

**PUBLIC LIBRARIES
AND
ICT LITERACY:
BRIDGING THE DIGITAL DIVIDE**

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I. INTRODUCTION TO THE STUDY

A. Background

1. The Digital Divide and Information Literacy

Knowledge is a core resource and engine of economic growth and employment in today's information economy. Rapidly evolving Information and Communication Technologies (ICTs) facilitate global inter-connectivity and accelerated information exchange, unfettered by time restraints or geographic boundaries (Nath 2). However, many argue that social and economic inequities have emerged between those groups who can benefit from new ICTs and those who cannot. This disparity has become known as the "digital divide."

The United Nations Educational, Scientific and Cultural Organization (UNESCO) defined the digital divide as "a phenomenon that results from the unequal application of, and access to, information and communication technologies leading to a global knowledge gap between information 'haves' and 'have-nots'" (UNESCO 7). This dichotomy threatens to create an "underclass of info-poor" who risk further marginalization in societies where computer skills open the doors to: "economic success and personal advancement, entry to good careers and educational opportunities, full access to social networks, and opportunities for civic engagement" (Norris 68).

Reddick, Boucher, and Groseilliers introduced literacy to the digital divide discussion as a critical and often ignored underlying factor, encompassing the ability to understand and use information effectively in daily living. Literacy levels, the authors concluded, influence the means by which people access information and participate in society (47).

Public libraries have long advocated the notion of "information literacy." In 1989 the Association of College and Research Libraries (ACRL), a division of the American Library Association, stated: "Information literacy is a survival skill in the Information Age" (4). The ACRL defined information literacy as "the ability to recognize when information is needed and to locate, evaluate, and use effectively the needed information" (1).

In 2002, the ACRL created a comprehensive set of information literacy competency standards and articulated a broader perspective:

Information literacy...is an intellectual framework for understanding, finding, evaluating, and using information—activities which may be accomplished in part by fluency with information technology, in part by

sound investigative methods, but most important, through critical discernment and reasoning (Information Literacy).

As Mendrinós described it, Information Literacy “enables one to seek, gather, retrieve, discern, analyze, evaluate, and apply information (2)” to problems encountered in daily life.

The Adult Literacy and Lifeskills Survey, which compared literacy skills in 20 countries in 2000, included, for the first time, an Information and Communication Technology Literacy Assessment Framework developed by Lowe and McAuley (1-14). This framework recognized the “transformation of skills” needed by citizens living in a knowledge-based society and economy and defined information and communication technology literacy as “the skills and abilities that will enable the use of computers and related information technologies to meet personal, educational and labour market goals” (6).

According to the authors, assessing the interconnections between life skills, ICT Literacy, and other literacy domains, “will contribute to a more empirically grounded understanding of how ICT literacy is embedded in a broader set of life skills” (9).

2. Role of Libraries

According to Newman, public libraries offer three essential ingredients needed to ensure benefits for all in the digital era: “infrastructure, content, and access” (5). Public libraries in Saskatchewan have been instrumental in bridging the digital divide and expanding the public’s access to an arsenal of information seeking tools. Universal public Internet access is considered an essential public service for libraries in the 21st century, ensuring that all citizens, regardless of ability to pay, have access to information resources (Saskatchewan Library Association 2-13).

The late 1990s witnessed a dramatically changing information environment coupled with a growing gap between those with access to new information tools and resources and a large segment of the population without access. This set of circumstances prompted policy decisions by both federal and provincial governments regarding the role of libraries in the emerging electronic information environment, which culminated in early initiatives that focussed on infrastructure development and public access in libraries across Canada (Jenkins 1-13).

The federal government’s Community Access Program (CAP) resulted in a proliferation of CAP sites in Saskatchewan, the majority of them located in libraries. The CAP program equipped these libraries with basic hardware and software and provided initial funding for training and telecommunications charges. Similarly, the federal LibraryNet program further expanded library

connectivity, and the Bill and Melinda Gates Foundation contributed computers and software to those libraries most in need (Campbell 1-16, Telephone Interview 11 May 2007).

The Government of Saskatchewan launched its high-speed CommunityNet program in 2000, which was instrumental in providing high-speed line connections to government departments and agencies, schools, and over 160 libraries of the province's 300 libraries. In 2007, an additional 40 libraries have highspeed CommunityNet connections through partnerships with schools and other agencies. Approximately 100 libraries remain on dial-up access (Telephone Interview 11 May 2007).

While federal and provincial initiatives and telecommunications infrastructure advancements opened the doors to electronic access for the public, skills training remained a challenge. Lectures and demonstrations offered through the CAP program could not fulfill a continuing demand from the public for hands-on training (Personal Interview 4 June 2002). Libraries were learning by experience that in order to fully develop ICT and information literate patrons within their communities, hands-on training was an essential element of learning how to use the tools now available in the public sphere.

3. The Internet Pilot's License Training Program

In 2000-2001, Saskatchewan's public libraries took an important step forward in diminishing the digital divide by developing a hands-on training program designed especially for those without Internet access or ICT skills. With \$32,000 in funding from the Government of Saskatchewan's "Government Online Fund," Southeast and Palliser Regional Libraries developed and delivered the "Internet Pilot's License" training program, which is the focus of this study.

This funding enabled the library system to build on its traditional role of providing information literacy training to citizens by augmenting information literacy with ICT skill development. This advancement recognized that connectivity and access to ICT tools alone, while fundamentally important, would not fully prepare citizens to participate successfully in a digital world.

The training program was intended for individuals in rural Saskatchewan without the access and skills needed to effectively navigate the Internet. The course comprised seven hands-on modules, which introduced learners to computer and desktop basics, e-mail, chat rooms and newsgroups, basic word processing, and Internet searching.

In addition to course content, the training program experimented with an innovative delivery system. Using mobile labs of laptop computers, printers, and digital projectors, two instructors took the training to the people in their own

communities and in comfortable and familiar settings: town halls, seniors' centres, libraries, and teen drop-in centres.

Participants included farmers, small business owners, seniors, Aboriginal youth, and teens at risk. From Arcola, Bengough, and Manor to Rockglen, Tugaske, and White Bear First Nation, 342 people in 15 rural Saskatchewan communities earned their "licenses" during the fall and winter of 2001 (Saskatchewan Provincial Library 1-15).

This study draws on the experiences, insights, and perceptions of these participants to explore the nature of ICT Literacy and skills training.

B. Statement of the Problem

The disparity in distribution of social and economic benefits in a new information era appears, in part, to be the result of inequities associated with access to ICTs, and the prerequisite knowledge and skills needed to use technology to enhance personal, economic, and employment goals. The challenge for policy makers is to identify effective mechanisms for reducing these disparities and to develop strategies that will overcome the digital divide.

Socio-economic barriers such as geographic location, income, education, and affordability of access most often characterize the digital divide. In Saskatchewan, for example, clear differences were found in patterns of Internet access and use between rural and urban residents, and between those with differing levels of education and household income (Statistics Canada 1-12). Marked differences also emerged between age groups, with a significant decline in Internet use by respondents who were 55 and older. Further research is needed to begin to understand why these differences occur and what might contribute to closing the gap.

Given the Internet's impact on the information environment, the issues surrounding the digital divide have become even more pronounced. The growing prominence of the Internet as the "paramount medium for transmitting and exchanging information" (Saskatchewan Library Association 4) has prompted the migration of many services to the Internet and the proliferation of information resources available online, including databases, government publications and services, as well as journals and magazines, of which many are no longer available in print form.

An increasingly important role for libraries is to "build user competency in a wide range of technology resources" (Linderman 12). Inexperienced users of technology risk alienation by technologically advanced institutions "that broaden opportunities for the educated user and further close doors for those who are already struggling" (8).

Norris argued that “the investment in digital skills and capacities through education, training, and lifetime learning represents one of the most important factors that might facilitate Internet access” and redress the inequities created by disparate access and skills (58-59).

The rapid evolution of the Internet and its central role in both industry and government transactions “necessitates a public policy role to facilitate access, technological literacy and the development of relevant and diverse content resources” (Reddick, Boucher, and Goseilliers 59).

In light of the above, the premise of this study is two-fold:

- 1 Information and ICT Literacy are key factors in diminishing the digital divide; and,
- 2 Public access and skills training provide opportunities for citizens to develop the Information and ICT Literacy skills needed to successfully participate in a knowledge society.

This study contributes to the digital divide discussion by exploring ICT Literacy as an essential component of Information Literacy, and the development of ICT Literacy skills in the public sphere. The study investigates the following research questions:

- a) What was the impact of the Internet Pilot’s License course on its participants?
- b) What factors facilitate or inhibit ICT Literacy?
- c) What factors contribute to an effective ICT skills training program?
- d) What is the role of the public library in providing ICT Literacy training?

C. Purpose of the Study

The Internet Pilot’s License training program had not previously been offered by the public library system. It was a new program, designed to reach individuals without access or skills to use the Internet, and tested a new delivery strategy of taking the training to the learners in their home communities. In general, the purpose of this study was to determine whether or not the course was effective. How satisfied were participants with the course? What can be learned from the experiences of these participants to improve future course design and delivery? As a delivery institution, how was the public library perceived?

On a deeper level, the purpose of the study was to use its findings to inform policy decisions and contribute to long-term strategies for bridging the digital divide by developing ICT Literacy in citizens.

The study had the following two goals:

1. To provide guidelines for the design and delivery of ICT Literacy training; and,

2. To provide policy recommendations on the role of the public library in developing and delivering ICT Literacy training.

D. Rationale and Significance

The digital divide literature has tended to focus on issues of access, connectivity, and computer ownership. While acknowledging these as important issues, this study explores ICT Literacy, a component of the digital divide discussion that requires further research in order to better understand effective ways of helping citizens develop skills and strategies for living in a digital world.

The study also examines the changing and evolving nature of literacy with a view to better understanding what constitutes literacy in a world increasingly reliant on electronic access to and dissemination of information.

The evolving and changing role of the public library in the digital divide discussion has not been fully explored and merits further research to contribute to policy and practice relating to the public library's role in ICT Literacy. This study explores this role from the perspective of one group of citizens who participated in the Internet Pilot's Licence course offered by two Saskatchewan regional libraries.

The study is significant in that there is a paucity of research on two key fronts:

1. Informal training methods and programs, particularly in Canadian libraries and community agencies, that are designed to help those without access and skills engage in the digital information environment; and
2. Factors that motivate or inhibit individuals in their use of technology and acquisition of ICT Literacy skills.

This study will contribute to this emergent body of knowledge and provide policy recommendations and guidelines for ICT Literacy strategies based on the study's outcomes.

II. REVIEW OF THE LITERATURE

A. Introduction

The notion of a digital divide represents a complex mélange of factors with economic and social consequences. This study posits that the digital divide is exacerbated by lack of Information and ICT Literacy skills. This review will provide an overview of the theoretical constructs of the digital divide, the evolving definition of literacy in a digital era, and the linkages between the digital divide and ICT Literacy.

The remainder of the review of literature will focus on research related to community-based training that facilitates the development of ICT Literacy.

B. Understanding the Digital Divide

Freeman suggested that throughout history, the integration of new technology into the economic system occurs through a prolonged and disruptive process of reform. New industries, products, and services surrounding new technologies create highly skilled jobs, while disrupting employment for those with outmoded skills. This “mismatch,” stimulated by each new wave of technological change “brings high social costs in the form of erosion of old skills and occupations” (160). The result, Freeman concluded, is an “uneven distribution of social costs and benefits” (162).

The Digital Divide Network defined the digital divide as the “gap between those who can effectively use new information and communications tools, such as the Internet, and those who cannot” (Digital Divide Basics 1). Increasingly, inequities in technology adoption exclude many from realizing the benefits of a changing economy. Similarly, Rose referred to the divide as a “technology gap” defined as a barrier for people without adequate resources and opportunities to access the information needed to function well in society” (Introduction).

Norris described the digital divide as “a multidimensional phenomenon” comprising disparities in the following contexts:

Global divide. The gap in Internet access that exists between industrialized and developing countries;

Social divide. The gap between “information rich and poor” within countries; and,

Democratic divide. The differences within the online community of users who either choose to use technology, or not, “to engage, mobilize, and participate in public life” (4).

The heart of the problem, Norris concluded, “lies in broader patterns of social stratification that shape not just access to the virtual world, but also full participation in other common forms of information and communication technologies” (91-92).

The bridges.org virtual organization concluded that ICTs have become foundational components of today’s societies and their economies. Consequently, “the digital divide means that ‘information have-nots’ are denied the option to participate in new ICT jobs, in e-government, in ICTs improved healthcare, and in ICT enhanced education” (What is the Digital Divide?).

MacLean et al described six dimensions of the Digital Divide:

Technological. Access to computers and the Internet;

Software and content. Tools required to access information resources;

Skills. Access to education and training;
Market access. Access to products and services and opportunities for business-to-business and business-to-customer transactions;
Public service. Access to public services, including health, education, and governance processes; and,
Governance. Democratic access to community development and decision-making processes (2).

C. Lemke cautioned against defining the digital divide within the narrow parameters of Internet access and computer ownership: the “chasm is deeper than just access” (Engauge, 21st Century Skills 1). Lemke concluded that access is only a first step toward equity and “true equity will require high levels of technology proficiency to ensure broader, meaningful, innovative uses of technology by all segments of the population” (1).

According to Taglang, the digital divide discussion focuses solely on access to technology. However, access alone will not overcome the divide. The author suggested:

To realize the potential of today’s information tools, people need the skills to operate them to better their lives and the health of their communities” (Content and the Digital Divide).

Selwyn reasoned that the digital divide argument is “conceptually weak” and fails to account for multiple factors that influence whether or not individuals will use ICTs in their daily lives. He questioned the simplistic focus on “access” inherent in much of the digital divide research. Characterizing those who do not use technology as simply those who lack access to technology is “too crude an analysis” (100). Alternatively, Selwyn proposed a broader perspective based on understanding an individual’s information needs and “the processes underlying how technologies are consumed and used” (107).

Awareness and use of new technologies like the Internet, according to Reddick et al, is “highly polarized along social class and generational lines” (1). The resulting digital divide cannot be defined simply as the differentiation between those who are connected to the Internet and those who are not. The authors concluded that other variables influence differential levels of access, including “needs, income, affordability, perceived value, education, gender, location and literacy” (58).

C. Information and ICT Literacy

“As society changes, the skills that citizens need to negotiate the complexities of life also change” (C. Lemke 2). This notion parallels how society defines literacy, which escapes the confines of a static definition and, instead, evolves and changes as society changes.

To capture the fluidity of literacy's evolving definitions and the multi-faceted dimensions of the concept of literacy, a number of literacy "genres" have emerged. These new forms of literacy are strongly influenced by developments in technology and are variously described as visual and media literacy; computer literacy; technological literacy; information technology literacy; information, communication, and technology (ICT) literacy; and information literacy.

