ADULT LITERACY EDUCATORS' PERCEPTIONS OF

TECHNOLOGY INTEGRATION

by

LISA MARIE LANGILLE

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The examining committee for the thesis was:

…………………………………………..
Dr. Tom Herman, Chair

…………………………………………..
Dr. Susan Church, External Reader

………………………………………….
Dr. Ann Vibert, Internal Reader

………………………………………….
Dr. Heather Hemming, Supervisor

………………………………………….
Dr. David Reid, Delegate Director

This thesis is accepted in its present form by the Division of Research and Graduate Studies as satisfying the thesis requirements for the degree Master of Education (Curriculum Studies).

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_____
Author

_____
Supervisor

_____
Date

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Abstract

This study explored adult literacy educators' perceptions of technology integration. Forty-six adult literacy educators in Atlantic Canada completed a mailed survey that focussed on their experiences with and attitudes toward computer technology. Six adult literacy educators acted as key informants through two informal, semi-structured interviews and a focus group meeting to further investigate issues surrounding technology integration within adult literacy education.

Adult literacy educators viewed the role of technology as having an increasing importance within adult literacy education because their definitions of literacy have expanded to embrace interactions with multimedia. However, nearly half of educators did not integrate computers within literacy instruction. Barriers to integration included a lack of funds, technology, professional development, time, skills, and comfort level. Nonetheless, educators expressed a great interest in increasing their levels of technology integration and believed that computer technology has the potential to play an important role within adult literacy education.

Acknowledgements

CHAPTER ONE: INTRODUCTION

This chapter will explore the complex and interactive relationship between the constructs of literacy and technology. The focus will then shift to address the implications such a relationship may have on the curricula and pedagogy of adult literacy education. Finally, the purpose of the study as well as the focus research questions will be introduced in addition to the significance such research may have in terms of educational practice.

Literacy and Technology

The International Adult Literacy Survey defines literacy as "the ability to understand and employ printed information in daily activities, at home, at work and in the community - to achieve one's goals, and develop one's knowledge and potential" (OECD, 2000, p.x). However, this definition of literacy must be interpreted to reflect the ever-increasing and changing presence of technology in various aspects of our lives. Mehlinger (1996) claims that technology "is not only a product of a given culture; it also shapes the culture that created it" (p.400). Walker (1999) suggests that the widespread use of information technology will alter certain expectations of what skills and knowledge are required to effectively participate in society. Essentially, the demands of reading, writing, speaking, printed information, home, work and community have adopted new dimensions in the face of radically emerging technologies. Although it is recognized that this concept is true for various types of technologies, the use of "technology" within the context of this research will broadly refer to computers.

Literacy is a concept that is continuously evolving with the changes in how society communicates. "Society" for the purposes of this discussion will focus on Western society in a broad sense. Further, this view of literacy is based on the underlying assumption that literacy is not a specific skill or set or skills (Levine, 1992; Street, 1984, 1995), nor is it something concrete to be taught and then attained (Au & Raphael, 2000; Shohet, 2001). In contrast, literacy involves a continuous development of communication with our environment; it is a lifelong process for all learners. Literacy may be considered a set of social practices that is embedded within particular dynamic social contexts. Shohet (2001) argues that literacy should be placed on a continuum rather than viewed as an entity someone either has or does not have. This is consistent with Levine (1992), who claims that literacy "is not a unified skill but a plurality of different capacities" (p.189). Furthermore, the notion of literacy being contextual may suggest a need for multiple literacies (Gillespie, 2001). Thus, it is essential to acknowledge that literacy is more than a set of skills, and may be more accurately described as an ongoing process which is continuously affected by the environment in which it exists.

Peters (1996) acknowledges that any "present-day discussion of literacy must include a component of technological literacy because technology has become such a large part of our culture (Fleming, 1990; Wedemeyer, 1991)" (p.185). Niederhauser (1997) further claims that it is time to reassess what it means to be literate in our society. The extent to which technologies can impact conceptions of literacy is largely dependent on the "broader social and economic contexts in which they emerge" (Warschauer, 1999, p.4). For example, to be literate in the 18th century meant something very different than

what it means to be literate in the 21st century. Thus, literacy has changed over time and will continue to be transformed by the demands of society.

Adult Literacy Education

Adult literacy education is offered through various forms of instructional programs. The three most commonly available are Adult Basic Education (ABE), which targets learners who read and write approximately at or below a grade nine level; General Equivalency Diploma (GED), which is offered to those reading and writing at a high school level and who are interested in attaining a high school diploma; and English as a Second Language (ESL), designed to develop literacy skills among individuals who do not speak English as a first language. In addition, family literacy, workforce literacy, and correctional literacy programs are also becoming increasingly available within the field of adult literacy education in an attempt to provide services to individuals with low literacy skills who maintain a variety of diverse needs. Also gaining momentum in the area of adult literacy are workplace literacy programs; these differ from workforce literacy programs in that they uphold a focus on specific workplaces, often using materials or tools found within a particular workplace setting as well as literate forms particular to such places. Workforce literacy programs, in contrast, place an emphasis on multiple literacies that will assist learners in various components of their lives, including the processes involved with finding and maintaining employment. Regardless of the particular foci placed on adult literacy programs, there remains opportunity for learner-centred education within his or her social context and community.

Although adult literacy programs vary in terms of their particular foci, it may be beneficial to learners when programs consider that literacy practices are socially embedded and therefore should not be taught in isolation (Au & Raphael, 2000; Purcell-Gates, 1995; Street, 1995). Arguably, it is important for literacy programs to operate with the objective of teaching 'literacies' in multiple social contexts rather than attempting to teach an "unrealised abstraction called 'literacy'" (Ewing, 2003, p.16). Neuman (1995) claims literacy may be more accurately represented as a set of social practices that vary depending on contexts, content, purposes, and participants. Given the fluid nature of literacy, it is understandable that all literacy programs are presented with ongoing challenges.

Considering the re-conceptualized definitions of literacy and learning within the 21st century, adult literacy programs must encompass revised curricula and pedagogy to reflect a broader conception of literacy if they are to adequately prepare learners for the increasing technological demands of society (Niederhauser, 1997). Although technology integration has increased within various educational sectors, numerous reports by the Office of Technology Assessment and the National Center on Adult Literacy (NCAL) have indicated that the realm of adult literacy education has greatly lagged behind (Di Petta & Woloshyn, 2001; Hopey, Harvey-Morgan, & Rethemeyer, 1996; NCAL, 1995; U.S. Congress, 1993). Chapter two will explore the reasons behind such differences. However, technology integration in other areas of education has resulted in very interesting research that may also have implications for adult literacy education.

Teacher knowledge of, attitudes toward, and experience with computers has been found to play a part in successful technology integration in both elementary and

secondary classrooms (Dupagne & Krendl, 1992; Kunz & Tsoukalas, 2000; Shayo, Olfman, & Guthrie, 2000; Specht, Wood, & Willoughby, 1999). This research has suggested that educators' perceptions around the overall potential usefulness of computers may influence their attitudes toward computers. Further, positive attitudes toward computers as well as necessary computer skills are essential for effective technology integration (Berge & Mrozowski, 1999; Rosen & Weil, 1995). Teachers' beliefs with regard to technology play a critical role in their use of technology in the classroom (Bielefeldt, 2001; Wood, Willoughby, & Specht, 1999); most teachers who support technology are often computer literate (Specht et al., 1999). For example, Specht et al. found that early childhood educators revealed little experience with computer hardware or their ability to problem solve around computer issues while 49% felt that computers made them nervous and 74% worried to some extent about causing problems during computer use. Such research may suggest that similar trends also exist within the field of adult literacy education although there is currently limited research in this area.

Research Questions

This study will attempt to work toward an understanding of how adult literacy educators perceive computer technology integration. For the purpose of this study, adult literacy educators included those who provide literacy instruction within a classroom setting to adult learners in Atlantic Canada. More specifically, this research will address the following questions: 1) How do adult literacy educators view the role of computer technology within adult literacy education?; 2) What experiences do adult literacy educators have with computer technology?; 3) How do adult literacy educators integrate

computer technology, if at all?; 4) What barriers exist for computer technology integration as perceived by some adult literacy educators?; 5) What relationships exist, if any, between adult literacy educators' computer experiences and their integration of computer technology?

Significance of Study

This research will have both theoretical and practical implications for the field of adult literacy education. How adult literacy educators view the role of computer technology within adult literacy education will provide useful information that may inform practice as well as policy. For example, policies may be potentially developed or enforced based on the findings of this research to ensure a more equitable education for adult learners. This research will enhance the body of knowledge around adult literacy education and technology integration, which may then have implications for the classroom, as well as professional development, and possibly the likelihood for future technology integration. Also, this study may lead to new directions for further research. For example, how is it that not all adult literacy educators have experience with computer technology?; How can educators most effectively teach adult literacy within the expanded concept of literacy?; How can adult literacy educators be supported in learning how to integrate technology in their classrooms? Thus, this research will offer insight into a framework for future research and practice in the field of adult literacy education.

CHAPTER TWO: LITERATURE REVIEW

This literature review will provide a context for the proposed research study. The review of the literature will begin with a broad view and move toward literature more specific to the relationships between educators' perceptions about technology integration within the classroom. Firstly, the impact of technology on the concept of literacy will be explored. Secondly, technology integration's potential for literacy development and instruction will be addressed. Thirdly, the integration of technology within adult literacy education will be discussed. Fourthly, the links between educators' beliefs and experiences with computer technology and technology integration within a classroom setting will be a focus.

Literacy

Three frameworks of literacy include the following: transmissional, transactional, and transformative. Each approach maintains underlying assumptions that in turn, impact the way curriculum may be developed and implemented within adult literacy education. Although these approaches emphasize differing beliefs, adult literacy educators may use a combination of them in the classroom (Prevedel, 2003).

A transmissional approach makes the assumption that literacy learning takes place sequentially. For example, learners may begin with learning the letters of the alphabet, followed by the sounds of each letter and eventually letter combinations, gradually working toward the reading of a word. Such an approach is often used in adult literacy education because both the educators and the learners are most familiar with this type of

learning, having experienced it during their former schooling (Prevedel, 2003). Further, a transmissional approach to literacy curriculum also bears the assumption that knowledge is an already-existing entity to be granted to the learner by the teacher. However, because someone other than the learner controls the learning situation, a power dynamic is perpetuated where educators are perceived to have a more valuable form of knowledge than the learners. Literacy instruction in this model often involves the use of pre-existing worksheets and exercises that involve the repetitive practice of isolated and discrete skills. Prevedel warns that regardless of intention, this approach "supports the view that low literacy skills are the burden and / or the responsibility of the individual as opposed to the result of a complex interaction involving culture, race, class, language, gender, families, communities, economies, and institutions of learning" (p.9).

A transactional approach to literacy curriculum involves a student-centred learning situation where learners become directly involved in the development of instructional materials that reflect their immediate needs and context. This approach enables learners to continue their literacy learning from their current perspective upon program entrance, depending on the specific needs and requests of each individual. It is also assumed within this approach that learners bring certain experiences and knowledge to literacy programs that must be regarded as valuable and critical to their learning process. Literacy learning within this context may involve real-life materials that require learners to use authentic literacy practices useful within their everyday lives. Although this approach recognizes the individual backgrounds and needs of learners, "it does not explicitly address political and power issues that cause and perpetuate marginalization and low literacy skills" (Prevedel, 2003, p.11).

A transformative approach assumes that learners actively create knowledge as they consider the power relations in their lives and world, "recognizing the causal and circumstantial relationships that cause social injustice" (Prevedel, 2003, p.11). In this situation, Prevedel claims that "gaining power with words translates into gaining personal power and making change in the world" (p.11). Prevedel further argues that such a context may enable learners to gain literacy skills simultaneously with critical thinking skills, which may help them with the process of transforming their lives and communities; this notion maintains the assumption that literacy and thinking are not separable. Critical adult education programs "do not simply teach literacy and other basic skills; rather, they show students how they can use those skills to transform their lives and the society in which they live" (Degener, 2001, p.27).

Adult literacy curriculum should extend beyond the mythical concept of a universal adult learner and recognize and address the diversity of learners' experience and background (Degener, 2001; Prevedel, 2003). One of the central components of participatory approaches to literacy education involves context-specific teaching in such a way that curriculum is developed around the needs and interests of learners (Auerbach, 1999) through the negotiation of curriculum and the sharing of power between educators and learners (Shor, 1999). Authentic dialogue between learners and educators encourages the sharing of experiences and beliefs and facilitates the building of knowledge (Graman, 1999). It is important for learners to experience literacy development through practice within the context of their lives so they may be able to use literacy in ways that reflect their own lives, needs, and interests.

Literacy curriculum that is relevant to learners' lives often requires a broadened view of literacy. The traditional view of literacy as reading and writing skills exclusively, which had previously excluded many individuals, may be challenged by considering literacy to be an ongoing progression. This is consistent with Kazemek (2000), who claims that literacy "is a comprehensive and lifelong developmental process" (p.56). Further, the belief that there is a universal set of literacy skills which may be applied across cultures, contexts, texts, purposes, and motivations has not been supported by theory, research or practice (Hunter & Harman, 1979; Kazemek, 2000; Venezky, Wagner, & Ciliberti, 1990). A democratic practice reinforces the idea that literacy is conceptualized within a broader social context rather than narrowly focussed on isolated skills (Purcell-Gates, Degener, Jacobson, & Soler, 2002). Additionally, such practice recognizes that literacy reflects the society in which it exists as well as the individuals within that society. For example, the interpretation of a word or text is highly subjective depending on who is interacting with it (von Glaserfield, 1998). Further, being literate is considered more than encoding or decoding text within democratic practice; it requires the use of knowledge and experience within a context to make sense of and to act upon the world (Neuman, 1995). Therefore, embracing the realities of learners is not just an issue of tolerance, but one of necessity for literacy development to occur (Ewing, 2003).

Technology's Impact on Literacy

Despite ongoing modifications of literacy definitions, Niederhauser (1997) states that inherent in all definitions is the use of words or symbols to represent and / or convey information. Although this remains accurate for the 21st century, it must extend itself to

include the various aspects of communication within today's society, one that is consistently revolving around the transfer of information and the creation of meaning. Thus, as Niederhauser contends, we need to revise our definition of literacy to mirror the needs of current society as it continues to develop. Niederhauser further predicts that similar to the changes in literacy brought on by the invention of the printing press in the 1400's, increased access to electronic information will necessitate a modification of current literacy. Therefore, the ever-increasing presence of technology should be represented within the context of literacy (Negroponte, 1995), because "literacy and learning are being redefined by the digital communication and multimedia technologies that are quickly becoming a part of the information age in which we live" (Reinking, 1995 in Kinzer & Leu, 1997, p.126).

When considering the relationships between learning and technology, it is essential that we distinguish between literacy using technology and technological / computer literacy. Literacy using technology still remains an ongoing developmental process, an instance where each learner brings literacy to the technology; however, computer literacy is often reduced to a set of skills required for use of computer technology. Aikenhead (1990) claims that "scientific / technological literacy empowers a group to gain control over its own destinies in dealing with the scientific and technological aspects of society" (p.129). Further, a "technologically literate person must…understand the relationship between technology and social change" (Fleming, 1990, p.62). However, within the realm of technological literacy lies a branch of literacy called information literacy, which addresses the increased interaction with information. Such an increase in this type of interaction has resulted in a change in the way society

operates. Middleton (2003) argues that strong information literacy skills are necessary to navigate through an increasingly complex and technological world. For example, the Internet is becoming one of the primary media of literacy and communication practices in multiple contexts such as workplaces and everyday lives (Shetzer & Warschauer, 2000). However, almost twenty years ago, Chandler (1984) warned against a primary emphasis on computer literacy, and claimed that all of the "enthusiasm about something called 'computer literacy' focuses on the computer and ignores its implications for literacy" (p.27). More recently, researchers have suggested that educators' foci need to remain on literacy learning first and foremost and not the technology itself (Eisenberg & Johnson, 2002; Imel, 1998). According to Michael Eisenberg and Doug Johnson, there is an increasing realization that computer literacy should not focus on knowing how to operate computers, but should incorporate the use of technology as a tool for organization, communication, research, and problem solving. Further, Kellner (2001) argues that computer literacy extends beyond technical knowledge and skills to demand "refined reading, writing, research, and communicating ability that involves the heightened capacities for critically accessing, analysing, interpreting, processing, and storing both print-based and multimedia material" (p.73).

