form of participation in her social network. She was providing a resource to someone else in her network whom she thought would get more out

of the computer computer. Similarly, many of the CNI participants chose to go through the program to get a computer for their children or other people in their households.

Childrearing. Barton and Hamilton suggest that a family's routines are structured by both the employment patterns in the family and the presence of children in the home. The presence of a child, for example, could influence the amount of leisure time that one has to pursue literacy activities. There were certainly cases in the CNI data when parents talked about not using the computer very much, because they were consumed with the day-to-day realities of raising children and maintaining a family. But, the experience of the CNI data suggests that child-rearing is a separate category of technology use that is at the level of social practice.

The CNI participants saw the value of the computers as a resource that they could provide in their homes for their children. There was a blending of goals, purposes, and domains because often games were purchased to help the child be more successful in school or to ensure school or grade readiness. Some of the CNI participants installed games on their computers for their children so that they could learn the alphabet and to make sure that their children knew the appropriate skills for each grade level. In some cases, the availability of the computer in the home opened up new dialogues between parents and teachers. Carla spoke of doing research with her children and using web sites sent home with by a teacher. A participant in one of the focus groups mentioned that her grandchild's teacher had suggested some website she could use to help her improve her subtraction and addition skills. In providing the computer as a resource for the family, perhaps this was a way for the CNI participants to be viewed as a good parents by their children's teachers.

The CNI participants used the technology in their homes to achieve specific parenting goals. They tried to control the behavior of their children, for example, by withholding computer privileges unless the children were well behaved. Technology could also be related to other parenting practices such as teaching a child life lessons, enforcing rules, doing homework, and creating a connection with the child. Carla gives an example of the use of technology in child rearing practices:

> Carla: Just everything like I'm teaching them, you know, how to respect other things, so that they can respect your things. That's the way. And the computer, just by itself is teaching them, you know, like to respect other things and that you got to be nice to the things, because they don't know that doesn't that it didn't cost me.
>
> Researcher: Right
>
> Carla: But they should know that you know, that if something is broken or something, it would cost you, you got to work and you've got to be able to give everything.

In this example, Carla cites the usefulness of the computer in teaching her children to respect and to take care of property. This is the interpretation that Carla makes in terms of the role that the computer plays in her family.

Technology was also related to childrearing practices in the sense that parents sometimes monitored their children's use of the computer so that they did not use it inappropriately. In some cases, this meant limiting use so that they would not damage the machines. In other cases, this meant limiting their use so that they would not be exposed to potentially dangerous situations. The parents were concerned that their children would accidentally wander into a chatroom or be exposed to pornography. This was especially true in families with young children whose use was monitored much more closely. There might also be variation in households in terms of a parent's child-rearing philosophy. These

examples suggest the need for a new category that relates to child rearing practices in the home.

Blending of Practices, Technologies, Relationships, and Locations

The CNI data extends the work of Barton and Hamilton (1998), because it encourages us to notice the ways that people blend their on-line and off-line methods of communicating, technologies, and practices. As Barton and Hamilton found, often a literacy activity may fall within many of the categories of practice. A person might send e-mail for the purpose of personal communication but also for the purpose of sense making to find out information related to a topic of interest. The CNI data suggests that people blend their methods of communicating with people electronically and in-person. They also blend the technologies that they use. They may use the computer for record keeping, for example, which is also connected to paper-based formats for keeping records. The home becomes a borderland between work, school, and other institutional practices.

Sassy, in her interview, provided several examples of this blending of genres. One example involved her use of her computer to create craft items. Sassy was very involved in creating craft items, and she was known in her social network for this expertise. The Sunday school teacher at her church asked her if Sassy had any craft ideas she might use with the children that attended classes at the church. Sassy suggested that she could make coloring books with pictures of crosses, Jesus, and Bibles that the children could color. She said that the children in class knew that someone in the church had made them on the computer because they were printed on blue, pink, and yellow paper rather than white paper. The church staff always printed things out on single-sided white sheets. This example is

interesting because her membership in the church community dictated the religious theme of the coloring books, but she broke with their practice of printing everything on white paper. Sassy's use of the computer also represents a blending of locations; her home computer was used in the production of a item for an institution for which she was a member. This example also represents a blending of purposes. Her production of the coloring books was a form of social participation in her church, but it also related to sense making in that producing craft items was a hobby she pursued through her computer. Sassy used her computer to produce craft items such as the coloring book for her church. At the same time, computers also became the topic of some of her craft items. She used old CDs to create clocks and drink coasters and created curtains for the Prairienet office that had the names of various web sites written on them.

In some ways, the use of computers created complexity for the participants, as they had to choose between practices, technologies, and navigate on-line and off-line relationships. For example, one very popular activity many of the CNI participants enjoyed was creating cards for people in their social networks. They had to make decisions however, based on whether or not their friends or relatives had Internet access or checked their mail, as to how to deliver their cards. At times, they needed to create cards on their computer and print them out because the person to whom they wanted to send the card to did not have a computer. This example is interesting because it shows how people blend old practices and new practices and the complexities this sometimes involves. This example illustrates, as Barton and Hamilton (1998) suggest that in any given situation there are multiple literacies present and people make choices between these literacies. In this case, Sassy had to choose

between a paper-based card she printed on her computer and a web-based card that she sent to others through the Internet using the Blue Mountain web site.

People also had to learn new rules of engagement and new types of relationships. They had to develop rules they could use to determine if people were deceiving them on-line. Sassy talked about rules that she developed to detect deception on-line. She noticed if people gave consistent answers when chatting or if they paused before giving answers. Sassy also made sure that the person she was chatting with revealed more personal information than she did on-line. The computer and Internet thus also provided a new way for the community members to detect if people in their social networks were being honest with them. The technology also allowed them to monitor the whereabouts of people. Finding people on-line was an important theme in the interviews. Several community members reported trying to find friends and relatives with whom they had lost touch with over the years. The computers could also be used to monitor the status of people in one's social network. Ruby reported that she used the computer to help a friend find information about a significant other whom they suspected of dishonesty regarding his background. Ruby used a web site that several community members became aware of through people in the CNI classes – the Illinois State Department of Corrections web site – to see if he was being honest. This site allows one to search to see if someone is in the Illinois penal system, to see what he or she looks like, to determine his or her status in the system, and even contains identifying features such as scars or tattoos. The prison web site raised issues of privacy for the CNI participants, because so much information about an individual was available on-line.

The Internet also opened up new forms of trick playing and joking. Sassy and her friend typically visited a web site where they could talk with other people over the Internet using a microphone on their computer. Sassy's voice sounded very similar to her friend's voice and she knew her log-in and password, so she took on her identity on the chat site. She played matchmaker setting up a meeting for her friend with a man with whom her friend had been communicating. E-mail became a new method for distributing jokes and stories, and the computer and computer use became the topics of jokes that were passed around. Urban legends and chain letters were passed from participant to participant.

Conclusion

Barton and Hamilton's (1998) home literacy practices provide a useful starting point to understand people's computer and Internet literacy practices. The CNI participants used their computers and Internet access for multiple purposes: to organize their lives, to communicate with others in their social network, to pursue private leisure, to document their lives, to pursue hobbies, to solve problems (sense making), and in support of organizations of which they are members. It should be noted that there was great diversity in terms of the way that people used computers. The point of this chapter is to show the range of literacy practices. The other research questions will try to understand both how people's literacy practices were supported (or not supported) through their social network and to account for this diversity of people's experiences with computers and with the Internet.

In applying the categories developed by Barton and Hamilton (1998) to the CNI participants, there were some uses of the computer that did not easily fit within their classification scheme. This was especially true when people related the use of the computer

to their own lives. The categories also did not seem to capture the way that people may use technology to achieve social purposes. Finally, the CNI data suggests that a new area of investigation may be the role of the computer in child-rearing practices.

It is relevant to note that these categories are only starting points in understanding people's literacy activities and that there is a great deal of overlap within the categories. People's literacy activities may fit within multiple categories because people can use text (and technology) to achieve multiple goals. People, for example, may send e-mail with the purpose of communicating with someone else in their social network (personal communication) and to gather information about a topic of interest (sense making). There are multiple literacies involved within each category. There would be a different set of expectations involved in communicating with a friend versus writing a formal business letter to complain about a product or service. Barton and Hamilton (1998) see these activities operating at the personal, family, group, and organizational levels. A person may keep a calendar, for example, to organize one's own activities and to manage the activities within the family. The next chapter will consider the way that people sustain these practices in their networks as they develop technical expertise.

CHAPTER 6

PROBLEM SOLVING AND THE DEVELOPMENT OF EXPERTISE

This chapter draws on the work of Barton and Hamilton (1998) who argue that it is necessary to go beyond identifying the literacy practices involved in home and community settings towards understanding how these vernacular literacy practices are supported in one's social network. Because literacy is viewed as a collective resource, this involves understanding how people develop expertise and how this expertise is shared within one's social network. This chapter is centered on understanding the technical problems that the CNI participants experienced and how they relied on others in their social network to solve these problems. Because the CNI participants are viewed as active technology users, this chapter also documents how they developed expertise in using their computers and how they shared this expertise with friends, family members, and other CNI participants.

This chapter draws on user support logs, interviews, focus group reports, and observational data to detail the types of technical problems that the CNI participants encountered. The use of these multiple data points provides the viewpoints of both the CNI technology staff and the participants themselves as they worked to get problems resolved. This chapter draws on the same data to discuss the development of expertise among the CNI participants, especially among the volunteers, and how people draw on their social networks to solve the problems that they encounter.

Problems Encountered by CNI Participants

This section draws on support logs maintained by the technology staff at Prairienet, interviews, focus groups reports, and observations of the CNI participants' use of computers

in their homes and during training classes. These data sources were used to document the technical problems experienced by the CNI participants. Overall, the most prevalent problem experienced by the participants was difficulty connecting to the Internet through Prairienet to send e-mail and surf the World Wide Web. Beyond the technical problems that the CNI participants experienced, the participants and technology staff also experienced human "connection" problems. It was often difficult for the technology staff and the participants to reach each other to discuss technical issues. Finally, this section demonstrates the way a problem like a "connection problem" can be very difficult to resolve especially for novice computer users.

Overall Profile of Technical Problems Experienced by the CNI Participants

The support logs maintained by the tech staff provide a useful source of information about problems experienced by CNI community members. The CNI project kept a log of problems experienced by participants to track the nature of the problems they experienced and how these problems were resolved. Three different record keeping procedures were used over the course of the project. In the first year, an e-mail account was set up for tracking purposes so when a computer was serviced or an attempt was made to contact a CNI participant, an e-mail was sent to the account detailing the tech staff's work. During the second year of training, a web-based system was used to record problems. Towards the end of the project, paper records were kept because the web system failed. There is overlap between the web system and the paper records in that items that were open when the web system failed were migrated to the paper system.

It was possible to get a rough sense of the types of problems that the CNI participants encountered as they used their new systems. In computing the types of problems that were experienced, I read through the descriptions of the problem provided by the tech staff and assigned each to a category that described the problem. This analysis is rough, because it was sometimes difficult to discern the exact nature of the problem the user was experiencing based on the descriptions provided in the support logs. This data is reported in Table 15.

Table 15: Problems Identified Through User Support Logs

Nature of Questions	Count – E-mail Records (Sept 1998 – Sept 1999)	Count – Web Records (May 1999 – December 1999)	Count – Paper Records (Oct 1999 – June 2000)	Total	Percentage
connection/e-mail/browser	119	86	27	232	43.77
video/monitor issues	21	12	15	48	9.06
problem not clear from description provided	32	7	6	45	8.49
keyboard/mouse	20	6	4	30	5.66
user questions	18	10	2	30	5.66
system will not boot	12	6	9	27	5.09
user-added components caused conflicts	7	7	5	19	3.58
hard drive failure	4	5	9	18	3.40
user deleted files/changed system	3	5	10	18	3.40
windows	13	2	2	17	3.21
floppy drive failure	9	2	1	12	2.26
general hardware failure	3	4	3	10	1.89
configuration issues	8	1	0	9	1.70
software	6	2	0	8	1.51
power supply/switch	5	0	1	6	1.13
virus	0	0	1	1	0.19
Total	280	155	95	530	100

It should be noted that there is likely some overlap in the categories. For example, a system that would not boot might be caused by a user deleting a necessary file or a hard disk failure. The most significant problem the participants experienced was connection problems when using Prairienet to access the Internet. The participants also experienced a number of other challenges including hardware failures related to the distribution of recycled equipment, problems connected to user inexperience, problems due to inadequacies in the training they received, and difficulties experienced when adding components to their system.

Problems connecting to the Internet. The problem experienced by the overwhelming majority of CNI participants was difficulty connecting to Prairienet to access e-mail and the World Wide Web. This finding is consistent with the Homenet study that also documented the difficulties that new users experience as they attempted to connect to the Internet (Kiesler, et al., 1997, 2000; Kraut, et al. 1998b, 2000). This category included problems such as modem failures, missing cables, incorrect settings, and user/password errors. This category also included problems with e-mail and with using a web browser, because it was often difficult in working with the data to separate connection problems from software or other problems such as forgotten passwords.

Challenges of using recycled equipment. Many of the connection problems were related to the challenges of trying to use older equipment to connect to the Internet. Many of the connection problems experienced by users in the first year of the project were related to the Windows 3.1 operating system that was distributed to the early participants. It was difficult to get the Windows 3.1 machines connected to the Internet because the operating system does not come bundled with the software needed to access the Internet. Later in the

program, computers were distributed with the Windows 95 operating system. Connection issues on the Windows 95 machines were related to failed modems and configuration issues. One other more recent technical issue that affected the user's ability to connect is that the computers were set to dial one of Prairienet's phone numbers that did not always allow the user's computer to connect correctly.

The CNI participants also experienced hardware failures caused, in part, by the distribution of used systems. These hardware failures included problems with the computer display caused by defective video cards and monitors, floppy drive failures, hard drive failures, and overall system failures. In some cases, the user's mouse and keyboard failed and needed to be replaced. The focus group, interview, and observational data revealed a similar pattern of breakdowns. This was especially true for users who received Windows 3.1 machines and who were among the early participants in the program.

User inexperience. Some connection, hardware, and software problems were related to user inexperience. Some of the novice users encountered difficulties setting up their machines to connect to the Internet once they took them home. The machines themselves were configured to dial into Prairienet, but the users needed to put their machines together once they took them home, and they needed to correctly connect a phone line to the computer. The users also experienced problems such as not remembering how to use the software in the machines to connect to the Internet or forgetting their log-ins and passwords. Occasionally, the users deleted files needed to access the Internet, or they changed the phone number or other settings that made their computer unable to connect Prairienet. The users also encountered problems using e-mail and browsing the web.

There were also significant Windows and hardware issues related to user inexperience. Some users deleted essential Windows files and could not start up their systems. There were also smaller problems that new users experienced related to using Windows. For example, some of the participants in their interviews mentioned that their children had deleted icons or resized the start button or the task bar. Often these small problems could take a long time for the CNI participants to fix and made their machines temporarily unusable.

Making changes to their computers. The last chapter argued that one of the first challenges the participants faced in taking their computers home was to discover what the computer could do for them. Part of this discovery process involved adding new software and peripherals to their systems. In the process of adding to their systems, the participants occasionally experienced problems that made their CNI computers temporarily unusable until they contacted the CNI staff or they fixed the problems themselves. Several of the participants installed software that changed their system settings, and this caused their computers to be unable to connect to Prairienet. Users also experienced problems when they added new devices such as a printer or when they upgraded their systems to become multimedia capable. Some of the new hardware caused conflicts with their CNI machines causing them to stop working correctly. Sometimes novice users were also not sure how to actually install these devices and to get them working on their systems. It was also inconvenient to upgrade since the CNI machines did not come with CDROM drives and most of the software and drivers for new peripherals come on CDROMs. It could be difficult for the users to fix problems themselves because the computers did not come with system disks

that contained an image of the software on their computers such as one would get if one purchased a new system.

Training issues. The interviews and focus data suggested that the training provided may not have been adequate for new users who were trying to learn to connect to the Internet for the first time. One issue in the training was that the computers the participants were trained on were different from the computer they took home. The machines in the training lab were already connected to the Internet so they did not have to go through the dial-up procedure when using the Internet. There were also differences in the software available on the lab machines and that was different from the machines that they received. This lead to difficulty once the users took their systems home because they could not connect to the Internet the same way as they did in class.

Using Prairienet can also be difficult for new users in that there are separate log-in procedures for making a text-based connection to check e-mail and for making a graphical connection (PPP) to surf the web. Because PPP time is limited to 10 hours per week for all Prairienet members, the CNI participants were encouraged to make a text-based connection to check their e-mail to save their PPP time. This meant that they needed to learn two dial-up procedures and to know which one to choose depending on what they wanted to do on the Internet.

There were also differences between novice and advanced computer users in their evaluation of the training program. We recall Sharon's story from the previous chapter and her difficulty using her computer. As a new user, it was difficult for her to use the keyboard and the mouse. This made it difficult for her to keep up with the training and to be successful

at tasks such as sending e-mail and typing in web addresses. Beginning users in the focus groups and interviews reported feeling rushed through the training and that they required more training to learn how to use the computers and connect to the Internet. In contrast, many of the more experienced computer users were bored by some of the training, because they already knew the skills that were being presented.

Human "Connection" Problems and the Difficulty of Relying on Formal Mechanisms to Resolve Technical Problems

In looking at the data, beyond the technical problems the participants experienced, a significant issue faced by both the users and the tech staff was finding a way to connect with each other and the number of contacts required to get a problem resolved. The support logs reveal that the CNI staff had contact with about 47% of the CNI community members over the course of the project (295 unique contacts, out of 628 adults completing project). Because of the differences in the record keeping systems, it is only possible to detail the quantity of contacts between the tech staff and the CNI participants for the first year of the project. On average, there were at least three contacts or attempted contacts with each community member that received support through the CNI program in the first year. The mean number of contacts was 2 and the mode was 1. This meant that it often took several calls to get a problem resolved. This also sometimes meant that a CNI participants might be without his or her computer for long periods of time while the computer was being serviced.