C. Lemke suggested that the prevalence of "hypertext, images and icons, charts and graphs, and statistical data" requires a redefinition of basic literacy that incorporates "the ability to read and understand complex documents that include images and information in an expanding array of technologies" (C. Lemke 2). This "technological literacy" or the capacity to "decipher meaning and express ideas through a range of media" (C. Lemke 2) has become a prerequisite to job readiness in today's workplace.

According to Beavis, new and emerging technologies and the changing demands of a knowledge economy have had a profound impact on the construct of literacy and on "what it means to be literate in society" (1). Beavis cites computer games as just one example of how new technologies challenge "traditional concepts of text, narrative, and literacy" adding "new linguistic and cultural forms" to a contemporary understanding of literacy (2).

Dorr and Besser concluded that it is necessary "to cultivate multiple literacies" that will develop a variety of skills drawn from print and multimedia literacies (6). This concept of literacy for the twenty-first century can be described as: "the knowledge, skills, and values essential for intelligent use of media and technology" encompassing media, information, visual, computer, and other literacies (2).

According to Spitzer, Eisenberg, and Lowe, new advancements in information technology have increased the volume of information available and the complexity of information systems to be navigated. Therefore, Information Literacy, enables people to "filter out" unnecessary information. The authors concluded that information literacy skills are the necessary tools that help us successfully navigate the present and future landscape of information (67).

Besser agreed, suggesting that the plethora of digital information available requires well-honed skills to discern "the relevance, veracity, and recency" of information retrieved (1). According to Besser, a wide gap exists "between those who have the skills and competencies to effectively evaluate the appropriateness of a given piece of information, and those who do not" (2). For those who lack these skills, Besser pointed to the importance of the library's role in "advocating 'information literacy' to bridge this digital divide" (1).

J. Lemke explored the concept of "informatic literacies" which includes the skills of a library user and text user, as well as the skills needed to categorize and

locate information and multimedia objects. Lemke suggested that the skills needed to systematically explore and navigate the Internet are necessary in the Information Age: “Without all these skills future citizens will be as disempowered as those who today cannot write, read, or use a library” (5).

B. Bruce suggested that “technology” and “literacy” should not be viewed as distinct and separate realms. These “realms” are inseparable, with technologies playing an integral role in “the construction of all literacy practices” (9). Bruce concluded that technologies are not “optional add-ons,” but are integral to “the definition of every form of literacy” (12).

Literacy is a prerequisite to “the ability to function well in one’s society” (National Forum on Information Literacy). In the information era, those who are unable to “find, evaluate and use information to enhance their quality of life” will be disadvantaged. The Forum viewed the public library as an important agency in mitigating this risk (2).

In its 2005 proclamation, the National Forum on Information Literacy (NFIL) described information literacy as follows:

Information Literacy lies at the core of lifelong learning. It empowers people in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals. It is a basic human right in a digital world and promotes social inclusion of all nations (NFIL Proclamation).

The Forum’s proclamation on Information Literacy and lifelong learning urged governments and intergovernmental organizations to support and invest in information literacy and lifelong learning strategies as a valuable public undertaking in developing the Information Society.

C. Bruce defined information literacy as “a way of thinking and reasoning about aspects of subject matter” (2) and concluded that information literacy research is at a very early stage. According to Bruce, one area requiring further research is in “strategies for helping individuals and communities to become information literate” (5).

D. Public Access and Skills Training

This section of the review of literature focuses on research specifically related to ICT use and non-use, followed by an examination of research on the provision of public access to information tools, including computers and the Internet, and methods by which adults acquire ICT Literacy skills, particularly in public libraries and community centres.

1. ICT Use and Non-Use

The large-scale Adult Literacy and Life Skills Survey, administered in over 20 countries, confirmed “large divides in access and use of ICTs” within countries (OECD 181). Age, gender, education, occupation, and literacy proficiency were found to be determinants of computer and Internet use or non-use. Income was a key factor underlying ICT access and use, and non-users of ICTs tended to have lower literacy levels. The survey concluded: “Further research is necessary to shed more light on the economic and social outcomes associated with ICT use and literacy skills” (193).

According to Norris, it is essential to understand technology use and Internet access at this stage of the diffusion process, “before the initial inequalities rigidify into a virtual Berlin Wall dividing the information-rich and poor, within and between societies” (240). Therefore, overcoming the digital divide requires attention to both access and skills.

Stites suggested that lack of access and the skills to use technology restricts learning opportunities. Those who “lack access to the information resources that technology can provide are in danger of falling further and further behind those who have such access” (1).

Finding the right information to solve a problem is often difficult for people and is often exacerbated by “financial, physical and geographic barriers” (Durrance and Pettigrew 15). Consequently, many citizens are unable to access the services they need. Using technology to improve access to local information resources may reduce some of the barriers faced by the information seeker (15).

Lowe and McAuley argued that even the concept of citizenship is undergoing change “as governments increasingly rely on the Internet as a means to communicate and disseminate information” (2). Accordingly, the authors suggested that “a comprehensive examination of computer use in workplaces, homes and community settings is therefore required” (2).

Stites concluded the effectiveness of technology can only be realized when access is integrated with the development of basic skills.

Using technology to address problems of unequal access to information and to raise the quality of adult learning opportunities will take more than simply increasing the supply of hardware, software, and telecommunications equipment. The hard questions have less to do with quantity and availability of technology *than with the quality and effectiveness of technology use* (emphasis added, 1).

According to Dryburgh, there is a lack of understanding about the impact of the Internet on “daily activities, communication, use of time, and work experiences” (1). In examining why and how Canadians used the Internet, Dryburgh found

differences between Internet users and non-users related to age, education, income, gender, and geographic location, described as follows:

Non-users of the Internet are more likely to be older individuals, and are more likely to have less education and lower household income than Internet users. Non-users are more likely to be women than men at every age group...and those living in rural Canada are less likely to use the Internet than urban dwellers (4).

Dryburgh noted that Internet use was influenced most by income and education: the higher one's income and education, the more likely one was to use the Internet. The two top reasons given for non-use of the Internet were cost and lack of access to computers or the Internet. Patterns of usage were distributed across five most frequently conducted activities:

- Searching for information on goods and services;
- Accessing online new sites;
- Searching for health and medical information;
- Accessing information on government programs or services; and,
- Playing games (8).

Reddick et al concluded that the "first divide" differentiated between users and non-users, and the "second divide," which creates a "dual digital divide," differentiates among various types of non-users of Internet technology. To develop their typology, the authors examined attitudes, beliefs, behaviours, and preferences associated with technology use. Three types of non-users emerged:

- 1 Type one non-users are the "near users," who recognize the potential of the Internet to meet their needs, but are prohibited from using the Internet due to the primary obstacles of cost/affordability of access and "technical skill development";
- 2 Type two non-users perceive little personal or social benefit from using the Internet; and,
- 3 Type three non-users are "far removed from online activities," seeing no personal benefit to be gained through use (44-45).

Non-users will be unable to realize any potential benefits of the Internet and the services available through it if "important variables such as content value, available time, social context, technological literacy, affordable access and related resources are not addressed" (55). From a public policy perspective, public access sites, technical skills training, and relevant content development were three important components identified that should formulate an access strategy (57). The authors concluded that further research is essential to more fully understand how individuals approach the use of new technologies and begin to integrate them into their information-seeking behaviors.

Crompton, Ellison, and Stevenson compared non- and infrequent Internet users with regular Internet users. Their analysis revealed that dropouts and infrequent users were more likely to be working, and more likely to have lower household

incomes than regular users. The most common reason for non-use, expressed by 30 per cent of drop-out households, was “no need of the Internet” (5). Seventeen per cent said it was too expensive, and 14 per cent indicated they had lost access to a computer. Only 20 per cent of infrequent users described their computer skills as very good or excellent, compared to 57 per cent of regular users who rated their skills as very good or excellent (4).

The authors concluded that “a person’s degree of comfort or familiarity with new technologies” and lack of incentive to use the Internet for a variety of activities may well play a role in Internet usage (3). They stated:

Being comfortable with surfing the Net is undoubtedly linked to the user’s level of comfort using a PC. Infrequent users were not nearly as likely as regular Net users to perform activities such as word processing, bookkeeping, data entry and analysis, and game playing” (4).

Silver examined Internet use among older Canadians and found that only 13 percent, or one in eight individuals aged 60 or older, had used the Internet during the year. This was notably different from the nine out of ten individuals aged 15 to 17 who had used the Internet. Overall, older Canadians use the Internet less as they get older; from fewer than one-quarter of those in their early 60s declining to fewer than one in ten in their early 70s, and only one in twenty aged 75 and older. As private and public institutions embrace technology as a means of providing information and services to clients and citizens, “many older Canadians are being marginalized” and those Canadians aged 60 and older are “most prone to being left behind, on the ‘shoulder’ of the information highway” (3).

Durrance and Pettigrew developed case studies of US libraries providing public access to the Internet and community information, and examined ICT use among participants in these programs. This work culminated in the identification of a number of barriers to successful information-seeking behaviors that “are highly significant because they represent the impediments that ICT users encounter when seeking information” (41).

The authors found that the main barriers to successful Internet-based information seeking activities were information related, including information overload and the problem of determining relevancy, poorly organized and classified information, and missing or outdated links. Other barriers included technological (line speeds; software compatibility); economic (affordability of equipment and on-line access); geographic (distance to public access site, lack of high-speed capacity in specific areas); search skill barriers; cognitive barriers (lack of understanding of how the Internet and search engines work); and psychological barriers (lack of confidence in information-seeking ability). Their study recognized the need to provide training and technical assistance to users and stressed the “importance of understanding the context in which citizens seek information and adopt new technologies” (17).

2. Community-based Access and Skills Training

According to Dickard, progress in bridging the divide requires continued emphasis on technology access and training if low-income groups and rural communities are to use information technology to break the cycle of economic and education disadvantage (4).

In an examination of digital divide intervention strategies around the world, the bridges.org organization developed “access criteria” designed to evaluate public access initiatives to determine their effectiveness and sustainability. The criteria included the following:

- physical access and availability of technology;
- appropriateness of the technology for local conditions and needs;
- affordability;
- capacity for participants to “understand how to use the technology and its potential uses”;
- locally relevant content;
- attention to socio-cultural factors which may limit use of technology;
- trust issues addressed, including “privacy, security, and cybercrime”;
- legal and regulatory framework;
- sustainability of the initiative within the local environment;
- macro-economic environment that fosters widespread technology use;
- and,
- political will within government “to do what is needed to enable the integration of technology throughout society” (Real Access Criteria).

A common theme to emerge from evaluations, according to the above criteria, was described as follows:

Policies and processes that are grounded in real life experience, in local circumstances, based on real user needs, and addressing the multiple issues of *real* access to ICT have been more effective than those that have not (Section 5).

In a study of users and uses of public Internet terminals, Boase et al found that public access terminals “can serve as halfway houses between using the Internet at work and school and owning a home computer with Internet access” (15). The authors found that public terminal users were more likely to be single women in their early 30s, who were university educated, new to the Internet, and of whom half were unemployed. The authors also found that unemployed individuals and new Internet users (“newbies”) were most likely to use public terminals. The authors concluded that public terminals serve a valuable transitional function allowing non-users to develop awareness and skills as a precursor to acquiring Internet access at home.

Public terminals stand out as where newbies often start. As they gain resources and jobs, they may well move on to use the Internet from home, school and work” (17).

The Community Technology Centers’ Network (CTC Net) comprises over 1,000 community technology centres across the US. The centres provide access to computers and the Internet, and provide training for people in low-income communities. Centres are typically affiliated with libraries, youth organizations, and multi-service agencies (CTCNet, About the Network). A series of studies assessed the impact of the program on centre users. These findings are particularly relevant to this study and are reviewed below.

The Annie E. Casey Foundation identified three common indicators of successfully delivered programs in a study of five technology-based projects providing computer access and training to low-income and minority participants. Firstly, “bottom up” demand was accommodated, meeting participants goals of develop computer proficiency to improve job qualifications.

Secondly, the programs were designed to meet a variety of needs and interests as expressed by their participants, from computer literacy and business skills to computer games, on-line research, and newsletter creation.

Thirdly, successful programs effectively met operational challenges including staffing, development of appropriate curriculum, funding needs, and timely maintenance and upgrading of hardware and software. The authors concluded that the most successful technology programs “are well integrated into center activities and into the life of the community (Computer and Communications Use).

In a study of five CTCNet centres and their users, Mark, Cornebise, and Wahl found that in 91 per cent of participants, “greater computer awareness and new computer skills increased participants comfort with technology as a tool for accomplishing their goals” (14). The authors attributed this outcome to “a learner-centered approach to both formal and informal teaching” (20).

Rose conducted a case study of five CTCNet centres and examined an often neglected organizational issue. She compared two organizational delivery models: free-standing centres and centres embedded in existing agencies. Rose concluded that embedded centres appear to be more sustainable because they have an existing client base and core funding in place. However, she cautioned:

...these types of centers must reconcile staff and space issues if they want to offer the full range of services associated with computer access. They must also offer more public-access hours to facilitate users’ personal growth and learning (Section 6.7).

In light of this, Rose concluded that the potential for competing agendas in any public access strategy must be reconciled if the agency is to develop an effective technology centre within its umbrella organization.

Chow et al collected survey data about participants and their patterns of ICT and centre use from over 800 individuals in 44 CTCNet locations. The study focused on reasons for attending a centre, how individuals used the centre, and attributes of centres that were successful in meeting the needs of their users.

The main reasons cited for attending a centre were to gain access to technology (hardware, software, and the Internet) and to learn how to use computers and the Internet for a variety of job-related and personal reasons. Overall, “a comfortable, supportive atmosphere was ranked as the top reason for coming to a technology center” (Executive Summary). Effective programs offered by the centres increased self-confidence and ameliorated “computer fears and anxieties” (Executive Summary).

The authors found that patterns of usage included e-mail, accessing the Internet to look for a job, obtaining civic and government information, playing computer games, and pursuing personal projects such as maintaining a mailing list or editing a newsletter. The authors concluded that the provision of a friendly, supportive atmosphere in which to learn about and use computers was paramount. This included recognizing the need for “well-trained, responsive, and caring staff” (Section VIII).

As part of the process of developing an evaluation framework for CTC Net programs, Penuel et al gathered data from six CTCNet site visitations. Two key advantages cited by participants in CTCNet programs were that classes were offered free of charge and, therefore, accessible to low-income participants; and the “patience of instructors” who were able to work effectively with inexperienced and anxious technology users. The study concluded that the programs offered at these centres increased “participants’ self-efficacy with computers,” especially in seniors (80).

McLaine collected survey data from CTCNet users, which measured user satisfaction and examined users’ goals, activities, and reasons for attending CTCNet centres. A supportive atmosphere, low cost, and convenient location were found to be essential to user satisfaction. User satisfaction was also related more to the user’s goals, activities, and reasons for attending a centre, than on characteristics such as income and ethnicity. This led to the following observation:

CTC users are more likely to be satisfied if they attend CTCs due to specific reasons, rather than simply experimenting with computers and community technology centers in general (20-21).