Reilly (1996) claims that the "tools we use shape both what we do and how we come to understand the world around us" (p.218). For example, the use of television has significantly changed society in many ways, enabling individuals to view and hear information to which they had not previously had access. Thus, the computer already has played an important role in altering the form and context of literacy while increasing learners' access to meaningful and relevant texts (Rosen, 1999). With the help of

computer technology, learners navigate their way through cyberspace to attain information applicable to their personal needs and interests. However, the skills required to successfully perform Internet searches and interact within an electronic environment may differ from traditional ways of information seeking. Kellner (2001) suggests a need for "new pedagogies and an expanded concept of literacy to respond to the importance of new technologies in every aspect of life" (p.68). He explains:

> Literacy involves gaining the skills and knowledge to read and interpret the text
> of the world and to successfully navigate and negotiate its challenges, conflicts,
> and crises. Literacy is thus a necessary condition to equip people to participate in
> the local, national, and global economy, culture, and polity. (p.69)

There are important issues surrounding technology that must also be considered within the framework of adult literacy education.

Social Issues and the Digital Divide

With the increased integration of technology in classrooms, various issues arise surrounding the ever-present subject of inequality. Dodge and Kitchin (2001) argue that "Western society is becoming increasingly separated into the 'haves' and the 'have-nots'" (p.184). Further, the "cost of the new information systems, although falling rapidly in real terms, represents yet another potential source of inequality between the developed and the developing nations" (Levine, 1992, p.191). Warschauer (1999) argues that the costs involved with using personal computers, the language on the Internet, and other factors suggest that "the medium is thus far dominated by a relatively wealthy elite, with most of the world's people shut out from using it at all" (p.17). Warschauer states

that since "some 80% of the world's population lack basic telecommunications facilities, let alone computers" (p.18), the danger of considering technology as a globally essential component of literacy becomes more obvious. Further, it is greatly disturbing that schools primarily serving students of diverse race and socio-economic backgrounds typically have less access to computer technology than schools serving more affluent students or Caucasian students (Au & Raphael, 2000; Macavinta, 1999; Selfe, 1999; Stoicheva, 2000). Beyond the issue of inequality with regard to technology access, we must also examine the implications of omitting a large part of the world from something like technology, which is viewed as such an important tool in other societies.

Despite the Internet's increasing usage, there is presently a gap between those who do and do not use the Internet, as much of the world does not readily have access:

> Lack of access to the technology of information society threatens to screen out vast parts of the world population behind a curtain of silicon, producing socio-economic disparities that are even more acute. After all, a network is defined as much by its holes or what it leaves out as by its links. (Morse, 1997, p.29)

Various cultures and languages are not represented in cyberspace due to lack of access and other reasons; however, even with the obstacle of access being removed in the future, there remain other barriers such as the very framework of the Internet itself. As much as technology has affected our definition and translation of what it means to be literate, it becomes blatantly obvious that one definition cannot be universally applied. Thus, such issues further support the notion that literacy is a relative concept which is society-specific in order to accurately reflect the particular society in which it is being considered rather than a concrete concept which can be globally relevant. However, it is important

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to consider literacy as constantly changing with the society in which it exists as well as a lifelong developmental process regardless of geographical location.

In recognition of differing needs of various societies and individuals, it is important to explore ways of closing the current gap. We must work toward new possibilities for using technology to extend the notion of multiple voices, especially considering the demands of hypertext where no single voice dominates (Au & Raphael, 2000). There is also a need for increased funding for programs and communities so that access to computers may be increased; however, there are needs that extend beyond increased access to computers. There is a need for instruction and support around learning how to use computers once access is attained (Stoicheva, 2000).

Technology Integration for Literacy Development and Instruction

The literacy abilities necessary to "successfully access, communicate, work, and create within computer and multimedia culture is quite different from reading and writing in the mode of print literacy" (Kellner, 2001, p.76). Reading electronic text requires navigation through visual and print detail as well as the ability to manipulate hypertext and comprehend text, which demands searching and decision-making capabilities (Smith, Mikulecky, Kibby, Dreher, & Dole, 2000). Without being familiar with the structure of electronic text, its non-sequential, non-linear layout, it may be difficult to make sense of information that traditionally has been presented hierarchically through print-based text. Additionally, writing with computers often demands proficiencies other than those used when writing with pencil and paper; for example, Kellner indicates that participating in electronic mail or discussion groups requires writing skills that emphasize clarity and

precision as well as knowledge of a whole new set of language conventions (e.g., ttyl = I will talk to you later). Such emerging approaches to literacy must therefore be represented within the classroom. If technology is changing the way individuals and societies may be literate, then it seems logical that technology plays a role in the development and definition of literacy.

Technology has the potential to provide a forum for learners to express themselves in a way that was not available within classroom settings where the emphasis often remained on traditional forms of writing, speaking, and reading. For many adults who struggled with print literacy and may have had negative experiences in the past and continue to carry feelings of resentment, failure and poor academic motivation into their adulthood, technology may offer an alternative way of learning (Lavery, Townsend & Wilton, 1998).

Technology can support the diverse needs of learners found in every classroom. For example, the forms of discussion have changed with the integration of technology within the classroom; learners who were perhaps too shy or intimidated to share their thoughts and feelings in front of their peers may be provided with the opportunity to reveal their valued input in a digitalized, "safe" environment. Further, Pailliotet (1998) has found participating in literacy activities with multimedia texts (traditional print, images, sound, video, etc.) may promote instructional goals and practices, including the literacy development of diverse populations. Considine and Haley (1992) claim that reading and writing across multimedia may facilitate the practice of collaborative learning and critical thinking. For example, using electronic discussion groups, electronic mail, and interactive websites engage learners in different forms of

communication; further, such modes of communication often involve the comprehension of and response to information, which may require learners to think in new ways. In essence, technology "is changing the kinds of interactions [learners] have with text as well as the kinds of texts with which they interact" (Reilly, 1996, p.206).

Grisham (2001) points out Bolter's (1998) claim that although word-processing may be the dominant form of writing in North America, linear word-processing may become outdated with the increasing use of hypertext. In addition, word-processors have also made their way into many classrooms, where some learners almost twenty years ago claimed that writing "with a computer is easier and more rewarding than writing with a pen" (Chandler, 1984, p.30). More recently, Di Petta and Woloshyn (2001) discuss various research that suggest word-processing tools for editing, spelling, grammar and style checking have positively impacted learners' writing process because they have increased their quantity of writing, their frequency of editing, and the complexity of their writing. Di Petta and Woloshyn also found voice recognition software to have a positive impact on adult learners, beyond improved literacy skills; they found that learners showed increased motivation for learning, improved confidence, and enhanced technological skills

Further, writing using technology for purposes such as electronic mail has the potential to enable learners to experience a form of conversation without the pressures and constraints of oral communication. Electronic mail and online discussion groups enable learners to write reflective responses at their own pace with opportunities to revise their work prior to being viewed by others. Word-processing provides a user-friendly space for the writing process whereas the ease of editing and revising far surpasses that

with pencil and paper writing (Fisher, Lapp, & Flood, 1999). Computers and electronic mail are altering characteristics of communication, making it more interactive in that the Internet is increasing the readership of writing. Warschauer (1999) claims that the Internet represents "the most diversified mass medium the world has ever known, potentially allowing greater numbers of people than ever before to put forth their views and publish their messages" (p.17).

Additionally, computer programs such as word-processors enable learners to produce text, both on the screen and on paper, which is always legible; this may enhance learners' ability to focus on their writing rather than letter formation (Fisher et al., 1999). Other advantages of the word-processor within literacy education include the ability to archive writing so that it may be revisited and revised with relative ease (Kamil, Intrator, & Kim, 2000; Warschauer, 1999). Fisher et al. claim that technology helps learners to "focus on content rather than mechanics; encourages the production of more and better developed essays; and reduces the drudgery of editing" (p.35).

Spelling checkers "allow the learner to eliminate errors (and mistypes) that would, if uncorrected, detract from the polish and authority of the resulting text" (Levine, 1992, p.190). In addition, Levine argues that word-processing software "has eliminated much of the drudgery associated in the past with the creation of finely-tuned and error-free texts, allowing the novice and the experienced author alike to concentrate on the creative process and to experiment freely" (p.190). Word-processing may make literacy development more relevant and meaningful to learners whereas their writing may be applied to real-life activities. For example, a learner could create an advertisement for a sale item using the computer or write a letter to his or her child's school or a business,

depending on the learner's needs and interests. Such practices can also be evaluated in a more authentic way since these ways of using literacy skills are more aligned with learners' real-life needs. Further, technology may provide a "powerful means of storing, revising, and presenting work over time, thus facilitating evaluation of more authentic work" (Kinzer & Leu, 1997, p.129).

Another component of technology that is contributing to the redefining of literacy development and instruction is the World Wide Web. The Internet may suggest how much modern text is unstable and shifting with constant updating of websites, which is much different from the stability of traditional books (Adams & Brindley, 1999). Designed "appropriately, hypermedia responds immediately to readers' informational needs as they attempt to construct a model of the information they encounter" and "supports readers, especially those who lack prior knowledge about a topic" (Kinzer & Leu, 1997, p.134). Further, research on talking books, when compared to conventional printed texts, revealed gains in both understanding and construction of texts as a result of early interaction with multimedia materials (Adam & Wild, 1997). Adams and Brindley argue that the impact of multimedia should also be considered in the examination of the relationship between technology and literacy:

> Interactivity and the blend of text and graphics in a good web site is an excellent example of the new kind of text which is emerging, an important communicative art form which must form part of the concern of literacy studies in classrooms at all levels in the future. (p.1239)

In electronic literacy environments, "linear text is being replaced by hypertext" (Topping, 1997, p.3). With the arrival of hypermedia, readers and writers must now become

acquainted with non-linear, non-sequential text structures that are the natural form of electronic texts. Further, the world of hypertext is continually changing, as Topping describes: "as with a river, you can never step into the same hypertext twice" (p.17). With this new world of literacy, there comes an ever-increasing need for learners to learn strategies on how to navigate their way around cyberspace as well as how to effectively read and write such non-linear texts.

It must also be recognized that digitized information "can be customized and transformed to meet the needs of the situation or of individual users" (Rose & Meyer, 1994, p.291), an essential component in any successful classroom as each individual learner requires different needs. Rose and Meyer claim that learners "with visual impairments can, for example, change the color, size, and typeface of text; the color of the background; and the color of word highlighting" (p.291). This could not be done so easily with the traditional textbook or novel; although these unarguably maintain a place within classrooms, other forms of text must also be offered to meet the needs of the various learners within the classroom. Rose and Meyer explain that even having "text read aloud makes information accessible that would be inaccessible in printed form" (p.291) to many learners.

Although there are many advantages to using technology in the classroom, Reilly (1996) quickly warns that "faster computers and larger hard drives don't mean more learning and better thinking" (p.219). It is essential that we do not place unjustified and nonsensical responsibility of our learners' education on the technology itself. Although technology clearly can provide various tools for learners to use, it depends on how they are used as well as by whom, when, where, and why. The focus need not be on the

technology itself but rather on the way it is used in literacy education. A transmissional approach to literacy education may position technology in the classroom to focus on skills-based literacy learning or specific skills for using the technology. For example, learners in such a setting may use computers to practice typing a new spelling word. However, a transformative approach may involve the integration of technology in the classroom as a tool for engaging learners in meaningful and relevant literacy practice. One example of this approach could involve a learner (who is seeking in-home childcare) using a computer to create an advertisement for a baby-sitter with a written description of the position and contact information. Susan Imel (1998) cautions that technology is similar to other instructional tools in that it can continue to perpetuate poor educational practice or it can be used as a means for transforming learning.

If attention is not paid to how technology is used within the classrooms, Smith (1988) warns that computers "have the capacity to devastate literacy and teaching" and "will take over while we are not looking" (p.80). Further, Smith argues that many "influential people, including computer and educational programmers, software developers, politicians, and administrators, believe that computers can teach anything that is expected of them" (p.80); additionally, Smith indicates that some people may claim that computers are "cheaper" and "more efficient than teachers" (p.80). However, Mehlinger (1996) contends that "no teachers will be replaced by a machine unless they attempt to do only what the machine can do better" (p.402).

Such arguments are consistent with more recent work that suggests that instead of using computers as a stand-alone tool for students to practice skills individually, computers may be more effective when embedded within the learning and when used in

combination with interaction among students as well as between students and teachers (Cromley, 2000; Parke & Tracy-Mumford, 2000). It is important to realize that computers are created and used by people. Computers cannot teach anything to anyone, as learners require a higher-order interaction than that offered by computers alone. Computers are simply machines whose plug may be pulled at any time. Although the Internet has been claimed to have "information about everything from everywhere and opinions from everyone" (Reilly, 1996, p.203), Cromley assures that computers cannot replace teachers nor can they teach students on their own.

Although the World Wide Web has the potential to create opportunities for various boundaries of time and space to be dissolved, there are other issues that represent themselves as highly problematic. With online log on, users are instantaneously connected to resources they would not otherwise be able to access; geographical location is no longer as limiting as it once was for those with Internet access. Learners are now given access to a vast amount of information, which may help to eliminate the various biases of our education system: "new technologies provide students access to information that was once under the control of teachers" (Mehlinger, 1996, p.402). However, there are issues surrounding the information now more available to learners in classrooms with online access; it may be that the Internet is no different from other forms of media in terms of reliability of information. Since there is potentially inappropriate material on television, radio, film, and other media, the focus of literacy instruction must also incorporate critical evaluation of such material so learners may be more readily equipped to make thoughtful, responsible, decisions surrounding their interactions with this

information. Information technologies may make critical teaching and critical reading far more important.

The information age has arrived. With its arrival comes the recognition that our previous definitions of literacy are no longer adequate (Niederhauser, 1997). With this, our previous teaching practices are no longer sufficient to prepare learners for full participation in their society. It is essential that educators recognize that there is more to literacy development than simply reading and writing; additionally, the types of reading and writing addressed within programs cannot be confined to traditional methods. Niederhauser suggests that literacies that include making meaning from and creating texts in a variety of formats are a present reality. It can be argued that information / computer literacy must also be considered, as with all forms of literacy, a lifelong process as opposed to being reduced to a specific, isolated set of skills. This skills-based approach to learning literacy with computers is not ideal; Cope and Ward (2002) claim that successful integration of technology must involve the use of technology as an integral part of a learner-centred teaching approach.

The way in which technology is integrated within classrooms influences its overall effectiveness. Educators, not the technology, must be in control of how literacy education proceeds (Eisenberg & Johnson, 2002). Further, software and hardware "may allow students to do things they couldn't do before, or may make it easier to do things students were already doing, but the teacher has an essential role in determining what gets done and who does it" (Reilly, 1996, p.206). Finally, the "new information technologies cannot be looked to for a once and final solution to the problem of world literacy" (Levine, 1992, p.191) or to the problems which exist within education. Mayers

and Swafford (1998) warn that "critical thinking and writing…do not simply happen as a result of the technology, nor merely from savvy pedagogical uses of the technology, but rather from a specific type of pedagogical practice in relation to the technology" (p.147).

Technology Integration within Adult Literacy Education

While a significant amount of research has addressed the benefits of computers (Askov & Bixler, 1998; Askov & Clark, 1991; Bixler & Askov, 1994; Rachal, 1995; Turner, 1998), little research has specifically addressed the effectiveness of computer use within adult literacy classrooms (Berger, 2001). However, Askov and Bixler (1996) found that computer integration may facilitate adult literacy students in developing skills in logic, problem-solving, and following directions. Additionally, research has also reported computer integration to improve academic proficiencies in areas such as reading, vocabulary, language, writing, and listening (Askov & Bixler, 1996; Huss, Lane, & Willets, 1990; Tousignant, 1996).

The self-paced, student-directed learning experience that computer integration may offer is beneficial for adult learners as they are able to take ownership of their own education (Osei, 2001). It is important for learners to retain control of their learning during the process of literacy development. Technology may offer adults privacy and more individualized learning opportunities, which are key factors in successful literacy development. However, using technology within adult education programs does not necessarily mean that it is being used within the classroom as an integrated instructional tool.