It often took several contacts by the CNI participants and the tech staff to get a problem resolved. This was a point of frustration both for CNI participants and staff members. This was caused by differences in schedules, disconnected and changed phone

numbers, and the difficulties involved in diagnosing and repairing computer problems. This is demonstrated in the following example that appeared in the logs for one CNI participant:

Table 16: Example of One User's Problems

Date	Notes
4/6/99	phone - left message with warehouse hours
4/9/99	Warehouse - assorted config problems. Replaced machine; will refurb the return.
4/13/99	phone- Windows error; will replace CPU and reimage hers for recycling warehouse 4-15
4/15/99	warehouse - problems logging in; may have been a password problem or orphaned shortcut. Fixed.
5/4/99	phone - unknown system problem; tried to install CD-ROM. Will bring to warehouse Fri 3:45.
5/14/99	warehouse - modem config problem. Fixed.
5/25/99	phone - left message
5/27/99	phone - left message to confirm warehouse Fri 5-28 4p.
5/28/99	warehouse - just needed help sending mail. Was getting disconnected, but we think it was just her time limit.
6/16/99	e-mail - general questions
6/21/99	ongoing - still answering questions via e-mail. The usual IPFs and occasional weird errors.

The example demonstrates the typical problems experienced by users: connection problems, hardware failures, and problems with added components. The first machine that the user received needed to be replaced because it had configuration problems. The user also experienced problems connecting to Prairienet and when the user tried to add a CDROM to their CNI system. This example demonstrates the difficulty of fixing a connection problem, because it can be caused by a hardware problem, an incorrectly configured machine, or a forgotten password. It took several contacts over the course of two months to finally get the

problem resolved. It is clear from the example that the user was able to make a connection because he or she was able to send e-mail but he or she still had some ongoing problems.

The CNI participants received "free" machines but there was often a great cost in time and frustration in making sure that the machines worked correctly. One of the consequences of the communication problems documented above was that the CNI participants sometimes experienced long delays in getting their computers fixed. This was true in the sense that sometimes the tech staff needed more information to resolve a problem, and they could not get in contact with the participants. This was also true in the sense that, after the CNI participants' machines had been fixed, it was sometimes difficult to get the message to them that they could pick up their computers. The users also experienced delays because they needed to pick up their machines during Prairienet's office hours which might be difficult given other commitments in life such as childcare and work demands. In addition, because many of the problems experienced by the participants were difficult to resolve, they often needed to bring the computer in several times to get the system working correctly which placed demands on their time.

Besides the formal help-giving that the CNI tech staff offered, they also provided some informal instruction when interacting with the participants. It is likely that the support logs significantly underestimate this type of informal help giving. In the above example, the tech staff member answered the participant's questions via e-mail. This type of informal help-giving also came up during the interviews. At least one participant talked about e-mailing back and forth with the tech staff about problems she was experiencing.

The support log data is also limited in that its focus is primarily from the point of view of the tech staff. This means that the focus is on hardware failures and "user error" and ignores real confusions that users may have about the connection process. The logs also underestimate the difficulties that users experience when trying to set up the computer to connect to the Internet at home. The support logs may also underestimate the amount of support required to help users resolve problems, because one of the volunteers with the project, Elaine, was particularly active in helping users resolve technical problems. Elaine started out volunteering and was later hired by the CNI project. The support work tshe did on her own and as a staff member at Prairienet are not recorded in these logs. The observational data of home computer use collected as part of this study is useful to further understand technical issues, because it helps to reveal the complexities involved for users as they try to connect to the Internet. The next section details the problems that one user experienced in trying to connect to the Internet.

The Intractable Nature of Technical Problems

As part of the data collection process, I went on some home visits with Elaine, who went out of her way to informally help the CNI participants overcome problems they encountered. The experience of one of the participants we visited gives a sampling of the complexity involved in connecting to the Internet. We went to the home of a participant who was in a class that Elaine taught and who called her to come to her apartment for help. Elaine had been to her house one time previously to install some games on her computer. Elaine had collected games from people she knew and often offered to put them on people's computers during the classes she taught. The community member said that she could not get to a web

site she wanted to visit and that she could not do e-mail. This section details the "house call" that Elaine made to help this community member resolve her connection problems and illustratedthe difficult nature of resolving technical problems for novice users.

In working with the community member, the first set of problems that experienced involved making sure that her machine was set up to connect to the Internet. We found there was no phone cord plugged from the wall to the modem in the back of her computer. The community member found a phone cord we could use, but it was too short to reach to the wall outlet, so we found a way to make the phone cord longer by using a splitter and the cord from the phone in the room. Elaine then tried to dial into Prairienet to connect to the Internet, but found that some of the participant's settings had been changed which would not allow the computer to dial correctly. After fixing these settings, Elaine was able to get the machine to dial into Prairienet correctly and turned the machine over to the community member to connect to Prairienet.

The second set of issues that emerged involved the community member's lack of experience with using the Windows operating system, the mouse, and the keyboard. As Elaine began to work the community member through the steps involved in connecting, she noticed that she did not double left click to open the program needed to connect to the Internet. Elaine then gave her a brief tutorial on opening programs and had her practice left clicking. They then began the process again of making a connection to Prairienet. Elaine noticed that when the community member was typing her information into the system that she capitalized some letters and not others. Elaine reminded her that the system was case sensitive and explained how to back up and fix the typing.

The next set of problems involved the process of logging into Prairienet. The community member could not remember her login or her password. Elaine remembered her login, because she had been her teacher, so she reminded her of the login and had her write this information down. Elaine then had to login to the Prairienet system herself so she could reset the community member's password. In resetting the password, the Prairienet system required that the password be typed in two times. Elaine had the community member do this, but she did not type the passwords in the same way each time. They had to repeat this procedure several times before the passwords matched up. They then started over with the community member successfully entering her login and password to get into the system.

Once in the Prairienet system, the next set of problems involved knowing how to get to the e-mail program from the main screen of Prairienet and how to actually send and receive e-mail. Elaine explained how to retrieve e-mail and encouraged her to try to send a message, using the manual to guide her. We left the room while she tried to compose an e-mail message in Pine, the e-mail application in use. When we returned, she had typed my e-mail address in the "to" line, but it was spelled incorrectly. She had typed a message successfully in the body of the e-mail. Elaine reminded her that e-mail addresses had to be exact and told her how to delete letters to correct the address and how to move from field to field to correct information. She then reminded her of the commands to send e-mail and pointed out on the screen where she could find this information.

The next set of problems involved knowing how to make a graphical connection to Prairienet and knowing how to use a web browser. Prairienet has a text-based system that people can use for e-mail and a graphical system that can be used to surf the web. Elaine

helped the community member make a graphical connection to the Internet. She then reviewed with her how to use a web browser and how to enter an address to visit a web site. The community member wanted to visit Yahoo, so Elaine had her enter the URL to go to that site. The community member said she wanted to look up information about art so they searched on that topic. The search brought up a number of categories, so the community member chose "art therapy." As we talked more with her, she told us that she was actually interested in drawing and wanted to find information on the Internet about art that she could make herself. After spending some time using Yahoo, Elaine explained how to disconnect from Prairienet.

While not everyone will have as many technical problems as the user profiled above, this example highlights the knowledge required to effectively to connect to and use the Internet. A new user may run into trouble when trying to connect to the Internet at many points along the way. These problems include not knowing how to open a program, difficulty remembering a password or login, and difficulty remembering the many steps involved to check one's e-mail or to go to a web site. Once a user gains expertise, getting to a web page or checking one's e-mail may be seamless and easy.

Before we left this community member's home, she showed us some drawings that she had produced. She had a spiral notebook of the drawings she had made and went page-by-page showing us her work. She also described how she had started taking a drawing class at a local community college but quit, because she felt that the teacher did not like her and that she did not like the teacher. It seemed that the connection and the interaction that she had with Elaine was just as important, if not more important, than the actual technology lesson.

She worked very hard to try to please Elaine and to learn the technology. Before we left, she went through her drawing book and gave both Elaine and me a drawing as if to show us that despite her struggles with technology, she did have talents in other areas. This experience reinforced the way that a user may struggle mightily to learn a new set of skills surrounding the use of technology but may be gifted in some other area.

The experience of this community member as she struggled to learn technology leads to another issue that came up in working with the data – the intimidation that new users face when trying to learn new technology. We must recognize and appreciate the risk that she took in revealing the difficulties she was experiencing in taking on the role of "student." A persistent theme that came up in the interview, focus groups, and observational data was the fear involved in learning how to use technology and in being in learning situations involving unfamiliar topics. This sentiment was best expressed by Angela:

> When you don't know a lot about computers it's kind of easy to get away from it. You get the computer, and it's nothing to keep you going with it, and you don't know anything about a computer, so you don't want to go in there because sometimes you get in there and do something wrong or because I mean our teacher was talking about how people be calling down there, talking about I done messed up my e-mail, I done did this, I done did that. So, I don't know. I was thinking that maybe if they had some like classes to help them, like to keep them, like to keep something on going with them because the more you use it, because it really is a fun thing. It's really real interesting, but if you're intimidated by it, you're not going to mess with it.

It can be difficult to be viewed as a person that does not know how to do something or as someone who has "messed something up." This is especially true after having just taken a class in whiche they were "supposed to" learn these skills. No one likes to feel stupid. It involves taking a risk to ask someone else for help. Horseman (1990) and Fingeret and Drennon (1997) made a similar point in discussing the fear and discomfort that people felt in

being judged as "stupid" when learning new literacy practices. Horseman argues that we need to create learning situations that break down barriers between the student and the teacher and create learning situations in which learners are treated as "knowers."

One such learning situation may exist in the informal interactions that occur between people as they attempt to learn new literacy practices. The next section draws on the work of Barton and Hamilton (1998) to discuss the informal help giving that occurred among the CNI participants as they attempted to integrate technology into their lives. The help giving was especially prevalent among the people who volunteered with the program. Describing the way that the volunteers learned about computers and provided help to others in their networks allows us to trace the development and sharing of expertise among the CNI participants.

Development and Sharing of Expertise

Beyond just identifying the problems encountered by the CNI community members, the second research question also seeks to understand how the CNI participants solved problems they encountered when using their computers. Taking a local literacy approach is useful because literacy, in this approach, is not viewed as an abstract set of skills in an individual but rather as a collective resource that is dispersed within reciprocal exchange networks of friends, neighbors, and friends. The people in Barton and Hamilton's (1998) local literacy study drew on the expertise of people in their social networks when they encountered uncertain literacy situations, and they provided help to others within their area of expertise. The practical implication of this view of literacy is that people do not necessarily feel the need to become experts on all topics. Those that have difficulties reading and writing

(or using computers) can get things done because they develop strategies to deal with unfamiliar situations and they have people in their social networks whom they can ask for help. In terms of this study, then, to answer the question of how the CNI participants solved the problems they encountered it is necessary to trace the development and distribution of expertise within people's social networks.

For the purposes of this study, the best way to explore the development and sharing of technical expertise within the social networks of the CNI participants is to document the learning strategies and informal help giving undertaken by volunteers with the project. Volunteers had a special role in the CNI project because they were very active in helping others learn how to use computer technology, and they were among the more active computer users. The examples and analysis in this section are drawn from the focus group, interview, and observational data collected in this study. Many of the participants interviewed for the project had done considerable volunteer work for the project. Data from a focus group held with the volunteers in the project was also used heavily in this section.

Development and Sharing of Expertise Through Volunteering

Barton and Hamilton tie the development of expertise to sense making – literacy activities undertaken in the pursuit of topics in which people have a special interest such as hobbies or in research undertaken to solve a problem (Barton and Hamilton, 1998). Sometimes these topics are pursued to the point that people become experts within their social networks. For some of the participants, the volunteers especially, the computer itself became a topic of interest that was pursued. This interest led some of the participants to spend considerable time using their computers, learning more about what the technology

would do, and solving problems that they and others encountered. They engaged in research activities such as reading books or their training manuals to learn more about computers. They also took further computer training through the CNI project and through other institutions nearby that provided training. The community members also learned by "playing" with the computer and through trial and error. They would encounter a problem and then experiment to learn how to solve the problem.

Besides sense making, the development and sharing of expertise among the CNI volunteers is also related to the practice of social participation. Social participation involves literacy activities that are carried out by people who are members of an organization. It was argued in the previous chapter, that the category of social participation should be expanded to include the informal help giving that people do for others in their social networks. The CNI volunteers helped other CNI participants more formally through their activities with the CNI project, but the CNI volunteers also did quite a bit of informal help giving outside the Prairienet classes.

Volunteerism was important, because it allowed the CNI participants to further develop their expertise. One of the benefits of volunteering was that the volunteers had ongoing contact with the CNI staff, so they could ask for help when they themselves experienced computer problems. Volunteering also allowed the participants to hear the curriculum again and to be in the position of having to answer questions of the people taking the classes. Their volunteer work gave them motivation to learn the material and a meaningful context into which to apply their skills. Volunteering also put them in the position to observe the problems others were having and to see how these problems were

solved. They could then apply this knowledge to their own computer problems and to the problems of others in their social network.

Their work with the CNI program also increased the volunteers' visibility within the CNI classes and within their own social networks as experts. The volunteers in the focus group talked about enjoying being in the position of helping others learn how to use the computer and being viewed as computer experts. The volunteers described how, when people learn that you know about computers, then people think you are "mister fix-it" or a "computer wiz," and they call on you for help. Sissy, an active volunteer with the program expressed it this way:

> I felt like I was kind of, had some kind of seniority, because I was there being able to answer questions, and people was calling me, hey, can you help me and you know so, it kind of made me feel good and so it was something that I enjoyed doing and it wasn't like, it was volunteer work, but I still got something out of it, you know, with my upgrades and everything. Plus I had a couple people calling me from, it was like seeing people out in stores and how do you get this, and how do you change this. And that kind of made me feel good. Made me feel like I really knew what I was doing, because they were asking me, you know, for help. So I really felt, you know, I felt really charged about that. I was really hyped about that. Yeah, I'm all the computer wiz.

Sissy describes how she was in the position to help others through her participation as a volunteer in the CNI training classes. She also helped people in the community who asked her questions because they knew her from her involvement in the CNI program. The participants in the volunteer focus group expressed a similar sentiment. They enjoyed seeing other people learn about computers and enjoyed being in the role of expert. The social infrastructure of Prairienet encouraged people to volunteer because they were able to earn upgrades to their systems.

Providing help to others in their social networks gave volunteers a meaningful context in which to practice their computer skills and encouraged them to learn new skills. Elaine expressed this idea during her interview:

> Researcher: All right, so first you got into games and then you did some e-mail or kind of simultaneous, then you kind of got into the Internet.
>
> Elaine: Then you know how it is, you know somebody else come along that really doesn't know anything about it and you think you know everything so you want to show off ... and then it just kind of become a habit, I guess. I'm not going to really to say I was just trying to show out, but I mean I'm the type of person where you know how some people know something. Some people don't like sharing their knowledge. Well, I'm different, you know. If I know something, it's, or if I have something if I can help somebody, I have always done that.

Once you become known in your network as a computer expert, there is an incentive to live up to that reputation. Being viewed as an expert "becomes a habit," and this encouraged those who were especially interested in computers to gain further computer expertise. Elaine described how people had problems that she did not know how to solve, so she would call someone to find out how to fix them, furthering her own computer knowledge and her role as expert within her social network.

Thus, through their volunteer work at Prairienet and through their own efforts, the volunteers developed computer expertise. The volunteers engaged in sense making and social participation activities to become local computer experts within their social networks. They developed some of the research-oriented strategies associated with sense making as they actively learned more about computers and the Internet. This was reinforced though their social participation activities in which they helped users formally as volunteers with the CNI project and, more informally, helped people they met through classes and within their own

social networks. The next section considers how expertise is shared among the participants' pre-existing social networks.

Work that Supports the Adoption of Technology Practices

The volunteers did a great deal of work within their social networks to assist people as they brought technology into their lives. The volunteers were both recipients of this type of help giving within their own networks, and they often shared this help with others in their social network. These help-giving activities addressed some of the technical problems that new computer users experience but also some of the more emotional issues involved in taking on new literacy practices. The volunteers were especially good at recognizing the emotional toll that learning new literacy practices exerts. They also were adept at removing some of the barriers to adopting literacy practices that the CNI program did not address, such as transportation issues. The work that was done within the networks of the volunteers that tended to support use included: (a) providing troubleshooting help and computer advice, (b) teaching others how to use their computers and what the computer could do, (c) monitoring progress, (d) acting as a partner is use, (e) providing resources to help one learn about and use computers, and (f) acting as an intermediary between the CNI project and friends and family members in their social network.

Troubleshooting and advice. The volunteers often had people in their social network upon whom they could call to troubleshoot computer problems and who could provide technical advice. Troubleshooters helped solve computer problems, helped to install new components to their computer system, and generally provided advice about computer matters. The volunteers, to the extent that they could, provided this type of advice to others in

their social network. The help that Suzy received from one of her friends provides an example of this type of help giving. Suzy's friend helped her with a number of problems that she encountered. He helped her install a scanner on her system. He told Suzy what hardware she should buy to connect the two computers in her office to her printer, and he installed the hardware. He also deleted some files on her system to make her computer run faster.

Having people in one's network with troubleshooting knowledge was important because it helped the participants understand if a problem was with the machine or due to some other type of error. Because many of the CNI participants were newer computer users, it could be difficult for them to discern if they were having the problem, if their computer was not working correctly, or if there were problems on Prairienet's end. Paul's experience in trying to install a scanner illustrates the role of the troubleshooter in one's social network:

> Researcher: Was that someone you know that helped you with the scanner?
>
> Paul: Yeah, someone I know, as a matter of fact, and they are very very computer knowledgeable. I mean, they couldn't get it to work. And I just had a bad scanner, and it was it was installed correctly and like one, two, three, four steps and that was it. I just took it back.