McLaine's study suggested a need for research that identifies factors that are effective in serving individuals most at risk within the digital divide. The author concluded it is essential to understand participants' "motivations and expectations" to better serve the needs of different audiences (11).

3. Summary and Conclusions

The review of literature reveals that the digital divide is complex and multi-dimensional, creating a gap between those who have access to ICTs, and the skills to use them effectively, and those who do not. Information and ICT Literacy are seen as vital prerequisites to full participation in a knowledge society.

The studies reviewed indicated that ICT use and non-use is associated with differences in gender, age, education, income, literacy levels, and access to ICTs. Community-based access to ICT tools and low or no-cost training that introduced individuals to ICTs in ways that address personal information needs have shown positive outcomes. ICT training in a non-threatening, convenient, adult-learner friendly environment can increase learner confidence in using ICTs and facilitate ICT skill development.

III. METHODOLOGY

This study explores ICT Literacy development in a group of individuals who participated in the Internet Pilot's License training program offered by two regional libraries in Saskatchewan. The study examines the impact of the course on participants, factors that facilitate or inhibit ICT Literacy, and factors that contribute to an effective ICT skills training program. Finally, the study examines the potential role of the public library in delivering ICT Literacy training.

A. Research Method

This study was designed as a broad, exploratory investigation to facilitate data collection on a range of issues inherent in this type of training program. Participants in the program were widely dispersed in many rural centres. Accordingly, the survey method of research was employed. In order to gather information from as many as possible, a mail-in questionnaire was selected as the primary research instrument for this study.

This study adopts Lowe and McAuley's ICT Literacy framework and its four indicators of ICT Literacy as a method of exploring factors that influence the acquisition of ICT Literacy skills. Their framework was designed to examine how respondents incorporate ICTs and ICT skills into their daily lives within the context of four dimensions of ICT Literacy, described as follows:

Incidence and use of computers and related technology. Does a person use a computer, the Internet, or other ICTs?

Frequency of use. How often does a person use a computer?

Task complexity. How complex are the tasks carried out?

Criticality or usefulness of applications to daily life. How critical, or useful, is the application of ICT to the main areas of daily life (9)?

With respect to task complexity, no criteria were established to determine whether one application was more complex than another. The indicator was used as a way of exploring a range of ICT applications that were considered by the researcher as sufficiently complex to require a reasonable command of computer and Internet skills.

The notion of “comfort” and familiarity with technology has also been posed as a determinant of ICT use of technology (Crompton et al, Mark et al). Accordingly, “comfort level” with computers and the Internet was used as a further ICT Literacy indicator to examine factors that may influence ICT use and skill development.

B. Data Collection and Analysis

The population surveyed was drawn from those participants who participated in the Internet Pilot’s License course and for whom mailing addresses were available to the Palliser and Southeast regional libraries.

The questionnaire was developed by the researcher, reviewed by regional library representatives and field-tested with four participants who were then eliminated from the population. The questionnaire was revised and distributed by mail to 305 participants. Each questionnaire included a postage-paid, addressed return envelope.

A dataset from the questionnaire’s quantitative responses was created and analyzed using SPSS software. The researcher coded the data gathered from the questionnaire’s open-ended questions and identified categories drawn from frequent occurrences of similar responses, course specific suggestions and observations, and general impact statements.

The questionnaire contained 26 closed and four open-ended questions. Questions asked participants to consider their motivation for taking the course, their comfort level with computers and the Internet before and at the time of completing the questionnaire (after), their frequency of use of the Internet and computer before and after the course, Internet and computer activities engaged in and their frequency of use; and the overall importance of computers and the Internet to their daily activities.

Participants were also asked to consider the design and method of delivery of the course, the topics and activities offered, perceived barriers to Internet and computer use, and the role of the library in providing ICT training. Specifically, data were gathered in the following five areas:

1. Demographic data
 - gender
 - age
 - employment status
 - education
 - income level
 - Aboriginal status
2. Course design
 - course topics
 - instructional approaches
 - overall satisfaction level
3. Course delivery
 - preferred delivery institution
 - the library as delivery institute
 - potential fees
4. Attitudes toward technology and patterns of technology use
 - motivation for taking the course
 - comfort level with computers and the Internet
5. Frequency of use and access patterns
 - barriers to use of computer and Internet technologies
 - library Internet access and service
 - importance to day to day activities of computers and the Internet.

Open-ended questions asked respondents to elaborate what they wanted changed in the Internet Pilot's License course and what they thought was best about the course. A third open-ended question asked them to discuss their experience with computers, the Internet, and the course. Within closed questions, there were also opportunities for respondents to add comments and suggestions. Consequently, in addition to the dataset developed from the closed questions, a rich array of qualitative data in the form of comments, suggestions, and impact statements was generated.

Generative questions that guided the design of the questionnaire and analysis of the data were as follows:

1. What motivated participants to take the Internet Pilot's License course?
2. What was their comfort level with computers and the Internet before and after taking the course?
3. What facilitated or inhibited ICT use?

4. Does comfort level with the technology influence frequency of use and comfort with computers and the Internet?
5. What factors contribute to an effective training course?
6. Did the Internet Pilot's License course influence participants' attitudes toward and use of computers and the Internet? Was the course instrumental in changing attitudes and enhancing ICT use?
7. What barriers to ICT use did participants experience?

C. Assumptions and Limitations

The broad spectrum of literacy and the knowledge, skills, and abilities required to become information literate are beyond the scope of this study. However, this investigation does assume that ICT Literacy is a subset of Information Literacy and that the identification of factors that facilitate or inhibit ICT Literacy will increase understanding of how adults develop ICT Literacy skills.

Given its exploratory intent, the study was not designed to measure the degree of ICT Literacy in respondents. Rather, the study explores a range of possible factors that may facilitate or inhibit ICT Literacy and captures data in a number of interrelated areas in order to provide a basis for developing guidelines for ICT Literacy training methods and recommendations on the role of public libraries in ICT Literacy training.

The population for the study was limited to those participants whose mailing addresses were available to the two regional libraries at the time of questionnaire distribution. Participants, who were registered by sponsoring agencies, were excluded from the population because sponsoring agencies were unable to release mailing addresses for privacy reasons.

IV. FINDINGS

The research questions, which guided this study, sought to discover the impact of the Internet Pilot's License course on participants, factors that facilitate or inhibit the development of ICT Literacy, attributes of an effective ICT skills training program, and the role of the public library in providing ICT Literacy training.

A. Description of Population

The questionnaire asked six questions about the life circumstances and personal characteristics of respondents. Respondents were asked to identify their gender, age range, employment status, highest level of education completed, annual income range, and Aboriginal status. In the introduction to these questions, respondents were advised that if they felt uncomfortable answering any of these

questions, they were free to leave them blank; however, most respondents chose to answer, in whole or in part

Of an N of 100 (respondents who chose to identify their age range), 20 per cent of respondents were male; 80 per cent were female. The following figure shows the age range of participants in the course from this population, with 53 per cent falling within the 45 to 64 age group and 37 per cent in the 65 and over group. Only 10 per cent were within the 25 to 44 age range, and none of the respondents was under 25. As illustrated, older adults age 65 and over formed a large part of the population – almost 40 per cent.

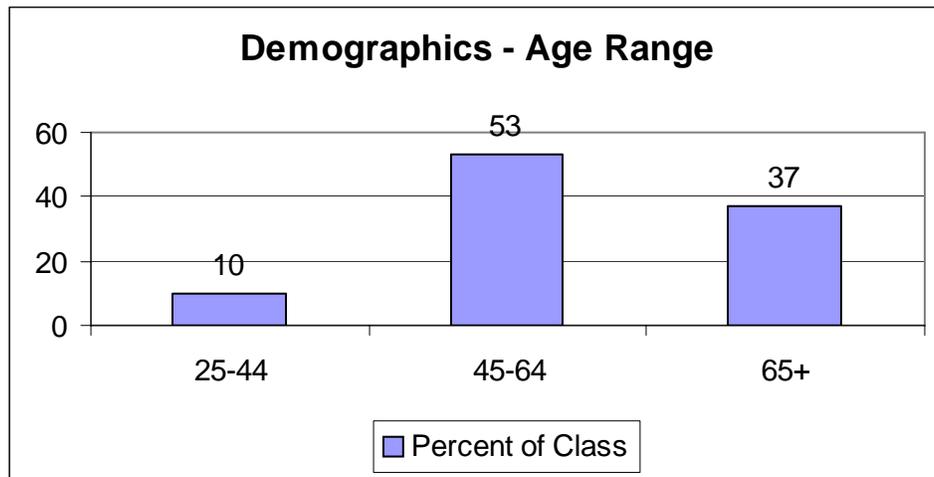


Figure 1. Age Range

Given the age distribution, it is not surprising that a large proportion of respondents--63 per cent--identified themselves as retired. Twenty-four per cent described themselves as self-employed or seeking employment. Only 13 percent described themselves as employed (see Figure 2). In retrospect, this question should have included a separate category described as either "Homemaker" or "Working Within the Home." Given the somewhat large percentage of respondents who described themselves as "self-employed" (21 per cent), one might assume that this category included a number of individuals who would otherwise describe themselves as homemakers. One respondent, in fact, pencilled in this response identifying herself as "homemaker." However, overall, this question revealed that 87 per cent of respondents identified themselves as other than "employed."

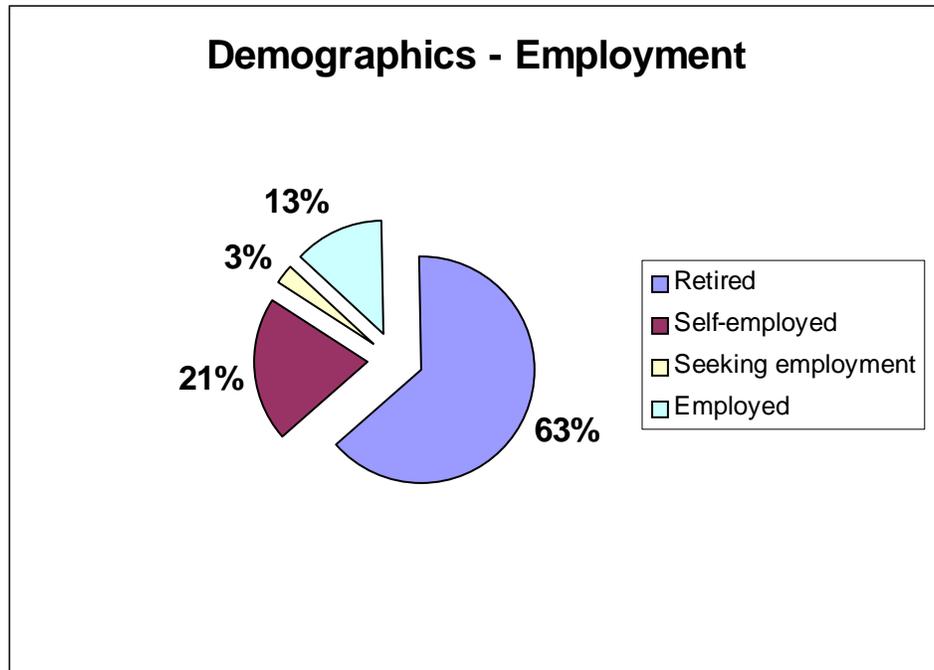


Figure 2. Employment Status

Respondents were asked to identify the range within which their personal annual income fell. From an N of 81 who elected to identify income range, 32 percent indicated a personal annual income of less than \$20,000. Close to half the group fell into the range of \$20,000 to \$36,000, and 24 percent of respondents indicated an income range of \$37,000 or higher as their personal income. Figure 3 shows a comparison of income.

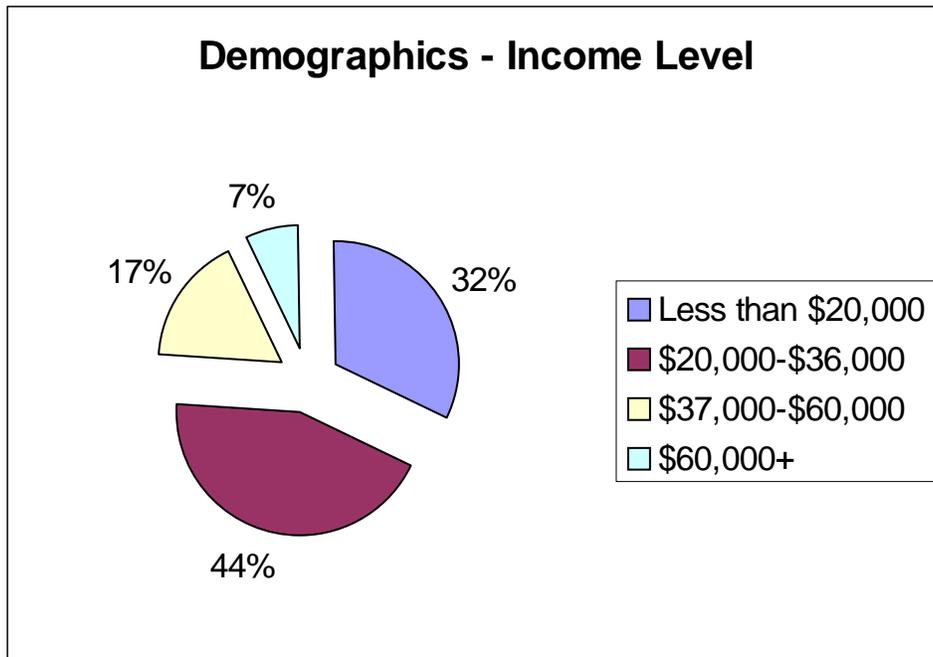


Figure 3. Income Levels

As illustrated in Figure 4, respondents comprised a well-educated group with almost 18 per cent having obtained a university degree, and 26 per cent having acquired a college certificate or diploma. Therefore, over 40 per cent of this population had obtained a post-secondary credential, with 13 per cent having acquired some post-secondary education or training.