There are multiple ways in which technology is being used in adult literacy education. Although technology use within programs should not be limited by predetermined categories whereas it should depend on individual learners' needs, some programs focus on using technology for instruction, as a supplement for instruction, as a means of delivery, or on providing instruction on technology use (Ginsburg, 1998). These technology uses, among others, have the potential to offer learners positive experiences if their learning needs and styles are firstly prioritised. Technology for instruction may provide learners with opportunities to learn about a technology with hands-on application; for example, if students were taught paragraph writing and were encouraged to practice writing paragraphs through peer e-mail, this would reflect technology use for instruction. When technology is used as a supplement for instruction, learners may use a CD-ROM to go through a step-by-step process for writing paragraphs. If technology is used for delivery, then an instructor may provide instruction on paragraph writing via a PowerPoint presentation. Instruction on technology use may involve students learning how to write paragraphs using Microsoft Word. All of these examples involve some form of literacy learning, as paragraph writing was central to the use of technology; however, with each method, the emphasis on technology as well as the involvement of the learner shifts. Ginsburg claims that technology as an instructional tool is superior to other approaches, as technology is not seen as an end in itself, but as an extension integral to learning. Technology as a means of delivery offers the least amount of learner involvement, which therefore may be the method relied upon the least (ideally); however, Ginsburg also argues that research has not shown the frequency of use between these methods within adult literacy education.

Although technology integration may offer unique and beneficial learning opportunities for literacy development, few adult literacy programs are using technology to its full potential. Unfortunately, previous research has shown that even if adult literacy education programs have access to technology, this does not mean that it is being used by learners or for literacy development or instruction. Approximately 82% of programs use technology for administrative purposes while technology is often used less frequently as an integrated part of literacy instruction (Hopey et al., 1996). This difference in technology use within adult literacy programs begs the following question: Why is technology not being integrated within the classroom and used as an instructional tool for literacy development? Exploration into reasons why technology is not being integrated within adult literacy classrooms, even in cases where access to technology is not an issue, is necessary in order that adult literacy education may be transformed to provide literacy instruction that reflects today's concept of literacy.

Arguments Against the Use of Technology

Although there are many perceived advantages of using technology within education, there are also arguments against its use. Despite findings of positive influences of computers on writing, there also exist arguments that computers may potentially have a negative impact on writing for some people. For example, Ragsdale (1997) believes that some people experience difficulty beginning their writing process using computers and therefore prefer writing a first draft using more traditional methods. Weiner (1996) argues that e-mail and instant messaging has increased a sense of immediacy with regard to writing, often resulting in a lack of proofreading before being

sent to a reader. Further, Weiner asserts that features of computer technology such as spell check, grammar check, and built-in calculators have been said to have a negative impact on writing whereas there is a general increased reliance on technology. Beyond these aspects of word-processing, the Internet has also been accused of posing some negative attributes.

Weiner (1996) argues that the Internet's format makes it difficult to navigate so it is easy for people to "get lost in the maze of online society" (p.7). This inability to find desired information often results in time inefficiencies with regard to Internet use as well as possible frustration on the part of the user. In addition, Weiner claims that the presence of inaccurate, undesirable, and offensive material on the Internet is becoming an increasing concern for various groups of people.

The Internet has also been found to impact components of social behaviour. For example, loneliness has been associated with increased Internet use (Morahan-Martin & Schumacher, 2003) as well as compulsive use of the Internet (Morahan-Martin & Schumacher, 2000). As more and more people are using the Internet, addiction to its use has become a real concern (Weiner, 1996). Even those individuals who may not be considered addicted to the Internet believe their use reduces time spent with family and friends (O'Toole, 2000), which may have negative implications for their relationships with others. Some of the appeal of the Internet may be related to its ability to provide an escape for individuals to a place unlike their own realities. However, these effects may be true of all media, including books. Bowers (2000) speaks of the Internet's potential for isolated text: "To digitize thought and aesthetic expression is to abstract them from their multilayered cultural and ecological contexts" (p.54). Because language and

literacy are so closely tied to the society in which they exist, and essentially are products of that society, this notion of de-contextualized text may be problematic for many, including literacy educators.

Educators must be aware of issues surrounding technology if they are to integrate into their practice. Warnick (2001) suggests the following based on the work of Bowers (2000) with regard to important considerations for educators:

> (1) the differences between Western technologies and more ecologically sound cultures, (2) alternative approaches to technology when making democratic decisions involving technology, (3) further study is needed on how modern technology changes culture and commodifies relationships, (4) a more complex view of culture is needed than what is currently presupposed by modern technology enthusiasts, (5) technology affects language and thought patterns, (6) issues of injustice arise when technology and the nature of work intersect, and (7) we should understand how the computer carries cultural assumptions that threaten diversity and sustainability. (p.216)

With the increase in technology in many societies, it is important that educators' relationships with technology are explored.

Educators' Relationships with Technology Integration

Research has shown computers to potentially improve literacy skills of adult education students. Stites (1998) argues that technology should be used with adult learners to "maximize opportunities for learner-centred, problem-focused, discursive, and contextualized learning" (p.56). A powerful, dynamic, interactive learning environment

may be created when technology is used as an instructional tool (Ginsburg, 1998; Jaffee, 2001; Osei, 2001). Further research is needed to gain a better understanding of issues faced by educators when trying to integrate computer technologies into adult literacy education (Berger, 2001). The lack of technology integration in adult literacy classrooms has been attributed to several factors. For example, Ertmer (1999) contends that barriers to technology integration fit within two broad categories: 1) extrinsic barriers (e.g., lack of access to technology lack of time, and inadequate technical and administrative support); and 2) intrinsic barriers to teachers (e.g., beliefs about teaching, technology, established classroom practices, and resistance to change). Both categories of barriers are equally important (Ertmer, Addison, Lane, Ross, & Woods, 1999).

Other obstacles have hindered technology integration for adult literacy educators. For example, Jaffee (2001) claims that funding continues to be a major barrier within adult literacy education. Jaffee also states that many adult literacy programs do not have the financial means to hire adequate staff as most are either volunteer or part-time status, let alone funding to provide professional development to existing staff members on technology use. Further, many adult literacy educators are unfamiliar with the technology available, if any, within their programs and thus, are often reluctant to integrate it for instruction (Hopey et al., 1996). Some research suggests that many adult literacy educators may not know how to integrate computers within the classroom (Osei, 2001) as a result of numerous variables, including an overall lack of experience with technology (Sivin & Bialo, 1992). Jaffee contends that integration of computers within adult literacy classrooms may result in improved literacy skills as well as an overall sense of accomplishment and enhanced self-esteem and motivation for learning.

As demands for technology in adult literacy programs increase, educators are faced with new challenges. According to Eisenberg and Johnson (2002), "too many schools, teachers and students still use computers only as the equivalent of expensive flash cards, electronic worksheets, or as little more than a typewriter" (¶ 2). They also point out that the extent to which technology is integrated into instruction depends on the educators' teaching style as well as the kind of available technology. Further, Cope and Ward (2002) found teachers' perceptions of learning and teaching, as well as their approach to teaching, also impact the learning context with regard to technology; they also found educators' use of technology to be related to their perception of the overall value the Internet poses for instructional purposes. In addition, some educators may require specific attention to deal with anxieties around computer technology and their competence using it (Rosen, 1999).

Without adequate professional development opportunities for adult literacy educators, the result of integrating computer technologies into the classroom is highly ambiguous (Kellner, 2001). Effective technology integration often involves professional development, environments that support collaboration and communication among peers, support from school leaders, and teacher confidence (Boule, 1998; Groves, Jarnigan, & Eller, 1998).

Conclusions

The increasing emergence of technology in various areas of society has forced a redefinition of literacy. With this, there have been movements toward the integration of technology within educational settings. However, the field of adult literacy education is

not keeping pace with other forms of educational programs in terms of technology integration (Imel, 1998). This absence of technology may be viewed as highly unfortunate, as the use of technology in adult literacy education may facilitate the development of literacy skills necessary for maximum participation in a technologically-advancing society. Hopey (1998) declares that technology integration may assist in the following ways: improve educational attainment and skill acquisition; reduce educational disparities often created by race, income, and region; improve the relationship between learning, assessment, and effectiveness; provide a relevant context for learning; accommodate differences in learning; motivate and sustain learning; provide increased access to learning opportunities; and empower learners. Further, technology may enable adult learners to take a more active role in their learning; computers may provide learners with a greater variety of resources, which may be accessed through a wider range of learning styles, and promote opportunities for collaborative learning (Gillespie, 1998).

Technology integration has the potential to benefit adult learners enrolled in literacy programs; however, current research suggests that technology integration is not happening in the majority of adult literacy programs. Although some research has shown that various barriers are responsible for this lack of technology integration, further research is needed to begin to understand adult literacy educators and their experiences with and perceptions of technology integration for literacy development and instruction. Such research is paramount for successful integration of technology within adult literacy programs, as integrating technology within the classroom may be more a human issue than a technological one.

CHAPTER THREE: THEORETICAL UNDERPINNINGS

There is no teaching without learning….Teachers find themselves continually ready to rethink what has been thought and revise their positions. Their learning lies in their seeking to become involved in their students' curiosity and in the paths and streams it takes them through. (Freire, 1998, p.30)

This research is grounded within an interpretive approach; the main objective of the study is to explore, with the goal of approaching an increased understanding of, adult literacy educators' perceptions of technology's role within literacy education. Within this framework, it is assumed that each participant brings his or her subjective experience to interactions with the researcher, the questions asked, and the topics explored. Thus, it is expected that there will be multiple perspectives revealed within the context of this study. Further, participant responses will be considered by the researcher through various lenses in an attempt to contemplate existing messages as well as the connections between them. As the overall goal of this research is to explore the ways in which adult literacy educators interpret or construct their experience with and understandings of computer technology integration within the classroom, the research is anchored in the methodological framework of social constructivism and its relationship with technology integration for literacy instruction.

Constructivism involves "inquiry, exploration, autonomy and personal expressions of knowledge and creatively….we learn by doing, by interacting with others and through authentic (real world) tools and experiences" (Burns, Heath, & Dimrock,

1998, p.2). Social constructivism is based on an understanding of the construction of knowledge as a process of negotiation through dialogue (Jonassen, Peck, & Wilson, 1999). Constructivist learning environments actively engage learners in the creation of knowledge as a result of comprehension and conceptualisation of information rather than maintaining an emphasis on the presentation or transmission of already-existing, objective knowledge (Cook, 2002). Constructivism is not a teaching theory, but one that addresses knowledge and learning; it defines knowledge as "temporary, developmental, socially and culturally mediated, and thus, non-objective" (Brooks & Brooks, 1993, p.vii). Within a social constructivist framework, the following assumptions will guide this research: 1) knowledge and understanding are constructed; 2) reality exists through experience and consists of multiple interpretations; and 3) understandings emerge through social interaction among and between beings and objects.

Constructing Knowledge and Understanding

Knowledge and understanding is ongoing throughout our lives, undergoing constant modifications based on our experiences; thus, we find ourselves constructing our overall understandings of the world in which we live (Brooks & Brooks, 1993). As our knowledge is constructed, it is understood that knowledge cannot be transmitted in any way. Further, whereas knowledge is a human construction, it cannot be neutral, absolute, or objective. Instead, it is "constructed, negotiated, propelled by a project, and perpetuated for as long as it enables its creators to organize their reality in a viable fashion" (Larochelle, Nednarz, & Garrison, 1998, p.8). Knowledge is fluid, dynamic, and contextualized.

Language plays an important role in the negotiation of meaning, knowledge, and understanding. Language lends itself to the sense-making and understanding of our world: "language is the medium that carries experience to the mind" (P540, 1996, p.3). Social constructivism also emphasizes the process of negotiation as the key to sense-making (Bentley, 1998).

Multiple Experiences and Interpretations

Social constructivism is also based on the assumption that there are multiple ways of constructing meaning (Bruner, 1990). Further, with every construction of knowledge and understanding, there is also diversity within interpretations (Larochelle et al., 1998). Therefore, "it stands to reason that the interpretation of a word or text will always remain an essentially subjective operation" (von Glaserfield, 1998, p.27). Social constructivism views knowledge and truth as socially constructed and multiple perspectives are accepted and welcomed (Jonassen et al, 1999). As each individual maintains differing life experiences as well as life perspectives and understandings, it becomes evident that knowledge and experience are interconnected. It may be argued that we are unable to separate our knowledge of the world from our experiences within it, as Jonassen et al. state, "we can only interpret information in the context of our own experiences, so the meaning that we make emerges from the interactions that we have had" (p.3).

Environmental Interactions

This research will emphasize the importance of dialogue with and between adult literacy educators. Such interactions are essential within the sense-making and

knowledge constructing not only of the world, but of the participants themselves (Bruner, 1990). We are in a constant state of relationship with our environments: an "organism is as active in constructing its environment as the environment is active in constructing the organism" (Garrison, 1998, p.46). Further, Garrison argues that such a transaction transforms both the individual and the world. Dialogue between individuals and communities is also a fundamental characteristic of social constructivism because, according to Bruner, our lives are based on "shared meanings and shared concepts" as well as "shared modes of discourse for negotiating differences in meaning and interpretation" (p.13). This human interaction may also be viewed as the "contextual, yet perpetual, affirmation, testing out, and negotiation of the respective worldviews or partners, who, so doing, co-construct their reality" (Pépin, 1998, p.179).

Implications for Literacy and Technology

> Literacy is a complex social practice learned through dialogic communication and apprenticeship into literacy discourse communities. It involves skills of abstraction, reflection, analysis, interpretation, cross-cultural understanding, collaborative problem-solving, and critical thinking. Computers in and of themselves will not provide any of these, but carefully planned computer-networking projects can provide a valuable support for any teacher interested in enhancing the literacy of students. (Warschauer, 1997, p.97)

Social constructivism will guide the course of this research in terms of how literacy and technology are considered throughout the study. For example, Warschauer (1997) claims that literacy cannot be classified as an individual cognitive action, but rather as a social practice. Within this social practice, literacy may be defined as "the

ability to understand and employ printed information in daily activities at home, at work and in the community – to achieve one's goals and to develop one's knowledge and potential" (OECD, 2000, p.x). However, it is also recognized that the increasing presence of technology and multimedia within many societies forces the redefinition of literacy to include multiple ways of gaining information rather than through the sole source of printed material. Throughout this research, technology will broadly refer to personal computer technologies. Technology integration will include the use of computers within adult literacy classrooms during instruction.

Social constructivist principles may be represented through technology integration within adult literacy classrooms. Adult learners who use technology during literacy instruction may have opportunities for social constructivist learning. Such an environment would promote shared power between learners and educators, problem-solving within real-world situations, multiple interpretations of knowledge and understanding, as well as active, reflective, and collaborative learning. Learners may use technology as a tool for authentic, meaningful learning that places an emphasis on process in addition to product. Further, a social constructivist classroom supports learners in meaningful contexts (Degener, 2001) and encourages them to take ownership and responsibility for their learning (Wissick & Calvert, 2001).

Technology integration within a social constructivist classroom rejects the use of computers to "enslave people, to program them, to dehumanize them" but rather encourages them to be used "in a liberatory manner, to extend our creative and expressive reach" (Falbel, 1991, p.36). As interaction is an important component of social constructivism, technology has the potential to enhance collaborative literacy practices,

as it essentially changes the form of interactions among students and between students and teachers. Technology may prompt learners to engage in higher-order cognitive tasks, and prompt teachers to question and modify previous assumptions about instruction and learning (Fisher, Dwyer, & Yocam, 1996).

Therefore, social constructivism provided the lens through which this research was conducted. Through multiple methods of data collection, adult literacy educators were able to co-construct a knowledge base of common language and an enhanced level of understanding of their experiences through active reflection. Multiple perspectives and interpretations through dialogue served as the basis for this research, resulting in an increased understanding of some educators' experiences with and attitudes toward computer technology integration within adult literacy education classrooms.

Method

I used both purposive and random sampling within this research with the goal of working toward an understanding of adult literacy educators' perceptions of technology integration. I conducted a review of Atlantic Canadian adult literacy education organizations through Internet searches including the NALD (National Adult Literacy Database) website (www.nald.ca) as well as informal discussions with adult literacy organizations via e-mail and telephone. As a result of this review, 392 adult literacy educators in Nova Scotia, Prince Edward Island, Newfoundland and Labrador were identified. New Brunswick adult literacy educators were unable to participate in this survey during this mail-out due to differing programming schedules; however, 120 surveys will be mailed to adult literacy educators in New Brunswick at a later date, as

requested by participating organizations. Due to time constraints, the data collected from the New Brunswick surveys (and from those surveys not yet received from NS, PEI, and NL) will not be included in this thesis; however, these data will be included in combination with that gathered for this thesis in the future to provide a broader view of adult literacy educators in Atlantic Canada. Within one month of survey distribution, forty-six surveys were returned; therefore, these surveys provided the data discussed throughout this thesis. In addition, six key informants were randomly selected from the Nova Scotia list (for accessibility reasons) of survey participants. These six adult literacy educators were then invited to participate in at least two open-ended, semi-structured interviews, and a focus group meeting. Prior to engaging in the survey, interviews or focus group, all participants signed a consent form.