His friend helped him install the scanner and, when it did not work, he diagnosed the problem; the scanner was faulty. This helped Paul make the decision to return the scanner to get his money back. Since the CNI machines were not multimedia capable, sometimes troubleshooters also provided advice about what type of upgrades could be performed most easily and sometimes they actually performed the upgrades.

The CNI participants were very active in their social networks in helping to solve Windows problems, connection problems, and some more basic hardware issues like correctly setting up a machine. The volunteers helped people with keyboarding and mouse

problems. They also helped people with Windows issues like finding a missing task bar or customizing the Windows background. They also helped with connection problems by making sure that the computer was set up correctly to connect to Prairienet.

Troubleshooting hardware problems is a more specialized form of computer help that many of the volunteers did not do. One exception was Elaine who helped people upgrade their systems, adding new sound cards and CDROM drives to their machines. She also gave advice to a friend about buying a computer and went with her friend when she bought a new computer. This relates to Elaine's interests and the way that she connected to the computer. In her interview she described herself as "the type of person where I'm always messing with stuff anyway. Ask my kids, I'm always getting in here, messing with something, trying to put something together, trying to figure something out." Elaine became a resource in her network for people who needed advanced troubleshooting and technical advice.

Teaching role. Even if the CNI volunteers did not always provide technical troubleshooting advice, they seemed very good at teaching others how to use technology and showing them the possibilities of the technology. The CNI volunteers often played this role within their own networks. The volunteers spent countless hours helping people they knew who went through the CNI program. Much of this helping involved showing people how to do things and sitting with friends as they learned how to use the computer.

Some of the teaching performed by the volunteers involved introducing people to new websites and other resources available on the web. Sassy described how one of her friends told her about a web site that contained a cookie recipe that she could make with her grandchildren.

People also helped others in their social network by showing them how to do things and setting up their computers to make it easy for them. Angela describes how one of her colleagues at work showed her how to find someone on the Internet:

> I don't really, you know, like I said, I'm still, this is kind of still new to me. I don't really go into the. Like I said, the only time I go on the Internet is like when I went to look for something specific and then I have to get on there and ask Colleen. Colleen, how do you, you know, like when I was looking for my girlfriend, I said how do you do that? And she said, I'm going to show you how to do that. I'm going to put it in your favorites. And next time you are looking for somebody just click on there, put the information in and stuff like that.

She not only showed her how to find someone, but she also put that link in her list of shortcuts so that she could access the web site again.

Monitoring progress. Another important role fulfilled by the volunteers was monitoring people's progress as they learned the technology. Suzy knew generally how people in her social network were using the technology and the trouble that they were experiencing. The volunteers often actively monitored people's computer use in their social network and provided encouragement as they learned to use the computer. Suzy provides an example of this type of monitoring.

> Researcher: And how about Gund?
>
> Suzy: Oh, she plays Solitaire. She plays, she likes the different games. She likes Minesweeper too. And then she has a brother in California she e-mails a lot. She enjoys that. She's just kind of trying to learn different. She, her goal is to look up her family tree, get her family tree figured out and go into the libraries from her computer.

Suzy knew about the ways that Gund was using the computer. She knew that she wanted to do genealogy research and the reasons this was so important to her. Suzy monitored people in her other volunteering pursuits as well. When I observed the work that she did for Share

Foods she could go through the list of those that participated in the program and tell their stories. Similarly, Elaine was very aware of how people in her social network were using (or not using) their computers and the help that they needed.

Related to monitoring people's uses of computers was the ability to identify the needs people had and the way that computers could fulfill these needs. Besides just monitoring people's uses of the computer the volunteers also introduced people to the uses of computers. Suzy told the story of how one of her neighbors was very sick and she encouraged him to get a computer so that he would have something else to focus on and so that he could transcend the limitations imposed on him by his health issues.

> Suzy: And it was just kind of real obvious to me when I'd popped over, I live in a mobile home park so its not so far so I'd go over and see them every once in a while and he'd just be house bound for quite a while and you could just kind of see that he didn't have much interest, or anything much to focus on except his bad health, so then I just mentioned to him, I said, have you ever thought about, you know getting a computer, because you don't have to leave your living room, you know, you can travel hundreds and hundreds and thousands, and around the world and I said there's so much knowledge out there.

Suzy identified several people in her social network whom she encouraged to learn about computers. She also noticed larger needs in the community and encouraged Prairienet to create a public access site to serve the youth in her community.

Partner in use. The CNI participants also encouraged use by acting as partners in use, using the technology with others. The use of computers and even learning about computers became a joint activity that was shared within people's social networks. There were several different examples of people who specifically sought out a new technology in their lives, because they planned to use it with a friend. In Suzy's case, her friend Terri

served this role. They made a plan to purchase computers at the same time so that they could lean on each other as they used them.

> Suzy: Sometimes, between my see my next door neighbor on the on the other side of me, she and I both got an e-machine, the very, like she got hers one night then I got mine like two or three days later. And we planned it that was so that we can kind of lean on each other and but she has had some compu(ter) some college courses, no, Parkland yeah college courses and so and plus her dad is really big into computers. So between Dorothy and I, we kind of tried (laugh) lead them through some of their problems.

There were other examples in the data of people who made a computer purchase because they wanted to use it with a friend. Sassy, for example, purchased her first computer so that she could communicate back and forth with a friend who did not live close by.

Beyond just using the computer together, people also engaged in activities that led to the development of computer expertise. This included activities such as attending computer classes together and volunteering together. Sometimes people adopted new technologies because they were following a friend's interest.

Resource provider. The volunteers were also especially good at identifying people's learning needs and providing resources so that people could use their computers. In some cases, a participant went out and purchased a new computer, and participant's let others within their social network such as children or friends use their computer. Paul provides an example of the way that computer equipment was shared in the CNI network.

> Paul: So a friend of mine was calling me about buying this computer and he's being all that, he wanted all this memory and all this stuff. So his wife so his wife called and said, Paul, she says, are you using the computer. I says no, not right now. She says, well, do you mind if I borrow it. I says I said no. I asked her why. She said because I want my husband to see what he's getting into before he actually goes to buy a computer.

Paul loaned his computer to his friend so that he could figure out what he wanted to do with the technology and what type of computer that he needed. For his friend's wife, it was a way for her to test to see if he was serious about learning about computers or if it was just a "phase." Paul offered to help his friend buy a computer once he decided what he really wanted to do with it.

In addition to loaning out equipment, at least one of the volunteers actually donated her volunteer time so that some of the friends in her network could upgrade their computer.

> Suzy: At Christmas I brought my machine in quick and had it all everything that you possible could put on it. I used my volunteer hours and I gave it to Sassy but then she went through the course and got one of her own. So then I got it back again for Share Foods. But now I'm gonna use my hours and give it to Gund. I'm donating my hours but she doesn't know it

Suzy's original CNI machine first went to Sassy who used it until she went through the program to get her own computer. She also donated the volunteer hours she had so that Gund could have multimedia access through her machines. Besides giving their CNI machines, the CNI participants also gave and received computer equipment they were not using. Gund, for example, received a printer from one of her relatives. In other cases, participants shared software such as games with each other.

The ability to provide resources was especially important within the context of families. One of the primary motivations for going through the CNI program was that the participants wanted a computer at home for their children and their grandchildren. The volunteers talked about how some people went through the program who were not especially interested in computers, but that they went through the training to get a computer for their children or someone else in their household. This demonstrates that all of these types of help

giving activities operate on many different levels, and that people with varying levels of expertise are able to fulfill these roles. Even if one does not use a computer at all, one is still able to help others.

Intermediary Role

The volunteers especially played an important intermediary role between Prairienet and the people in their social networks. The resources they provided may not have had anything to do with the technology itself. Suzy has provided help in countless ways to those in her immediate friendship network and to those she has met through her volunteer activities. She told people about the CNI program, brought applications for them to fill out, delivered computers to them when they completed the program, drove them to classes, and offered support and encouragement along the way. In addition, she helped people learn to use their computers and to solve technical problems. Through her volunteer work at Prairienet she has gained an understanding about how the organization works. This has allowed her to give people she knows useful advice about the application process and the procedure for getting into classes and how to resolve problems.

Suzy's case is interesting because she drew in many people from her social network to provide help. She had a technical troubleshooter who provided technical support when she needed something installed. Her friend, Terri, acted as a partner in use. Suzy herself acted as a teacher, caretaker and resource provider in her own friendship network. Providing this type of assistance seems connected to the role of the "gardener" identified in the social informatics literature (Nardi & O'Day, 1999). A gardener is someone who helps people use computer programs more efficiently and who helps solve problems for members in their

work group. In a CAD group that they studied, Nardi and O'Day found more advanced users who wrote programs, distributed programs, helped to set standards, and answered technical questions. Similarly, Nardi and Miller (1991) found that advanced users help novices in constructing spreadsheets by: (a) taking on the role of keeping up to date on new developments, (b) serving as mentors to less knowledgeable users, and (c) acting as liaisons between experts and novice computer users.

The gardener role is important because the gardener is able to speak the language of technology domain and to translate it to less experienced users. This helping role may be a formal or informal part of a person's job responsibility, and this may have consequences in terms of how effectively information is transmitted in an organization. Several researchers have studied the helping role in an organization (Eveland et. al, 1994, Okamura et al, 1994). This type of role is similar to the role played by teens in the Homenet study who helped others in their families use the computer and helped to solve technical problems (Kiesler, et al., 2000). In this dissertation, this type of help giving was especially characteristic of the volunteers who served the program.

Benefits of Relying on Social Network

There are many benefits associated with relying on one's social network to get computer help. In some cases, the participants I interviewed were part of long term friendship networks that had a history of providing help and support in many different areas. For example, Gund and Suzy lived near each other and were in regular contact. Gund and Suzy at one time or another provided emotional support and provided care when the other was sick. They shared meals together. They did volunteer work together. They knew each other's

histories and life stories. There was an expectation that they would be there for each other. Obviously this was not present in every case and for every network dyad.

User-centered learning. A benefit of relying on one's social network to learn how to use the computer is that there is some knowledge about the life of the person who needs help. Suzy and Gund were dealing with computer use in the context of a real problem and using the actual computer that was causing a problem. This is different from a classroom setting in which one is teaching generic computer skills. In addition, the computers used in a classroom setting are different than the ones that the community members received (which caused some problems in using the computer at home).

Reciprocal relationship. People in one's social network may be more willing to ask a member of their friendship network for help. Friends are part of ongoing relations, so, to some extent, there are expectations that a person might be willing to help. There may be a shared history of help giving in many different contexts.

Partner in use. In some cases, other members of one's social network tended to encourage use because the technology was used together. Suzy and her friend Terri bought computers at roughly the same time so that they could lean on each other as they learned to use them. Sassy's friend encouraged her to buy a computer so that they could fax each other back and forth. In using the computer with a friend, there is a reason and a motivation to learn how to use the computer.

Regular contact. One might have more regular contact with someone in one's social network, more than in a classroom setting in which the teacher may not be a member of one's social network. Of all the people that provided training, Elaine was the one who was called

on for help most often by members of the community. This may have been because she went through the CNI program herself and also because she was seen as a member of the CNI participant's social network. This also speaks to the community members' abilities to add people to their social network. For example, Suzy was adept at adding people to her social network including the CNI staff. One way she did this was through her volunteer efforts. Carla was a Spanish speaker who went through the CNI classes. She had regular contact with some of the other participants through her social circles and at the store that her family owns.

Flexiblity. People's friendship networks are also more flexible than are those within traditional classroom instruction. Rather than having to attend a class, a person could get help at home using the computer that they were having trouble with and in the context of an actual problem. People could get help in a comfortable place and at a time that was convenient rather than in a classroom setting.

Limits of Relying on Social Network

There are some limits to the helpfulness of one's social network in distributing technical expertise. Helpfulness is really constrained by many of the factors described in the first research question. It should also be noted that each entry point for help (trouble shooters, caretakers, etc.) is also a source of potential breakdown. For example, a troubleshooter who does not explain what he or she is doing is not really helping the learner to understand how to solve a problem. This section describes some of the limits to the sharing of technical expertise that were observed.

Limits to expertise. There is an expertise involved in explaining how to do something in a nontechnical way. Suzy described how she learned how to help others

through her own unsuccessful learning sessions with someone in her social network. Suzy talked about working with people and giving them the time to actually try out whatever it was that she was trying to explain. In addition, there may be people in one's social network who have technical expertise but not in the areas that are needed to solve a problem. For example, Suzy's son knew a lot about computers but he knew about Macintosh computers, rather than IBM-compatible computers so his expertise was not useful to Suzy.

Shifts in one's social network. Shifts in one's friendship, neighbor, and even family networks can influence a person's ability to give and receive help. People may be involved in long-term friendship ties but these are not necessarily stable because people move in and out of friendship networks and because the availability of people in one's social network shifts over time as does one's ability and willingness to draw upon their social networks. For example, if a friend moved or if a friendship soured, this would directly impact one's ability to draw upon his or her social network to get a problem resolved. In Suzy's case, her friendship with Terri is no longer as strong, so they no longer use the computer together as they had originally planned. The advantage of ongoing friendship networks is that there is a shared history, but at the same time it is not necessarily something that one can always count on for help when it is needed.

Knowledge about people in one's social network. Some of our long-term volunteers who participated in the CNI program said that they limited the amount of social support that they gave to other people if it appeared that the person that they were helping did not genuinely want to learn how to use the computer. In some cases, because the expert user was a member of one's family or friendship network, learning about computers was

inhibited. Instead of actively learning how to resolve technical problems there was an expectation that the friend would always be available to solve problems that would arise. In addition, the shared history between people who are part of a shared social network may make it less likely that a person will provide help or share equipment. For example, one of the participants talked about not sharing a piece of extra equipment they had because they did not think that the friend would take care of it. Elaine went through cycles when she would provide help to friends in her network, and then she would stop providing help, because she did not feel like they were really trying to learn.

Strength of the tie. The strength of the tie that people have with their friends seems important in determining the level of support that is provided. People may be more likely to give ongoing help and go out of their way for someone with whom they are closer as opposed to a stranger.

Ability to draw people into social network. The ability to draw people into one's social network seems important in terms of getting and receiving help. In some sense, it could be argued that Suzy was building a social network around her that was composed of people who were interested in using computers and the Internet.

Individual limits. There are individual limits that govern one's ability to provide help, such as limits to one's time and energy. In addition, other responsibilities such as a job or a family may limit the help that can be given. Carla talked about how she helped some of the participants that went through the Spanish training sessions, but her help giving was limited because her primary focus was on her children when they came home from school. She could not help people in the evening because of her family responsibilities.

Conclusion

The focus of this chapter is on understanding the nature of the problems that the CNI participants encountered and how participants drew on their social networks to solve these problems. A number of different problems were identified through the user support logs, the survey and focus group data, and the observations of home computer and Internet use including: (a) understanding what the computer could do for them, (b) connection problems, (c) hardware and software failures, and (d) the intimidation involved in learning a new set of literacy practices. These problems represent one set of barriers that inhibited the CNI participants from adopting the literacy practices identified in the first chapter (organizing life, personal communication, documenting life, sense making, private leisure, social participation, and child rearing).

The question of how the participants solved (or failed to solve) these problems gets at how literacy practices are supported in one's social network. The work done by the volunteers to support computer use among the CNI participants was studied in order to document computer learning and the work involved in supporting computer use. The volunteers engaged in a number of sense making activities in which they activity pursued computer knowledge. Volunteering was also a form of social participation that gave participants a reputation among the CNI participants and within their own social networks as computer experts. They became known in their social network as people who could solve computer problems.

In contrast to the more formal help-giving provided by the CNI project, the work that the volunteers did to help each other solve problems was important in encouraging the

adoption of new literacy practices. The volunteers engaged in a number of different activities to help others make sense of the technology and solve technical problems. These activities included: providing troubleshooting help and computer advice; teaching others how to use their computers and what the computer could do; monitoring progress; acting as a partner is use; providing resources to help one learn about and use computers; and acting as an intermediary between the CNI project and friends and family members in their social network.

There were several advantages to relying on more informal mechanisms for solving technical problems. The instruction was more flexible than the classroom instruction provided by the CNI program and the instruction could also be tailored in the sense that the volunteers may have had a clearer sense of what the learner wanted to do with their computers and why it was so important. Participants were working on real problems on the learner's actual computer rather than talking about computer problems in a classroom setting. It was not that the CNI staff did not answer learner questions or help them resolve issues. The volunteers especially seemed to benefit from the interaction with the CNI staff. There were also opportunities for informal interactions in the classroom and when the participants called in for problems. However, there was still a separation between the CNI staff and the users that the volunteers helped to bridge.

Despite the importance of the informal help giving provided by the volunteers, there are some limits to the effectiveness of using this method to resolve problems. For example, sometimes people in one's social network do not always have the expertise necessary to resolve a problem. It was also the case that people's networks shifted over time which meant

that a person that used to provide help was no longer available as a resource to resolve problems. In addition, the CNI participants had busy lives and there was only so much help that they could provide to others in their social network.

This chapter detailed many of the technical problems that the CNI participants experienced as they attempted to use their computers and make sense of the technology in their lives. This chapter presented one type of barrier that the CNI participants encountered – the complexity of using and learning about computer technology. The next chapter considers in a broader way the factors that shaped the participants' uses of their computers. The next chapter addresses the complexity of the CNI participants' lives and the difficult choices that they needed to make as they adopted a new set of literacy practices.

CHAPTER 7

COMPUTER USE AND DREAMS OF A BETTER LIFE

Research question three seeks to understand what we can learn from the lives of the CNI participants about issues of access, technology use, and literacy. This question gets at the impact of participating in a program like the CNI and the nature of the evaluation process. How do we measure the impact of participating in a program like the CNI, and what is a "good" outcome? How do we account for the ideological barriers that the CNI participants encountered as they moved from thinking about what the technology could do for them to attempting to integrate technology into their lives? The point of this chapter, then, is to understand the types of questions that are useful when we take seriously the lives of our participants and treat them as "knowers."