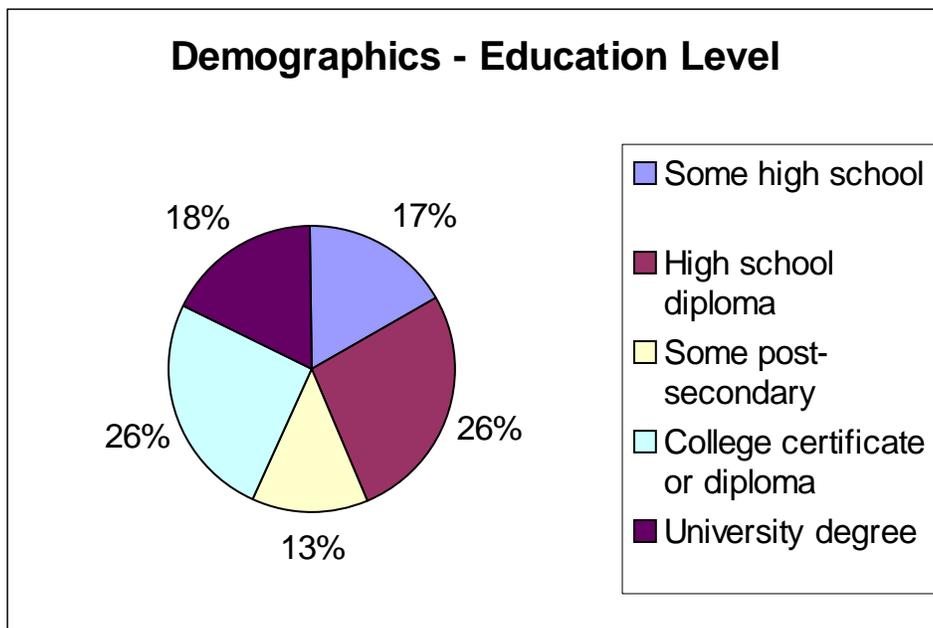


Figure 4. Education Level

The Internet Pilot's License Course was designed, in part, to attract Aboriginal learners, an objective of the Questionnaire was to compare experiences, perceptions, and insights of Aboriginal and non-Aboriginal participants. However, none of the respondents identified themselves as Aboriginal. Therefore, this comparison was not possible. This may have been due to the inability to distribute the questionnaire to those students who were sponsored by an external agency and for whom privacy regulations prevented access to mailing addresses.

In summary, the responses to the Questionnaire's demographic questions showed that respondents were predominantly women who were likely to be age 45 and older, self-employed or retired, and well-educated, with low to modest personal annual incomes.

B. Reasons for Taking the Course

As one way of exploring participants' experiences with and perceptions of ICTs, respondents were asked to rate the importance of seven possible reasons for taking the course, from "not at all important" to "very important." Respondents were also invited to volunteer other reasons they may have had for taking the course.

"The course was offered in or close to my home community" was identified by 77 per cent of respondents as a "very important" reason for taking the course--the top rated reason. Seventy-one per cent of respondents rated *"To increase my confidence when using a computer and/or the Internet"* as a "very important" reason, and just over half the respondents (53 per cent) identified *"To help overcome my fear of computers and/or the Internet"* as a "very important" reason.

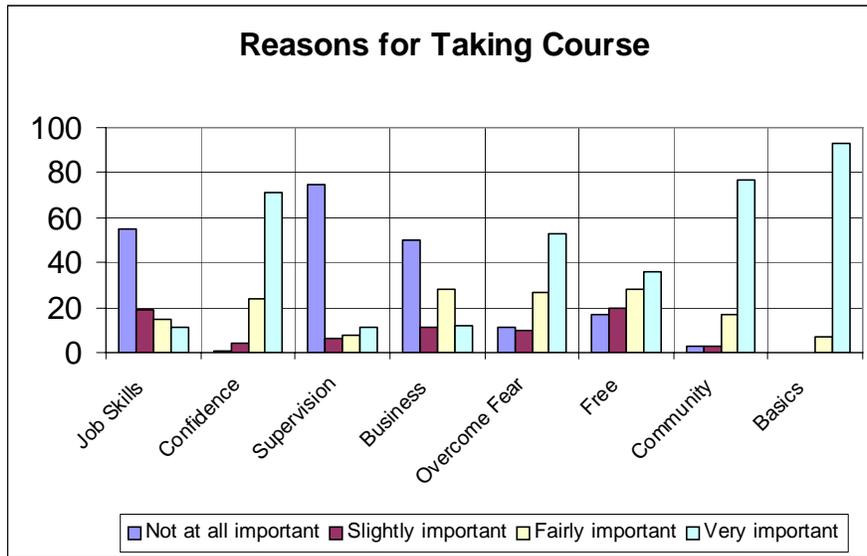


Figure 5. Reasons for Taking Course

Not surprisingly, given the age distribution and high percentage of retirees among the population, “to increase my job skills” and “to enable me to supervise my children’s use of the Internet” were considered “not at all important” by most respondents. Fifty-five per cent considered increasing job skills “not at all important” and 75 per cent indicated “supervising children’s Internet use” as “not at all important,” although one respondent penciled in “supervising grandchildren” as important. Half the respondents considered “learning how to apply a computer and/or the Internet to a farm or business” as “not at all important,” although almost 40 per cent considered this reason as fairly or very important, which may reflect an important reason for taking the course for those who described themselves as self-employed.

A reason that was volunteered by 15 respondents in open-ended responses was categorized as: “to learn the basics of the computer and the Internet” and was variously described as “to introduce me to the use of computers,” “to learn the basics of using the Internet,” and “to learn vocabulary and very basics of computer use.” Other respondents volunteered similar reasons, described as “to become computer literate” or “I didn’t have a clue about computers.” In retrospect, adding a well-crafted reason that reflected the above would likely have been rated highly by most respondents. Other comments volunteered indicated a broad range of reasons that motivated respondents to take the course. These included the following:

- “I want to write a book”;
- “To learn how to keep track of personal finances”;
- “Just for knowledge”;
- “To learn how to send a message to my family”;
- “I was totally electronically illiterate”;

*“To broaden my horizons”; and,
“Retirement hobby.”*

In summary, respondents came into the Internet Pilot’s License course with a wide variety of interests and reasons for taking the course. Overall, respondents were highly motivated to take the course because it was offered free of charge in or near their own communities. Respondents also suggested that taking the course would help them overcome their fear of computers and the Internet, while building their confidence in using a computer and/or the Internet for a range of personal, educational, or business activities. Many volunteered they wanted to learn the basics of computers and the Internet in order to become “computer literate.”

C. Course Design

Data about respondents’ experiences with and observations about the design of the course were gathered in three main categories: course topics, instructional approaches, and satisfaction level. Respondents were invited to list other topics that they would like to see included in such a course and two additional open-ended questions invited respondents to comment on what they would change about the course and what they considered to be the best thing about the course.

1. Course Topics

The course was designed around seven modules and covered the following topics:

- 1 Introduction to computers (parts of a computer, how a computer works, using a mouse, and navigating the desktop);
- 2 Computer viruses;
- 3 Searching the Internet (Internet Explorer and Netscape, search engines, evaluation information);
- 4 E-mail (setting up and using e-mail accounts);
- 5 Chat Rooms and Newsgroups;
- 6 Advanced Internet searching (use of Boolean operators, more search engines, online demonstrations);
- 7 Introduction to Word Processing (Microsoft Office and word processing basics).

Respondents were asked to rate the importance of the above topics from “not at all important” to “very important.” Following is a description of the importance respondents ascribed to the course topics.

Two course topics emerged as the most important topics. Sixty-seven per cent of respondents considered “Searching the Internet” as a “very important” topic,

and 66 per cent described “E-Mail” as “very important.” Fifty-five per cent considered “Word Processing” to be “very important.” The Introductory module was rated by 51 per cent of respondents as “very important” and 40 per cent described “Viruses” as “very important.” The two topics considered to be much less important were “Advanced Internet Searching,” rated as “very important” by only 27 per cent of respondents, and “Chat Rooms” which was considered to be of least importance with only 11 per cent describing it as a “very important” topic.

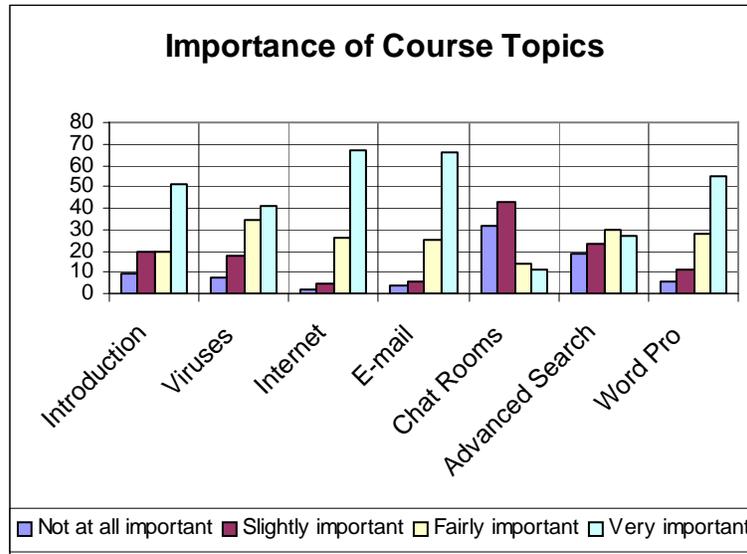


Figure 6. Course Topics

When asked to indicate other topics that should be included in the Internet Pilot’s License course, respondents identified a wide variety of topics, which reflected a diverse range of needs, expectations, and prerequisite knowledge. Other topics noted included the following:

- Keyboard instruction;
- Advanced word processing;
- How to buy a computer;
- Application-specific topics, including accounting and spreadsheets;
- Trouble shooting and error messages; and,
- Working with folders and files.

2. Instructional Approaches

Anecdotal data gathered from course developers indicated that participants in prior training initiatives through the CAP program wanted more than a lecture or demonstration; they wanted hands-on training in an informal, small group setting, rather than one-on-one training situations. There was also an understanding that learners preferred working in pairs, sharing a computer. Course developers

indicated that friends and spouses would attend together and pair up. The relaxed setting of partnering with a “buddy” was viewed as less intimidating.

However, a review of the evaluation forms completed by course participants revealed some dissatisfaction with inadequate hands-on practice time and the need to share a computer. The questionnaire, therefore, sought to gather data on instructional approaches that would help dispel some of the uncertainty around key elements of the course design.

Participants were asked to rate their preferences for “different approaches to learning new information and skills,” on a scale from one to five, with one representing their “most preferred” approach and five representing their “least preferred” approach. Respondents were asked to rate the following six different approaches:

- 1 Small group instruction in which an instructor works with a small group of participants;
- 2 Individual instruction in which the instructor works one-on-one with a participant;
- 3 Participants in the course work together in pairs sharing a computer between them;
- 4 Participants in the course work by themselves, each with a computer;
- 5 The instructor presents new information and demonstrates new skills. Participants then practice new skills at home;
- 6 The instructor presents new information and demonstrates new skills. Participants then practice new skills during class time and at home.

While some obvious preferences emerged from the responses, it was apparent that respondents wanted a varied approach to learning new information and skills that included a mix of instructional approaches aligned with the learner’s needs and the instructional situation.

Respondents did prefer small group to individual instruction. Seventy per cent said small group instruction was “most preferred,” compared with 34 per cent who rated individual instruction as the “most preferred” approach.

Respondents made it clear that “hands-on” practice was the most preferred approach. Seventy-two per cent chose “one” on the five-point scale, representing “most preferred,” for the instructional approach of practicing new skills during class and at home. The “hands-on” approach was reinforced with written comments in which some respondents suggested: “more hands on (doing),” “[allow] plenty of time to actually work on computer for a good period of time,” and “more practice time.” Only 16 per cent indicated practicing new skills at home was their “most preferred” approach.

The class was evenly divided when asked to indicate preferences for working with a partner, sharing a computer; and working individually, each with a computer. Fifty-two percent indicated that working on their own computer was “most preferred.” However, 53 per cent of respondents selected working in pairs, sharing a computer, as their “most preferred” approach. The scenarios presented them may have been confusing, since they were asked to consider two choices combined in one scenario: “working together in pairs, sharing a computer” versus “working by themselves, each with a computer.” Some respondents may have preferred the ability to work in pairs rather than by themselves, and may have been responding to that approach, apart from the issue of the shared computer. However, in the open-ended question asking respondents what they would change about the course, the issue of sharing a computer was raised. The following comments reflect how some respondents felt about sharing a computer when asked what they would change about the course:

“To have a computer to myself. Two cannot see unless looking straight on.”

“Everyone have access to their own computer for this course.”

“I would like to work on a computer by myself instead of in pairs.”

While many participants may not have minded sharing a computer, they may have seen this situation as preventing them from having adequate hands-on practice. The following comment links the desire for more hands-on practice with the issue of sharing a computer.

“Sometimes I didn’t get enough time to try everything, even although my partner did and I was able to watch. I guess it’s the motto ‘Learn To Do By Doing,’ Not Watching.”

Another respondent suggested that because the group combined both beginners and advanced students, “different approaches to learning” were required. In other words, no one instructional approach was necessarily regarded as the best one.

In summary, as illustrated in Figure 7, despite the seeming anomalies in some responses, respondents appeared to want a variety of instructional approaches, and preferred working on their own computer within a small group, with lots of opportunities for hands-on practice.

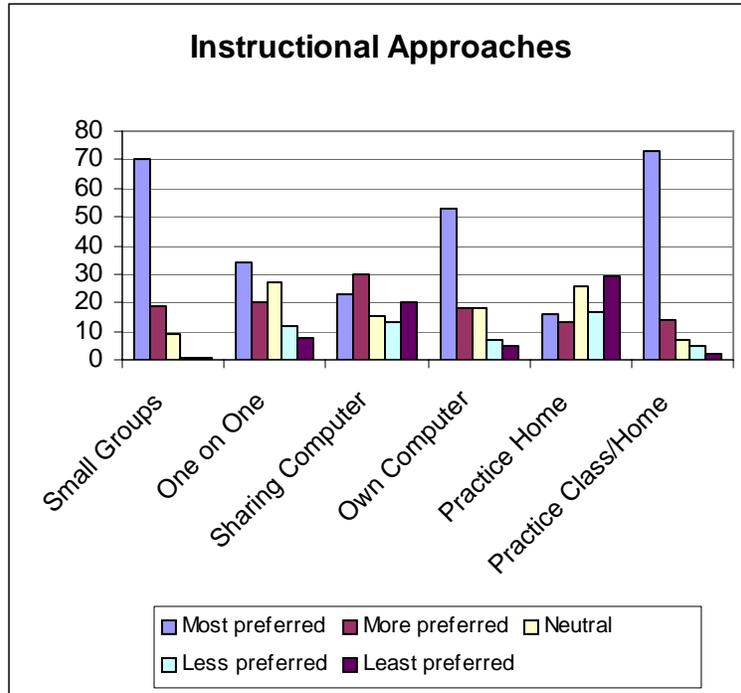


Figure 7. Preferred Instructional Approaches

3. Course Satisfaction Levels

As the following table illustrates, the Internet Pilot’s License course received a very high satisfaction rating. Ninety-two per cent rated their satisfaction with the course as “mostly” or “completely” satisfied. While complaints and negative comments emerged in the open-ended responses, it was obvious that these did not overshadow how participants felt about the course and their level of satisfaction with it. The researcher is convinced that this population was so appreciative of this training opportunity that, despite problems encountered, respondents indicated they were highly satisfied with the course. This notion will receive further analysis later in this section.