The first component of data collection involved a self-administered survey (see Appendix A), which was developed based on personal experience working in the field of adult literacy in addition to the research conducted by Wood et al. (1998). The first section of the survey was intended to gain information about the general demographics of adult literacy educators while the remaining sections addressed educators' general computer use, their computer use at work, their views on computers, and finally their views on computers and literacy. The information gathered from the surveys provides insight into how computer technology is being used by adult literacy educators. The survey results may facilitate an enhanced understanding of educators' experiences with and attitudes toward computer technology, which may then have implications for professional development and program delivery.

The survey package included a letter of initial contact that introduced the study (Appendix B), requested participation, guaranteed confidentiality, identified the researcher, and offered contact information for questions or concerns. Also included within the package was a consent form for participation in the survey (Appendix C) which was signed by participants and returned to the researcher for storage in a locked cabinet, stored separately from the data. The survey included a variety of items including a combination of open and closed questions, as well as a series of statements answered on a 5-point Likert scale (Likert, 1932). Throughout the survey, respondents maintained ongoing opportunities to include additional comments concerning various items. Prior to using this survey for collecting data, it was piloted with four experienced adult educators, who completed the survey and engaged in a debriefing session to discuss the clarity of the survey as well as their interpretations of the questions, resulting in minor, consensual modifications. Additional sources of data (i.e., interviews and focus group) also extended the exploration of adult literacy educators' experiences with and attitudes toward technology integration.

The second data source consisted of open-ended, semi-structured interviews with 6 key informants, all randomly selected adult literacy educators from the Nova Scotia survey mailing list. Random sampling was used to invite key informant participation for two reasons: 1) I did not want to further bias my expectations of participants' responses; 2) I did not want to suggest that each of the 6 individuals were necessarily representative of a larger population based on any one criterion. For example, if I had chosen key informants based on 6 varying levels of computer experience, there may have been an increased risk of making unwarranted connections between their responses and their

computer experience. Random sampling was used with an understanding that each key informant has unique experiences that do not necessarily represent the experiences of others with whom they may share some similarities (i.e., similar level of computer experience). The use of semi-structured interviews enabled adult educators to reflect on their experiences with and attitudes toward technology integration in literacy education. Through dialogue with these key informants, I was able to approach a better understanding of their constructed perceptions of literacy and technology integration. The key informants, as a group, represent diverse views on computer technology and its integration within adult literacy education. The initial interviews with participants took place after I reviewed their completed surveys. The survey findings provided a basis for the interview guide questions that guided the framework for the initial interviews. Prior to the interviews, all key informants completed an informed consent form (Appendix D). With consent from the participants, the interviews were audio-recorded and later transcribed and analyzed. A series of questions (see Appendix E) provided the framework for the interviews. Throughout the interviews, I maintained flexibility to probe for additional information. All participants were interviewed at least twice, with the first two interviews lasting approximately one hour; the number of interviews conducted varied among participants and was based on individual responses until the focus questions were perceived to be thoroughly explored by both myself and the individual being interviewed. Once all six key informants had been interviewed and the survey data had been analyzed, we gathered together for a focus group meeting.

The focus group meeting was the third source of data. Prior to participating in the focus group meeting, all key informants provided their informed consent (Appendix D).

The focus group meeting was video-recorded with consent from participants; also, the focus group was guided by a series of questions (see Appendix F for the focus group guide), which were formulated based on the results of the surveys and interviews. Themes or trends identified within surveys and interviews provided the framework for the focus group. Throughout the meeting, participants were encouraged to comment and elaborate on, as well as evaluate these themes to deepen the overall understanding of these issues.

Beck, Trombetta, and Share (1986) define a focus group as "an informal discussion among selected individuals about specific topics relevant to the situation at hand" (p.73). Through the social interaction among participants, negotiated understandings of literacy and technology integration may have unique opportunities to develop although a solidified, collective understanding is not the aim of the focus group, but rather the exploration of a broad range of opinions from participants (Vaughn, Shay Schumm, & Sinagub, 1996). After the focus group meeting, key informants individually participated in follow-up telephone interviews guided by a series of questions (Appendix G). This provided individuals with an opportunity to reflect on the focus group meeting and to offer additional insight into their understandings since their participation in the focus group meeting.

Interviewing individuals with varying attitudes toward and experiences with technology was found to be beneficial whereas the broadened perspectives appeared to enhance the information gathered throughout the focus group meeting. The purpose of multiple data sources was to increase the richness and depth to which we may approach an understanding of the various perspectives of adult literacy educators.

Participants

The forty-six adult literacy educators who completed the survey (37 females; 8 males) ranged from 20-60+ years, with the majority falling within 40-49 years of age, as shown in Figure 1. Forty-six percent of educators maintained between 1-10 years experience teaching, depicted in Figure 2.
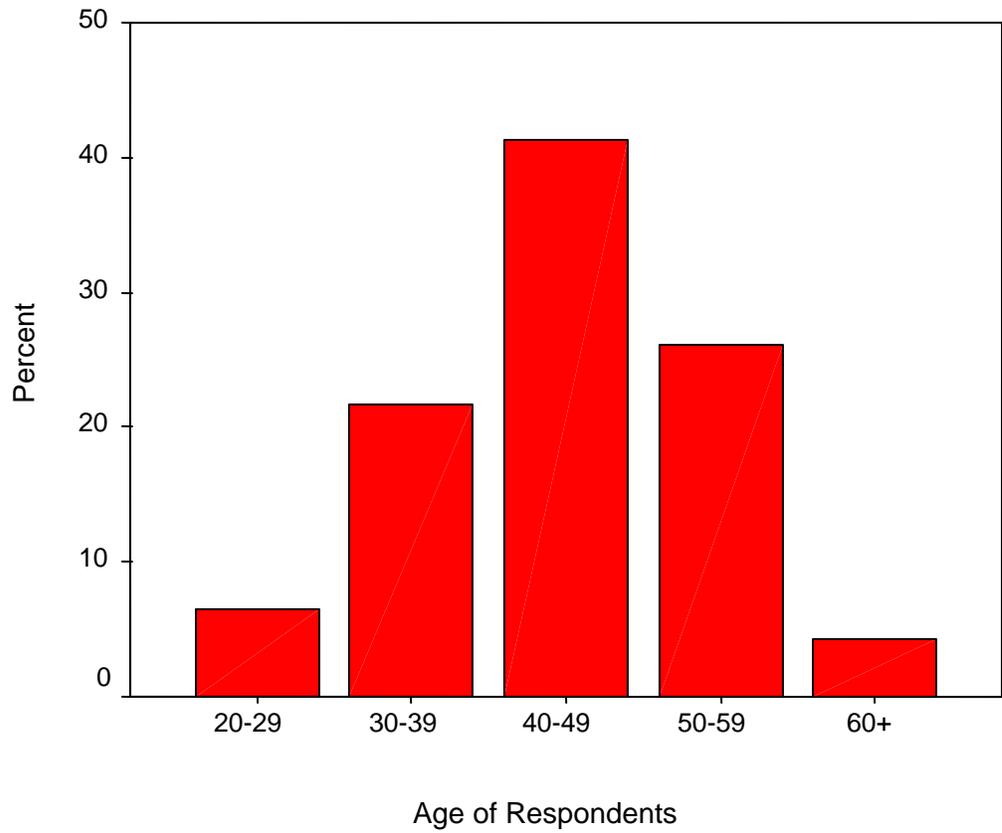
Figure 1. Percentage of survey respondents within each age category (*N = 46).*
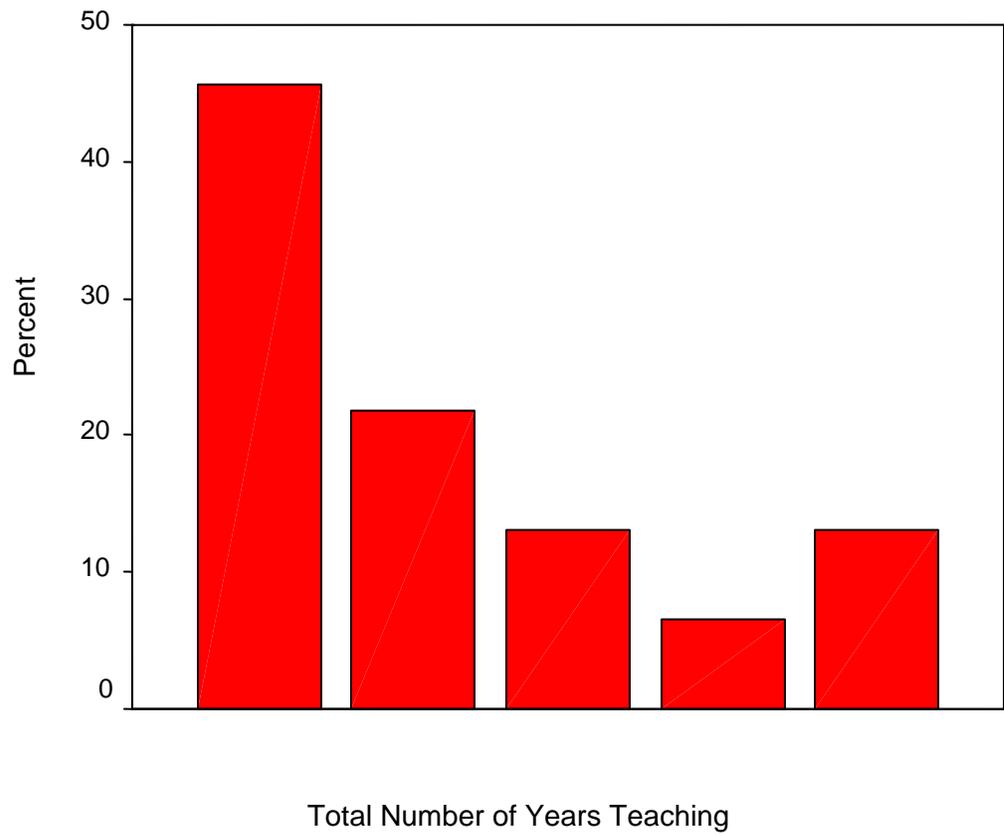
Figure 2. Percentage of survey respondents' total number of years teaching

(*N* = 46).

All survey respondents provided instruction in English except for one individual, who provided literacy instruction in both English and French. Seventy three percent of the educators were currently employed in the field of Adult Basic Education while eleven percent were involved with workforce education; the remaining participants taught either English as a Second Language or Family Literacy. All individuals were in paid positions; forty percent taught adult literacy in rural settings, fifty-eight taught in urban settings, and two percent taught in a combination of rural and urban settings. Four respondents were from Newfoundland / Labrador, thirty-one from Nova Scotia, and eight from Prince Edward Island (three individuals did not specify in which province they provide literacy instruction). Forty-eight percent of respondents' highest level of education was an undergraduate degree, thirty-three percent had a master's degree, eleven percent had a college diploma, and the remaining eight percent completed secondary alone or in combination with teacher's college or some post-secondary education, as shown in Figure 3.
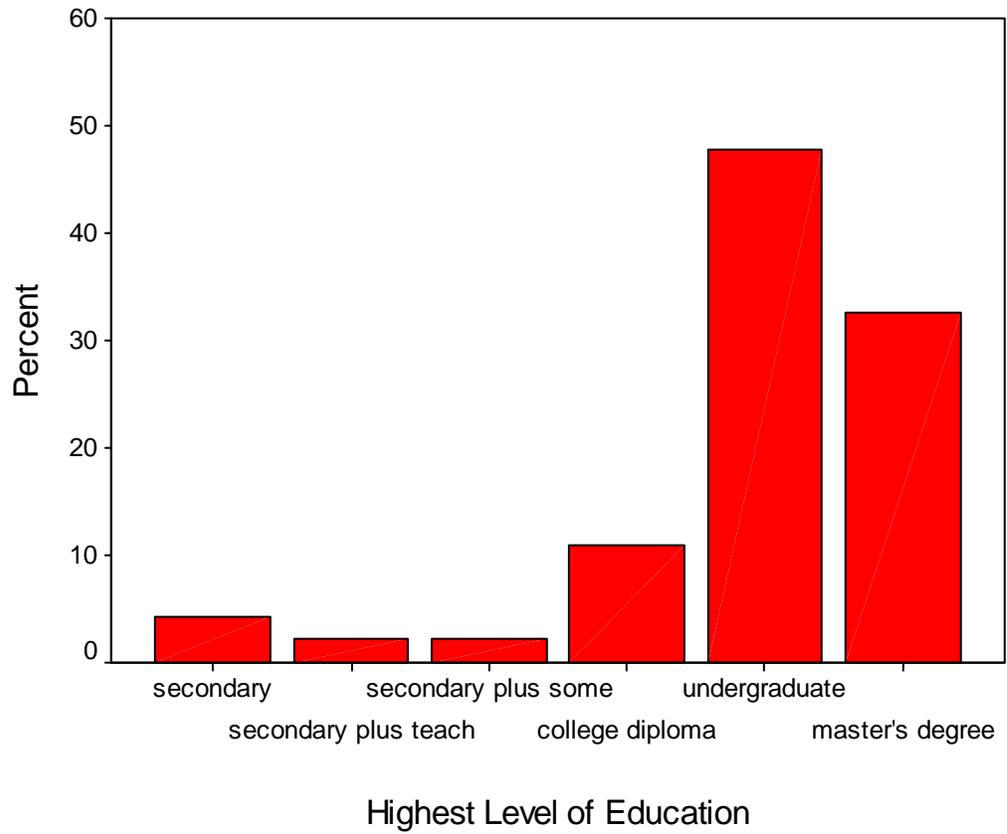
Figure 3. Percentage of survey respondents' highest level of completed education

($N = 46$).

Ethical Considerations

Various measures were taken in order to ensure minimal risk with regard to participation in this research. For example, consent forms for the surveys were blindly detached from the actual surveys upon their return and each survey was identified only by number. The survey consent forms were then stored separately from the surveys in a locked cabinet in a secure office. Key informants also signed a consent form prior to their participation in the interviews and focus group meeting. The forms were also stored in a locked cabinet away from the data and each key informant was assigned a number for identification and analysis purposes. Key informants were able to cease participation at any point throughout the research without penalty. Throughout the production of this thesis, every known effort was made to conceal the identity of the key informants. Also, direct quotations used throughout this document were included only with the permission of the individuals to whom the words belong.

CHAPTER FOUR: FINDINGS

The goal of the data analysis was to address the five research questions within a well-developed contextual description of the participants' perceived experiences with and attitudes toward computer technology integration within adult literacy education, which may then suggest various implications for the field of adult literacy education. Whenever possible, I chose to include educators' voices because they are central to this research.

Data analysis focussed on the proposed research questions: 1) How do adult literacy educators view the role of computer technology within their definition of literacy?; 2) What experiences do adult literacy educators have with computer technology?; 3) How do adult literacy educators integrate computer technology, if at all?; 4) What barriers exist for computer technology integration as perceived by some adult literacy educators?; and 5) What relationships exist, if any, between adult literacy educators' computer experiences and their integration of computer technology? The themes found within the transcripts from the survey, interviews, and focus group meeting will be explored in Chapter Five with reference to the literature within the framework of the guiding research questions. I recognized throughout the entire analysis that the data may represent themes and issues that extend beyond the scope of the initial research questions; therefore, I remained open to such possibilities and tried not to examine the data too narrowly. My interpretation was aimed to best represent the data collected as much as possible, also recognizing that I bring my own contextual experience and knowledge to my reading of the data as well as its interpretation.

Survey

The closed-ended items of the survey were entered into Statistical Program for Social Sciences (SPSS 11.5) for Windows. Once the data was entered, analysis was conducted to determine descriptive information such as the mean, range, and standard deviation for survey items. The survey questionnaire enabled the compilation of numerical data in order to provide a summary of the population's demographic profile. Further, certain items were also examined in terms of possible significant correlations. The open-ended survey items were coded for themes (open-coding followed by axial coding) using Microsoft Word. These methods of analysis provided a summary of the population's descriptive profile and also formed the basis of additional inquiry with key informants through individual interviews.