The framing of this chapter is influenced by work that takes a situated approach to the study of technology use. This approach argues that technology use is situated; the same technology will be used in very different ways depending on a variety of factors such as the characteristics of a user, institutional norms and practices, and features of the technology (Bruce & Peyton, 1999). When looking at marginalized groups, additional factors come into play such as the extent to which people are made an active part of the decision making process (Bishop, et al., 1999; Choksi, 1997) and the extent to which literacy programs create a climate in which people are treated as "knowers" rather than as people deficient in literacy skills (Horsman, 1990; Taylor & Dorsey-Gaines, 1988). This approach recognizes that the process of acquiring new literacy practices is often accompanied by difficult and sometimes painful life changes such as shifts in identity, relationships, and family roles. Just as we

recognize that people bring technology into their lives in unique ways, this study also argues that we must view the impact of having access to technology as being situated. This means that having access to technology can be empowering, disempowering, or some complex combination of both depending on the situation (Bruce & Hogan, 1998).

Situated technology studies borrow from the work of Dewey (1920/1948) who argued that "every moral situation is a unique situation having its own irreplaceable good" (p. 163). This makes it important to understand the "good" in each case, and this definition will be different across situations. Dewey used the example of evaluating the concept of "good health" and the many different meanings that this term can entail. For someone who is relatively healthy, achieving "good health" has one meaning. For a person who has suffered chronic health problems, the pursuit of "good health" and the qualitative meaning of this concept may mean something entirely different. In a similar way, a "good impact" of having access to technology for the CNI participants may differ for each person depending on the situation. The CNI participants' definition of a "good impact" may also be very different than that taken by researchers, policy makers, and those running a literacy program.

When we take seriously Dewey's (1920/1948) perspective about evaluating the "good" in each situation, our view of the research process changes. Rather than viewing impact of technology in universal terms, the goal is to understand the situated nature of impact. That is, the relative "good" of having access to technology varies depending on the person and the situation.

As Dewey put it:

> The practical meaning of the situation – that is to say the action needed to satisfy it – is not self-evident. It has to be searched for. There are conflicting desires and alternate apparent goods. What is needed is to find the right course of action, the right good. Hence, inquiry is exacted: observation of the detailed makeup of the situation; analysis into its diverse factors; clarification of what is obscure; discounting of the more insistent and vivid traits; tracing the consequences of various modes of action that suggest themselves; regarding the decisions reached as hypothetical and tentative until the anticipated or supposed consequences which led to its adoption have been squared with actual consequences (p. 163-164).

There are consequences to taking the approach that Dewey suggests. The first is that as researchers we must look at each situation and identify the way that a "good impact" is defined. The second is to look at each situation and the elements of each situation to understand whether technology use is empowering, disempowering or some blend of the two. Finally, we need to look at the research process itself and the assumptions that we make about our research participants and their pursuit of what we (and they) perceive to be a "good" outcome.

The goal of this chapter is to understand the situated nature of technology use, access, and literacy. The chapter begins by trying to understand in broad terms the reasons why the CNI participants wanted to participate in the program and the value that technology held in their lives. The chapter will then explore the judgments that researchers make when people fail to adopt new literacy practices.

Importance of Technology in the Lives of the CNI Participants

A useful starting point in understanding the situated nature of technology use and the impacts of access to technology is in looking at the reasons why the CNI participants cared so deeply about participating in the program. The computer was not a neutral object that was

placed in their homes. The technology had meaning for them, and they were active participants in defining the role that technology had in their lives. Crabtree, et al., (2001) make a similar point in describing the ideological nature of computer use in the home:

> The meanings members attach to technologies drive adoption and shape use. The use of desktop computers in the home, for example, is motivated and regulated by the meanings members' attach to it. The communication may be an 'educational' or 'communication' tool or something that the kids 'waste time' on. It is not that the computer either assumes one of these meanings or the other but rather, at different times in the course of different events that occasion its use (doing homework, sending an email to a friend, playing games, etc.), the computer assumes all of these meanings and is thus woven into the milieu of domestic activities. (Crabtree, et al., 2001, electronic version)

In answering the first research question, this study argued that one of the first things that the participants had to do was to figure out what the technology could do for them. This answer changed over time as their lives changed, as their understanding of the technology changed, and as the technology itself changed.

Motives for Participating in the CNI Program

We can connect the motivations of the CNI participants to go through the program to the larger discourse that surrounds the acquisition of literacy practices. Horsman's (1990) work is useful in framing the results in this section, because she ties her participants' reasons for participating in a literacy program to their dreams for a better life for themselves and their children. Similarly, the CNI participants connected their use of computers with achieving a better life. They hoped that the computer could help them to: (a) increase their economic security, (b) provide better lives for their children, (c) be taken seriously, (d) make a contribution to the community and within their own families, and (e) "be somebody" because they could fit in with a world that increasingly is using technology. This section draws on

focus group data and interview data in exploring why it was important to the participants to have access to technology. In particular, some comments made by Stephanie, a single mother in her twenties who participated in the Windows 95 focus group, will be used to illustrate the important role that technology held in the lives of the participants. She was especially articulate in connecting the issues of technology use, access, and literacy to people's everyday lives. This section also draws on comments made in the interviews concerning the importance of technology in people's lives.

Desire for economic security. Having access to a computer at home meant that there was potential for the CNI participants to gain economic security, because it could provide a second income. We recall, for example, Gund's desire to use her computer to organize the sale of craft items that she produced. The computer itself could be used to make money by producing items such as business cards. Repairing computers and teaching others about computers is a skill that could be leveraged to gain a second income. Knowledge about computers could potentially be leveraged to get a better job. Stephanie provides an example of the potential of the computer to provide economic security.

> Stephanie: They allow us to have second incomes. I could sit at my computer and do some desktop publishing for somebody. My friend over here is doing a business. She needs business cards and she can pay me 50 dollars and it sounds ridiculous but its what it costs if you go to a viable business that has a billboard and she can pay me $50 for something that might take me 10 minutes to set up on my computer at home. You know that's an income, that's empowering that's allowing me to move from out of that low income to something better for me and my family, my kids.

The computer was seen as having the potential to help the participants move out of poverty. In producing a second income, the computer had the potential to create a better life for Stephanie and for her family.

Desire to provide a better life for their children. The computer was also valued because the CNI participants tied the computer to their care-taking role as parents. This was true in the sense that they were providing a resource that they thought that their children needed to be successful in school. More broadly, they felt they were providing access to opportunity for their children.

> Stephanie: My son is in gifted programming, and the majority of the kids in gifted programming are upper middle class wealthy people. They have computers in their homes. When they come in and they bring their school papers in, they're typed in on a computer. When my son comes in, before we had a computer, it was hand written. There's a difference, there's a stigma, there's a self-esteem issue there when you're sending the kids and they have to compete against things like that. There are parents that even say in the gifted program if your kid doesn't have the tools, he doesn't need to be in the program. And the tools would be a computer. If they don't have the means in which to participate, if they can't, if you can't take them to a museum and afford the admission to get in, then they don't need to be a part of this. I don't want my kids to miss out on opportunities and the computer kind of helps with that, it really helps with that.

In providing her son with access to a computer, Stephanie was providing him with a tool that he could use to compete with his classmates at school. She felt that this was important because her son could turn in assignments that looked like the ones turned in by other children in his class. Having access to a computer removed the risk that her son would be "stigmatized" or that his work would be judged as less worthy because it was typed rather than hand written.

We must also recognize the value that the computer had for Stephanie in providing this resource for her son. She did not have to send her son to school without having access to a computer. Providing computer access was a way that Stephanie was showing the she was a good mother. Sissy, one of the participants interviewed for this study, made the connection more explicit in her interview. She talked about being a good role model for her children by

learning the technology and providing the resources for them. She wanted her children to be able to say "my mom can do that" in terms of being able to use a computer.

We see further evidence of the way that people tied the use of computers to their role as parents in the way that they often limited their children's access to computers and to the Internet. Parents with younger children often insisted on being present when the children used the computer so they would not accidentally wander into inappropriate sites. The computer was also seen as having the potential to teach life lessons like sharing, cooperation, and the need to take care of one's property.

This care-taking role extended to other family members as well. Several grandparents went through the program to provide a computer for their grandchildren who were either living in their homes or who stayed with them during the day while their parents worked. To some extent this role extended to family members outside one's immediate nuclear family and to friends in one's social network. We recall, from the previous chapter, the way that Suzy provided resources to friends in her social network.

Desire to be taken seriously. Some participants saw the potential of the computer to help them act as advocates for themselves. Computers allow one to act as an advocate in the sense that you can communicate your ideas in a form that may be taken more seriously.

> Stephanie: It's a pretty big deal if you're poor. It is really a big deal. And there are a lot of people, I know a lot of people that do nothing but sit on their computers and play Solitaire and I play my fair share of Solitaire but I can get on my computer and it is a viable tool. I can do things. I can advocate for myself. And when I have a problem I can type a professional letter and send it to somebody and they take it seriously versus a hand written, stationery, or lined college wide ruler paper, it makes a difference. Appearance counts. It's a voice box. It's a whole lot of things.

Stephanie felt that she would be taken more seriously, because she could type a professional letter on her computer rather than sending a hand written note. We also notice in Stephanie's comments judgments about the appropriate role of computers in one's life. From her perspective, playing games was not a productive use of the computer, or at least not as productive as doing something serious like advocating for oneself. This points to the situated nature of people's judgments about appropriate use of a computer. Game playing can be interpreted differently. Games playing can be a way for children to learn "skills" or as an activity that is shared between friends or an unproductive use of time.

In extending Stephanie's comments a little further, the value of the computer is that one could also be taken more seriously in other settings such as school settings because one could type a paper. Several CNI participants wanted the computer, because they were attending school themselves, so the computer allowed them to type their work and use the Internet to conduct research. There were mixed results of using CNI computer for schoolwork. One of the participants who participated in the early CNI training classes ran into problems, because she could not print out the papers that she produced on her Windows 3.1 machine – at her school they used Windows 95. Similarly, a participant described how she could not figure out how to use some of the page set-up features in her computer, so her teacher took points off of her work because the paper was not turned in correctly formatted. In contrast, one of the focus group participants talked about how she found a web site on-line to improve her granddaughter's math skills and how she could now get web sites from her granddaughter's teacher to use with her at home.

Desire to make a contribution in the community. The computer was also viewed as a way for the CNI participants to make a contribution to the community and to extend their experiences beyond the limitations of income and the daily realities of their lives. Gund provides an example of this type of desire in her discussion of the importance of volunteering:

> Gund: It's very important. It really is. I, and for me I always said let me, let me be the first one to be an example. Because we cannot get paid for everything that we do.
>
> Cece: mmm, hmm
>
> Gund: I wasn't brought up like that. I was brought up, if you can render a service for somebody, you render that service. And your pay will come later. Ain't never know which way it's coming from. So, I enjoy it just, just coming down here. I enjoy coming down here because it get me away from home.

This desire was especially prevalent for those who volunteered with the CNI program. Like Gund, many of the volunteers talked about wanting to help others in their community learn how to use the computer. It was not always framed in religious terms, but the desire to help others motivated people to volunteer and to use computers.

Desire to "be somebody." Underlying many of these categories is the desire to own a computer to "be somebody." Owning a computer was viewed as a way of being part of the "technological world." Ruby describes how even if people cannot operate their computers there is something important about being able to say that you own a computer:

> Ruby: Because I do know some people that have them sitting there and they're not in use. And they're, they haven't discarded them because they don't want to discard them because they really wanted the computer. If nothing but to play games on them, it was theirs. I mean and most people that have them, want them for more than playing games. They want it for, they have a reason, they want knowledge about the computer, but then when that when something happens to their computer and they don't know how to make it work, and it appears that it stopped working, they lose interest, and they said forget it. This lady said one day I'm just going to throw it out

> the door. And, you know, that's the way they feel. I'll throw it away one day, but they don't throw it away yet, because it's something about having a computer or owning a computer that makes a person feel sort of good.
>
> Researcher: What do you think it is about that?
>
> Ruby: I think it's because of the high tech, because it's so high tech and I think people sort of contribute that to being something.

The computers that the CNI participants owned were not neutral objects placed into their homes. The computers were tools through which they felt that they could "be somebody." Computers made them feel as if they belonged with other people that use technology. As we can see from Ruby's quote, viewing the computer as a tool to "be somebody" is double edged when a person runs into problems using the technology, whether those problems stem from a lack of knowledge about using a computer, a lack of adequate training, a breakdown in the computer, or a lack of expertise within one's social network.

It is worth making some points about the preceding examples that address the social values ascribed to technology use and ownership. These examples are reminiscent of Bruce and Hogan's (1998) discussion of the way that, as technologies become widely used, ability and disability become defined in terms of people's ability to access and use dominant forms of discourse. Owning a computer meant that Stephanie's son could type a paper like his peers did at school and that she could type a letter to advocate for herself and be taken seriously. Fingeret & Drennon (1997) make a similar point in arguing that the value of literacy to the participants that they studied is that they could do things as other people did them. The CNI participants are all too aware of the judgments that are made about them. As Stephanie put it, "They don't expect us to own them. We can't afford them and therefore we're ignorant about technology." Owning technology provides the potential to do things as other people do them.

We also must remember that the impact of technology use is situational. People bring technology into their lives in different ways, and they make different judgments about the value of technology in their lives. For example, while some valued the ability to use spreadsheets to record their finances, many more chose not to use spreadsheets because they did not want to keep their finances on the computer. Similarly, there was a great deal of variation in people's judgments about the value of word processing. This reminds us that computer ownership can be empowering, disempowering or some complex blend of the two.

Deconstructing a "Good" Use of Technology: Elaine's Story

The previous section spoke in general terms about the reason why computers were important to the CNI participants. In taking a situated approach, the goal is to move from the general to the specific to uncover the impact of having access to technology. Elaine's experience with technology and her participation in the CNI program helps us to think through the impact of having access to technology and the complex choices that people make in integrating technology into their lives. Elaine went through the CNI program in 1999. She became very interested in the computer and did quite a bit of volunteering with the program. She has been extremely involved in helping people resolve technical problems. It was because of these efforts that the CNI project decided to hire her as a staff member. She has been involved with training and working with the technical staff as they assembled computers for distribution.

When Elaine first came to work at Prairienet, the hope was that she would be able to take the technical skills she learned and start her own business. This may still happen, but it is worthwhile to consider some of the bumps that she has experienced as we think about the

connection between access to technology and the benefits that access are supposed to bring. Elaine had been working with the director of Prairienet to create a business plan to get a small business started. He encouraged her to go through a special training class that is designed to help people start small businesses. Part of this training involves creating a business plan, and there is funding available through the program to actually start a small business. Elaine went through this special program, but she has not finished the business plan for a computer related business, and it appears this is not something she is going to pursue in a formal way for now.

While she has decided to put a computer business on hold, she has decided to start another business. She has obtained a childcare license and has begun offering childcare services in her home. One of the barriers that Elaine faced as she thought about starting a computer related business was the fear of doing something "this big." She talked about being overwhelmed by all the steps involved in actually creating a computer business. Elaine was dealing with the fear of moving her life in a different direction and doing something unfamiliar. Childcare, on the other hand, was more familiar to her because she had raised her own children and she was actively involved in the lives of her grandchildren.

Another reason that she started the childcare business was because of the importance of family to her. Childcare is an issue for her extended family, especially when her daughter is working. Elaine's daughter and her two children live in Elaine's home. Elaine insists that her grandchildren should not be taken care of by just anyone. She said that her daughter wants her to watch her children as she has for other grandchildren in the family. By getting

her childcare license, she can receive funding to watch her grandchildren while her daughter is at work and she can watch other children as well.

Elaine obviously had a strong connection to her children and to her grandchildren. One of the reasons she wanted to get the computer in the first place was to keep up with her grandsons:

> Elaine: I guess it made me realize too that, you know, here in a few years and stuff they going to know quite a bit about computers and stuff. I'm not going to know anything. And then I, you know, like in schools and stuff now, too, they, they're, it's mostly every school, you know have computers. Because at the time, they were going through Head Start. That's what they did. They sit there and let the kids, they, you know mess with the computer, you know quite a bit more in the day time, and then like I said, as you know too, a whole lot of things now is computerized, so you know, I knew that if I wanted to keep up at all, if I wanted to keep with my grandkids or if it was something that they wanted to know that they didn't know, I couldn't tell them not unless I learned it. So that's kind of how I really got interested in doing this.

Elaine saw the potential of the computer to help her grandsons get ahead. Since participating in the CNI program, she has purchased several computers and has given them to her grandchildren. She talks about buying them computer programs such as Jumpstart so they can get ahead in school.

It is important to note here that Elaine has made a perfectly valid "choice" about where to focus her attention and energy. She may decide that she does want to start up a computer business, or she may continue to do some work informally for people she knows. When we look at some of the reasons why Elaine has decided not to pursue a computer-related business, we begin to understand the messiness that comes between an intended effect of a program designed to increase literacy skills and the reality of people's lives. This gets at the heart of programs like the CNI that are designed to promote social change.

How should we interpret Elaine's use of technology? How should we evaluate the other participants' uses of technology? The key issue here is in the interpretation of the choices that the poor make in striving to adopt new literacy practices and in achieving these goals. From the point of view of researchers and policy makers operating from an access model, all that is required is to provide the opportunities for literacy training and access to computers. From this perspective, if people do not choose to take advantage of these opportunities then they lack the motivation to achieve a better life. This is in contrast to the poor for whom choice is constructed in a different way and for whom difficult decisions must be made about pursuing new literacy practices and accounting for the realities of everyday life.