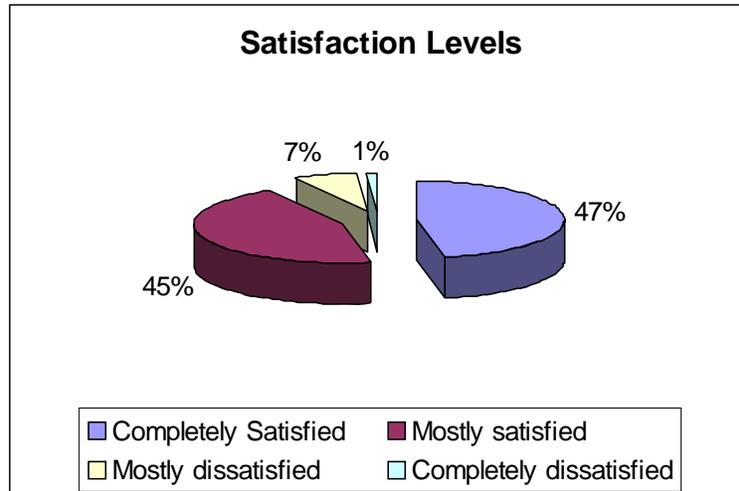


Figure 8. Satisfaction Levels

D. Course Delivery – Role of the Public Library

The Internet Pilot’s License course was new, had not been offered through the public library before, and was made possible through a special government funding allocation. Given this set of circumstances, one goal of the study was to learn from participants their views on which institution they felt was best suited to deliver such a course, whether libraries should continue to offer such courses, and whether or not a fee should be charged for a course offered through the library.

Anecdotal data gathered from course developers indicated that cost was a “big issue” for many potential participants in this kind of training. It was felt that offering the course free of charge removed a potential threat or barrier to taking such a course; since participants may have felt they had nothing to lose by participating. Lastly, charging a fee for libraries presents a policy issue: the public library system has a long tradition of offering its services free of charge. Attaching a fee to a service offered by the library would be contrary to historical policy and the notion of free access. Therefore, the views of participants, as a population within the public which libraries serve, were important in recommending future policy in this area.

1. Preferred Delivery Institution

Respondents were asked to chose one institution (high school, library, regional college, Saskatchewan Institute of Applied Science and Technology [SIASST], university, or a specified “other”) which they believed was best suited to offering the kind of training involved in the Internet Pilot’s License course. Seventy-four

per cent identified the library as the best-suited institution. A distant second choice, at 13 per cent, was the high school.

A similar question was posed asking respondents to indicate their preference for each of the above institutions, from “most preferred” to “least preferred,” if they were to take another course similar to the Internet Pilot’s License course. Responses yielded similar results. As illustrated in Figure 7, the per cent of respondents selecting “most preferred” for each institution is as follows: library (80 per cent), high school (21 per cent), regional college (8 per cent), SIAST (5 per cent), and university (3 per cent).

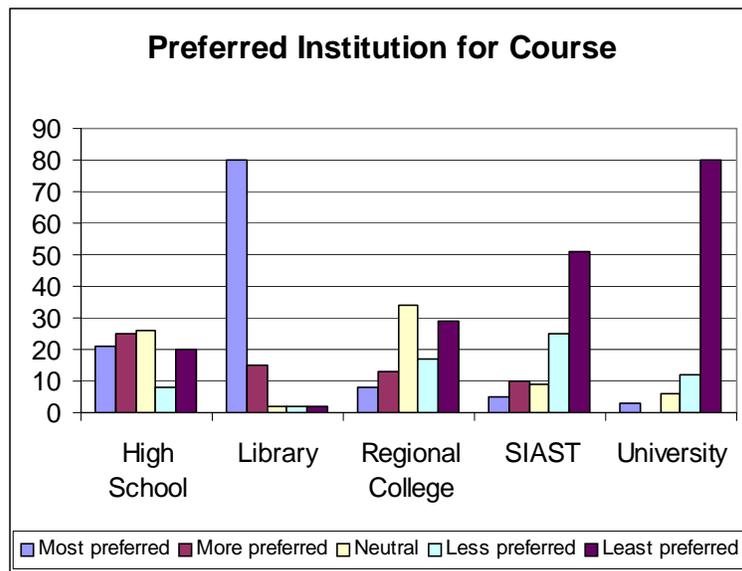


Figure 9. Preferred Institution

2. Public Library as Delivery Institution

In response to the question “Do you think that libraries should continue to offer courses like the Internet Pilot’s License course?” an overwhelming 99 per cent responded “yes.”

Given the high satisfaction rating for the course, in combination with the library’s designation as a preferred delivery institution, and near consensus on the library’s continuing delivery of such courses, it is clear that this population believes the library has an important role to play in providing this type of training.

3. Potential Course Fees

The issue of fees was a difficult one for respondents. Several respondents pencilled in question marks and comments beside the response boxes in the questionnaires.

In response to the question, “If there had been a fee charged for the Internet Pilot’s License course, would you have signed up for the course?” 89 per cent of the respondents indicated “Yes, depending on amount of fee.” In a follow-up question asking respondents if they thought participants should be asked to pay a fee for such a course, 61 per cent replied, “Yes.” When asked to indicate the fee range that should be charged, 71 per cent indicated the \$5 - \$25 fee range, and 26 per cent indicated the \$26 - \$50 range. Only three per cent suggested the \$51 - \$75 range and no respondents checked the higher fee range options. Therefore, almost all respondents (97 per cent) who thought a fee should be charged suggested it should be \$50 or less.

The responses to the above questions suggest that people may have taken the course had there been a small fee charged, and overall, there appears to be a willingness to pay a nominal fee of less than \$50 toward this type of training course. However, several respondents penciled comments in the margin beside the response boxes noting the policy issue of a public library charging for such a service.

4. ICT Experience, Perceptions, and Patterns of ICT Use

This section examines respondents’ “comfort levels” with computers and the Internet before taking the course and at the time of responding to the questionnaire (after), their frequency of use of computers and the Internet before and after taking the course, the activities engaged in and their frequency of engagement following the course; and finally, the importance of ICTs in their day-to-day lives.

a) ICT Comfort Levels

As one way of assessing the impact of the training course on participants and their subsequent ICT use or non-use, the questionnaire asked respondents to assess their comfort level, on a five-point scale from “very uncomfortable” to “very comfortable,” with computers and the Internet before taking the course and at the time of responding to the questionnaire (after). This approach acknowledged that participants may have engaged in subsequent ICT training, as well as having had time to practice their skills if they went on to become ICT users following the course. Therefore, while the increase in comfort levels with the technology, as illustrated in the following tables, cannot solely be attributed to the training course, the self-assessment of comfort levels before and after is one indicator of the impact that the training had on respondents.

The following figure compares respondents’ comfort levels with the computer before the course and after.

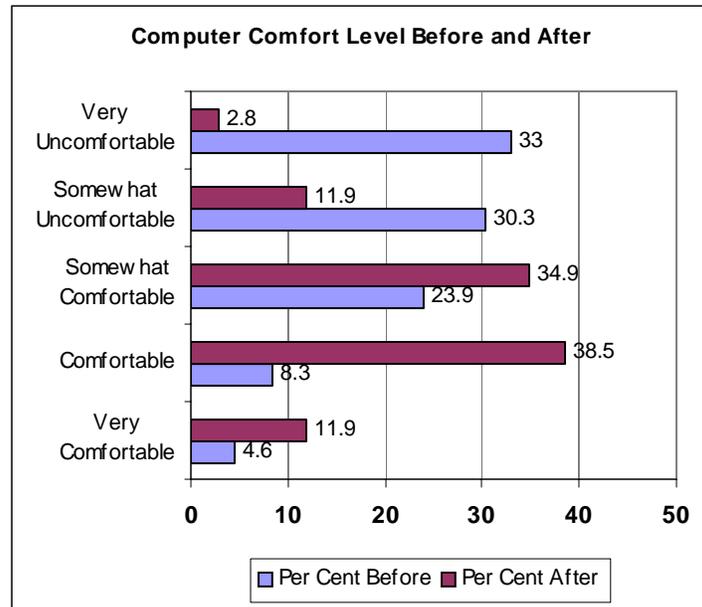


Figure 10. Comfort Levels with Computers Before and After

As the comparison illustrates, 33 per cent of respondents described themselves as being “very uncomfortable” with computers before taking the course. This percentage declined by 30 per cent to only three per cent of respondents indicating a comfort level of “very uncomfortable” after. Correspondingly, only eight per cent of respondents described their comfort level with computers as “comfortable,” and 5 percent as “very comfortable” before taking the course, which compares with 38 per cent who described themselves as “comfortable,” and 12 percent as “very comfortable” at the time they completed the questionnaire.

A similar shift in comfort levels occurred with the Internet, as the following figure shows. Forty-four per cent of respondents described themselves as “very uncomfortable” with the Internet before the course, compared with only six percent describing themselves as “very uncomfortable” after. Nineteen percent described themselves as “somewhat comfortable,” and eight percent as “comfortable” before taking the course, compared to 28 percent describing themselves as “somewhat comfortable,” and 28 per cent as “comfortable” after. Eight percent assessed themselves as “very comfortable” before the course, compared to 19 percent after.

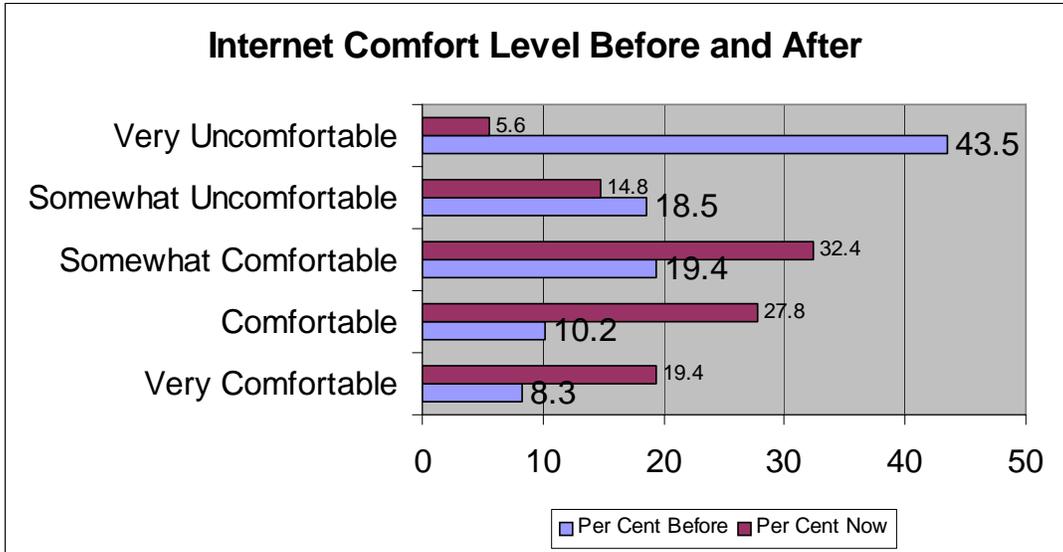


Figure 11. Internet Comfort Levels Before and After

These findings suggest that the course contributed to increased comfort levels with computers and the Internet after taking the course.

b). Frequency of ICT Use

According to Lowe and McAuley's ICT Literacy Framework, in addition to whether or not computers and related technologies are used, frequency of ICT use is an indicator of ICT Literacy. The questionnaire asked two questions exploring this dimension.

Respondents were asked to indicate how often they used a computer and the Internet before taking the course and at the time of responding to the questionnaire (after). The following table shows the frequency of computer use before and after the course.

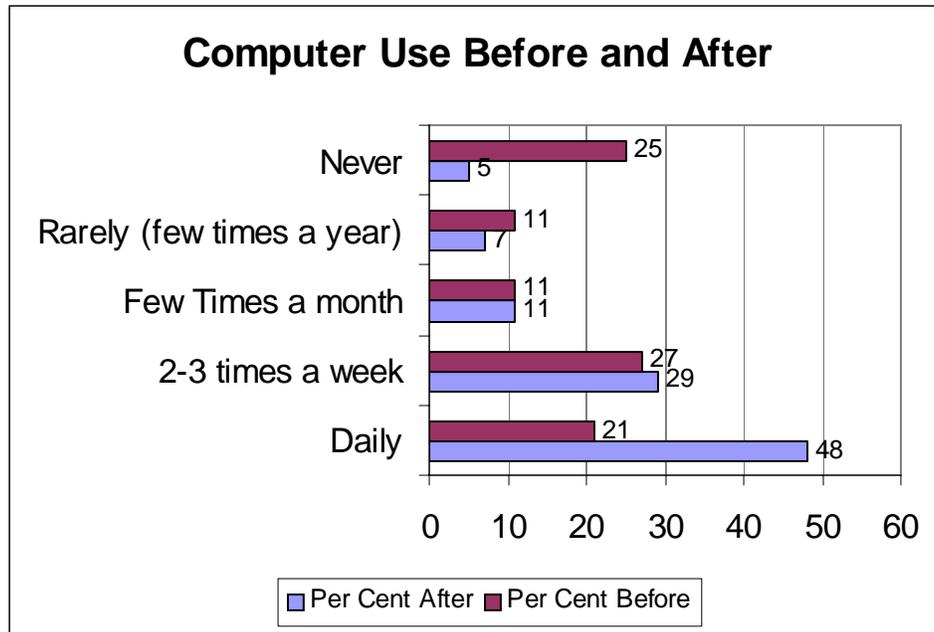


Figure 12. Computer Use Before and After

Twenty-five percent of respondents had “never” used a computer before taking the course, and 11 percent had “rarely” used a computer. Twenty-one percent described their usage before the course as daily, and 27 percent designated usage as “2-3 times a week.” Computer use increased following the course, as reflected by the increased percentage of respondents who considered themselves daily users of a computer, and the corresponding decline in those who “never” used the computer after the course, from 25 percent before to five percent after.

Frequency of computer use after the course also increased. The percent of respondents who described their frequency of computer use after the course as “never” declined from 25 per cent before taking the class to five per cent after the course. The percentage of those describing their frequency of use as “daily” increased from 21 per cent before the course to 48 percent after. The percentage of those who described their frequency of use as “a few times a month” and “2 to 3 times a week” before the course remained almost the same. Therefore, the course appears to have made the most impact on those who had never or rarely used the computer prior to the course, with the frequency of daily use increasing significantly.

Similar results are revealed when the frequency of Internet use before the course and after is assessed, as illustrated in Figure 13. Forty-three per cent of respondents described their frequency of Internet use before taking the course as “never,” compared with fifteen percent after. Eleven percent “rarely” used the Internet before and six percent rarely used the Internet after. Twelve percent described their Internet frequency of use as “daily” before the course, compared with 34 percent who described their Internet use as “daily” after the course.