Educators' Computer Use

Educators' frequency of computer use differed depending on the specific activity or purpose. For example, it was reported that using e-mail, searching the Internet, word-processing, and computer use at work occurred either a few times a week or daily. However, computers were used either never or a few times a year for playing games, banking, shopping, using chat rooms, and marking. All participants had a home computer while 93.5% had Internet access, 97.8% had a printer, 60.9% had a CD burner, and 50% had a scanner at home. Educators used their home computers for personal use, job-related tasks, and other tasks a few times a week on average. Survey participants claimed to use the computer approximately 8 hours on average each week ($M = 497.4$ minutes; $SD = 400.6$) although the range varied greatly (10-2000 minutes). Respondents

used their home computers 91-135 minutes each week for personal use and work-related tasks; however, less time was dedicated to computer use for purposes other than personal or work-related tasks (46-90 minutes per week).

Although 80.4% claimed to use computers in the classroom, educators generally assumed computer use by students as being part of the learning process when planning instruction only sometimes; when educators rated their likelihood of assuming computer use by students when planning on a 5-point Likert type scale (1 = never; 5 = always), the result was a mean of 2.9 with a standard deviation of 1.2. When asked if they used computers to teach literacy or reading, only 55.6% educators responded positively. Of those responses, the following aspects of computers were used to teach literacy, listed in the order of highest to lowest frequency: software, word-processing, Internet research or games, teaching resources, online reading exercises / tutorials, e-mail, and basic computer instruction. The frequency of educators' use of classroom computers and their level of computer use for literacy instruction within the classroom were found to be related (chi-square with one degree of freedom = 8.360, p = 0.004). When using computers for teaching, educators reported network crashes, lack of computers, and students not finishing their work a moderate amount of the time as being sometimes problematic, and therefore may affect their likelihood of using technology with learners. The following factors were identified as being influential in educators' decisions to integrate computers in their teaching: if technology is available; if they have enough time; if computer use is relevant to learning outcomes; if computers can enhance the lesson or reinforce the concept; the level of students' literacy and computer skills; and if research, graphics or word-processing is needed. In comparison with other educators at

their learning centre, respondents felt they were approximately equal to their co-workers in their ability to integrate computer technology.

Computer Access

The survey data revealed that adult literacy educators used computers at work in a varied manner, often dependent on the availability of computers within their learning centre. Only 67.4% of respondents had a computer in their classroom although 80% had a computer lab within their learning centre; 62.2% had access to computers in a library or resource room in their centre and another 43.2% had computers in another location such as offices, c@p sites, and staff rooms.
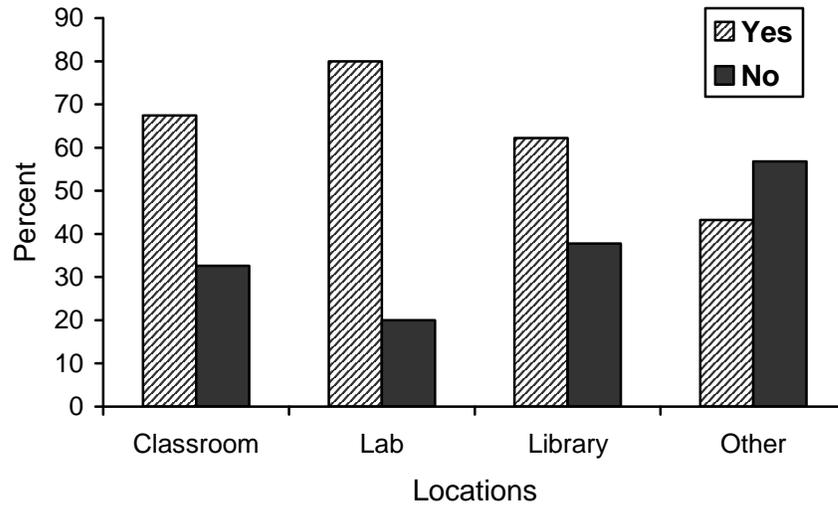
Figure 4. Percentage of educators who use computers within these locations

($N = 46$)

It was also found that educators working in urban settings were more likely to have a computer in their classroom (68%) than those working in rural areas (52.9%). It was found that educators and their learners use computers at different frequencies depending on location, as shown in Table 1. Educators reported using computers in the classroom, computer lab, or other learning centre locations (i.e., offices, c@p sites, and staff rooms) a few times a month; however, it was also found that students use classroom computers as frequently as their educators but tend to use lab, library/resource computers more frequently; educators reported using those computers a few times a year whereas learners were reported to use them a few times a month.

Table 1

Descriptive statistics of educators' and students' frequency of computer use by location

(N = 46)

	Frequency of Use	
Location	(1 = Never; 5 = Everyday)	
	Educators	Students
Classroom Computer		
M	3.3	3.2
SD	1.8	1.6
Lab Computer		
M	2.8	3.6
SD	1.4	1.3
Learning Centre Library / Resource Computer		
M	1.7	2.7
SD	1.1	1.5
Computer in another Location in Learning Centre		
M	2.5	1.6
SD	1.8	1.3

Student Computer Use

The primary uses of computers for students included Internet searches (80.4%) followed by prepared software (60.9%), then online quizzes / assignments (37%) and other uses (34.8%) such as word-processing, e-mail, games, science activities, and basic webpage creation. Educators estimated that approximately 25% of their students have computers at home and felt that relative to their own computer skills, students were somewhat skilled.

Support for Technology Integration

Educators reported feeling that their learning centre administration supported the integration of computer technology for them, as educators (95.5%) and for their students (95.7%). Educators reported that computer integration was supported by administration as shown by ongoing discussion about increasing technological resources, professional development for staff, and the hiring of specialized information technology personnel. However, barriers such as the current lack of funds, technology, professional development, and time were reported to be a concern; for example, one respondent wrote, "We support it in theory; however, funding to obtain adequate amounts of equipment is next to impossible."

Although 95.7% of educators received some kind of professional development workshops within the last three years, the majority (33.3%) reported that none of them were related to computers. Those who participated in professional development around computer technology did so via the following methods (listed from most to least frequently reported): talking with colleagues, in-service workshops, courses, journals /

books, online training, conferences, and videos. Of those forms of professional development, the majority (30%) of respondents identified in-service workshops as the most valuable, followed by courses (19%), and talking with colleagues (11%) with the remaining categories identified as equally valuable. The most valuable forms of professional development, as reported by the participants in this study, appear to involve an element of human interaction around the topic of technology integration.

Educators reported getting assistance sometimes with computer issues from students offering help, as well as by requesting help from both students and colleagues. It was also found that colleagues sometimes asked respondents to use computer assignments or activities they developed and sometimes asked for help using computers within their learning centre.

This survey revealed that helpful colleagues or information technology specialists, up-to-date technology and software, availability of computers, student interest, curriculum support, Internet access, and word-processing features all enhance educators' implementation of computer technology in the classroom. However, as only 67.4% of respondents have a computer in their classroom, this was classified as a definite barrier.

Educators identified the following barriers as inhibiting their implementation of computer technology in the classroom (from most to least frequently reported): lack of time, lack of adequate technology, lack of educators' skills with computers, limited access to computer labs, lack of funding as well as good software, limited student computer and literacy skills, unreliable technology, and lack of student comfort with computers.

Educator Attitudes Toward Computers

On a scale from 1 – 5 (1 = very at ease; 5 = very uneasy), educators reported being fairly at ease (*M* = 1.5; *SD* = 0.7) using computers; on a scale from 1 – 5 (1 = very enthusiastic; 5 = very unenthusiastic), respondents felt quite enthusiastic (*M* = 1.9; *SD* = 0.9). A two-tailed Pearson correlation showed that educators' ease felt about using computers and their enthusiasm about using computers were significantly correlated at the 0.05 level (*p* = .026). The data gathered in this study does not show the direction of the relationship: are educators' more enthusiastic about computers because they feel at ease using them, or do they feel more at ease with computers because they are enthusiastic about computers?

Although 92.5% of educators reported supporting the integration of computer technology for their students (6.5% supported integration sometimes), their actual use of computers for literacy education was less frequent (55.6%). Educators felt that technology should be used as a tool to enhance learners' independence and self-confidence whereas the demands of today's world requires individuals to have a basic understanding of computers; educators felt that such skills will assist learners with increased employment and future educational opportunities. On a scale of 1 – 5 (1 = never; 5 = a great deal), educators reported developing class assignments or activities that use computers only a moderate amount (*M* = 2.8; *SD* = 1.3).

The survey results showed that 90.9% of respondents considered computer integration to fit within their personal instructional approaches. Educators reported that computer technology facilitates literacy development in a natural, meaningful way for learners. It was also indicated that computers have the potential to widen learners'

viewpoints and assist them in achieving their goals while gaining independence. Educators also felt that computer integration lends itself to student-driven learning opportunities where power and knowledge may be shared between learner and teacher. However, some educators prefer to use more traditional approaches, claiming students' preference for human interaction when compared to using computers. Participants also indicated that technology integration closely matches the learning outcomes for adult literacy learners whereas word-processing and research are important components for literacy development.

Most educators (86.7%) viewed computers as an integrated part of the curriculum as opposed to a stand alone activity (47.5%). However, it is interesting that there appears to be an approaching relationship between educators who view computers as a stand-alone activity and those who believe their students do not have the skills needed to use technology effectively (chi-square with 2 degrees of freedom = 5.952, $p = 0.051$). The Likelihood ratio showed a significant relationship between these variables ($p = 0.047$). This relationship seems logical whereas stand-alone computer use requires students' independent use, thereby assuming a base level of necessary computer and / or literacy competency.

Additionally, educators rated twenty-eight statement around their attitudes toward computer technology on a 5-point Likert-type scale (1 = strongly disagree; 5 = strongly agree); means and standard deviations of selected items are shown in Table 2. It was found that computers can be used as tools to complement teaching and may provide individualized instruction and variety. Educators also felt that computers bring current information to the class and can be useful for students with special needs.

Table 2

Descriptive statistics for educators' attitudes toward computer technology (N = 46)

Attitudes Toward Computers (1 = strongly disagree; 5 = strongly agree)	*M*	*SD*
I see computers as tools that can complement my teaching	4.5	0.5
Computers provide variety in instruction and in content for my students	4.1	0.7
Computers are useful for students who have special needs	4.4	0.7
Having computers provides opportunities for individualized instruction	4.1	0.8
Computer technology allows me to bring current information to the class	4.4	0.6

Educators rated their experiences with computers at home higher (M = 4.0; SD = 0.8) than at school (M = 3.2; SD = 1.2) or during youth (M = 3.1; SD = 1.4). Overall, respondents reported being interested in computer technology (M = 4.2; SD = 0.7).

With regard to how educators generally feel about computers, it was found on a 8-item scale (scores could range from 0-24), that educators ranged from 13-24, with a mean of 21, which suggests that respondents generally felt that computers can be satisfying, may assist their creativity, are encouraging, bring them together with other people, and raise their opinions of themselves. They generally felt comfortable with and good around computers, and are able to approach computers in a thinking way rather than a feeling way.

Educators identified personal characteristics of excellent teachers in the following ways (most frequently to least frequently reported): patient, knowledgeable, flexible / adaptable, compassionate and caring, humorous, have diverse teaching styles to individualize instruction, are creative, organized, have a willingness to learn, and are non-judgmental and tolerant. Although 72.1% of educators did not report any differences in features between teachers who integrate technology and excellent teachers who do not integrate technology, the following characteristics were stated as differences by the remaining 27.9%: have computer skills, are comfortable with computers, are more ambitious, take on more work, are more flexible, and have more time.

Educator Work Attitudes

The teacher efficacy scale (Gibson & Dembo, 1984) was also included on this survey. This scale measures how efficacious educators perceive themselves. It includes

items such as "When I really try, I can get through to most difficult students" and "When the grades of my students improve, it is usually because I found more effective teaching approaches." Scores can range from 9-54. Scores on this scale ranged from 16-54 with a mean of 42.5 (*SD* = 7.6), which suggests that educators had a relatively high sense of efficacy.

This survey also included a work preference inventory (Amabile, Hill, Hennessey, & Tighe, 1994). The 30-item inventory includes items that indicate internal motivation (e.g., What matters to me is enjoying what I do) and external motivation (e.g., I am strongly motivated by the money I can earn). Scores on each of the two scales could range from 15-60. It was found that educators' internal motivation ranged from 30-60 with a mean of 45.1 (*SD* = 6.7) which was higher than their external motivation, which ranged from 20-46 and had a mean of 30.4 (*SD* = 6.4).

Educator Views on Computers and Literacy

This survey revealed that 69.6% of educators felt that the idea of what it means to be literate has been changed by technology. Additionally, the following explanations were provided with regard to this relationship: basic literacy has not necessarily changed, but expanded; computer literacy follows basic literacy (hierarchical); computer literacy is now a basic skill because computers are necessary tools in today's society. In addition, it was found that 88.9% of educators view technology as a necessary component of adult literacy education whereas it is now a part of everyday life, prepares learners for the workforce, is now included in literacy, builds learner independence and self-esteem, yet sometimes depends on students' needs, interests, and skill level.

For those educators who use computers for literacy instruction in their classrooms (58.7%), the following features were reported as the usual focus: Internet searches, word-processing, software, basic computer fundamentals, reinforcement of skills, individual projects, evaluating resources / critical thinking, increasing student comfort level with computers, and e-mail. Educators who did not report using computers for literacy development provided the following reasons: they had limited access to technology; they considered it the responsibility of a computer instructor; and, the quality of the available technology was lacking.

Educators rated their experience with computer technology as being positive ($M = 4.2$; $SD = 0.7$) on a 5-point Likert type scale (1 = very negative; 5 = very positive); further, they felt that those positive experiences affected their willingness to use computers during literacy instruction somewhat (1 = very much; 5 = not at all; $M = 2.3$; $SD = 1.3$). Ninety-three percent of educators surveyed thought computer technology may facilitate literacy development for adult learners because it increases student interest, offers variety, increases access to print, enables independent learning, provides learning opportunities for diverse learners, increases students' self-confidence, may lead to empowerment, and increases the overall literacy level of learners. However, some educators felt that there was a need for basic literacy skills before moving to the computer. Others reported that access to appropriate software for adult learners is often problematic. It was further mentioned that literacy development through the use of computers also depends highly on the needs of the learners.

It was found that 83.3% of educators would like to increase their level of computer use for literacy instruction because computers may lead to better achievement

of outcomes, makes learners more employable, and creates an environment for self-paced learning which is considered an important aspect of adult education. However, there were stipulations attached to their interest in increasing computer use. The educators reported that increased access to technology, more professional development, improved quality of both software and hardware, and more paid time were necessary for this to occur.

When asked about their perception of technology within the future of adult literacy education, educators reported that computers should play a significant or even mandatory role; they also envisioned a future of increased access to interactive, age-appropriate software and programs that are more relative to adult learners. Educators also felt computers will increasingly represent a method or tool for learning rather than acting simply as content. Specific features of computers such as word-processing, e-mail, and Internet searches were also viewed as gaining more importance within adult literacy education. When asked to compare their future vision with what is currently happening within their learning centres, most educators indicated that it varies greatly because of the lack of the following: technology, teacher knowledge, time, resources, and support. However, there was also mention of attitudinal barriers to the integration of technology on the part of both the learners and educators. For example, it was indicated that many adult learners are afraid of computers and prefer the live interaction with teachers as opposed to a computer screen. Also, some educators felt that it was important for adult learners to gain basic literacy skills before using computers in recognition of the literacy skills often necessary to use computers.

Interviews

Six survey respondents were randomly chosen from the Nova Scotia mailing list. These individuals were then invited to act as key informants throughout this study, which would involve their participation in at least two interviews and a focus group meeting. The interviews were audio-recorded and later transcribed by the researcher. Transcripts then underwent open-coding followed by axial coding so themes could be interpreted from the data. Initial interview transcripts were analyzed prior to the focus group and the follow-up interviews to inform the development of guiding questions for further exploration. The interviews that were conducted after the focus group meeting were also coded for themes using the same approach. All quotations included within this thesis, resulting from the interviews and focus group meeting have been included only after attaining the consent of all key informants.

Key Informants

The six key informants had varying experiences with and attitudes toward computer technology. All participants (ages 30 – 59) were educators in the field of adult literacy in either formal or informal settings. For example, some individuals worked within community, non-profit organizations funded through project grants while others provided instruction in college settings funded by the Department of Education. Informants' teaching experience ranged from one to over thirty-one years. Their programs included Adult Basic Education, Family Literacy, Workforce Education, and Academic Upgrading. Four participants provided literacy instruction in rural settings while the remaining two taught in urban settings. The highest levels of education

attained by the key informants ranged from secondary plus some post-secondary education to masters degrees.