We see an alternative way of thinking about choices when we listen carefully to the way the CNI participants relate technology use to their lives. They talk about the choices that they need to make about participating in programs and adopting new literacy practices and the way these choices to some extent are constrained by the realities of their daily lives.

> Sharon: Because it's draining to working this hard to get someplace else without support whether it's financial or emotional or verbal or any of those things. It is exhausting because you still have to go work a 40 hour week plus 40 hour week because our income, we're usually underpaid, we're only at the minimum or take care of you kids, work a 40 hour week come home take care of your kids your family. If you're trying to go to school at night you're still doing stuff like that so all those things play into the whole low income and what that means and why people take advantage and some people don't.

When choice is constructed in this way, the choice of whether or not to participate in a program like the CNI program or to buy a computer takes on a different meaning. Barton and Hamilton (1998) argue that, in studying hidden literacies, we gain an appreciation for the logic and value behind people's literacy activities and practices.

Deconstructing Choice: "Waiting it Out"

In one of the focus groups, a participant introduced the concept of "waiting it out" to describe some of the barriers that people encounter when making decisions about whether or not to participate in a program such as the CNI program. She defined waiting it out as "this is what you have to do but this is how far away it is" and the sacrifices involved in participating in a program like the CNI program. As she put it, "some people can't afford, literally can't afford to do that. A weeks worth of classes, you have to catch the bus everyday, can make the difference in buying a meal at the grocery store, milk and a loaf of bread, and that's for some people a pretty serious thing." Participating in a CNI training class, acting as a volunteer in the program, and even investing the time to learn a new set of literacy practices involves choices. People need to make very careful choices about finances, about how to expend their energy, about childcare, and about safety.

The failure to take seriously the real difficulties that people face when trying to adopt new literacy practices is drawn from the work of Horsman (1990) who studied women who were participated in a literacy training program. She argues that what are often left out of discussions about literacy are the complexities involved in women's lives and the way that their caretaker roles in the family may inhibit their abilities to take on new literacy practices. As she put it:

> Discourses of 'motivation' lead to an assumption that material circumstances should *not* be allowed to affect women's participation in educational programs, and hence to the identification of some students as not really serious. But the attention to material circumstances of women's lives and the social dis/organization that women live leads to questioning the assumption that participation in adult programs is a matter of 'choice' which women make based on their degree of motivation. Rather than women making an active 'choice' to start a program and continue until they met their goals, it seemed that they moved in and out of programs depending on the situation in their

> lives at the time. In contrast, discourses of 'motivation' assume an agent who attends a program through his or her own individual act of will, and so contribute to the picture of the individuality of the learning endeavor (p. 146).

Extending Horsman's argument, it's not just that women face obstacles due to material circumstances when they make "choices" about participating in programs like the CNI. They also make difficult "choices" and they face obstacles due to material circumstances when deciding how to let computers and other technology into their lives and when adopting new literacy practices.

Horsman's (1990) work is useful in pushing the idea that we need to answer the question of how a plastic box full of wires and circuits can tell the tale of social relations (Bruce & Hogan, 1998). The story not being told, when we abstract the details of people's lives from discussion about the digital divide, is the real way that material circumstances influence literacy. This suggests that one way we can understand the way that social relations are inscribed in the CNI machines is by noticing the factors that influenced the CNI participants' use of the computer. This also suggests the need to think more closely about the way that gender works itself out in terms of the CNI participant's use and access to computers.

The CNI participants in the focus group and the interviews mentioned a number of barriers that made it hard to "wait out" the CNI program, to participate in subsequent training classes, and even to volunteer. In addition, some of the policies and workings of the CNI program and the features of the computers that they received impacted use. These issues included: transportation, childcare, busy lives, the exhaustion of everyday life, loss of telephone access, computer experience, features of the training classes and the CNI program.

Transportation. Transportation was a major issue for some of the participants. The participants talked about making sure that the training classes were on bus routes so that people could get to the classes. This was a lesson that was learned during the first round of training. At that time, the classes were scheduled to begin before buses were running which caused major difficulties for people trying to attend the classes.

Childcare. Having someone care for one's children was an issue for the participants while attending the CNI classes. This was closely related to the scheduling of the CNI classes. As one participant put it, "If you know that every 4 weeks you were going to have a cleaning class, then the people would know ok, I can catch this cleaning class. I have this much time in advance to maybe do a babysitting swap or find somebody that I don't have to pay or catch a ride and then it gets easier." There seemed to be two issues with childcare – the cost of finding someone to watch one's children and finding someone safe to watch one's children. The CNI project did provide child care services for some of the classes. People could bring their children to class and volunteers were given credit for watching the children. This was a valuable service, but it became impossible to continue because the training sessions were held either in academic or office-oriented settings in which it was somewhat awkward to provide childcare. People did sometimes bring their children informally to the sessions.

Busy lives. The CNI participants had busy lives, so it was sometimes difficult to find training classes that fit their schedules. The classes were either scheduled two nights a week over the course of two weeks for a total of four sessions or on two consecutive Saturdays for the entire day. One of the seniors interviewed for this project, Sharon, was scheduled for

evening classes. This meant that she had to take the bus to and from the classes at night, which she felt was dangerous. In general, the participants were offered the choice of day or evening classes, but the times often conflicted with other commitments such as work, family, and church obligations.

Exhaustion of every day life and lack of support. The participants also talked about the exhaustion that came from working hard to support a family, provide resources, and care for their children. This was especially true for the single mothers who participated in the program and who often lacked adequate support for all the activities they were trying to undertake.

Loss of telephone access. The loss of telephone access was an important issue that influenced people's ability to get help and access the Internet. Of the 11 people I interviewed for this project, at least two had lost telephone access sometime over the course of the study. In addition, one of the focus group participants mentioned in the interview that he or she accessed the Internet from the library because he/she no longer had phone access at home. In my experience at Prairienet, I noticed changed and disconnected numbers were a major issue for the CNI participants and for the staff at Prairienet. There was often a significant delay between the time that the participants turned in the application and the time they were trained. An attempt was made to contact people via mail if one's number was disconnected, but this meant that not everyone received training. Over the course of the program, this also made it difficult to provide technical support, especially if the problem was difficult to resolve.

Computer experience. The previous chapter detailed the problems that the CNI participants experienced and the many problems that new users especially faced in trying to connect to the Internet. The new users especially were intimidated by using the computer. There was often a significant delay between the time they took the computers home and when they actually tried to connect to the Internet. There were also issues of figuring out what this computer meant in their lives and what it would do for them.

It was apparent that the training did not always address the differing levels of computer experience. For the more experienced users, the coverage of the CNI program was more than they needed. They already knew about using the mouse, operating in a Windows environment and using a browser. For the less experienced users, the coverage of the CNI program was not adequate. It was hard for them to learn how to do e-mail or surf the web when they were experiencing problems using the keyboard and the mouse.

Features of technology and training program. There were also features of the technology and the training program that influenced use. The CNI participants received used computers that were not multimedia capable. The computers contained web browser software and a free word process/spreadsheet package. Because one of the major reasons for participating in the program was for their children, the lack of multimedia capability and games on the computer caused a mismatch between the participants' goals and the program. Since much educational software comes on CDROMs, the participants could not go out and buy software for their computers unless they upgraded their systems. Having used equipment also meant that the computers broke down. The CNI project provided support for 90 days which meant sometimes people were left on their own to get a computer problem resolved.

This was an issue for new users for whom it sometimes took awhile to try to get connected to Prairienet. It was also intimidating for new users to experience computer breakdowns which led some people to conclude that "these computers aren't worth having." Since the computers were older, they also were slower than new computers might have been.

Another issue was that the person that went through training was not the one who necessarily used the computer. Sometimes this mismatch resulted in some participants becoming interested in the computer for themselves. In other cases, the person was going through the program to get a computer for a child or another family members, and was not interested in the training. This had the potential to made the computer less useful, in that some things learned in class like connecting were important to know how to do once the computers were in the home.

Some of the operating procedures of Prairienet as a community network also limited the CNI participants' use of their computers. One of the major limitations of using the Prairienet system to connect to the Internet is that Internet access is limited to 10 hours a week of graphical access (PPP) needed to surf the web. It is possible to upgrade one's account to have more PPP time, but the CNI participants had to know about this option and pay a small fee to get this additional access. Since free "Net Neighbor" accounts are limited to one per household, this limited the extent to which other household members could use the Internet if they relied on Prairienet as their sole Internet Service Provider. This issue is especially salient given that often the CNI participants were going through the program to get a computer in their home for other family members such as children.

Evaluating the CNI Participants' Choices and the Gendering of Literacy Practices

Returning to Elaine's story, in recognizing the complexity of people's lives perhaps we can evaluate her choices differently. In some senses, by providing childcare she is providing support for her daughter who is able to work because of her efforts. Many of the women participating in the program felt that it was their role in their family to provide the computer as a resource for others in the family, especially for the children. In talking with the volunteers, there were often criticisms leveled against those whom they perceived not to be motivated to learn about computers. It was charged that sometimes people went through the program "just for the computer" or that some people "just play games" or "they don't use the computer." We can return again to Sharon's story of giving her computer away to her niece so that she can put it to good use. Perhaps we can reframe this somewhat when we consider the important social function that the women served in their families when providing the resource of a computer, even if the women did not use the computer themselves.

In considering the impact of gender roles on participation in the CNI project, we can also appreciate the differences in the way that some of the participants viewed the project in contrast to the goals of the CNI project. The goal of the CNI project was to get computers in people's homes and to increase computer literacy skills. In constructing the program, skills were taught such as e-mailing, word processing, and surfing the web. For the participants however, the CNI program was a resourceful way of getting computers in their homes, a way to be good role models for their children, and a way to give their children a better life.

Part of the way that gender roles played out in this study was that women often served an intermediary role between social institutions and their families in terms of getting material

resources into their home. It becomes the female's job in the family to get computers in their homes by contacting the Urban League, inquiring about the program, filling out the application, and going through the classes.

> Carrie: I make it my business to know what is available to me to help me to get on my, to help you know have my son a better place to live or grow up how ever you want to ...
>
> Stephanie: so they can be educated and we can set good examples so they can be resourceful so they can advocate for themselves and so that they can go out and do things and be in a better place that they were
>
> Researcher: is that why you are getting your computer through the CNI, its kind of another way that you are being resourceful?
>
> Stephanie: Yeah
>
> Several: Yeah, exactly

The comments of the focus group participants indicate that they view it as their job to be resourceful so that their families have the resources that they need.

In some ways, the gender issues surrounding participating in the CNI program can be limiting for both women and men. Perhaps some women were going through the program to provide the resource for the family, and they were not as interested in using the computer in their own lives. This is also limiting for men in the sense that perhaps they are cut off from social institutions that could help them acquire new literacy practices.

Conclusion

This chapter in many ways is about asking questions and understanding what is important in studying technology use in marginalized communities. Perhaps the value in this chapter is in helping us to understand better the types of questions that are important to ask in studying technology in low-income communities. Some of the issues raised in this chapter,

such as the complex choices that the participants made in bringing technology into their lives and the gendering of literacy practices, can be used in the design of other literacy programs that teach computer literacy skills.

The final research question focused on understanding what the lives of the CNI participants can teach us about computer literacy and programs like the CNI project that are designed to teach literacy skills. This seems to get at the heart of the study and in some ways ties all the research questions together. It was argued that this question involves exploring how the CNI computers become inscribed with social meaning. Computers become a site for hopes and dreams for oneself and one's family. They offer the potential for economic security, the opportunity of being a good parent, the ability to advocate for oneself and one's family, a way to be productive, and the means to "be somebody." There are a lot of real barriers caused by a lack of material circumstances that get in the way of achieving some of these goals. However, rather than dismissing these issues and arguing that poor people lack motivation, we need to fully account for real barriers that the participants experienced due to a lack of transportation, childcare issues, the busyness of their lives, the exhaustion of everyday life, and the loss of telephone access. We must also account for the ways that the policies of the CNI program and the training did not always serve the participants well, particularly those with less computer experience.

When we look at the details of the lives of the CNI participants, we begin to see how the digital divide literature does not really capture the dimensionality of their lives and the way that they use computers. The details of the lives of the CNI participants also show the complexities involved as people try to adopt technology into their lives. This is important

because it suggests that it is important to go beyond just focusing on access to technology towards a consideration of understanding technology in use by considering the context surrounding the use of a particular technology. It also sharpens our thinking about the different goals involved in providing access versus supporting people through the long process involved as people figure out the ways that they want to actually use a technology. The final chapter will review some implications of taking seriously the lives of marginalized groups when designing training programs geared towards increasing literacy skills.

When we look at the stories of the participants, we see a group of technology users that were actively bringing technology into their lives. The participants in this study wanted the computers to make their lives and the lives of their children better. They found ways to connect the computer to their lives in meaningful ways. They were motivated to use computers despite the problems that they encountered. They used their computers, through their volunteer work and informal help giving, to serve their families, friends, neighbors, and communities.

How do we reconcile this profile of technology use with the portrait painted by researchers and policy makers when they talk about the poor and the need to improve literacy skills? There is a disconnect between the lives of the CNI participants and the approach that is typically taken by researchers and policy makers who remove the details of people's lives from discussions about technology use. This disconnect presents a challenge, from a research perspective, in deciding how to present the results in this chapter. Should the goal be to show how the lives and technology use of "have-nots" are not really that different from those of middle class America? If this is the case, then perhaps this study is not about "low-income"

technology users but is more generally about technology use in the home. Should the goal be to demonstrate the way that low-income groups are different from middle class America? If this perspective is taken, then perhaps this study should argue that the poor really are different from everyone else and focus on the reasons why they adopt or fail to adopt new literacy skills. In recalling the discussion in the first chapter, any number of reasons have been offered by academics and policy makers to explain why people fail to achieve the "good life" despite the existence of literacy programs.

In addressing this disconnect, this study argues that it is, in the end, the wrong question to ask whether or not the poor are like or not like middle class Americans, whether or not their use of technology is empowering or disempowering, or whether the poor are inherently worthy or not worthy in terms of their pursuit of new literacy practices. Instead, this study takes on a different question, drawing from work that takes a situated approach to the study of technology use. The impact of having access to technology can be empowering, disempowering, or some combination of the two depending on the people involved and on the situation.

It is important to point out that in arguing for taking a situated approach to evaluating the impact of a program like the CNI on people's lives, this study is not taking a relativist position. A situated approach seeks to inform and pursue social change through the process of inquiry into the specific case (Pardoe, 2000). In understanding the specific case, we will know more about the differing ways that people define what is "good" in a particular setting, the specific course of action pursued, and the consequences of a particular course of action. This knowledge can be used to inform other programs seeking to achieve social change. In

this case, people can take the lessons learned from the CNI program and use them in the design of new programs.

CHAPTER 8

DISCUSSION

When we take seriously the lived experiences of the CNI participants, we begin to see how the "have-not" or "low-income" categories do not capture the dimensionality of their lives and their use of technology. The CNI participants were active technology users. They made decisions about the meaning and the role of technology in their lives. They worked diligently to overcome the problems that many new users experience when using the computer and the Internet. They helped other people in their social networks use technology. In some cases, this help giving involved providing actual technical assistance. In other cases, help giving meant removing some of the obstacles involved in using and accessing technology caused by a lack of material circumstances. In exploring the lives of the CNI participants, we also noticed the complexities involved as people try to adopt new technology practices.

This study suggests that it is important to go beyond focusing on access to technology and go towards a deeper understanding of the context of use surrounding the use of a particular technology. Providing access to technology is a much different goal than supporting people through the long process involved as they figure out the ways they want to use the technology. This chapter will discuss the implications of taking seriously the lives of marginalized groups in research, teaching, and the design of public policy.

Summary of Study Findings

This study began by describing the unique ways that the CNI participants brought technology into their lives. The digital divide model starts from a point of deficiency; "have-nots" are lacking in access technology and in the technical skills necessary to be productive

and successful members of society. We do not hear the stories about how "have-nots" use technology when given the chance and about the meaningful ways they connect technology to their lives. In this study, I have tried to tell some of these stories. For Suzy, the computer became a tool through which she served the community by using it to coordinate Share Foods. For Gund, the computer was a "lifeline" between the generations that she could use to research her family tree so that her grandchildren would know about their family. For Sassy, the computer provided a way to communicate with others and to extend her social network. For Carla, the computer was a tool that could be used to teach her children life lessons like cooperation and sharing. For Angela, participating in the program was a way to provide a resource for her son. For Sharon, the computer was a source of frustration but also a way for her to provide a resource to someone else in her family. These stories are touchstones for each of the research questions posed in this study.

The first research question asked how the CNI participants used the computers and Internet access they received through the program. Barton and Hamilton's (1998) work provided a way to talk about the literacy practices that were occurring in the participants' homes and communities. The participants used their computers to organize their lives, maintain their social networks (personal communication), pursue leisure activities, document their lives, research topics of interest (sense making), and support of social organizations of which they are members. The categories are meant to be starting points, because, as Barton and Hamilton note, a literacy activity may encompass several categories. A person may send e-mail, for example, to a distant relative to research his or her family tree. This literacy activity would involve elements of personal communication, documenting life, and perhaps sense making. The CNI data suggests that one new literacy practice that might be studied is

child-rearing practices that occur in the home. The computer was used by parents to teach their children life lessons such as the need to take care of one's belongings and values like cooperation.

The second research question involved understanding the nature of the problems that the CNI participants encountered and how they drew on their social networks to solve these problems. One of the first problems experienced by the participants was figuring out what the computer could do for them. This involved making a personal connection between the technology and their lives. When we reflect on the stories of the CNI participants we see that the differing decisions they made about the role of technology in their lives. This helps us to realize the way that the meaning of technology in any given setting is negotiated and comes to be defined through use. This also focuses our attention on the way that the same technology can be empowering or disempowering depending on the situation.

Because this study was guided by work that takes a situated approach to the study of technology use, we also notice the way that attributes of the technology influenced used. The participants encountered a number of technical issues such as problems connecting to the Internet, hardware failures, and software failures. The data suggested that these problems were often difficult to resolve. A connection problem, for example, could be due to a modem failure, the incorrect set-up of a computer, the failure of a mouse or keyboard, or the forgetting of a password.