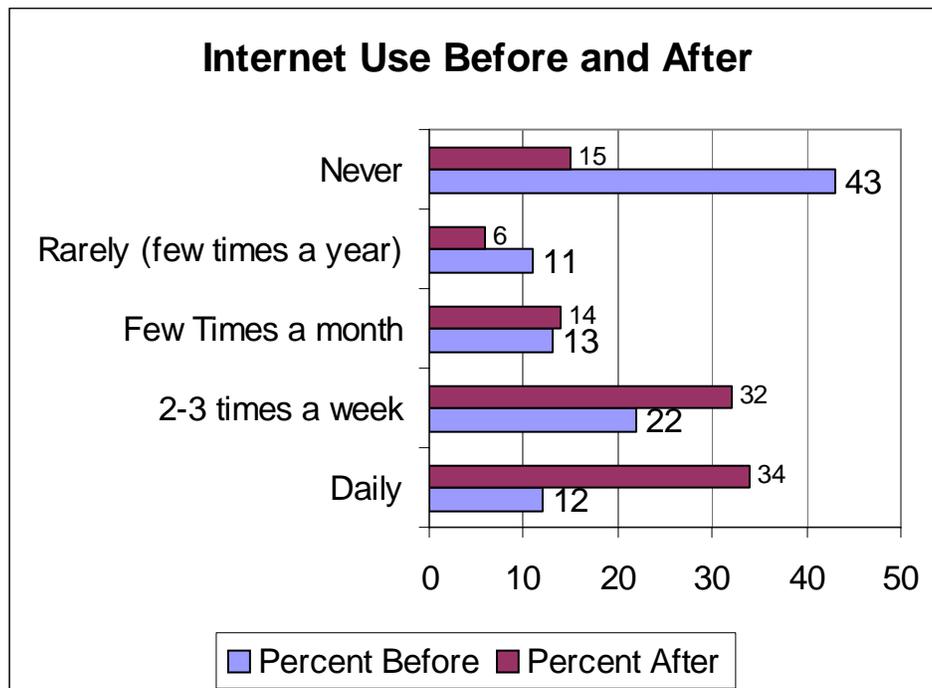


Figure 13. Internet Use Before and After

When assessing frequency of use from the perspective of ICT users and non-users, another comparison can be made. ICT users could be considered those who used computers from a few times a month to daily and ICT non-users as those who rarely or never used a computer or the Internet. Given this frequency of use clustering, the percentage of respondents who fall into the ICT user category, according to computer use, rose from 59 percent before the course to 89 percent after. Forty-one percent of respondents categorized as ICT non-users before the course declined to just 11 percent.

Similar results occurred with frequency of Internet use. ICT users, according to Internet use, increased from 46 percent before to 79 percent after the course. Fifty-four percent of respondents before the course were ICT non-users, according to Internet frequency of use, which declined to 21 percent after.

A further measure of ICT use and non-use can be determined by the frequency of use of various computer and Internet activities. The number of participants responding to this multi-part question ranged from an N of 88 to an N of 92, reflecting that not all respondents in this group engaged in all activities. By this measure, the data suggests that 92 of the 111 respondents (83 percent) were ICT users according to their engagement in some computer and Internet activities following the course. Correspondingly, 19 of 111 respondents (17

percent) could be described as ICT non-users who did not engage in any of the computer and Internet activities identified in this question.

Consequently, these findings indicate the course contributed to an increase in frequency of use of both computers and the Internet, and an increase in the number of respondents who could be described as ICT users.

c). Patterns of ICT Use

The third dimension of the ICT Literacy Framework is complexity of ICT tasks or applications. This dimension was built into the questionnaire by providing respondents with a list of twelve computer and Internet activities including searching the Internet, playing games, purchasing goods or services online, banking online, accessing library services, e-mail, spreadsheets and word processing. The application dimension was combined with the frequency dimension, in which respondents were asked to rate the frequency of each activity conducted from “every day,” “several times a week,” and “a few times a month” to “have done this, but not in the last month” and “never.”

It should be noted that those who had not used a computer or the Internet since taking the course were instructed to skip this question, therefore the respondents who were ICT users after taking the course form the population for this question. This population ranged from an N of 89 to 92, which indicates a high percentage of respondents either becoming or continuing to be ICT users. Conversely, approximately 20 percent of respondents did not continue to use ICTs. Possible reasons for this are explored later in the section, when the issues of access and barriers are examined.

To identify the activities most frequently engaged in, the percentages of respondents indicating a frequency of “daily,” “several times a week,” and “a few times a month” were combined. Accordingly, the top six activities engaged in most frequently were as follows:

1. Using e-mail to send and receive messages (87 per cent)
2. Searching the Internet for information (73 per cent)
3. Playing games (42 per cent)
4. Using a word processing program (42 per cent)
5. Searching and reading magazine and newspaper articles online (“InfoTrac”) (28 per cent)
6. Using the Internet to access library services (search the library catalogue online, put a book on hold over the Internet, etc.) (19 per cent).

The remaining six activities reflect much less engagement by users. It is important to note, however, that the two activities of banking online and using the Internet to access government information garnered a proportionately high rate of

engagement and reflects general trends in these two applications. In descending order of frequency of engagement, the remaining six activities are as follows:

7. Do banking online (pay bills online, transfer funds, look up account balances, etc.) (16 per cent);
8. Use the Internet to get information on provincial and/or federal government programs or services (15 per cent);
9. Work on a spreadsheet (12 per cent);
10. Have a “real-time” conversation online in a “chat room” (8 per cent);
11. Log on to a newsgroup or listserv (7 per cent); and,
12. Purchase goods or services online (6 per cent).

Though not identified often enough to create separate variables, it was interesting to note other activities engaged in and volunteered by participants. These included scanning and printing patterns, articles, and digital pictures; operating a business website; entering contests; genealogy; and doing the farm’s books. Again, had these activities been offered as choices, they would likely have prompted responses. These activities and the twelve activities described above reflect a diverse, and in many cases, complex set of applications engaged in on a regular basis by respondents who became, or continued to be ICT users after taking the course.

d). Importance of ICT Applications

The fourth dimension of ICT Literacy is criticality, or how important ICTs and their applications are to one’s day-to-day activities. Respondents were asked to assess how important the computer and the Internet was to their day-to-day activities.

Fifty-one per cent indicated that the computer was “fairly” (37 per cent) or “very important” (14 per cent). Similarly, 50 per cent said the computer was “slightly” or “not at all important.” Therefore, the population was evenly divided over their assessment of the computer’s importance to them.

The Internet was slightly less important, with 45 per cent indicating that the Internet was “fairly” (32 per cent) or “very important” (12.5 per cent). Fifty-five per cent of respondents indicated the Internet was “slightly” (37 per cent) or “not at all important” (19 per cent) to day-to-day activities.

Given the frequency of ICT use following the course and the diverse applications in which respondents engaged these results are surprising. The importance of ICTs does not appear to reflect increased use and diversity of applications engaged in. However, had respondents been asked instead to assess the criticality of specific applications, such as e-mail and word processing, the question may have yielded higher criticality ratings.

E. Access to the Internet

The questionnaire explored patterns of access to the Internet. Those respondents who used the Internet following the course were asked to indicate from where they had usually accessed the Internet during the four weeks prior to completing the questionnaire. Sixty-two per cent of respondents had accessed the Internet at home, followed by 14 per cent obtaining access at a library. A small percentage accessed the Internet from a friend or relatives' computer (eight per cent), and five per cent at their workplace. One respondent accessed the Internet from a commercial site such as an Internet Café.

The high percentage of respondents who accessed the Internet from their homes in the four-week period prior to taking the course is consistent with the number of respondents who indicated they had an Internet connection at home. Based on an N of 94 representing the number of respondents who used the Internet after the course, 75 per cent had an Internet connection at home. This large percentage is both surprising and encouraging, given previous findings indicating much lower rates of home Internet connections in rural Saskatchewan.

F. Barriers to ICT Use

Respondents who had not used a computer or the Internet after the course were asked to identify reasons from a list of possible reasons provided. In coding the responses to this question, the researcher noted that, in addition to the respondents who had never used a computer and/or the Internet since taking the course, respondents who selected "rarely," and "a few times per month" also indicated reasons for their infrequent use. A decision was made at that point in the analysis to include these responses, in part because the questionnaire's instructions may have been confusing and it seemed clear that the infrequent users also faced barriers that they wanted to point out. Therefore, the reasons for both non- and infrequent users are included in the analysis.

The number of respondents and the reasons selected for having never or infrequently used a computer after the course are as follows:

- I don't have a computer (17 respondents);
- There is no one to help me with technical problems (6 respondents);
- I found using the computer too difficult (2 respondents); and,
- My computer doesn't work (1 respondent).

Following are the reasons selected for non- or infrequent use of the Internet and the number of respondents selecting each reason:

- No Internet connection at home (19 respondents);
- I don't have the confidence to use the Internet (11 respondents);
- An Internet connection is too expensive (7 respondents);
- There is no one to help me with technical problems (7 respondents);
- I'm too worried about privacy and security (7 respondents);

The Internet does not meet my needs (3 respondents);
No access to a computer anywhere (2 respondents);
The speed of my telephone line is too slow (2 respondents);
My computer doesn't work (1 respondent); and,
No longer interested (1 respondent).

Given the above findings, non- or infrequent ICT use can be attributed, in part, to six primary barriers:

Lack of access to a computer,
No Internet connection at home,
Affordability of an Internet connection,
Lack of confidence to use the technology,
Lack of technical assistance, and,
Concerns about privacy and security.

Additional barriers were identified in responses to open-ended questions and will be discussed later in this section.

G. Library Internet Access and Service

Public access to the Internet has been described as an important means of diminishing the digital divide; therefore, this study explored whether or not this population had used a library as a public access point and what their perceptions were of the service.

Forty-four per cent of those respondents who used ICTs after the course indicated they had accessed the Internet from a library. These respondents were asked to rate their satisfaction with three aspects of their library's Internet access service: waiting time to get on a computer, help with a problem, and convenient location.

Of an N of 36, the majority of respondents indicated high satisfaction ratings with the waiting time to access a computer: 22 respondents were "completely satisfied" and 10 respondents were "mostly satisfied." Similar ratings occurred when asked to rate "help if I have a problem": 32 of 36 respondents were either "completely satisfied" or "mostly satisfied." The location of the access service was also rated highly: nearly all respondents (33) were "completely satisfied" with where the computers were located.

The data gathered here was cursory and limited because of the length and areas covered in the questionnaire. However, because of the importance of libraries as both access points and as Information Literacy enablers, further research to explore this issue in greater depth is warranted.

H. Experiences, Insights, and Perceptions of Respondents

Respondents were given the opportunity to add any other information not covered in the questionnaire through three open-ended questions:

- If there was one thing that you could change about the Internet Pilot's License course, what would that be?
- What was the best thing about the course?
- Is there anything else that you would like to add about your experience with computers and the Internet, or about the Internet Pilots' License course?

The responses to these questions yielded a rich source of data encompassing a total of 148 separate responses. Nine categories emerged from the coding of these qualitative responses: Course Content, Materials, and Instruction; Multiple Levels; Hands-on Practice; Shared Computers; Social Dimension; Technical Problems; Location and Cost; Training; ICT Access; and, Impact of the Course.

The above nine categories were further organized into three main subject areas: 1) Course Design and Delivery, 2) Barriers to ICT Use, and 3) Impact of the Course on Participants. The following section describes these findings and draws on the experiences and observations of the respondents as expressed in their own words.

1. Course Design and Delivery

a) Course Content and Materials

One respondent suggested, *"less time on chat lines."* Another said: *It seemed to me a lot of time was spent on the inner workings of computers. I just wanted to learn how to operate well enough to be able to go to local library and use.*

However, simply put, many participants wanted more: *More instruction regarding using the computer as a word processor.*

More time on Word Processing.

More time on e-mail.

More classes.

Presentation materials and hand-outs were important to participants and were cited often as the "best thing about the course":

I liked the overhead.

The hand-out material for each class was well prepared and user friendly. You could review at home by using these notes and information.

The take-home booklets were very useful.

The handouts were also very helpful, as we had something to fall back on if we forgot something when we got home.

For some, the presentation materials and handouts were seen to be lacking. The following are further comments about course materials and suggestions for improvement:

On screen image print was too small for some eyes, so missed information.

Instructor's hand out sheets were too small in the pictures pertaining to future reference. It would be good to have a take home "manual," written in simple layman terms, on basic things; i.e., cut, paste, changing home pages, that we could refer to at a later time.

Provide notes on the how to's.

Add a section on graphics; poster, invitations, etc.

b) Instructors/Instruction

There was a wealth of comments made about the instructors and the impact they had on the learner's experience, especially for those to whom the course content was unfamiliar and intimidating. One of the few negative comments about the instructors reflects a concern for how an instructor relates to those who are struggling:

I felt [the instructor] was more interested in showing us how knowledgeable he was rather than helping those who were having difficulty grasping basics.

Positive comments far exceeded negative ones. Participants were particularly sensitive to how instructors treated them in class and how their questions were handled, as reflected in the following comments:

[The instructor] made me feel that there was no such thing as being dumb about learning the skills to operate a computer.

The instructor was very good. He made learning fun and didn't make you feel dumb when you asked questions or needed help.

The instructor talked and instructed in basic English, did not use technical terminology and [I] found it easy to understand and comprehend.

He took time to help out with things I didn't understand at all.

Free to ask questions and knowledgeable instructor who answered at our level.

You could ask questions and receive an answer.

The instructor...was great! He was very helpful with questions/answers.

[The] freedom to feel comfortable asking questions. Every question was answered and I never felt foolish asking.

Participants also appreciated other instructor attributes, such as patience, competence, willingness to provide individual assistance, a sense of humour, and the ability to put people at ease, as reflected in these comments:

Our instructors were 'wonderful!' Very willing to help out. Lots of 'Patience.'

The instructor was very competent and patient and made the course very interesting.

[The instructor] was very knowledgeable and ready to help with any problem. A good instructor helps with learning!!

Our instructor[s]...were both very helpful and knowledgeable. The instructor makes (or breaks) the course.

[The] instructor made me feel comfortable.

The instructor was so patient and genuine. As a bonus, he had a good sense of humor!

Some respondents made suggestions for enhancing the teaching-learning process:

There should be more repetition. Go over what you learned the day before.

A mike [microphone] would be good – hard to hear at times.

More individual instruction.

c) Multiple Levels

As mentioned in the findings associated with comfort levels and ICT frequency of use before taking the course, this population of respondents was fairly evenly divided between ICT users and non-users on beginning the course. Participants

felt the impact of multiple levels of pre-existing knowledge and skills, ranging from those who had never turned on a computer to those who were daily users of both the computer and the Internet. They described the problem that this presented in the following ways:

I didn't know anything about computers – not even how a 'mouse' functioned before taking the course. Would prefer a course on basics of computer. For people with no experience with computers – the info was too much and too complex.

I would have preferred to have been in a computer literate class. Many seemed quite experienced, and many questions were answered by the instructor, about specific problems. This was too advanced for me.