The survey data revealed that the majority of key informants used computers for searching the Internet for information and word-processing a few times a week whereas the majority use e-mail on a daily basis. The average amount of time participants used computers per week ranged from 60–840 minutes ($M = 323$). On a scale of 1–5 (1 = very at ease; 5 = very uneasy), participants rated their general ease between 1 and 4 ($M = 2$). Participants' enthusiasm toward using computers ranged from 1 to 4 ($M = 2.5$) on a scale of 1-5 (1 = very enthusiastic; 5 = very unenthusiastic). All participants owned a home computer but only half had access to a computer in their classrooms. Further, those with classroom computers maintained diversity in the actual technology provided; for example, not all classroom computers had Internet access or CD-ROMs. One third of participants with a classroom computer did not use it themselves for any purpose; however, all participants with a classroom computer reported its use by students. One third of participants implemented some form of computer technology in their classroom. All participants viewed computer technology as an integrated part of the curriculum whereas half reported considered it a stand-alone activity as well.

Two thirds of participants felt the idea of literacy has been changed by technology. Although 5 out of 6 key informants regarded computers as a necessary component of adult literacy education, only half reported using computers for literacy instruction in their classrooms due to the lack of technology. When key informants were asked to rate their experiences with computer technology on a scale between 1 and 5 (1 = very negative; 5 = very positive), responses ranged from 2 to 5 ($M = 3.7$); participants felt

that their experiences with technology somewhat affected their willingness to use computers during literacy instruction. Half of the key informants indicated that the use of computer technology may facilitate literacy development for adult learners; another half of participants reported using computers to teach literacy or reading.

Definitions of Literacy

The key informants were asked to define literacy within the initial interviews. Their definitions varied and ranged from specific skills to a more holistic view of literacy. For example, one individual stated that literacy involved "the ability to interact with print and visual and audio media as well…to access and relay the information, both as a receptive and expressive aspect"; another key informant claimed that literacy included "the ability to read, the ability to understand and comprehend the written word but also…to be able to write it." Another participant considered literacy to be a broader concept that involved the "ability to communicate in our world in such a way that is effective" while another added that a "key element of literacy involves empowerment…personal empowerment." Another key informant reflected on the fact that her definition had expanded over time:

> I work with people on an almost daily basis who, by the boxed definition (of just being able to read and write) of literacy, are illiterate – and I don't consider them illiterate at all. They have a lot of skill and they have a lot of knowledge and they are able to pass that knowledge on in a way that works for them and in a way that works for other people. Simply not being able to read or being able to write – that, for me, boxes it in and takes away from everything else that they have to

offer. Everyday my definition of literacy changes…or broadens maybe…to encompass other things.

Role of Computers within Literacy

All key informants felt that computers play an increasingly important role within literacy for various reasons. For example, computers were reported to be tools for use alongside other tools such as calculators and various pieces of technology that may be used in the classroom environment. One participant claimed that computers ought to be used only as tools to ensure that over-reliance on technology is avoided at all costs: "reliance and empowerment are antithetical in my mind so [computers] play a role and should be understood clearly to be an assistive tool but not in lieu of basic literacy skills….I still like the idea of connecting with print." Computers were also viewed as being increasingly connected to the changing workforce and world in which we live. With such considerations, participants also made reference to adult learners' being uncomfortable with computers upon initial interactions with them. However, once access to computers was increased for learners, educators reported a positive change in learners' outlook on life as well as their own self-confidence. One individual shared a story of a former learner who felt she could not learn to use a computer because she "could not read or write"; once she learned how to e-mail, she found her reading and writing skills improved over time, which also had an impact on her self-perception and overall outlook on life. Another participant added that many learners involved with literacy programs are often living in low-income circumstances; for these individuals, "computers open up a

whole world of information for them that they would *never* have available to them otherwise."

Educators' Experiences with Computers

Key informants' experiences with computers consisted of a vast range. When recalling initial experiences with computers, half of the key informants reported very negative memories. For example, one participant stated, "my first experiences were pretty nasty….I can remember threatening [the computer] with a manual typewriter because I would just get so frustrated with it." This same individual also reported a shift in attitude toward a more positive outlook on computer experiences: "I now work with computers on a daily basis and….[I] think I'm pretty good with computers." The key informants reported using computers in varying ways. Four out of six individuals had taken some form of computer course at some point in their lives while one of them had experience teaching computer technician courses. The remaining two participants claimed to be self-taught and limited their computer use to primarily word-processing and using e-mail although one individual paid bills and did her banking online. However, one individual stated one of the benefits of being self-taught:

> I think in order to feel comfortable with a computer is to sit down and play with
> it….the only thing I begrudge sometimes is the time it takes me but the more you
> play with it, the quicker you become at it. It's a matter of taking time and making
> time to use it – it's the neatest way in the world to do your banking and pay your
> bills.

Although all participants reported using their home computers for word-processing or using the Internet and computers at work to some extent, not all individuals reported confidence with regard to their computer skills. For example, one key informant stated, "my kid is better at [using computers] than I am and he's seven" while another claimed, "I don't consider myself to be a computer person."

Educators' Comfort Level with Computers

When asked how comfortable they were using computers, all key informants claimed to be somewhat comfortable with them. Although all individuals reported a fairly high comfort level with computers in general, five out of six also reported that their comfort level is limited to a specific set of skills. For example, one individual stated, "I'm comfortable in the range of skills that I possess" but is "challenged by upgrades and replacements" whereas she claimed that she does not "have the generalized skills to work [her] way through without instruction."   Another participant who reported feeling comfortable with computers also warned, "I wouldn't say I'm great with them….there's a lot I don't know" while someone else felt that although she could not "do everything" on a computer, she questioned whether or not it is possible to "ever get to that point."

When compared with using computers alone, half of the key informants reported being less comfortable using computers with students in the classroom. Those who felt comfortable using computers in the classroom also made reference to specific skills; one informant reported feeling comfortable using computers with her students in the classroom because it involved "word-processing and going on the net and teaching them the basics…so I'm okay with that" while another claimed to feel comfortable using

computers with students "as long as it was in [her] realm of expertise." One participant felt that her comfort level using computers in the classroom was decreased by the lack of quality technology available, voicing concern that adult literacy classes often receive computers that were deemed insufficient for use by other organizations rather than computers equipped with capabilities considered to be standard by most organizations or companies.

Role of Computers in Adult Literacy Education

All key informants reported that computers belong in adult literacy classrooms for a variety of reasons. The most frequently reported reason why computers are a necessary component of adult literacy classrooms was that computers are playing an amplified role in society. One key informant explained how this lack of computer knowledge may impact an adult learner:

> Increasingly, people who do not have some facility with computers are going to feel disempowered (a key concept for me in literacy) and maladapted in the world….If there are tools being used in the world, then they belong in people's repertoire….Having no experience with computers contributes to adult learners' lowered self-esteem….They just don't feel like full participants in the world that they live in so just even to take away the mystique, [computers are] valuable.

Whereas many learners may have to use computers for some aspect of their lives at some point in time, the key informants emphasized the importance of learners becoming comfortable with computer technology. One individual stated that just having a computer in the classroom can "break down the mystique" and the "fear of computers".

Another participant claimed that the presence of the computer in the classroom will gradually initiate some kind of curiosity so that learners eventually make contact with it: "They kind of get to look at it, see other people using it; they may get close to it, look over your shoulder - you know, that kind of thing."

Another reason why computers belong in adult literacy classrooms was reported to be the fact that many adult learners are enrolled in literacy programs with the goal of being able to better assist their children with homework: "to help their kids, they're going to have to be able to use [computers]." Using computers within their adult literacy programs was suggested to better prepare learners for helping their children with homework and learning in general whereas their children are using computers at school on a regular basis.

Computers were also said to be helpful in terms of increasing learners' self-esteem with regard to their learning abilities. For example, physical and learning difficulties were reported as being lessened with the use of computers through various computer software and hardware. Computers were considered as overall "confidence builders" by most participants. One individual shared an experience of a learner with motor-skill difficulties whose confidence was boosted when he was able to produce, for the first time in his life, legible, perfectly formed letters by using a word-processing program.

Although all key informants felt that computers are important to adult literacy, there were also some voiced concerns. One individual noted a learner's unpleasant encounter with chat groups; whereas some learners "have a problem distinguishing, making decisions, and choices...the first thing they're doing is giving out their phone

numbers and addresses….so it's got its risks." Another participant warned that since learners "can become very overwhelmed by computers very quickly….[Educators] need to be sensitive to that if you're going to have computers in the classroom."

Current Use of Computers in Adult Literacy Education

Educators reported various aspects of computers as being important for adult literacy learners. Increasing learners' comfort levels with computers was a primary concern for educators. In addition, word-processing, Internet searching, e-mailing, evaluating Internet sources were cited as being important for adult literacy learners.

Computer use within the classroom was felt by educators to be limited by their lack of access to sufficient quantity and quality of computers within their classrooms. At the time of the interviews, four out of six participants had one computer in their classroom; however, the capabilities of that computer were limited basically to word-processing or playing games. One of these individuals chose to take her learners to a public computer lab in a next door building instead of trying to use the old computer in her classroom; she stated, "If our goal is to have people become familiar with computers, then we want them to become familiar with computers that are more current." The remaining two participants without classroom computers had access to a computer lab within their learning centre.

With regard to educators' actual use of computers for adult literacy education, learners were sometimes provided with opportunities to use computers for practicing specific skills that could also be done using pencils and paper. For example, one educator gave an example of computer use in her classroom: learners type sentences onto

the computer using focus words and then use functions such as "bold" or "italics" to alter the text on the computer screen. However, this same individual also mentioned learners using computers in her classroom to create church bulletins and do other community-based work. When reflecting on this process, she recalled a learner informing her that he "learned more in those two days [creating the bulletins] than he had in months previously moving through manuals of arbitrary exercises." The educator then made an insightful comment that "the more the task can be integrated into something that is already happening or meaningful to [learners], the greater the retention is going to be."

Other key informants reported using computers with their learners to search for information on the Internet, to create resumés and stories using Microsoft Word, playing games such as solitaire, and to gain basic computer skills such as saving files and opening programs. One participant described computer use in her classroom as being something learners do individually during "down-time" or at noon; she also made an interesting observation that although the learners who are not very comfortable using computers tend to use the classroom computer on their lunch break rather than during class time, "they all use it at some point."

Computers' Facilitation of Literacy Development

During interviews, all educators reported that computers have the potential to facilitate the development of literacy skills for their adult learners. One educator also indicated that computer use should not "take the place of learning basic literacy skills" but rather be used to facilitate literacy development. Another educator said that a certain level of basic literacy is important for learners to have before using computers since

computer use often involves some level of reading and / or writing. Educators also felt that the increased access to print, literature, and information was an important aspect of using computers with adult literacy learners since their interests and motivations may be better addressed through reading material than would otherwise be available; the amount of reading materials available to learners is also enhanced by networked computers: "they can get newspapers, magazines, encyclopaedias, and dictionaries online so you wouldn't have to have a paper or hard copy."

Most educators shared stories of adult learners who increased both literacy skills and practices through the use of a computer. For example, one educator explained that once her learners felt comfortable using computers, because "they wanted to read what was on the screen…it was a pull toward literacy whereas before the computers, they were falling asleep….and they're gaining valuable skills even though it doesn't seem like work to them." Another participant mentioned positive changes in terms of her learners' interest in writing with the computer: "when they got on the computer, they were typing away and writing letters and life stories – if they were asked to do that in pen, they wouldn't want to do it…[but] with the computer, it's different." It was also stated that learners' quality of writing seemed to improve with computer use through word-processing programs that offer features such as spell-check; additionally, learners were reported to have less anxiety around the writing process whereas they were able to independently edit their work. Another individual witnessed great improvements in her learners' ability to spell and length of e-mail communication: "'How are you?' became 'How are you? I am fine. The kids are great.' instead of just a one-liner like, 'I am emailing you because I have to'." One educator was amazed at the changes in some of

her learners once they began using computers: "People who would not write everyday were writing every day. People who never would have turned on a computer in their lives were now using computers and telling me about information they had found."

Further, educators reported various attitudinal changes in their learners that they would attribute to their use of computers. One educator reported that through the use of computers, her learners feel "like they're one with the world…they don't feel so isolated." Another individual explained that computer use has given her learners "general confidence in this world; when they feel they have some facility with the computer, their self-image is enhanced by that so that's a very positive change." An educator fondly remembered how computer skills really changed one former learner's life direction: "One woman didn't realize how much she liked computers since she had never been exposed to them….from our program, she went to community college and is now working with computers." One participant reported that using computers really "opened up worlds for people that they had never even considered and would have never even known were there."

Professional Development around Computer Technology

Five out of six key informants reported an interest in increasing their level of computer use within their literacy classrooms while one educator felt that her current level of computer use was sufficient.

When asked what was felt to be necessary in order to increase their level of computer use in their classrooms, educators indicated the following: increased time, funding, quantity and quality of technology, work-space, and professional development.

When considering this question, one educator strongly felt that the political and corporate will to provide all individuals with access to adequate literacy education was central to all other needs reported above: "I think that everybody should have access to a computer…if education and training and literacy were really as important as the government says it is, this wouldn't even be a question."

If educators were able to increase their computer use within the classroom, many indicated an interest in using them with learners in a variety of ways. For example, educators reported job searches, Internet research, banking, resumés, word-processing, and paying bills as being important for adult literacy learners to engage in with computers.

In order to increase educators' overall comfort level with using computers in the classroom, it was suggested that there is a need for more professional development in the areas of basic computer skills, specific programs such as Power Point and Excel, as well as regular general instruction or workshops around new upgrades or software applications. When considering current levels of professional development centred on computer technology, all educators felt that these need to be increased. For example, informal literacy organizations tended to receive very little formal training; it was indicated that professional development was often left to individual educators. For example, one educator explained that she would have to apply for funding and time away from the classroom in order to attend a professional development workshop, often offered outside of her organization. However, there was a sense of resistance to this idea whereas this would require a cancellation of her classes since there would be no substitute teachers provided to take her place within the classroom; whereas learners'

time in class is limited due to life circumstances and lack of funding, it was revealed that every moment with learners is precious.

Focus Group

The focus group meeting was video-recorded so I was better able to concentrate on facilitating the discussion rather than focussing on note-taking; in addition, the videotape enabled the focus group meeting to be revisited and transcribed at a later date. Once it was transcribed, it was coded for themes, which were then addressed during the follow-up interviews with key informants. One of the key informants withdrew from the study after the initial interview due to scheduling difficulties so the focus group meeting and the follow-up interviews were conducted with the remaining five key informants. The focus group guide was developed based on the data gathered from the 46 returned surveys as well as the initial interviews with the key informants.

Computer Use in Practice

After acknowledging that the ways in which educators use computers in adult literacy education vary, the participants reviewed the examples of technology integration provided in the focus group guide (i.e., Internet searching, word-processing, basic computer instruction, teaching resources, e-mail, games, evaluating resources, online reading exercises / tutorials, and software). All participants felt these examples reflected their own experiences. When asked to list these examples in the order of most to least frequently used within their own practice, the following order was established: basic

computer instruction, word-processing, Internet searching, and software (e.g., SARAW, WinWay Resume Program, and Mavis Beacon Typing Tutor).

Benefits of Technology Integration

The following benefits of technology integration were reported through the surveys and initial interviews with key informants in no particular order: assists learners with achieving goals, increases learners' independence, increases access to resources, encourages student-driven learning, leads to empowerment, enhances learner motivation, facilitates individualized instruction, increases learners' employability, enables sharing of power and knowledge (learner / teacher), increases learners' self-confidence, facilitates literacy development, and widens learners' viewpoints. All key informants felt that increased and improved communication and connectedness should not only be added to this list, but be made central to all other benefits. For example, one participant stated that the benefits listed appear to be by-products of the increased and improved communication gained from using computers. There was also a mention of the increased importance of such connectedness for people living in rural areas, who may not otherwise have access to "the rest of the world."

Anecdotes were shared among individuals that showed how using computers had seemingly changed the life direction of former learners. For example, one participant spoke of a learner who had never used a computer prior to the literacy program; this learner was pleasantly surprised about her newly discovered ability to learn computers. Over a few months, the learner's self-confidence and independence for learning grew tremendously, which in turn, gave her the courage to apply to community college where

she pursued education in the field of computers, in which she is currently employed full-time. Upon reflecting on this instance, the key informant reported that the learner felt a real "sense of accomplishment and empowerment once she knew what everyone else was doing" with computers and was able to then participate in that realm; "mastering computers makes them feel like they're now joining in with the rest of the world…what do we hear about all the time? Computers, computers, computers…we need them for business and everywhere really."