A situated approach also suggests that attributes of the users can influence use. One of the greatest factors that influenced people's use of the computer was their prior computer experience. Because many of the CNI participants were new computer users, they experienced a great deal of intimidation as they attempted to integrate the technology into

their lives. This meant that it often took them a great deal of time to try something such as trying to connect to the Internet. New users also experienced difficulties using the mouse and the keyboard that influenced their ability to use their computers to achieve their goals.

The second research question also involved understanding the work that must be done to support the adoption of literacy practices in one's social network. The work done by the CNI volunteers was used to document the types of activities needed to support computer use within the CNI community. Through the work that they did for the project, the volunteers gained expertise in solving computer problems and in helping other people solve problems that they encountered. Through their volunteer efforts, the volunteers also gained visibility within the CNI community and within their own communities as computer experts. The volunteers engaged in a number of support activities including: providing troubleshooting help and computer advice; teaching others how to use their computers and what the computer could do; monitoring the progress that people made as they adopted new practices; acting as a partner is use; and providing material resources that people needed to participate in the program such as transportation to classes. It is relevant to note that troubleshooting advice seemed to be a more specialized form of expertise that was more difficult to learn. The majority of volunteers were not able to repair a computer but they could make recommendations about purchasing computers and do some basic troubleshooting procedures. People could be experts in different ways such as being an expert in a particular program, being an expert in fixing a Windows problem, or being an expert in the procedures for working through the CNI program.

The character of the work performed by the volunteers was important because they provides informal help that went beyond the more formal training and help-giving activities

offered by the CNI project as an institution. Rather than dealing with computer problems in the abstract, the volunteers were often able to help people in their homes as they tackled problems on their own computers working on tasks that were of interest to them. The volunteers were very much in tune with the emotional aspects involved in being a learner and the vulnerability that people experience in having to show others that they do not know how to do something. Perhaps some of the distinctions between teacher and student were lessened, because the help giving occurred, to some extent, within the context of people's already existing social relationships. This meant that people may have been more willing to ask for help because they were seen by the help giver within the context of their whole lives rather than as learners experiencing computer problems. Also important was that the volunteers sometimes acted as partners in use with others in their social network. Computers and learning about computers became a joint activity that could be shared with others.

In addition to their informal help giving, the volunteers often filled an intermediary role between the CNI project and friends and family members in their social network. They helped others in their social network overcome some obstacles that the CNI project did not address such as a lack of transportation or a lack of childcare. The participants filled the role of telling other people about the program and about the process of going through the program. In some cases, they even helped them fill out the application to participate in the CNI program and delivered the computer to them when they finished the program. In terms of the CNI project, the volunteers were important in helping to identify things that could be done differently or in highlighting some of the reoccurring problems that they saw in working in the community. Their work was important in delivering the training and in getting

the computers ready for distribution. Certainly, this expertise could have been drawn on more heavily in the program.

The third research question was focused on understanding what the lives of the CNI participants can teach us about computer literacy and programs such as the CNI project that are designed to teach literacy skills. More broadly interpreted, it was argued that this question is related to the ideological nature of technology use and the social meanings that people attach to technology. The CNI participants saw the potential of the computer to help them gain economic security, be good parents, advocate for themselves and their family, be productive, and fit in a world that is increasingly requiring technical knowledge. The CNI participants teach us that having access to technology is not enough. They experienced real barriers in trying to achieve their goals. Rather than dismissing these issues, we need to fully account for the barriers that the participants experience due to a lack of material circumstances. These barriers included a lack of transportation, childcare, the busyness of their lives, the exhaustion of everyday life, and the loss of telephone access. We must also account for the ways that the policies of the CNI program and the training did not always serve the participants well, particularly those with less computer experience. More broadly, the goal of this dissertation was to develop a new framework for studying technology use in marginalized communities. The next section more fully considers the model used in this dissertation.

Towards a Framework for Understanding Technology Use in Marginalized Communities

An alternate framework was developed in this dissertation, a technology-in-use framework, based on the local literacy approach of Barton and Hamilton and work that takes

a situated approach to the study of technology use (Bruce & Hogan, 1998). The technology-in-use approach seeks to: (a) relate the technology activities that occur in people's homes and communities to literacy practices and social practices, (b) describe the development of expertise and the way that this expertise is shared throughout one's social network, and (c) understand the meaning that people attach to technology and the barriers that they face in adopting new literacy practices.

In developing this alternate framework, the work of Barton and Hamilton (1998) was important because it provided a language to talk about the hidden literacy practices that occurred in the homes of the CNI participants. The study of hidden literacy practices involves studying people, places, and activities that are often ignored in traditional research studies. In the case of the CNI project, the study of the hidden literacies of the participants took on all three of these meanings. This study involved researching the experiences of "have-nots" whose life experiences are often abstracted from discussions about the digital divide. The study also involved researching home literacy practices, a setting and a group of activities that are now starting to be addressed in the literature. While there is research that studies technology use in the home, there are few studies that try to link these uses to larger literacy practices and social practices.

The local literacy literature was also important, because it provided a way to talk about how people draw on others within their social network to solve problems that they encounter. From this perspective, literacy does not reside in the individual but is spread throughout one's social network. When people encounter unfamiliar literacy tasks, they draw on the expertise of others within their social networks and they provide help to others based on their areas of expertise. In applying this concept to this dissertation, this made it important

to track the work the volunteers did in providing formal and informal support to others in the project and within their own social networks. It also made it relevant to consider the way the act of volunteering itself helped the participants both gain expertise about computers and gain visibility as computer experts.

Finally, the local literacy literature was important to understanding the barriers that people encounter as they attempt to adopt new literacy practices. The value of the approach is that the assumption is made that there is a logic behind people's pursuit of new literacy practices even if their actions or beliefs differ from dominant conceptions of literacy. The local literacy literature points to the way that adopting new literacy practices impacts existing relationships and one's sense of self. This literature also looks at how family and gender roles impact the adoption of new literacy practices and the role of institutions in promoting a view of the poor as other. In applying these ideas to this dissertation, this suggests the importance of understanding the value the CNI participants placed on the computer and the factors that influenced their ability to use the computers in the way that they wanted.

Work that takes a situated approach to the study of technology use was also important in developing the approach used in this dissertation because it emphasizes the way that people make decisions about how to use technology and the way that the attributes of technology shape use (Bruce, 1993). This insight is relevant because as much as the CNI participants were making decisions about bringing technology into their lives, their use was also influenced by features of the computers that they received.

The situated approach also provided philosophical grounding for this study in understanding the ideological nature of computer use. From this perspective, technology is not neutral, people assign different meanings to the technology, and they use the same

technology in very different ways. It becomes important, therefore, to understand the meanings that people attach to technology and the way these meanings are connected to social practice. On a larger scale, it is relevant to notice the way that social relations become inscribed in technology.

This dissertation started by arguing against the deficit models that lie beneath the arguments of researchers and policy makers in defining the problem of technology use in marginalized communities. Research that looks at poverty and literacy, tends to foreground the identification and counting of members of marginalized groups and puts the lives of marginalized groups and the barriers that they experience due to a lack of material circumstances (transportation, childcare, support, etc.) in the background. The assumption is made, as Horsman (1990) puts it, it "that material circumstances should *not* be allowed to affect women's participation in educational programs, and hence to the identification of some students as not really serious" (p. 146, italics hers).

It was argued that it is important to consider the ideology behind efforts to address the digital divide because of its tie to the generation of poverty knowledge (O'Conner, 2001). Poverty knowledge involves accumulating knowledge about the poor and applying what has been learned in the creation of intervention programs designed to improve the lives of the poor. The poverty knowledge concept is important because through our research we help to define what counts and what does not count in designing public policy and training interventions for the poor. We need to seriously consider the implications of promoting a view of the poor as deficient and of creating a research agenda that ignores the lives of the poor and their experiences.

As I have worked more with the data and the research questions, I realize the way that I framed the problem statement in the first chapter is only half right. It is not just that researchers tend to operate from a model in which the poor are seen as being deficient. Rather it is that technology and the pursuit of literacy practices are a site for the study of competing ideologies. The participants taking part in the CNI program approached computer ownership with their own set of hopes about what the technology could do for them such as achieving economic freedom and better lives for themselves and their families. It is in addressing the issue of how to achieve these goals that the two sides diverge. Those that operate from an access-oriented paradigm argue that once you provide the technology, any failure to achieve these goals is because the poor do not choose to do what it takes to achieve these goals. In contrast, when you look at the lives of the poor it is apparent that a lack of material resources impinges on their ability to achieve these goals.

Horsman's (1990) framing of her study in terms of discourse is useful in opening up the ideological nature of literacy. She draws on the work of Foucault and feminist poststructuralists in analyzing the conflicting discourses implied by a term such as 'illiterate'. In using the discourse concept, she is referring to the language, assumptions, and meanings that become attached to categories and that come to define our understanding of these terms and appropriate action. The value of this insight is that it points to the importance of language in shaping reality and the connection between language and power. She used the example of the discourse surrounding the concept of "mothering". There are assumptions about what it means to be a good mother. When these assumptions are made by institutions, these discourses can be used in the exercise of power such as a social service agency that takes a woman's children away because the did not "mother" correctly. The discourse

concept allows a researcher to account for both the experience and assumptions of institutions and members of marginalized groups. The value of the approach is that we can recognize the great weight that dominant discourses have on people's lives and the way that through their words and actions that they resist dominant discourses.

From a research standpoint, the use of the discourse concept helps to address the differences between those that study the digital divide and the lives and experiences of marginalized groups. It also helps us to recognize that research involves an exercise of power, so that when we use language that defines marginalized groups as other we are promoting a vision of reality in which the poor are viewed as deficient. From the perspective of members of marginalized groups, the discourse concept allows us to look for ways that they resist dominant discourses that define them as "other". In terms of the CNI project, this helps to highlight the way that the women defined the importance of the program as a creative way to get computers in their home rather than seeing it as a "literacy program". We also see the way they resist dominant discourses when we read their stories and see the unique ways they brought technology into their lives.

Implications

This section will consider the implications of taking a technology-in-use approach when studying computer and Internet use and the way that people connect technology to their lives. By understanding the lives of the CNI participants, we can better understand the complexities involved in adopting new literacy practices and we can draw significant new insights into research, training, libraries and public policy.

Implications for research. In highlighting the digital divide approach as an example of poverty knowledge, I am very deliberately calling on researchers to think about the

assumptions they make about the poor and how these assumptions carry over into the design of research and the production of knowledge about the poor (O'Conner, 20001). Researchers need to carefully consider their role in perpetuating myths and stereotypes about the poor through the language that they use and the models that they build to describe the behavior of the poor. This implies a change in

> the way that 'professors' relate to the 'practitioners' and the 'poor'. It asks that researchers act as public intellectuals in a way that is neither customary nor rewarded in traditional social scientific venues. It asks, too, that recognized poverty experts relinquish the power and recognition that comes with an exclusive claim to objectivity, by opening knowledge to other forms of learning and experience. And it asks that they be explicit about their own ideological assumptions (O'Conner, 2001, p. 294).

Throughout this dissertation, I have argued that we need to question the categories used to describe certain groups such as the "poor." In the writing, I have used quotes around words such as the "poor" to point out the ideological assumptions behind these categories. I am essentially arguing that we need to put ourselves in quotes as well. As "professors", "researchers", and "activists", we need to think carefully about the assumptions that we make about the poor, about our work practices, and the ideology behind the work that we do particularly as it relates to groups such as the "poor." For that matter, how do we move away from terms like "marginalized", which still have the effect of treating people as "other", and move towards appreciating the intrinsic value of all people in our society?

This dissertation supports the idea that the study of hidden literacies is an important and legitimate research area. The study of people, places, and activities that occur outside of traditional settings such as schools or the workplace broadens our understanding of what it means to be literate. Rather than viewing literacy as a monolithic standard that people either measure up to or not, we can recognize the multiple literacies that are present in a given

setting. This allows us to take into account the experiences that people bring into a setting and the way they chose between competing literacies. This understanding is beneficial not only to "marginalized" groups but to all people who are trying to acquire new literacy practices.

Implications for training. This study also has implications for the design and implementation of literacy programs. In many ways, when we understand the messiness involved as people try to adopt new literacy practices, it makes the process of training much more complicated. This is true especially when we look at the difficulties the CNI participants experienced due to a lack of material circumstances. This means that issues that are traditionally thought to be outside the scope of a training program are suddenly relevant. Put differently, it is part of our job when providing training to find creative ways to deal with differences in material conditions like a lack of transportation, childcare, or social support. All of the things that occur in the middle, between starting a literacy program and achieving one's goals, are relevant to the design of training.

This study also suggests that we need to see the learners in our programs as "knowers" rather than as people who are deficient in acquiring literacy skills (Horsman, 1990). The people that participate in literacy programs may still be working on learning new literacy practices, but they are experts in their own lives, in the lives of their families, and on issues that are important to them. Barton and Hamilton's (1998) work is useful here, because it suggests that expertise is distributed throughout a network and that people provide help based on their areas of expertise. This suggests that all people have expertise even if it does not happen to coincide with the material being covered in a literacy class.

Luis Moll's work is useful in giving practical ideas for treating the people in our training programs as "knowers" (Moll, 1994; Moll, et al. 1992; Moll & Greenberg, 1990). He suggested the importance of identifying the "funds of knowledge" present in people's homes as a basis for organizing classroom activities and learning. From his point of view, classrooms underestimate what children are able to do in the classroom. Moll started researching the lives of working class Latino children and their families with an eye towards uncovering the knowledge and skill in the community. He found that there was a great deal of knowledge in the community that did not count in school settings. This included knowledge about topics such as growing plants, electrical wiring, mechanics, and carpentry. This knowledge was shared informally within families and within people's social networks. These "funds of knowledge" was used to structure the lessons taught in the classroom. Rather than just being a tool for a researcher, the idea is that the teacher could learn about and perform this type of ethnographic analysis to better structure his or her classroom activities and to make them more relevant to the lives of the students.

In a similar way, technology instructors can move from teaching students discrete technology skills to a teaching model that builds on the knowledge that students already possess. Barton and Hamilton's (1998) work on literacy practices that occur in the home and the school and this study provide some clues as to the topics that might be useful starting points. For example, one could use the social practice of documenting life to organize classroom instruction. For example, a unit could be developed in which students create a family tree. This could involve teaching skills such as word processing, scanning, photo manipulation, and Internet searching. Obviously, the goal would be to find a topic that is

personally relevant to the learners and involves doing the work that Moll describes (Moll, 1994; Moll, et al. 1992; Moll & Greenberg, 1990).

In thinking more about Moll's (Moll, 1994; Moll, et al. 1992; Moll & Greenberg, 1990) work, one of the important features of this method of instruction is that learning is placed within the context of an ongoing set of practices that the students are engaged in over time. This means that the students would have reason to continue developing their skills after the classroom instruction is over and that they would have occasion to use their new skills. As Gardener (1991) notes, sometimes after a class ends students are never called on again to exhibit their new literacy skill. This suggests that the power in connecting technology use directly to people's lives is that there will be an impetus to keep using their technology skills.

The challenge when looking at the stories of the CNI participants is that they all brought technology into their lives in different ways. This points to the need for individualized instruction and more of an inquiry-based model of instruction. The issue then becomes discovering the topics that the students are interested in and helping them pursue those interests in the classroom. This fundamentally changes the nature of instruction. The tendency when teaching abstract skills is to stop when things get really complicated which typically occurs when a student tries to do something on his or her own like conducting a search on a topic of interest. It is relatively easy to guide students through a scripted search, for example, but they encounter difficulties when trying to conduct searches on their own. This leads to questions like what should I search for (why is this database useful to my life), what search terms should I use, how do I interpret the search results, and how specifically do I find the information that I need. When students are allowed to structure their learning in

large and small ways, they run into more problems, but they are also more likely to overcome those problems, because they are pursuing a topic that is personally relevant.

It is important to note the unique ways that participants brought technology into their lives that far exceeded the ideas that the CNI project had when distributing computers and providing computer training. The CNI project tended to think about training in terms of teaching concrete skills such as e-mailing or word processing. The CNI participants, in contrast, had the goal of bringing the computer into their lives in meaningful ways. They used the computer to help them in their volunteer activities, to help them be good parents, to communicate with others, and to provide resources for their families. This means that the intended learners need to become a much more active part of the planning process when figuring out how to carry out the training.

This study points to the emotional toll involved in learning new literacy practices. The participants in this study talked about the intimidation they felt in learning new technology skills especially when they encountered computer breakdowns. One of the practical implications, from a training standpoint, of this intimidation is that it may take new users a great deal of time to adopt new literacy practices. Similar to the participants in the Homenet study, it often took the CNI participants a while to decide to try to connect to the Internet and then to overcome all the problems associated with getting on the Internet. This suggests the need for the availability for ongoing training, so that when people make an attempt to try something new there is someone there to help them. This study also raises issues about providing repair and support to people participating in training programs that give out computers. There is a need to balance the practical limits of the resources in an organization with the ongoing nature of computer use and learning.

It is also relevant to note how a project like the CNI program can achieve goals having nothing to do with computing. Horsman (1990) found that one of the most valuable parts of the training program that she studied is that it gave the woman who participated a chance to socialize and to connect with each other. Learning "literacy skills" was secondary. Similarly, each CNI participant had the goal of learning to use the computers, but each also used the computer to achieve social goals. Carla used the computer in an attempt to be a good parent. Suzy used her computer in her volunteer work as a form of social participation and to feel productive despite health issues. Angela and her son cooked a recipe they downloaded from an Internet site. Sassy used a story she found on the Internet to teach her grandchildren religious lessons. We need to leave room in our training for the students to construct their own meanings of the technology and literacy in their lives.