[The course] was not really designed for someone who knew nothing about computers.

I probably should have taken a computer beginner[']s course.

There was too much information crammed into too short a time. The beginner[']s course should take longer. It is hard to absorb everything (especially when one is older). (I'm 74).

I was not familiar with computers at all and took course to gain some knowledge, but instructor we had talked far above my level. The result is that I learned almost NIL.

Instructor went too fast and [I] felt the course was a bit too advanced for anyone just beginning to learn about computers. It could have been a longer training period.

On the other hand, those with ICT experience and knowledge prior to entering the course wanted more in-depth instruction.

Teach more about everything. It was too basic.

Make the course more involved. Dig a little deeper into the subject.

I wish there was a second level for non business use. I have many questions and would like to learn more since I've used and owned the computer for awhile.

It was obvious from their responses that respondents had given this problem considerable thought. Numerous suggestions for change were offered, some of which follow:

More basic instructions for beginners – or a beginner and more advanced course separately.

One class should be added specifically just to use the computer.

Have two courses. One just for computer use minus the internet.

A course designed for seniors who have never used a computer but who would like to learn something about it.

For older students it would be valuable to go more slowly from one operation to another with more individual help and practice.

Smaller groups so more questions could be answered.

Continue to offer and embellish – more individual help to people who need it.

d) Hands-on Practice

Eighteen separate comments addressed the issue of hands-on practice. Respondents felt strongly that the hands-on component was a very important part of the course's instructional approach. Several associated hands-on practice with a positive learning experience and indicated that the opportunity for hands-on was the best thing about the course. Following are some of the comments:

Hands-on experience and practice is the best way to learn.

It was good to practice on the computers there so we later could do it at home.

It was good to have a computer to try the things you were learning.

Many felt there were not enough opportunities for hands-on practice and saw this element as one thing they would change about future courses.

More time to try what we learned.

More hands [on] application or practice.

More computers to work with after the classes – more hands-on right away as that is the best time to try out what you have assimilated or think you have assimilated.

There was not adequate time on the computer.

Everyone should [have] hands on opportunity to use a computer in the class.

e) Shared Computers

The above comments are linked, in part, to the issue of sharing computers. While some respondents viewed sharing a computer as a positive experience and an opportunity to learn with a partner, many thought sharing a computer deprived them of adequate hands-on time as can be seen from the following comments.

Don't have two participants in front of one computer. My 'partner' spent a lot of time looking for the letters of the alphabet on the keyboard.

I was paired with a person who had never used a computer before. This proved to be quite a drawback in learning more information regarding the Internet.

I would like to work on a computer by myself instead of in pairs. Sometimes I didn't get enough time to try everything, even although my partner did and I was able to watch. I guess it's the motto 'Learn to Do by Doing,' Not Watching.

To have a computer to myself. Two cannot see unless looking straight on.

f) Social Dimension

In expressing what was best about the course, several respondents commented on the social aspect of the course. Participants enjoyed the camaraderie of working and learning with others in a relaxed, friendly environment, as illustrated in these comments:

Finding either people who were in the same position as I was and working together and learning from one another.

Getting together and learning from others.

Getting new people interested.

Socializing with regards the computers.

Good atmosphere.

The camaraderie of the participants.

Relaxed atmosphere.

Friendly – Fun.

g) Technical Problems

One technical challenge that caused problems in delivering the course, and obvious frustration among the participants, was attributed to the slow line speeds at some locations where the course was held. Slow Internet connections prompted several complaints from respondents and to some was the one thing they would change about the course:

To be sure that all computers could access the internet easily and in a short time.

The hook up at the library was not adequate enough so that all the computers could be used.

The land line...made it difficult to establish a connection at times.

Some respondents commented on the impact of the slow line speeds on the learning process:

Internet access was extremely poor at our library and most of the time we were unable to use and practise it – poor learning experience.

A lot of the class time was wasted because the dial up was way too slow. It would be nice to have the course held at the high school where they have high speed.

I found the class not to be as successful as it could have been because with several of us online at once it took too long to get any info. So one of us would shut down hoping to make it better for someone else.

h) Location and Cost

Several respondents said the fact that the course was delivered locally and free of charge was the best thing about the course.

The fact it was offered locally.

It was offered in our local library (we live in town), and no charge. Too good a deal to pass up.

Held in centre that was close.

It was in our local town. I do not have the time available to take a course out of town.

The familiarity of the location.

NO CHARGE.

2. Barriers to ICT Use

Comments about barriers to ICT use emerged when respondents provided additional comments about their experiences with technology. For the most part, barriers fell into two groups: training and access.

a) Training

Respondents identified lack of training as a barrier to their continued engagement with ICTs, as reflected in the following comments:

I need a lot more training.

Need more instruction!

I need much more instruction and information on buying [a] computer for my own personal use.

I am next to self taught on the computer. I would like to take a computer course but such is expensive and not close at hand.

b) ICT Access

Despite opportunities for public access to ICTs, a number of respondents considered lack of computer ownership and an Internet connection at home to be barriers to their ICT use, as reflected below:

Do not have one [a computer] in my home yet.

Since I don't own a computer my skills have not improved since the class.

I do not have Internet.

I haven't had a chance to practise what I learned – so I still feel very uncomfortable.

I felt more confident after we were done, I just haven't been able to use the skills I learned.

3. Impact of Course on Participants

A large number of comments--25 responses--spoke about the impact that the course had on respondents and what the experience meant to them. For some it meant being able to communicate more with family and friends:

I was able to use my computer and send e-mail to friends and family.

I never had sent or received e-mails – I now do.

...we have a daughter living in the Caribbean. Now we can communicate [more] often.

Just learning about Email how to use the typewriter and the bit I learned about getting new messages, or reply on messages and putting pictures in my documents.

I've used E-mail the most.

Many respondents wrote about how the course had increased their confidence in using the technology, suggesting this was the best thing about the course:

The knowledge I gained to feel comfortable with any computer. I wanted to go on the internet and had no idea how to go about it. Also to order books from the library (large print and audio).

It made me feel more at ease when using the computer. I felt I knew my way around better.

Finding a comfort level with the computer. Not being afraid to try things.

Gave me confidence to use computer.

I can now use the computer with some confidence – before I didn't know how to turn it on.

Respondents also acknowledged the impact of acquiring new knowledge and skills, from becoming computer literate to enhancing existing skills:

It allowed me to become familiar with the terminology used in computers, and their use today. Actually – like learning a foreign language! Thank you.

I learned how to work the computer, as I had never used a computer before.

Learned how to use the computer and have purchased one.

It gave me a start.

I basically knew nothing before this course, but also took another course while taking this one and now have no problem using either [computer or Internet].

I learned much regarding how to search for information on the Internet.

Helped refresh mem[ory] of when I used computers in the past.

I learned a few things I didn't know before because I had just got a new computer and didn't have a lot of internet experience.

One respondent simply said: *I enjoyed it all.* Another said: *It's great to be learning something new.*

The following section will provide a summary of the findings in accordance with each of the research questions and the goals of the study, and based on the findings, will discuss conclusions and recommendations.

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. Overview of the Study

The ability to use computers, the Internet, and other information and communication technologies (ICTs) provides individuals with the skills and resources to become ICT Literate, which is viewed, in the context of this study, as a subset of Information Literacy. This study posits that developing this capacity in all citizens is an essential means of overcoming the digital divide which threatens to disadvantage those without access to ICTs or the knowledge and skills to use ICTs effectively.

This exploratory study was an investigation of the experiences, perceptions, and observations of 111 participants in a training program that introduced them to ICTs, specifically computers and the Internet, and a range of practical applications of that technology, including word processing, Internet searching, and e-mail. The primary research instrument was a questionnaire distributed to individuals who participated in the Internet Pilot's License course.

The study adopted the construct of ICT Literacy as defined by Lowe and McAuley: "the skills and abilities that will enable the use of computers and related information technologies to meet personal, educational and labour market goals" (6). The study also integrated Lowe and McAuley's four dimensions of ICT Literacy and Mark et al's concept of comfort with technology, which provided the researcher with a set of five indicators that characterize ICT Literacy. The indicators were used to assess ICT Literacy gains and to explore the development of ICT skills and abilities in participants using computers and the Internet after the Internet Pilot's License course. The study also explored attributes of a well-designed ICT training program and the role of the public library in developing and delivering ICT Literacy training.

The following research questions guided this study:

- a) What was the impact of the Internet Pilot's License course on its participants?
- b) What factors facilitate or inhibit ICT Literacy?

- c) What factors contribute to an effective ICT skills training program?
- d) What is the role of the public library in ICT Literacy training?

The study's goals were to provide guidelines for the design and delivery of training that will contribute to developing ICT Literacy; and to provide policy recommendations on the role of the public library in developing and delivering ICT training programs.

B. Summary of Findings

The population for this study emerged from 305 individuals who participated in the Internet Pilot's License course offered during 2000-2001, and for whom a mailing address was available for distribution of a mail-in questionnaire. From this group, 111 responded.

The majority of respondents were women (80 percent) aged 45 and older. The largest group of respondents was in the range of 45 to 64 years old (53 percent), followed closely by those aged 65 and older (37 percent). Only 10 per cent of respondents were in the 25 to 44 age group, with no respondents younger than 25. Respondents were, in general, well educated with 44 percent having a post-secondary certificate, diploma, or university degree. The majority of respondents (81 percent) identified themselves as either self-employed or retired. Income levels were predominantly in the low to modest range with 75 percent of respondents identifying annual personal levels of \$36,000 or less, including 32 percent in the less than \$20,000 income range.

When asked to identify reasons for taking the course, 77 percent indicated that a very important reason was that the course was offered in or close to their home communities. Two other reasons that were rated highly as very important were: "to increase confidence when using a computer and/or the Internet," and "to help overcome my fear of computers and/or the Internet." When respondents volunteered their own reasons for taking the course, a wide variety of reasons emerged from the desire to learn the basics of computer and Internet use to more advanced applications such as wanting to write a book, learning how to keep track of personal finances, and learning how to send e-mail messages to family members.

The course received a very high satisfaction rating, with 92 percent either mostly or completely satisfied with the course. Eighty percent of respondents identified the library as the "most preferred" delivery institution for this type of course. Respondents were almost unanimous (99 percent) in indicating that libraries should continue to offer courses like the Internet Pilot's License course. The majority of respondents indicated they would be willing to pay a nominal fee of \$50 or less to take such a course.

The most important course topics to respondents were searching the Internet, e-mail, and word processing, with small group instruction and “hands-on practice” as the preferred instructional approaches. People preferred to practice on his or her own as compared to working on a computer with a partner.

When asked to assess their “comfort level” with computers and the Internet before taking the course and at the time they completed the questionnaire (described as “after” in these findings), significant shifts occurred. A third of respondents (33 percent) assessed their comfort level with computers as “very uncomfortable” prior to the course, while only three percent assessed their comfort level as “very uncomfortable” after. Similarly, 43 percent assessed their comfort level with the Internet before the course as “very uncomfortable,” which declined to only six percent after.

When examining the percentage of respondents who assessed their comfort level as “comfortable” before and after the course, only eight percent assessed themselves as “comfortable” with computers before the course, compared to 38 percent assessing themselves as “comfortable” with computers after. The percentage of respondents assessing their comfort levels with the Internet also increased, from 10 percent indicating “comfortable” with the Internet before the course, to 28 percent indicating “comfortable” after.

Similar results emerged from indicators of frequency of use of computers and the Internet before and after the course. Twenty-one percent selected “daily” to describe their use of computers before the course, with almost half of respondents (48 percent), indicating “daily” use of the computer after. “Daily” use of the Internet also increased with 12 percent of respondents assessing their use as “daily” before the course compared with 34 percent indicating “daily” use after.

Computer and Internet activities most frequently engaged in at the time of responding to the questionnaire were: e-mail, Internet searches, playing games, and word processing. Fifty-one percent of respondents viewed the computer as fairly important or very important to their day-to-day activities. A smaller percentage (46 percent) indicated that the Internet was either fairly important or very important.

Nineteen respondents (approximately 18 percent) who did not continue to use the computer and Internet following the course, and others who did and still elected to indicate problems they faced, were asked to identify possible barriers or reasons why they did not continue. The most frequently selected barrier was the fact that they did not have a computer (17 respondents) and that they did not have access to technical assistance. Similarly, non use of the Internet was attributed to the lack of an Internet connection at home (19 respondents), followed closely by the next most frequently selected reason: lack of confidence to use the Internet. When respondents volunteered other reasons for non-use, additional training was identified as a need, in addition to the lack of computer or

Internet access, which reduced opportunities to practice the skills learned in the course.

Qualitative responses yielded data in three main categories: course design and delivery, barriers to ICT use, and impact of the course on respondents. Given the marked differences in ICT skills levels and experience, there were opposing views on the depth and breadth of topics covered. For ICT non-users, the course seemed to cover too many topics and too much information and the experienced ICT users in the course wanted more depth and advanced applications. Respondents acknowledged the multiple skill levels as being a challenge and suggested that future courses should be designed to address more homogenous groupings of skill levels; i.e., a beginner's course versus a course for those with more skills.

Instructional aids such as projected images and hand-outs were very positively received, although with some comments on size of print and small images. The materials were seen to be valuable learning aids when practicing at home what had been introduced in class. Respondents offered suggestions for additional materials that they thought would have been helpful such as more information on topics not covered in class, how-to instructions, and a simple manual that could be referred to at home.

Overall, respondents articulated the ability to apply what they had learned in the course, such as how to use e-mail to communicate with friends and family, as one of the best things about the course. Developing confidence and basic knowledge and skills enabled the majority of respondents to benefit directly from the course and increase their frequency of use and complexity of applications when using the computer and the Internet. Many respondents identified specific information resources that they were able to access with their new skills such as the ability to order large-print and audio books online from their local library, to access online journals, and to conduct Internet searches on specific topics.

Course instructors, for the most part, received very positive reviews. Instructor attributes that were described as the most meaningful to participants were:

- 1 Sense of humour;
- 2 Patience;
- 3 Ability to create a non-threatening, non-intimidating environment;
- 4 Ability to make learning fun;
- 5 Expertise in handling questions and putting people at ease; and,
- 6 Ability to provide individual assistance when required.

Respondents also noted the benefits of the social dimension that characterized the course. While the instructors created a positive environment, respondents also enjoyed the camaraderie of working and learning in a small group setting, socializing with their classmates and working in a relaxed, informal, friendly, and supportive environment.

Respondents wanted a variety of instructional approaches and favoured the small group approach. They were particularly keen on having lots of time for hands-on practice and would prefer to have the option of working on their own computer rather than sharing one with a partner. The technical challenge of slow Internet connections was seen as the most annoying and frustrating problem associated with the course.

Two major benefits of the course were that the course was offered at no cost and was available in or near the respondents' own communities.