Barriers to Technology Integration

Technology integration was found to have many barriers such as lack of the following: funding, access to computer labs, educators' computer skills, students' computer and literacy skills, time, appropriate software, students' comfort level with computers, professional development, and adequate technology (quantity and quality). Another barrier that key informants felt should be added to the list is the overall self-confidence of learners whereas many enrolled in literacy programs have a history of failure in academic settings and may be fearful of taking risks involved with learning about computers. The diversity of learners' experiences with computers was also reported as a potential barrier; one participant spoke of "hyper / hypo computer literacy" as being present in literacy classrooms with diverse age groups. All participants indicated a noticeable difference in the computer skills of older learners versus younger learners whereas many of the younger learners have had more opportunities for computer exposure and in many cases, some form of instruction at former schools. A lack of education among funding agencies around the importance of computer integration within

literacy education was also cited as a barrier. Additionally, limited flexibility in terms of program development and implementation was another noted barrier.

Moreover, focus group participants all believed that each barrier could be either directly or indirectly traced back to a mindset; for example, "it's more than a lack of funding – it's a lack of respect for a whole population of people – it falls under poverty and the idea of 'deserving' versus 'non-deserving'." One participant also added a comment regarding the unstable conditions of the technology available to learners since computers that make their way to literacy programs tend to be ones that "no one else wants":

> It's a double whammy - you have somebody who has challenges with learning and you put in their hands a faulty device, and really, you almost have to question the morality of it sometimes…so I'm plainly having my own issues around computers, so that's another barrier…you really need supports in place.

Educators' Confidence with Computers

All key informants agreed with the finding from the survey and interviews that educators generally feel more comfortable using computers for their personal use than for instructional purposes. In a discussion exploring the possible reasons behind this finding, it was suggested that educators often have not been given access to computers to use with their students so there have not been any opportunities to become more comfortable using them in this context. For those who do have access to the technology, it was argued that educators are not provided with enough professional development in the area of technology. All participants reported an importance for basic computer instruction

provision for educators first before moving toward educating them about using strategies for using technologies with students.

Suggestions for Professional Development

All key informants indicated an interest in furthering their knowledge and experience around computers and technology integration. When asked about preferred topics for professional development opportunities, key informants stated that basic computer skills was primary, specifically including word-processing, Internet, and e-mail: "We need to know the basics so we know how to teach them because we've picked up bad habits along the way of using them ourselves." Other suggestions include the following: becoming more familiar with available software to enhance teaching (such as Power Point, Inspiration, and keyboarding software). There was also a consensus among participants that professional development is extremely important whereas computer manuals often tend to be inaccessible to average individuals; therefore, there were suggestions for the creation of plain language manuals that contain information about computer use along with exercises that would be appropriate for adult learners. Although informants agreed that most of their learners need repetition and practice of skills to increase understanding, it was recognized that this practice needs to be meaningful and have a purpose; for example, one participant mentioned having learners search for recipes if they were interested in cooking while learning and practicing Internet searching skills.

Participants considered the following forms of professional development: in-service workshops, courses, talking with colleagues, online training, videos, conferences, journals / books. All key informants felt that books and journals are the least desirable

forms of professional development: "You have to waste time finding what you need – it's never that simple with those computer books." The most preferred form of professional development was in-service workshops followed by discussion with colleagues. It was mentioned that online training may be problematic for some whereas many do not have access to the Internet. However, it was recognized that professional development CD-ROMs could be used with a computer in such cases. When one participant exclaimed that videos were not preferred when compared to face-to-face discussions with people, all key informants agreed that they prefer more interactive forms of learning if given the choice. The quality of professional development focus was also a concern for informants; all reported that materials and training developed and provided by literacy educators would be advantageous since it would be more likely to be "tried, tested, and true" rather than a "marketing scheme."

Barriers to professional development included a lack of funding, time, and support. It was mentioned that most literacy educators work full-time and are not provided with any training and / or preparation time built into their days. When educators are absent, "there are no substitutes provided which means that the students lose out in the end – we don't even take time off when we're sick because of this." Support from employers is also an issue of concern in terms of their overall attitude regarding the value of such professional development as well as the financial support. Again, participants mentioned that the underlying barrier of a discriminatory mindset on the part of funding agencies also has a negative impact on the likelihood, amount, and type of professional development they are likely to receive.

Follow-up Interviews

Within two weeks of participating in the focus group meeting, key informants were contacted via telephone at a time convenient for them for a follow-up interview. An interview guide was used as a framework for the interview. All responses were recorded for later analysis.

Role of Computers within Adult Literacy Education

All educators reported that computers should play an important role in adult literacy but provided different reasons. One participant claimed that she was going to increase her own computer skills so she could then teach her learners because "by and large [her] students do not have computer skills in place." Another individual stated that "people are going to have to use computers more and more – for bank machines even - everything's computerized." It was also reported that computers "are excellent for visual and tactile learners…learning is better with computers." Computers were also stated to promote more individualized learning with adult learners and decrease their "isolation" and assist them in "breaking down barriers" in their lives.

There was also mention by one educator of variation of computer time provided to adult literacy learners based on their skills: "We provide more computer time for students [when] they happen to be a higher functioning group….Computer use is dependent on the abilities of learners." Even if educators have access to technology, there are other factors that impact how and if computers are used with learners. Further, this same participant felt that there was a definite difference of abilities between her learners based on their age: "younger students tend to be more computer literate";

however, it was stated that these younger learners tend to "spend more time stimulating their eyeballs than their minds."

Although computers were felt to be an important component of adult literacy education, participants repeatedly mentioned that a lack of access to technology remains a major barrier for them, as one educator articulated: "Technology is very important in adult literacy education and very unattainable by a large percentage. Many educators and learners don't have access to technology."

Even with the present lack of access many educators described, the experiences they have had with learners using computers was reported to be very promising: "I've seen many learners learn from using computers. They think they're learning computers, but they're actually learning literacy skills and having fun while doing it!" Further, whereas educators felt that "computers should be integrated into adult literacy education because computers are the way of the world…lots of students could benefit" from using computer technology.

Dynamics of Barriers to Technology Integration

All educators agreed that at the root of all the barriers mentioned previously during the interviews and focus group meeting, such as lack of funding, space, technology, as well as others, is a particular mindset or way of thinking. The mindset they had referred to consists of a sort of discrimination against certain populations that are often involved with adult literacy education as well as a certain short-sightedness that negatively impacts literacy programs.

The mindset of funding bodies, government, policy-makers, and society in general was reported to hinder many factors within adult literacy education. For example, one educator felt that such a "mindset is the reason why there's no funding for materials and computer technology." Another participant indicated that a "mindset about discrimination, as well in terms of society in general, also tends to impact policy." Unfortunately, participants revealed that current policies tend to perpetuate rather than mitigate such societal discrimination.

Another educator articulated the negative impact of short-sightedness on program funding:

> I can think of one instance where a learner attended our program 7 years ago but left periodically and returned before finally completing the program. She is in her early 30s, has learning disabilities, and was interested in auto-body repair. She started our program doing a vocational focus but then decided to switch to academic upgrading. She eventually did her GED but didn't pass all of the tests. So, she did levels 3 and 4 at the community college. By that time, she found out she had knee problems so could not pursue a career in auto-body. She then got a truck driving license and is now successful with long-haul trucking making $26.00 / hour. So, at the time she completed the program she did not walk into a full-time job; however, if funding bodies tracked her progress into more long-term situations, her success would be evident.

One educator felt that such short-sightedness is simply "how the system seems to work, with HRDC and federal government." She also clarified that the "individuals within the

system are not always short-sighted but the policies in place prevent them from changing things for the better."

An educator explained the broader impact of such ways of thinking:

When it comes to universal access to computers, one of the biggest barriers is attitudinal. There is a societal attitude about people who are seen as deserving and non-deserving; this attitude is socially-constructed and serves a purpose to have people less able to participate than others – people are constantly being discriminated against because of this attitude.

Such thinking has been said to reinforce a "digital divide." Although a digital divide is often defined as the gap between "haves" and have-nots" in terms of technology, it appears to be more complex. There is a social context in which individuals exist that consists of many interrelated factors. For example, the present state of an individual with regard to education, income, health, and many other life components, should not be examined or considered in isolation since each is associated with other aspects within the framework of one's life.

The Digital Divide

All educators agreed that the current lack of computer technology within adult literacy education is perpetuating the cyclical nature of the digital divide. Educators reported potential negative ramifications for adult literacy learners who are denied access and instruction around computers. One individual described how the workforce is changing to incorporate more involvement with computers:

Low-level, entry jobs involve some interaction with computers…this seems to be a general pattern in society. I have a sense that people without computer knowledge are not able to fully participate in society because it's become fairly standard.

Educators also reported that such individuals often struggle with "self-esteem issues as well since some people feel unworthy and ashamed because of their lack of computer skills." Another educator spoke to the pressures of societal expectations on adult learners:

There is an underlying expectation in our society that everyone knows the computer basics but we really have to give voice to and advocate for these people since it affects their self-esteem. They feel like they're not keeping up with the rest of the world, like they don't belong in this world. For example, I have a 61-year-old learner who wants to learn about computers to fit in with the world.

Within the discussions around a digital divide, educators also reported certain gaps within the larger context. For example, participants felt that there were extreme differences with regard to computer knowledge and skills between certain populations based on age, setting (urban / rural), and socio-economic status. One educator described the diversity in computer experience of her learners:

I have high school students who know how to use computers but I also have 30 - 40 year-olds returning to education and have had no experience with computers…this makes a gap between those two types of people [and] puts the older learners at a disadvantage in life, especially in terms of jobs and education.

Socio-economic status was also reported to be a factor within the digital divide: "those who cannot afford [computers] are left behind." One educator reported that "there is an underlying attitude that those individuals are non-deserving and therefore are not provided with support to catch up with those who can afford to be technologically knowledgeable." Additionally, one individual indicated that people living in more rural areas may have less opportunity with regard to computer access, as well as computer instruction, when compared to those living in more urban areas.

Another educator stated that many adult learners are "behind the 8 ball before they can even have a chance" without opportunities to use technology whereas "learning can be enhanced with technology, educators do a better job with technology, and [educators and learners] have access to more resources." Additionally, one educator indicated that "computers have also become a social thing that can bring people together if they're given the opportunity for access and learning."

Bridging the Gap

The most frequently reported suggestion for bridging the gap between individuals was to increase access to computer technology and instruction for both learners and educators. It was recommended that diminished or eliminated costs of computer access for learners and educators would provide additional opportunities for individuals without current access. Educators felt that businesses upgrading to new computer systems could recycle their old equipment by donating it to literacy programs whereas "some computers are better than no computers, no matter how basic they may be." However, there were also suggestions for monies specifically allotted for computer technology within adult

literacy program budgets. It was stated that such funding is necessary to purchase "quality machines for every literacy classroom" whereas "educators need access to technology" and "students need free access to computers as well as computer instruction." One educator wished that there was enough funding so that when learners are "through with their literacy instruction…learners could receive computers afterward" to eliminate the barrier of access.

It was also suggested that there be increased focus on people living in rural areas so that they may have access to computer technology and instruction. One educator described a program called "Computer Literacy on the Move":

> It's a free service that delivers computer instruction to people's home who cannot leave to get it otherwise (e.g., people with disabilities, those without transportation). It's a really effective program. There is a lack of funding though so it's not widely functioning. We need a blanketing of NS so we can bring literacy to small pockets of communities to give people equal opportunity. We need to start taking more laptops into community halls.

It was also suggested that certain types of educational materials would be beneficial to adult literacy learners trying to learn about computers. One educator reported feeling that since "computer manuals are the worst teaching tools" there is a need for "good quality materials that have been tried and tested in the field." It was also added that there is no need for "fancy, high-gloss, high-price materials" yet there is a high demand for "field-based resources developed by people in the field"

A negative mindset on the part of funding bodies, government, policy-makers, and society in general was reported to be the root of all other barriers to equal access to

computers and computer instruction within adult literacy. Therefore, it seems logical that

educators suggested that this mindset needs to change in order to effectively address a

digital divide:

> There needs to be an overall commitment to closing the gap – by government,
>
> Department of Education, businesses. The mindset needs to change and people
>
> need to start viewing adult literacy and community education as a   serious,
>
> valuable part of our society - people need to start taking it seriously. As it stands
>
> now, community education is often viewed as something to keep people busy
>
> instead of being valued as important education.

Recommendations for Future Research

When asked what areas need further research with regard to adult literacy and

technology integration, educators reported a variety of areas for exploration. Educators

wanted increased information regarding literacy and reading skills programs available on

the Internet that they and their learners could access. Further, educators recommended

the "development of resources and materials, software, and exercises" geared toward

adult literacy learners. However, it was reiterated that there is "a real need for people in

the field to develop quality teaching tools." One such resources have been developed, it

was suggested that research be conducted to evaluate "their effectiveness with adult

literacy learners." In addition, it was suggested that interviewing literacy learners about

their "ideas on technology integration to find out their needs and wants" would be

beneficial whereas the learners are central to educators' goals for education.   For

example, one participant posed one question of importance to ask learners: "How many would use computers if they had access?"

Furthermore, there were suggestions for research around issues of access to technology. Questions such as following surfaced through discussion: "How can we get computers out there?"; "How can we reach people?"; "How can we reach the most people in the most effective way?"; "How can we make computers accessible - financially, in a good location, with travel allowance?" In addition, it was reported that a "comparison of programs funded for technology integration to those without technology integration" would provide insight into "the real benefits for learners and program effectiveness." Such research would then begin to answer questions such as, "If we remove the barriers to technology, does it really work? How is it most effective?" It was also added that research is needed to explore the "idea of rural people not having access to computers and inequities between populations."

A broader focus around adult literacy education programs was also raised as possible future research topics. For example, one educator felt it would be interesting to follow-up the progress of adult literacy learners at a much later time than currently practised "since current program evaluation does not give learners the chance to get on their feet before evaluating their 'successes'."

Conclusion

Analysis of the computer usage surveys, interviews, and focus group meeting has exposed some interesting and important insight around educators' perceptions of technology integration within adult literacy education.

All educators had a computer at home and were more likely to have a printer and Internet access than a CD burner or scanner. Their primary uses of computers at work and home consisted of word-processing, searching the Internet, and e-mailing at least a few times a week. Although less than 70% of all educators had access to a computer in their classrooms, it was also found that educators teaching in urban settings had greater access to computer technology than those teaching in rural settings. It was also found that educators who do have computers in the classroom, do not necessarily have networked computers or ones equipped with CD-ROMs. Despite the fact that 93% of educators claimed to support technology integration for their learners, only slightly more than 50% used computers for literacy instruction.

Although access to technology was indicated as a significant barrier to technology integration, it is interesting that not all those with classroom access used computers for instructional purposes. This may suggest that reasons for integrating computer technology into adult literacy education are more complex than simply having access to technology. Educators reported less comfort level using computers for instructional purposes when compared with using computers for personal use. One possible reason provided included an overall lack of opportunity for educators to use computers in the classroom due a lack of professional development. Not all educators felt trained well enough to use computers when teaching; on a scale of 1-5 (1 = strongly disagree; 5 = strongly agree) educators revealed a mean of 3.9 ($SD = 1.0$), which suggests a greater need for professional development. Additionally, educators indicated the following criteria as being important for technology integration in addition to access: if there is enough time, if technology is relevant to learning outcomes, if computers can enhance or

reinforce a concept, if research or graphics or word-processing is required, as well as the level of learners' computer and literacy skills. It was also found that learners' abilities may affect if and how computer technology is used within the classroom even if educators have access to the technology. This was related to the diversity adult literacy learners represent in terms of many factors including age, computer experience, and literacy skills.

Barriers to technology integration included the lack of the following: funds, quality and quantity of technology, professional development, educators' computer skill level, time, appropriate software, students' comfort level with computers, and learners' skill level with regard to computers and literacy. Although over 95% of educators felt they had administrative support for technology integration, their actual access to technology and resources does not reflect this. Many felt this is due to a lack of funding, which was reported to be linked with a certain societal discriminating mindset that impacts funding agencies, policy-makers, and government. This same mindset was identified to be the root of all other barriers to technology integration within adult literacy education.