Finally, the work of the volunteers points to the types of support needed to adopt new literacy practices and also points to the importance of moving students from the learner role to the teacher role. The volunteer program associated with the CNI program gave participants a meaningful context in which to apply their skills both inside the classroom and outside the classroom. Inside the classroom, the volunteers were able to help people in class use their computers and to learn more technical skills on their own. The volunteers also took on the identity of experts within the CNI community and within their own social networks. They were looked at as people who knew about computers and who could help solve technical problems. This provided a motivation to use the computer and to gain more technical knowledge.

Implications for libraries. We need to consider how libraries can either be sites of empowerment or oppression for marginalized groups as they adopt new literacy practices.

Libraries have had a mixed record in this regard. Muddiman et al. (2000), for example, reviewed the history of the libraries in the UK which were based on the Victorian model of trying to help "disadvantaged" people, particularly those in the laboring class. Muddiman et al. argue that making material available to 'disadvantaged' groups was viewed as both a way to educate the poor and to control their behavior. There was also an attempt to weed out those that deserved access to the material in the libraries from those that did not deserve access which included criminals, vagrants, and those in poor houses. In the 20th century, the focus changed to providing free access to information for all which was translated into providing outreach services for special groups. Similarly, in the United States, the libraries have been sites of access to information and control. One of the goals of the Carnegie libraries, for example, was to teach the poor middle class values. Questions can also be raised as to who the libraries actually serve, particularly in terms of decisions that are made about the material that is included (or excluded) from its collection. Berman (1998) for example, notes that many libraries do not have material that is relevant to various cultural groups and that libraries are not necessarily welcoming places for marginalized groups.

It is relevant to think about the role that libraries should play in attempting to address inequities in material circumstances as people try to adopt new literacy practices. Muddiman et al.'s (2000) work is interesting because they suggest that libraries can take two positions in trying to address this issue. The first is the more typical approach – that is to focus on the role of the library in providing access to information. It is a 'take it or leave it' approach that focuses on making sure that all people have equal opportunity in terms of their abilities to access information. The second approach involves 'some element of redistribution of material or cultural capital to the excluded and disadvantaged" (Muddiman et al., p. 57). The

focus is not just on access but "equalities of outcome". Muddiman et al. argue that the first approach has not worked all that well and there is a need for libraries to be more interventionist to truly serve the needs of all people in the community.

Muddiman et al.(2000) argue that in order to serve the needs of marginalized groups that libraries will need to take a "more socially responsive and educative approach" (p. 58). This requires the libraries to take on an educative role and to build partnerships with other organizations in the community. Similarly, Bishop et al. (1999) suggest that libraries should not only focus on providing the community with access to information but to build capacity within the community to create information.

Armstong, Lord, and Zeiter (2000) provide an example of the power involved in taking into account the information needs of low-income residents. They surveyed low-income patrons and found that they wanted information on doing career searches, job advancement, material relevant to their cultural groupings (including translated materials). There were some other fairly specific requests like the library should have a listing of companies that pay health benefits or companies that provide on-site day care. The staff learned more about what the people in their libraries actually wanted, and tried to provide these services. Based on the information they gathered, they tried to promote existing services and add further services such as career resources and workshops and materials for those that needed information translated. They also pointed to the need to partner with other organizations, community based service agencies, and school districts.

Implications for public policy. Katz (1989, 1995) has argued that public policy in this country is characterized by a view of the poor as a group that is in need of improvement. The burden of change is placed on the individual who needs to transform himself/herself by

overcoming perceived deficits in literacy and life management skills. We can see this line of thinking when we look at the access-oriented model that dominates discussion about the digital divide. The assumption is made that if only the poor will get some training or if we can provide them with computer then they will automatically have access to all the benefits associated with technology use. Any failure to achieve these goals is because there is something lacking in the poor. This focus means that other issues are never addressed like politics, power, and equity

O'Conner (2001) argues that we need to reconceive poverty knowledge to adequately inform and guide public policy efforts. "In a new poverty knowledge, factors now treated, if at all, as mere background – history, politics, public and private institutions, ideology – become much more the stuff of direct, and critical scrutiny" (O'Conner, 2001, pp. 292-293). This requires us to deconstruct the language that we use to describe the poor and the assumptions that are made in creating public policy. This suggests the importance of taking a situated approach to public policy design and evaluation. Schön and Rein (1995) argue that the value of taking a situated approach is that it opens up debate because in recognizing the ideological nature of public policy debate we can better understand our similarities and differences. While Schön and Rein focus on the work that public policy makers do, they ignore the importance of including the voices of marginalized groups. O'Conner argues that a new poverty knowledge requires us to recognize expertise outside of academic and public policy circles.

The implication of this dissertation is that public policy needs to move beyond a focus on access to addressing the social context surrounding use. In terms of marginalized groups this means recognizing the creative and unique ways that people bring technology into their

lives when given the chance. It also means recognizing the challenges they face due to a lack of material circumstances. The Morino Institute (2001) suggests that we shift focus away from just trying to provide access to marginalized communities to a focus on helping people use technology to achieve their goals. They talk about a "social divide" rather than a digital divide which refers to "the grave disparities in economic opportunity, education, health, safety, housing, employment, and even transportation" for marginalized groups (Morino Institute, 2001, p. 7).

The practical implication of the approach taken in this dissertation is that public policy efforts need to be undertaken that view marginalized groups as active technology users and that helps them overcome the real barriers that they experience due to a lack of material circumstances. This means that it may be necessary to fund literacy programs over the course of several years as people bring technology into their lives and overcome the barriers associated with technology use. This also means that funding should extend to activities that go beyond the scope of classroom activities such as providing childcare services or transportation so that people can attend classes. More than anything, public policy efforts would benefit the most by having people in marginalized groups in positions of power to state their own needs and to craft public policy that is responsive to their needs.

Limitations

As with any study, there are limitations that may impact the interpretation of the findings in this dissertation. One of the more important issues to address is the ideological nature of the perspective that has been taken in this dissertation. In this dissertation, I have argued that we need to understand the way that technology becomes a site for competition between the views of the poor and the views of academics, policy makers, and activists that

operate from a deficit view. I have tried to tell the stories of people classified as "have-nots," to show the ways that they incorporated technology into their life in unique ways and the challenges that they faced in adopting new technology practices. As a consequence, the experience of the CNI participants was placed in the foreground, while the viewpoints of institutions that serve marginalized groups were placed in the background.

One limitation to the approach taken in this dissertation is that the stories of technology "have-nots" are still being filtered by a person that is part of academia. While I have made every effort to represent the stories accurately, the participants themselves may have told their own stories differently, and they may have set up the problem addressed in this dissertation differently. It is also the case that while I have tried to tell their stories, this work does not change the fact that the CNI participants themselves do not have access to the academic discourse that is happening surrounding the digital divide. In addition, while I am very much committed to telling the stories of the CNI participants, the telling of the stories was embedded in academic discourse. This means that while achieving the goal of writing a dissertation, the academic language used in this dissertation may also have the effect of excluding the CNI participants from joining the conversation surrounding the digital divide. If the goal is to change the way that we do research, then we need to go beyond acting as filters for disadvantaged group. We need to make them an active part of the research process and give them the power to state problems from their own points of view (Mishler, 1986).

We may also need to broaden out the way that we collect and analyze data and be more reflective about the ideology that we use in interpreting the data (Hicks, 2002). This suggests the value of action research approaches that actively involve participants in deciding what is important to research and in actually conducting the research (Bishop et al., 2001). In

this way, we are removing some of the distinctions between researcher and participant and treating the participants in our studies as "knowers".

Another limitation to this study is that, in describing the experiences of the CNI participants, I may not have always captured the diversity of opinion among the CNI participants. I did try to show how the participants used the technology differently, but there were some differences of opinion that I did not always account for in this study. For example, in the third research question I emphasized a number of issues that tended to make it difficult to adopt new literacy practices such as a lack of transportation or a lack of childcare. There were differences, particularly in the volunteer focus group, concerning how much emphasis should be placed on these material circumstances. There was debate concerning whether or not the CNI program should motivate people to learn technology skills or whether people need to motivate themselves. While material circumstances do provide important constraints on the "choices" that people make as they adopt new technology practices, there is still some responsibility on the individual to be an active participant in the process

In telling the story from the point of view of the participants, I have placed in the background the challenges that institutions encounter in trying to help people integrate technology into their lives. Prairienet, for example, has practical limits in terms of budget and manpower constrains that might make it difficult to provide ongoing training or unlimited technical assistance. While I have pushed in the idea that categories do not capture the dimensionality of people's lives, there are some practical reasons for using categories. In terms of the CNI project, difficult decisions had to be made about whom to allow to participate in the program and whom to exclude, which meant setting up some criterion to measure "low-income". In telling the story from the point of view of the participants, I may

not have always reflected the diversity of opinion among researchers, policy makers, and activists. I tended to paint a picture of academic discourse in a monolithic way when in reality there is great diversity of opinion regarding the poor and technology use within academic circles.

Another limitation of this study is that it relied so much on volunteers, particularly in talking about the type of support needed to support technology use. It could be argued that many of the activities of the volunteers were happening more broadly within the CNI project. For example, Bishop et al. (1999), in a telephone survey conducted of community members who completed the program found that 80% reported that someone other than themselves had used the computer and 65% reported that they used their CNI computer to show someone else how to do something. It may also be the case that this type of practice was a strategy used by this community more broadly to deal with the challenges experienced due to a lack of material circumstances. For example, one of the participants, in talking about the scheduling of training, talked about wanting to have advanced notice so that she could participate in a babysitting swap so that she would have someone to watch her children for free. Similarly, we could look at Suzy's volunteer work with Share Foods and as a volunteer driver as a strategy used to find out about resources available in the community to help in dealing with her day-to-day life. The participants were very active within their churches and other organizations in the community.

The value in focusing so much on volunteers in this study is that it allowed me to paint a picture of the CNI participants as active technology users. The work that the CNI volunteers did as they learned about technology and as they helped others to use technology provided obvious examples of how the CNI participants actively constructed the meaning of

technology in their lives. One limitation of this approach is that I may have missed the active way that nonvolunteers brought technology into their lives. In other words, there are many different ways of being an active technology user and this study caught some of these types of activities and missed others. Barton and Hamilton (1998), for example, in describing the literacy practice of "social participation" suggested that people can participate in organizations in many different ways. A person can attend a meeting or they can read a newsletter. Both activities indicate some level of social participation. The CNI volunteers were active technology users and they were extremely motivated to overcome barriers to technology use. By focusing on this group of users, I may have missed some of the ways that the CNI participants engaged with the CNI program and with technology that were subtler. I may have also missed the reasons why people rejected bringing technology into their lives and the degree of frustration caused by experiencing computer problems.

One of the most significant limitations to this study is my dual role as researcher and curriculum coordinator of the project. This dual role was discussed in the methodology section, but some other issues are relevant to highlighted in the discussion section as well. I think that the blind spot that this dual role creates is in assessing the way that the CNI project did not always serve the participants well. As an institution, Prairienet is a place where there is potential for empowerment and disempowerment. I may have missed the way that the CNI program exerted control over the participants and failed to account for their experiences adequately.

One last issue that is relevant to note about this study is that a majority of the participants were women. This is not necessarily a limitation in the sense that the demographics of the CNI participants closely match the demographics identified in the

literature of technology "have-nots". There is some evidence from my interview with Paul, a CNI participant and volunteer, and through information gathered through an all-male CNI training class that men face different issues in trying to learn new technology practices. There is some evidence that men may be disconnected from social institutions that may be able to help them learn how to use computers. This is partially because it is viewed as the woman's role to interact with social institutions to provide resources for the family. There is also some evidence that men may think about computers differently. Rather than being a resource for the family, the men in the training class talked about wanting to know how to fix the computer. They also thought computers were feminine and associated them with secretarial work. I am not presenting these issues as "results" but it may be worthwhile to think about how men experience poverty differently as well as construct the meaning of technology differently from the women studied in this dissertation.

Future Research Directions

Several lessons were learned about evaluating technology use by the CNI participants that would apply more broadly to others interested in studying technology use in the home and in the community. One of the lessons involves the shifting nature of the subject matter being studied. People's use of the technology changed over time as they found new uses for the technology in their lives. The technology itself changed as people added software and hardware to their CNI machines. At the very least, this suggests that technology use studies need to be interpreted as snapshots of the participants' current uses of the technology. Even as I write this dissertation, I am learning new ways that the participants are making use of their computers and technical expertise. Elaine, for example, recently created a slideshow presentation that contained pictures of her family members that she took to a family reunion.

This is a different use for a technology that may traditionally be thought of as an application for doing a presentation in a formal setting. Similarly, Elaine just installed a web cam for her computer that can be used to take still pictures and that she intends to use to create short videos to send by e-mail. The meaning of the technology in the participants' lives changed as they added new hardware and software and dreamed up new uses for their technology. People's uses of technology changed based on all kinds of factors like illness, the time of year (summer versus winter), or getting a new job. Similarly, Anderson and Tracey (2001) suggest that the people's use of technology use changes over time based on events that occur in people's lives.

Another lesson learned was the complexity involved in evaluating the impact of a program like the CNI project. The impact of having access to technology was not necessarily immediate or direct. For example, Angela participated in the CNI program to get the computer in her home for her son. She never used the CNI computer. If we focus only on Angela and her technology use, then perhaps this could be considered a negative impact. If we focus on her goal of getting a computer for her son, then perhaps this is a more successful outcome. Angela's example is also interesting, because she used the computer quite a bit at her workplace but not the CNI computer in her home. Researchers need to make careful choices about whom to follow in telling the story of technology use. They also need to make decisions about what types of computer use count and in what settings. If I had only focused on the use of the CNI computer, then I would have had less understanding of the role of technology in people's lives.

It may have been interesting to look at technology use more broadly in the homes of the CNI participants. The computer was only one form of technology that they used. It would

have been interesting to know how their use of technology fit in with their use of other types of technologies in their homes and communities. It may have been useful to do a day-in-the life type study of the CNI participants recording their use of the CNI computer, the Internet, and other technologies.

Another possible research direction would be to focus more explicitly on the CNI participants' use of the computer and the Internet in the pursuit of reading and writing activities. While I broadly tried to connect the use of the computer to literacy practices, these linkages might be made more explicit by focusing on the reading and writing that the CNI participants perform (and do not perform) on their computers.

Another possible research direction would be to focus more explicitly on the way that gender roles are connected to technology use and to the acquisition of the computer as a resource in the home. The overwhelming majority of participants in this study were women. There is some evidence that suggests that providing this resource in the family and interacting with institutions like Prairienet or the Urban League has traditionally been the role of women in the family. There are also some studies that suggest that communicating with other family members, especially extended family members, becomes the job of women in the family There is evidence to suggest that this practice is continuing with woman sending e-mailing more with friends and family than men in families (Boneva, Kraut & Frohlich, 2001).

It would be interesting to compare the study of home use of technology with other studies that document the informal learning that occurs in a variety of settings (Twidale, Nichols, & Paice, 1996; Nardi & Miller, 1991; Nardi & O'Day 1999; Orr, 1996). These studies suggest that informal learning is not confined to vernacular literacy practices that

occur in the home and in the community as Barton and Hamilton (1998) suggest. These informal learning practices may be similar to vernacular literacy practices in that to a large degree they are not supported or even recognized by formal institutions. It would also be interesting to compare the social infrastructure needed to support technology use in organization settings (Kling, 1999) to the work the volunteers did to support technology use in the home. Similarly, there may be overlaps between the work done by CNI volunteers to support technology use and the way that expertise was shared within their social network and the use of learning circles in educational settings (Riel, 1993).

It would also be useful to bring in work that studies more explicitly the way that technology use within the home is tied to patterns of activity within the household (Crabtree et al., 2001; O'Brien, et al. 1999). O'Brien et al.'s work is useful because they consider the way that technology is tied to routines in the family like getting the children ready for school or the way that people use media in the morning to mark time. They also consider the way technology is used to mark ownership of space and in parenting activities. They argue for the importance in understanding how people manage the technology in their homes and the ways the people's rituals and routines are influenced by the technology. Crabtree et al.'s work is interesting, because they focus on rituals that occur in the home and the way that technologies, as artifacts, are used to mediate the organization of life in the home.

It would be interesting to use the framework used in this dissertation to study other groups as they use technology in their daily lives. Taylor and Dorsey-Gaines (1988) argue that being poor is not a contextual variable that a researcher can identify and then check off their list of variables to account for in a study. If we extend this idea, the context of people's lives, whatever that context may be, is not something that can be easily accounted for and

then ignored in our research. This means it is relevant to deconstruct the many different taken-for-granted assumptions that are made when we study any group of users such as computer experts, novices, and even categories of users like senior citizens. This approach may also allow us to notice the way that people's real lives "impinge" on their work and educational lives and vice versa (Kazmer & Haythornthwaite, 2001; Haythornthwaite, 2001).

Conclusion

As I close this dissertation, I would like to reflect further on the role of the researcher in achieving social change. In this dissertation, I have made the case that it is important to think about the language that we use in talking about the poor and other marginalized groups. The digital divide metaphor uses a classification system that creates categories of advantage or disadvantage relative to people's access to technology. Sometimes the most interesting thing about classification systems is what is left out when we place a person into one category or another. In terms of the digital divide metaphor, what gets left out is the lived experience of members of "have-not" groups. The categories do not capture the unique ways that members of marginalized groups bring technology into their lives when given the chance. The categories also do not capture the way that a lack of resources can impinge on a person's ability to adopt new literacy practices.

More than anything, the value of incorporating the views of marginalized groups into our research and in our debates about public policy is that we can change the discourse surrounding the poor in this country. This may require that researchers give up their roles as experts and work as partners with marginalized groups in conducting research and working for social change. As Katz (1989, 1995) put it, the work that we need to do as researchers to change the discourse in this country is to move from a view of the poor as "other" to a

discourse of the poor as "us." "The fundamental questions are not about the details of policy or the sources of revenue; they are, rather, about the basis of community, the conditions of citizenship, and the achievement of human dignity" (Katz, 1989, p. 239).