Respondents identified lack of ongoing training and lack of computer and Internet access from home as two main barriers to ICT use.

C. Conclusions

The findings revealed that the Internet Pilot's License program made a positive difference for those who participated in the course and responded to the survey. The following section draws conclusions from the findings in response to the study's four research questions.

1. Impact of the Course on ICT Literacy

The study found that the Internet Pilot's License training course increased ICT Literacy among participants according to a set of ICT Literacy indicators that assessed comfort with the computer and the Internet, ICT use or non-use, frequency of ICT use, complexity of ICT applications, and importance of ICTs to daily life.

This study also found that the set of five ICT Literacy indicators was a useful instrument to gauge the impact of the course on its participants and to assess those factors that either facilitated or inhibited ICT Literacy skill development.

In applying the first indicator, comfort level, the study found that the Internet Pilot's License course contributed to increasing respondents' comfort levels with both the computer and the Internet. Increased comfort levels facilitated an increase in confidence in using computers and the Internet.

Incidence of use, the second indicator applied, showed that the number of respondents who became computer and Internet users increased by 30 percent. Collectively, 83 percent of respondents became or continued to be computer and Internet users after the course and 17 percent assessed themselves as non-users of computers and the Internet after the course.

The third indicator, which assessed frequency of use, also showed a positive gain: respondents increased their use of computers and the Internet. Almost half the respondents (49 percent), an increase of 27 percent, described themselves as daily users of computers after the course, and over a third of respondents (34 percent) described themselves as daily Internet users, an increase of 22 percent.

Applying the fourth indicator, task complexity, revealed that respondents increased their ICT Literacy by applying computers and the Internet to a wide range of applications, identifying at least five activities that were engaged in the most frequently: communicating by e-mail, searching the Internet, playing games, word processing, and searching for information online. A range of other activities, volunteered by respondents, pointed to other activities engaged in including scanning patterns, operating a business website, entering contests, and bookkeeping.

Respondents remained somewhat ambivalent about the importance of computers and the Internet to their daily lives, the fifth indicator. Approximately half the respondents indicated computers were fairly or very important to them. The Internet was considered less important, with 44 percent considering the Internet fairly or very important to them, and just over half (56 percent) describing the Internet as slightly or not at all important. Had respondents been asked to indicate the criticality of individual ICT applications, a more informed assessment of the degree of criticality would have been likely.

Overall, this study found that the Internet Pilot's License course increased ICT Literacy levels as reflected in increased comfort levels and confidence, increased ICT use and frequency of use, and engagement in diverse and complex applications of the technology.

2. Factors that Facilitate or Inhibit ICT Literacy

This study concludes that four key factors facilitate ICT Literacy levels:

- a) Compelling information-relevant motivation;
- b) Confidence in ICT use;
- c) Affordable, community-based ICT Literacy training; and,
- d) Affordable Access and Support.

a) Compelling Information-Relevant Motivation

Information literacy enables individuals to find, evaluate, and apply information to problems encountered in daily life. ICT Literacy, as a component of this process, uses technology to facilitate access to and use of information to fulfill a range of personal, educational, and employment needs (Mendrinós, Lowe and McAuley).

This study concludes that a key factor in developing ICT Literacy as characterized above, is the presence of a compelling reason or motivator drawn from personal, educational, or employment related needs, goals, and aspirations. Findings revealed respondents experienced the exhilaration and satisfaction of gaining new knowledge, of learning new skills, and of developing the confidence in their abilities to use ICTs in response to individual needs and goals.

Numerous examples provided by respondents illustrated the purposefulness with which they approached the often arduous task of learning how to use a computer and the Internet. Individuals wanted to learn how to track personal finances or maintain the farm's books; how to use e-mail to communicate with a daughter living in a foreign country; how to access on-line journals, and how to use word processing to write a book. And sometimes, the motivator was simply to have fun and relax by applying new skills to playing computer games.

Despite the many challenges that this course presented, participants persisted and surmounted numerous difficulties to achieve personal learning goals. A compelling reason, whether motivated by personal, educational, or employment related needs, will facilitate ICT Literacy and provide incentive to grapple with the complexities of technology in order to gain the skills needed to pursue individual learning goals.

b) Confidence in Using ICTs

This study's findings support the conclusion that ICT Literacy can be increased by exposure to ICTs and applications that are meaningful and personally relevant. Becoming familiar and comfortable with ICTs will increase one's confidence to explore using technology in a range of activities. Feeling "more at ease" with technology and "not being afraid to try things" were ways in which respondents described their growing confidence in using ICTs.

Confidence can also be increased by frequency of use—the time to "practice" as some respondents described it—and the ability to develop, reinforce, and apply new skills in a variety of pursuits. "Learn to do by doing," as one respondent said, builds confidence.

Conversely, lack of confidence and infrequent use of ICTs inhibits ICT Literacy. For those who did not continue to use ICTs after the course, reduced confidence and comfort levels persisted. Not being able to practice what was learned or apply the skills learned inhibited further skill development and confidence in using ICTs.

c) Affordable, Community-based ICT Literacy Training

For many respondents, training was a key facilitator in learning how to use and apply ICTs. “The course gave me a start,” said one respondent. Training was instrumental in helping many overcome their fear of technology and in enabling them to develop enough basic skills to continue using ICTs beyond the training environment.

This study concludes that public libraries are well positioned to provide community-based training that is offered in libraries or in other community settings that can accommodate small group instruction in friendly, informal, relaxed, and familiar surroundings such as senior’s centres, town halls, or drop-in centres.

The findings support the conclusion that the public library is the preferred organization to provide ICT Literacy training and that the public is likely to support libraries in their development and delivery of ICT Literacy training.

The penetration of public libraries in over 300 communities provides province-wide potential points of access to ICT training, which is particularly important in rural and northern communities where access to this type of training may be limited.

Given the conclusion that information-relevant training facilitates ICT Literacy and skills development, the library is also well positioned to build on its traditional role in developing Information Literacy among citizens. Libraries are knowledgeable about the information-seeking behaviours of their patrons, and through long experience, understand the information needs of their communities. These are key factors in the public library’s participation in community-based ICT Literacy training.

An essential requirement of any community-based training facility, as this study revealed, is appropriate telecommunications capacity. Engaging a group of learners in Internet activities requires high-speed network access to facilitate fast and efficient Internet access. As these findings revealed, the frustration and delays prompted by slow line speeds was detrimental to the learning process. Access to high-speed services through CommunityNet will be increasingly important for public libraries in Saskatchewan in order to fully develop a mandate in ICT Literacy training.

d) Affordable Access and Support

Lack of affordable access to ICTs in one’s home inhibits ICT Literacy. Despite opportunities for public access, in libraries, for example, respondents reflected on

not having a computer at home, not being able to afford an Internet connection, and not having technical help as barriers to their further skill development.

“I don’t have a computer” was the most frequently identified reason for not using technology after the course. Not having an Internet connection and not having the confidence to use the Internet were barriers to many. Accordingly, this study concludes that lack of affordable and convenient access to ICTs, and lack of opportunities to acquire technical help are factors that inhibit ICT Literacy.

The findings also support the conclusion that geographic proximity to training—in or near one’s own community—and at no- or low-cost are important incentives to encourage individuals to participate in ICT training. Affordable access to training is another mitigating factor in diminishing the digital divide.

Many respondents indicated that they would not have been able to participate in this type of training unless it was available close to home. Because the training was at no cost, respondents were motivated to participate. It was “too good to pass up” and there was “nothing to lose” expressed the incentive individuals felt about registering for the course. However, the study also concluded that despite the attractiveness of no-cost training, the public is likely receptive, if necessary, to pay a very low, nominal fee for training. The study concludes that access to low or no-cost training, in or near one’s own community, is an important factor in developing ICT Literacy.

3. Factors Contributing to Effective ICT Skills Training

As outlined above, this study concludes that community-based, affordable, low or no-cost training that is relevant to the information needs and learning goals of participants are key attributes of an ICT Skills training program. This section draws on the study’s findings to propose course design elements that are likely to contribute to effective ICT skills training that creates a positive learning experience for adult learners.

The study concludes that there are five key factors that will contribute to the design and delivery of an effective ICT skills training course:

- 1 Accommodating multiple skill levels;
- 2 Accommodating learner needs;
- 3 Skilled instructors;
- 4 Social dimension;
- 5 Intervention and follow-up training.

a) Accommodating Multiple Skill Levels

This study concludes that high frustration levels are likely to occur when experienced ICT users are required to advance at the same rate as beginners; and conversely, that those with no experience and skills are likely to be intimidated by advanced information and skills. Therefore, meeting the needs of multiple skill levels is a major factor in effective ICT training.

To the degree possible, classes should be designed to accommodate prerequisite skill levels. Organizing classes according to beginner, intermediate, or advanced skill levels is one approach. Alternatively, differing skill levels may be accommodated in one class by grouping participants according to skill level and adapting introduction of new knowledge, skills, and activities to the needs of each group. Demonstrations and direct instruction may be combined with independent group work to enable the instructor to teach one group while another group with a differing skill level completes an assigned task.

Adjusting the pace and introduction of each new skill or activity to the level of knowledge and skills of participants will strengthen the ability to nurture skill development, particularly in inexperienced learners with low confidence levels.

b) Accommodating Learner Needs

The study concludes that responding to individual needs by incorporating a range of activities and information-relevant resources is more likely to increase ICT Literacy than simply providing training on a particular piece of hardware or software. Therefore, training that is information relevant, with a problem-solving focus, rather than an equipment focus, is likely to enhance learning. As one respondent reflected, the “inner workings of computers” wasn’t of interest; it was how to use the computer to access resources at the library that was relevant and of interest.

As the findings revealed, participants are likely to begin a training course with a variety of interests, needs, and reasons for pursuing ICT training. Gaining an understanding of these needs is likely to enhance training outcomes. An informal needs assessment prior to course commencement or during the first session may enable the instructor to more readily accommodate and build on individual learner needs and interests.

Based on this study’s findings, adapting content to age levels when selecting information topics is warranted. As the findings revealed, a group of retired adults is unlikely to be as interested in employment related information as a group of younger job seekers might be.

This study concluded that participants in an ICT training course are likely to enjoy a variety of instructional strategies that combine group and independent tasks, with individual assistance readily available when required. Ample time for hands-on practice that moves beyond demonstration or lecture is essential.

Clear, easy to read, well organized and relevant instructional aids will contribute to enhanced understanding. Take home materials that support and enhance topics introduced in class may enhance skill development for those who want to advance their skills at home.

While the study's findings were somewhat ambivalent about the strategy of pairing participants to share a computer, opportunities for learning activities with a partner may well be a valuable instructional approach among beginners as a further method of reducing anxiety and increasing their comfort levels.

c) Skilled Instructors

This study concludes that an instructor who is experienced in working with adult learners is a key factor in the success of an ICT training program. This is especially important when providing training for adults with little or no ICT experience who are likely to have high anxiety levels and low confidence in their ability to use technology.

Questioning techniques was an important instructional technique that emerged in this study. The ability of instructors to handle questions in a supportive and non-threatening way is likely to put people at ease and instil confidence. A sense of humour and patience, with the ability to make learning an enjoyable experience were other attributes of a skilled instructor that emerged in this study.

d) Social Dimension

Incorporating a social dimension to training was found to be an important factor in facilitating ICT skills development. Providing training in a relaxed, friendly, collegial environment is an important strategy in adapting instruction to the needs of adult learners. Opportunities to socialize over coffee during breaks, for example, were applauded by respondents and are, therefore, likely to contribute to a positive adult learning experience.

Learning with and from others as partners in a shared learning experience is likely to facilitate ICT Literacy. Discovering that other people share the same challenges and problems helps reduce anxiety and build confidence.

e) Intervention and Follow up Training

As the findings revealed, approximately 20 percent of respondents did not continue to use ICT skills following the course, for a variety of reasons. Post-training follow-up and intervention, where required, may help those who encounter roadblocks in their skill progression to get back on track.

Strategies might include the availability of “drop-in” sessions for those who are experiencing problems or for those who require assistance with a specific skill or task. Another possible strategy is to modularize training, offering introductory training modules, with follow-up modules that focus on different topics of interest. This may enable participants to practice basic skills learned, with opportunities to participate in information-specific modules to incrementally advance both their ICT skill level and digital information-seeking capacity.

Despite the availability of public access to computers and the Internet at libraries, approximately 17 respondents in this study did not continue to use ICTs due to lack of computer ownership and Internet access at home. Therefore, promoting the libraries’ public access services may be an important method of encouraging potential ICT non-users to seek help.

The study’s findings on barriers to ICT Literacy support the conclusion that libraries are well positioned to provide intervention strategies as a vital digital divide counter measure. This may be a key method of ensuring that those most at risk will re-engage in the process of further developing their ICT Literacy skills.

4. Implications for Public Libraries and ICT Literacy Training

Public libraries have the potential to harness the power of ICTs and build Information and ICT Literacy capacity among Saskatchewan residents by exposing citizens to information-rich environments equipped with the technology to reach beyond the walls of the library and its community to global information resources.

This study supports the conclusion that public libraries have an important role to play in developing and delivering Information and ICT Literacy training. This role has the potential to make a significant contribution to diminishing the digital divide with the promise of a systemic approach to integrating what MacLean, Newman, and others describe as the multiple dimensions of the digital divide: providing access in public spaces to technology, content, education and training, essential government services, and the means by which to participate in democratic decision-making processes.

Public libraries have the capacity to provide familiar, comfortable, non-threatening public spaces in communities across the province—in close proximity to where people live and work—and in ways that can accommodate citizens who face significant social and economic barriers.

The public library infrastructure makes libraries one of the most accessible public organizations in Saskatchewan with over 300 branch libraries in communities across the province. Potential partnerships with other community-based organizations and with school-based libraries can expand the sphere of public access even further.

Building public library capacity to fulfill this promise will rely on knowledgeable, skilled library practitioners who can integrate what Bruce called the two “realms”—technology and literacy—to ensure that no Saskatchewan citizen is denied access to fundamental skills needed in a knowledge society.

Bridging the digital divide will require public libraries' ongoing participation in the development and maintenance of a telecommunications infrastructure that can support ICT Literacy training in a digital era, including the implementation of high-speed access in all Saskatchewan libraries. Public support to ensure that libraries have the necessary resources to achieve this vision will be paramount.

D. Recommendations

Since this study was conducted, select libraries have continued to offer the Internet Pilot's License course and other ICT training courses. Waiting lists to participate in this form of training are the norm. Access to ICT Literacy training in public libraries, especially in rural and northern Saskatchewan, is sporadic.

The review of literature and conclusions of this study support the role of public libraries in developing and delivering affordable, community-based ICT Literacy training within the broader context of Information Literacy. This study recommends the development of a comprehensive public library policy framework and strategy that will embed Information and ICT Literacy training in the services of all public libraries in the province in order to make a decisive and far-reaching difference in diminishing the digital divide.

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