How should we evaluate a program like the CNI, research about marginalized groups, or public policy efforts geared towards increasing access to technology? What is the role of institutions in achieving social change? This study showed the many diverse ways that people brought technology into their lives and the ways that they used technology to make a difference in their own lives, in the lives of their families, and in their communities. This study showed that it is not enough just to provide access to technology or to provide access to the opportunities to use technology. This study also showed that it is not enough to treat "low-income context," as a static variable that can be checked off and then forgotten. In a similar way, terms like "access," "technology use," "literacy," "success," and "empowerment" are situated terms that can take on very different meanings. This requires a research agenda that works to clarify and describe the meanings of these terms from the point of view of the participants and the complex set of factors that explain how and why a technology was used in a particular way in a given situation. In taking a technology-in-use approach, public policy, research, and outreach efforts are judged based on their ability to release the capacity in individuals to define the meaning of technology for themselves and to achieve their self-defined goals. Social change will only happen when members of marginalized groups are in positions of power to shape public policy and research agendas and when they gain the power to make decisions about issues, including technology use, which affect their lives.

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APPENDIX A

Human Subjects Form

UIUC INSTITUTIONAL REVIEW BOARD
IRB-1 Form For Review Of Research Involving Human Subjects
417 Swanlund Administration Building, MC 304
Website: http://www.uiuc.edu/unit/vcres/irb e-mail: irb@uiuc.edu phone: 333-2670

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1. Responsible Project Investigator: Ann Bishop (Qualified Faculty or Staff Supervisor) | Phone: | E-mail Address:

Ann P. Bishop | 244-3299 | abishop@uiuc.edu

2. Department/Unit Name Campus Address/ Mail Code

Graduate School of Library and Information Science, 501 E. Daniel St, Champaign, IL 61801, MC-493

3. Name of Investigator (if different): Phone: E-mail Address:

Cecelia Merkel 255-9015 c-merkel@alexia.lis.uiuc.edu

4. Project Title:

Contextualizing the Digital Divide: A situated approach to the study of technology use in a low-income community

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5. Funding: Pending funding decision _____ X Funded _____ Not externally funded _____

6. Funding Agency:

Telecommunications and Information Infrastructure Assistance Program (TIIAP)
National Telecommunications and Information Administration, U.S. Department of Commerce

7. Grant or Contract No: 17-60-9702

8. Name and address of agency official, if any, to be notified of IRB approval:

Paul Drucker, U.S. Department of Commerce, TIAAP,National Telecommunications and Information Administration, 14 th Street and Constitution Ave., N.W., Room H4090,Washington, D.C. 20230

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9. Type of Subject: (Check all appropriate blanks in both A. and B.)

A.	X	Adult, non-student	B. X	Normal volunteer	Abnormal mental status
	____	UIUC student	____	In-patient	____ Individual with limited
	____	Minor	____	Out-patient	civil freedom
	____	Other (explain)	____	Mentally retarded	____ Pregnant women/fetuses

10. Number of Subjects in Study: (including controls) 3 to 10 Participants

Reserved for Board Use Only

Track: _____ Log No: _____ Reviewers: _____

11.		X	Subjects will receive payment or some compensation for participation. *If yes, state*
	yes	no	*amount and form of payment here.*
12.	X		Access to subjects will be gained through other institutions or agencies. (See May, 1995
	yes	no	Handbook for Investigators, page 24.) *If yes, list specific institutions under #19 below.*
13.		X	Project involves non Univ. of Illinois investigators. *If yes, list investigators and their*
	yes	no	*affiliation here.*
14.		X	Project involves medical instrumentation or biological devices that require electrical
	yes	no	equipment to be attached to subjects. *Please attach a copy of the completed electrical equipment form which can be requested from the IRB office.*
15.		X	Project involves use of drugs or medical devices not certified by FDA for clinical use *for*
	yes	no	*this purpose.*
16.		X	Investigator has, or has applied for, Investigational New Drug certification by the
	yes	no	FDA for the use of drugs included in this project. *If yes, provide copy of the FDA form.*
17.		X	Investigator has or has applied for an Investigational Device Exemption (IDE) from
	yes	no	FDA for the use of a significant risk medical device in this project.

18. OBJECTIVES AND SIGNIFICANCE OF THE PROPOSED RESEARCH:

The purpose of this study is to broaden our understanding of the digital divide. Most digital divide studies do not directly study technology use in at-risk communities and define the digital divide only in terms of people's access to technology. Because at-risk groups are not directly studied, researchers and policy makers often make assumptions about technology have-nots based on the membership in particular demographic groups - the poor, certain minority groups, those with less education, and single-parent families. Research in the social informatics domain suggests that social infrastructure is equally important in understanding technology use. This study is proposing a new approach to the study of the digital divide that includes a consideration of the social infrastructure needed to support technology use. The study will examine computer use by people taking part in a computer training and distribution program sponsored by the Community Networking Inititiave (CNI). The CNI project is an outreach effort of Prairienet, a community computer network, to low-income residents in Champaign County. People that complete the CNI training program receive a free recycled computer and Internet access through Prairienet. By directly studying technology use in at-risk communities, this research will allow us to develop a more accurate and theoretically grounded understanding of technology use in at-risk communities.

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19. VOLUNTARY PARTICIPATION: Describe the method for a) selecting subjects and b) ensuring that their participation is voluntary. **A copy of the consent form to be signed by the subject and/or any explanation to be given to the subject should be attached to this form.** If no consent form will be used, explain the procedures to be used to ensure that participation is voluntary. If any information is withheld from subjects, identify what will be withheld, justify the withholding, and describe the debriefing plan, if any. Special requirements for consent need to be met for certain subject populations including children. Consult the May, 1995 Handbook.

Adults from a number of low-income neighborhoods in Champaign-Urbana were recruited by the Urban League for participation in the CNI's computer training and distribution program. These CNI trainees have already complted a 6 or 12 hour training program and have received a recycled computer through the project. Subjects will be recruited to participate in the study via the telephone. An introductory meeting will be set up with participants where the researcher will discuss the research study and how the requirements for participation in the study. The researcher will ask the participants to sign the consent form and answer questions about the study and the consent form.

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20. PROCEDURES: Describe how subjects will be involved. (Attach additional page only if more space is needed)

Adults that have completed the CNI computer training and distribution program will be recruited as participants for this study. This research involves both interviews and observations. Participants will be asked to allow the researcher to conduct two one-hour interviews about their use of the computer and Internet. Participants will also be asked about the types of problems that they have encountered in using the computer and the ways that they have overcome these problems. Participants will also be asked to allow the researcher to observe the way they use the computer and solve technical problems in their home. Where possible, the interviews and home visits will be held at the same time to reduce the time burden on the participants. The interviews and home visits will be scheduled at the convenience of the participants. The participants will be given an opportunity to read the portions

of the research report that pertains to their participation in the project as a way of triangulating the data and negotiating the interpretations present in the final report.

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21. CONFIDENTIALITY OF DATA: If data are collected that could be associated with individual subjects, describe the methods to be used to ensure the confidentiality of data obtained (See May, 1995 Handbook, page 25). Confidentiality of data is required unless subjects give express permission that their data may be identified.

Notes will be taken during the home visits and an audio recording will be made of the interviews. The notes, tapes, and any other information gathered during the observations and interviews will be kept confidential. No one other than the project's research team will have access to this material. Material will be used only for the stated research purpose of understanding technology use and the way that people overcome technical problems.

No information will ever be reported in a manner that will allow anyone to identify subjects unless we have obtained their prior written approval.

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22. RISKS ASSOCIATED WITH PROPOSED RESEARCH: X Minimal risk _____ More than minimal risk

Describe the risks to the subject (whether or not you consider them to be risks of ordinary life) and precautions that will be taken to minimize them. The concept of risk goes beyond physical risk and includes risks to the subject's dignity and self-respect, as well as psychological and emotional.

Some subjects may feel uncomfortable describing their use of computers and Internet technologies with the researcher. They may feel that revealing this type of information is an invasion of privacy. Participation in a research study may be a new experience for the participants and they might not be aware of their rights.

To minimize these potential risks, participants will be informed of the purpose and the nature of the information that they are asked to divulge. They will also be informed that they may refuse, without penalty, to answer any questions.

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23. BENEFITS: Describe the benefits to the subject and/or society. The IRB must have sufficient information to make a determination that the benefits outweigh whatever risks are involved. (See May, 1995 Handbook, page 24) Payment to subjects is not considered a benefit of the research.

The subjects will be informed of the results of the observations and intervies and the general research efforts of the project. They will receive a list of project milestones detailing the achievements of the project. In addition, a summary of the focus group will be put on the Community Networking Initiative's web site for their review (http://www.prairienet.org/cni).

This study will benefit participants in that results may lead to improvements in CNI's user training and support services. Because the project is required to produce a "how-to" manual at the end of the

program, other projects may gain insight into potential barriers of use experienced by novice users in a computer training and distribution program.

CERTIFICATIONS:

1. I am familiar with the HANDBOOK FOR INVESTIGATORS (May, 1995). I will adhere to the policies and procedures explained therein.

2. Should I wish to make changes in the approved human subjects protocol for this project, I will submit them for review **prior to** initiating the changes.

3. If any problems involving human subjects occur, I will immediately notify my Departmental Executive Officer and the Executive Secretary of the Institutional Review Board.

Signatures:

Responsible Project Investigator	Investigator (if different)	Date

APPENDIX B

Interview Guide

Date:
Location:
Name:
Type:
Human Subjects: yes no
Pseudonym:

I. Background

a. Where originally from? # of years here? How heard about the CNI program?
b. When did you go through the program
c. Why did you initially go through the program

II. Prior Computer Experience

a. How long have you used computers
b. Where - At job, school, home, other
c. Where do you have access to computers, Internet
d. What types of things did you do with the computer

III. Sense of the History of Your Computer Use

a. First Computer through the CNI, how did you use it, issues or problems
b. Then what (upgrades, computer on payment plan)
c. How do you use computers? CNI machine in particular and others? Volunteer work? E-mail, Web, other
d. Other

IV. Who uses your CNI machine - friends, family, grandchildren, other

V. Have you helped others use their computers

VI. Problems that you've encountered?

a. Cni machine
b. Upgrades
c. Any problems you couldn't resolve
d. Issues with the CNI tech support

VII. Strategies used to resolve problems

a. How did you solve problems that you encountered
b. Examples of problems resolved/unresolved

VIII. Things that you've noticed as a volunteer and interacting with others? (problems, uses, how resolved, transformations in people's lives)

a. did you volunteer
b. what types of things did you do
c. why important

IX. Anything else?
a. Things you'd like to do with the computer?
b. Any surprises?
c. Best parts/worst part of owning a computer

APPENDIX C

Curriculum Vitae

Cecelia Bridget Merkel
Graduate School of Library and Information Science
University of Illinois at Urbana-Champaign
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EDUCATION:

Ph.D. (2002), Library and Information Science, University of Illinois at Urbana-Champaign. Dissertation: Uncovering the hidden literacies of "have-nots": A study of computer and internet use in a low-income community.

M.A. (1995), Communication Studies, Kent State University, Kent, OH. Thesis: A test of the skills deficiency and self-efficacy models to explain argumentative behavior.

B.A. (1991), Communication and Political Science, Canisius College, Buffalo, NY. Graduated All College Honors.

TEACHING EXPERIENCE:

Graduate Assistant, Community Networking Initiative (CNI), University of Illinois, Urbana-Champaign, IL (Summer, 1998 to Fall, 1998).

> **Computer and Internet Basics**. Taught computer and Internet skills to low-income teens and adults in the Urbana-Champaign community.
>
> Project URL: http://www.prairienet.org/about/cnioverview.phtml

Teaching Assistant, Department of Speech Communication, University of Illinois, Urbana-Champaign, IL (Fall, 1996 to Spring, 1997).

> **Introduction to Communication Technologies**. This course focused on teaching computer and Internet skills and on discussing issues surrounding the impact that communication technologies have on the individual, on groups (including work groups), and on society.
>
> Course URL: http://lrs.ed.uiuc.edu/students/c-merkel/spcom199.html

Teaching Assistant, Department of Speech Communication, University of Illinois, Urbana-Champaign, IL (Fall, 1995 to Spring, 1996)

Persuasive Speaking. This course focused on teaching persuasive speaking skills.

Teaching Assistant, Department of Communication Studies, Kent State University, Kent, OH (1992-1995).

Public Speaking. This course focused on teaching basic public speaking skills.

RESEARCH EXPERIENCE:

Research Assistant, Department of Library and Information Science, University of Illinois, Urbana-Champaign, IL (Spring, 1999 to Summer, 1999).

Project: Community Networking Initiative (CNI). The CNI is affiliated with Prairienet, a community network in the Urbana-Champaign area. Through this project, low-income members of the community received free computer hardware, software, Internet access, and training. The research team was involved in evaluating the effectiveness of the training, user support, and all aspects of the project.

Project URL: http://www.prairienet.org/about/cnioverview.phtml

Research Assistant, Department of Library and Information Science, University of Illinois, Urbana-Champaign, IL (Fall, 1997 to Fall, 1998)

Project: LEEP Virtual Community Project. This was an NSF funded project that studied a distance education program (LEEP3) in the Department of Library and Information Science at the University of Illinois.

Project URL: http://alexia.lis.uiuc.edu/~ruhleder/LEEP/overview.html

Research Assistant, Department of Library and Information Science, University of Illinois, Urbana-Champaign, IL (Summer, 1996 to Spring, 1997).

Project: "Wired Organization" Project. This project was co-sponsored by Xerox Parc and involved an ethnographic study of a holding company that made use of remote communication technologies to organize their work.

Project URL: http://alexia.lis.uiuc.edu/~ruhleder/thc/thc.html

Research Assistant, Department of Library and Information Science, University of Illinois, Urbana-Champaign, IL (Fall, 1996 to Summer, 1998)

> **Project: Illinois Digital Library Initiative Project (DLI), Social Science Team**. This research group focused on studying how scientists and engineers made use of a digital library containing engineering journals.
>
> Project URL: http://forseti.grainger.uiuc.edu/dlisoc/socsci_site/index.html

CURRICULUM EXPERIENCE:

Curriculum and Instruction Coordinator, University of Illinois, Urbana-Champaign, IL (December 1999 to present).

> **Project: Community Networking Initiative (CNI)**. Currently responsible for planning the teen and adult training for the CNI project. Responsible for coordinating the graduate assistants and teen volunteers participating in the project.
>
> Project URL: http://www.prairienet.org/about/cnioverview.phtml

PRESENTATIONS:

Merkel, C. B. (2000). Outreach and community involvement: Prairienet. Community Network Technology Conference: TeleCommunity 2000. Austin, TX, December 11, 2000. (Presentation slides available at: http://www.prairienet.org/~merkel/austin/

Merkel, C. B. (1999). Access and training in low-income communities: Community networking initiative. Community Technology Center Network (CTCNet) Conference. Chicago, IL, June 18, 1999. (Presentation slides availabe at: http://www.prairienet.org/~merkel/ctcnet1999.

Merkel, C. B. (1999). The internet: A resource for creating an inclusive classroom. Parkland College Workshop. Champaign, IL.

Merkel, C. B. (1999). Approaches to and lessons learned in training the public. Alliance Library System (ALS) Workshop, Canton, IL, April 21, 1999.

Merkel, C. B. & Bishop, A. P. (2000). Prairienet: A sociotechnical infrastructure for community knowledge networking. Global Community Networking: Building an Internet for Citizens. Barcelona, Spain, November 3, 2000.

Merkel, C. B. & Kist, W. R. (1998). Integration of technology: Unplanned conversations. Presentation to the College Reading Association (CRA), 42nd annual conference, Myrtle Beach, South Carolina, November 6, 1998.

Bishop, A., Merkel, C. B., Caroline, J., & Camp, S. (1998). University/community collaborations: Technology for the disadvantaged. Presentation to the College Administrators Conference, Urbana-Champaign, IL, October 15, 1998.

Buerkel, R., Merkel, C. B., & Algren, M. (1994). Motives for compliance-gaining. Presented at the 85th Annual Meeting of the Speech Communication Association, Washington, D.C., April 29, 1994.

Finucane, M. & Merkel, C. B. (1993). An investigation of trait argumentativeness in children. Presented at the Graduate Student Research Colloquium, Kent State University, April 29, 1993.

PAPERS:

Bishop, A., Neumann, L., Star, S., Merkel, C., Ignacio, E., Sandusky, R. (2000). Digital libraries: Situating use in changing information infrastructure. JASIS, 51 (4), 394-413.

Merkel, C. B. (1999). Folkloristics of educational spaces: Material lore in classrooms with and without walls. To be published in Library Trends, 47 (3), 417-438.

SERVICE:

Editorial Board, International Journal of Educational Technology (IJET), (http://lrs.ed.uiuc.edu/ijet/).

Review of Paper, Can Computer-Based Testing Achieve Quality and Efficiency in Assessment? International Journal of Educational Technology (IJET), February, 1999.

Review of Paper, How Control in Cooperative Work is Influenced by Explanation Needs, Computer Supported Collaborative Work Journal (CSCW), February, 1997.

Review of Paper, Virtual Classrooms and Communities, Group '97 Conference.

Mentor for a LEEP distance education student (1997-1999).

ORGANIZATIONS:

Computer Professionals for Social Responsibility (CPSR).

VITA

Cecelia Bridget Merkel was born in Buffalo, New York on July 13, 1969. She earned a Bachelor's degree in Communication and Political Science from Canisius College in 1991. She earned a Master's degree in Communication Studies from Kent State University in 1995. She earned a Ph.D. in Library and Information Science from the University of Illinois at Urbana-Champaign in 2002. She is currently the Curriculum Coordinator for CNI/Prairienet where she organizes computer and Internet training classes for individuals and groups in the Champaign-Urbana community.