Over 90% of educators felt that computers fit within their personal approach to teaching and learning; further, almost 87% viewed computers as integrated whereas only 47.5% considered computers as a stand-alone activity. Moreover, there was an approaching relationship between educators who viewed computer use as a stand-alone activity and those who felt their learners do not have the skills necessary to use technology effectively. This seems to be a logical relationship whereas a certain level of competency in terms of literacy and / or computer skills is needed to independently use

computers. The overall uses of computers for literacy instruction varied among educators. Those who reported using technology with their learners indicated that primary uses included word-processing, searching the Internet, using software, e-mailing, basic computer instruction, reinforcement of skills, individual projects, evaluating resources / critical thinking, and increasing students' overall comfort level with computers.

It was found that there is an interest and a need for more professional development among adult literacy educators that focus on general basic computer instruction followed by more specific software applications and strategies for effective integration. Over half of educators attended either none or one professional development workshop related to computer use over three years prior to completing the survey. This is unfortunate, especially whereas in-service workshops were identified as the most valuable form of professional development for learning about computers and technology integration and the majority of educators reported a strong interest in increasing their computer skills and knowledge.

When compared with educators who do not integrate technology, educators who integrate technology were reported to have the following characteristics: more computer skills, higher comfort level with computers, more ambition, take on more work, more flexible, and have more time. Some of these perceived differences may provide some important considerations for areas of professional development as well as program delivery changes, such as the addition of built-in preparation time. Further, educators reported that their experience with computers affects their willingness to use computers with learners in the classroom. This is an important factor to consider, especially

whereas it was found that educators rated their experiences using computers at home higher than at school or when they were younger. This may suggest that there need to be increased opportunities for educators to have positive experiences with computers within their school environments.

Computers were felt to be a necessary component of adult literacy, especially whereas almost 95% of educators indicated that computers may facilitate literacy development and because the definition of "literacy" itself has been altered by technology within society. Educators indicated that literacy has expanded to include the interaction with multimedia to the extent of desired participation in today's technologically-advancing society. Further, many other benefits of using computer technology with adult literacy learners were cited including the following: increases learners' self-confidence; increases access to resources and print; supports independent, promotes student-driven learning; increased employability; assists learners reach their goals; increases learner motivation; widens learners' viewpoints; increases independence, which was reported to lead to empowerment. It was also found that increased and improved communication was central to the benefits of technology integration within the classroom.

With so many perceived benefits of technology integration for adult literacy learners, it was reported that the exclusion of computers within literacy programs would be doing a disservice to learners. Educators also indicated that there are great inequalities among and between populations in terms of access to computer technology and instruction. There was a strong desire on the part of educators to begin taking action toward bridging the gaps that currently exist. In the effort to lessen the digital divide, educators felt that a change in mindset around adult literacy learners and literacy is

fundamental to progress whereas this mindset directly and indirectly affects access to programs, funding, technology, and instruction for educators and learners. It was mentioned that certain research may also play a role in reducing inequalities and augmenting overall access to literacy and technology education.

CHAPTER FIVE: DISCUSSION

The discussion of the findings is focussed specifically around the initial questions that guided this research with reference to an already-existing body of literature and research on adult literacy education and technology integration. Further, educators' approaches to literacy instruction were contemplated within the frameworks of transmissional, transactional, or transformational models of teaching.

A transmissional teaching style maintains certain underlying assumptions. For example, there exists *tabula rasa*, to which already-existing knowledge is added through a one-way directional interference by the "expert" teacher. Teaching approaches within this framework may include whole class instruction, lectures, and foci on skills and "facts". However, a transmissional approach of "filling students with information and facts…and a training approach of instructing them in isolated decoding skills, become equally untenable" (Warschauer, 1997, p.90).

Transactional teaching involves teacher guidance, mentoring, and modelling within a supportive learning environment where collaboration is encouraged and some aspects of curricula may be negotiated with learners (Weaver, 1994). This model of learning stresses the importance of active learning as a process where learners construct their knowledge through interaction or transaction with the social and physical environment.

The transformational model of learning is based on dialogue and problem-solving through curricula and content generated from learners' lives. Further, "one of the central aspects of a participatory approach to adult literacy instruction is that teaching is context

specific: curriculum content arises from the needs and interests of each group of participating learners as much as possible" (Auerbach, 1999, p.31). This model reinforces the notion that teachers and students co-construct understandings, learning and growing together from the process as they share experiences and understandings. The curriculum is shared and co-governed between students and teachers through negotiation and power-sharing (Shor, 1999). This is transformative in terms of the individual and how he or she understands his or her own life. Further, Paulo Freire suggests the following: "Dialogue belongs to the nature of human beings, as beings of communication. Dialogue seals the act of knowing, which is never individual, even though it has its individual dimension" (Shor & Freire, 1987, pp.3-4). It is through dialoguing with educators and the data provided by the educators that I have come to approach an understanding of this research: "We cannot separate our knowledge of things from our experiences with them. We can only interpret information in the context of our own experiences, so the meaning that we make emerges from the interactions that we have had" (Jonassen et al., 1999, p.3).

Adult Literacy Educators' Views of Computer Technology within their Definition of

Literacy

It was found that the educators' definitions of literacy have expanded to include multimedia as an information source as well as means of communication. This finding reflects the literature around the impact of computer technology on the definition of literacy (Negroponte, 1995; Niederhauser, 1997). The educators felt that computers

should play an increasingly important role within literacy whereas computers are becoming a part of many life aspects.

The educators of this study indicated that computer use demands a certain level of literacy; this was the reason provided by those who felt their learners should gain a strong sense of basic literacy skills *prior to* using computers. However, this approach to literacy and technology may bear certain assumptions about literacy and learning; for example, this way of thinking may suggest that literacy is simply a set of isolated skills to be learned before engaging in meaningful literacy activities. Fox (1999) describes this approach to literacy education: "In addition to defining students by their deficiencies, deficit theories – especially in their application to basic writers – tend to reduce writing to a set of discrete skills to be learned, especially the countable ones such as punctuation and spelling" (p.69). Becker (1999) predicts that due to the close alignment of technology with constructivist approaches to learning, the educators whose pedagogy reflects skill-based approaches will be less likely to integrate technology. From this standpoint, it is encouraging that most educators within this study (86.7%) viewed computers as being an integral part of literacy development. These educators felt computers may facilitate literacy development primarily through the use of word-processing, the Internet, and educational software. Such approaches to literacy using technology may promote opportunities for learners to develop literacy skills while engaging in meaningful and relevant activities using technology.

The educators felt that there are many benefits of using technology within adult literacy education including the increase of the following: learners' independence, employability, self-confidence, motivation, empowerment, literacy level; increases access

to print, information, and resources; facilitates individualized, self-paced learning; and provides variety for learners. These benefits reported are consistent with other research around educators and technology. For example, Kellenberger and Hendricks (2003) found that teachers believed computers to be valuable for increasing learners' motivation. In addition to increasing learners' motivation for learning, Hopey et al. (1998) also found that technology integration within adult literacy may assist learners in gaining independence and therefore increased ability to control many aspects of their lives. Research has also shown additional perceived benefits of technology integration for adult literacy education such as enhanced student control over his or her learning, and increased computer skills, employability, self-esteem, and access to information (Kunz & Tsoukalas, 2000; Osei, 2001). Most of the educators within this study (95%) believed that computers may facilitate literacy development while 88.9% reported that computers are a necessary component of adult literacy education. Au and Raphael (2000) describe how technology integration may offer learners new possibilities: "Helping students gain ownership of literacy contributes to their empowerment because students realize they have tools of communication that can be used to gain a better understanding of the world and to act upon (or rewrite) the world" (p.179).

However, some educators also reported some cautions around the use of technology for literacy instruction. For example, there were some concerns expressed around issues surrounding the importance of human interaction. It was felt that despite the perceived benefits of technology integration, it is important to recognize that computers cannot replace human interaction that is valued so highly in more traditional approaches to teaching and learning. Shechtman and Horowitz (2003) found that there is

a difference between interacting with computers in comparison to interacting with humans whereas there is an element of relationship established between humans during interactions and communication. Perry (2003) claimed that one group of students learned more about Shakespeare through traditional, lecture-style teaching than another group of students who had used technology in more constructivist ways. However, this finding is questionable whereas the instrument he used to assess the learners' progress consisted of a 100-question test and a 5-question essay test. Such a test may have been more aligned with the transmission approach. It would have been interesting to see how both groups of student excelled using more authentic forms of assessment that do not rely on the regurgitation of information. However, his conclusion that human interaction is an important component of education is important. It is unfortunate that a dichotomy between humans and computers is often created since discussions around technology are often conducted by humans, in which case, it makes sense that humans would be chosen between the two. However, it may be more beneficial to explore ideas around technology without creating an "either / or" situation, but an exploration that considers how both may be complemented by the other.

Adult Literacy Educators' Experiences with Computer Technology

The educators' experiences with computers were examined in terms of their frequency of usage, type of computer use, and professional development received around computers. Their general computer use was more frequent than their use of computers at work; it was found that the educators used e-mail, Internet, and word-processing at least a few times a week whereas their use of computers at their learning centre averaged a few

times a month. Galloway (1999) found that the most frequent use of computers by educators was word-processing followed by educational software. He also found that the applications of spreadsheets, multimedia, desktop publishing, programming, hypermedia, tele-communications were rarely used, if ever, for instructional purposes by educators. Brickman, Braun, and Stockford (2000) found use of the Internet, e-mail, and word-processing to be the most frequently reported uses of computers for educators.

Galloway (1999) found that over 83% of educators taught themselves how to use computers as well as more specific software applications rather than through an external source. Although the educators in this study were found to have received a low quantity of professional development workshops, Karsten and Roth (1998) suggest that the content and approach of professional development may be more influential on educators than the quantity. This study was consistent with other research in that educators surveyed did not favour methods of professional development involving technical dependence such as online courses or workshops (Carter & Titzel, 2003). Both this study and the one conducted by Carter and Titzel found in-service workshops to be the most preferred form of professional development, along with other methods that involve face-to-face interaction such as courses and talking with colleagues.

Watson (2001) argued that educators integrate technology in their classrooms when it is consistent with their own pedagogical practices and subject area. This study found that 90% of the educators felt computers fit within their personal approaches to instruction. Early research conducted around technology integration found that there was a lacking correlation between educators' computer skills or interest and their actual computer use with learners (Morrison, 1986). Further, this same study found that

classrooms that involved active learning, group work, and high levels of learner autonomy used computers more frequently than classrooms that involved whole-class teaching.

Because adult literacy education curricula and pedagogy must reflect the lives of learners, the participants of this study claimed that it is essential that technology play a role. Whereas adult learners are being increasingly required to use technology in their everyday lives, its integration within literacy programs seems to be a necessary component. Adult literacy education must involve a broader context than isolated skills for the learners. What it means to be literate extends beyond encoding and decoding text; it involves the ability to make sense of and participate within the world; as our world changes, so must the concept of, and thus the education around, literacy. To electronically participate in the world requires literacy skills that differ from traditional literacy skills for interacting with print text. For example, hypertext demands new ways of engaging with text (Smith et al., 2000). Therefore, adult literacy education must involve not only opportunities for literacy development in the traditional sense, but the facilitation of literacy skills that enable learners to fully engage in their surroundings.

Adult Literacy Educators' Integration of Computer Technology

Research has found that adult literacy educators use technology in a wide variety of ways (Carter & Titzel, 2003). This study found that 55.6% of the educators used technology to teach literacy or reading. When computers were used for this purpose, they were incorporated in the following ways: software, word-processing, Internet research or games, teaching resources, online reading exercises / tutorials, e-mail, and basic

computer instruction. Carter and Titzel found the three most frequent uses of computers by educators included using technology to create lessons, using technology for drill and practice skills, and accessing lesson plans on the Internet. Brickman et al. (2000) found word-processing and the Internet to be widely used by both learners and educators, which is consistent with this study. However, Kunz and Tsoukalas (2000) found that both students and teachers used computers primarily for word-processing and that educators accessed the Internet more frequently than learners. This same study also noted that the primary use of computers by educators was administrative in nature. Carter and Titzel revealed that teachers who taught students with very limited literacy skills were less likely than other educators to use computers with learners in any capacity; this was a concern for some educators in this study. Some educators expressed that their students' lack of literacy and computer skills sometimes hindered their perceived capability to integrate computers in the classroom. This suggests that the question of whether or not educators use technology should be expanded to include *how* they use technology.

An American study that analyzed twenty-eight key studies within the past twenty years about technology within education revealed the following: "Many reports present strong assertions that technology can catalyze various other changes in the content, methods, and overall quality of the teaching and learning process, most frequently, triggering changes away from lecture-driven instruction and toward constructivist, inquiry-oriented classrooms" (Culp, Honey, & Mandinach, 2003, p.5). Degener (2001) suggests that from a social-constructivist viewpoint, adult literacy education should occur in meaningful contexts with relevant connections to learners' lives. Educators in this study reported that their learners learned better when content was meaningful and

relevant, a characteristic that was deemed important to literacy education by many. Research has found that the use of technology is more effective when it is integrated into authentic interactions among learners and between educators and learners (Cope & Ward, 2002; Cromley, 2000; Mayers & Swafford, 1998). Such a finding appears to be closely aligned with the transactional approach to literacy instruction and learning.

During discussions with participants throughout this study around the use of technology within education, there appeared to be a perceived dichotomy between technology as a subject and technology as a tool for learning other subject foci such as literacy. The difference between approaches also may be described as teaching *with* computers as opposed to teaching *about* computers. Watson and Tinsley (1995) found that teachers who integrate technology within their classrooms are those who clearly relate the use of technology to their pedagogy within their own subject area.

Additionally, Becker (2001) found educators' philosophies of learning and teaching made an impact on the way in which they integrated computers within their classrooms. For example, Becker found that educators whose practice was closely aligned with constructivist theory tended to have more competence using computers, used computers more frequently with students and on their own, used them in ways that required more complex skills, and had more technical expertise. Law et al. (2000) found that without the transformation of pedagogical beliefs, educators' use of technology will simply remain traditional; teaching practices would continue the same way, but be transferred through the use of technology. This study found an approaching correlation between the view that computer use should be treated as a stand-alone activity and the belief that learners' lack the necessary skills to use computers effectively. Further,

Eisenberg and Johnson (2002) warn against the use of computers as electronic worksheets. Susan Imel (1998) suggests that technology can do one of two things: they can perpetuate poor pedagogy or can transform learning.

Trinidad (2003) argues that learners must be provided with opportunities to interact with one another and take ownership of their learning if they are to be motivated through authentic learning. Trinidad further describes how learners may relate to such an approach:

> A sense of empowerment and engagement for the learner emanates from a multitude of learning situations, where they are no longer dependent on the specific and often limited knowledge of their educator, but work within the community of learners mediated by the educator. (p.105)

Ira Shor (1992) asserts that empowerment "does not mean students can do whatever they like in the classroom. Neither can the teacher do whatever she or he likes. The learning process is negotiated, requiring leadership by the teacher and mutual teacher-student authority" (p.16). Through meaningful learning experiences that instil a sense of independence and self-confidence in learners may provide them with increased abilities to go about their lives the way they would like. Linda Shohet (2001) states that adult learners arrive at literacy programs with certain expectations:

> In addition to enrolling in programs for the purpose of job upgrading, adults enrol in these programs to broaden their education, help their children succeed in school, or to make social connections. Besides learning to read and write, students report increased self-esteem and confidence and an

awareness of the ability to learn. (Redefining the boundaries of literacy section,

¶ 2)

Learners' reasons for attending literacy education are broader than learning how to decode and encode words – they participate because they want to be able to *use* language rather than simply construct it.

Perceived Barriers to Computer Technology Integration

Educators in this study revealed several barriers to technology integration; the barriers may be categorized into two divisions: external or environmental barriers and internal or attitudinal barriers. External or environmental barriers may include, but are not limited to, the lack of the following: quantity and quality of technology, work space, quantity and quality of software, access to resources, funding, and professional development. Internal or attitudinal barriers include, but are not limited to, the lack of the following: awareness and acknowledgement of literacy issues by society, government, funding agencies and policymakers, societal respect for all populations, time, and the comfort and skill levels of both educators and learners. However, it must be recognized that external and internal barriers are interconnected and share complex relationships. For example, a certain societal mindset or attitude may influence government, policymakers, and funding agencies, which then impacts the funding of adult literacy programs, which therefore affects learners' and educators' access to technology and thus, the practicalities of technology integration within adult literacy education.

Funding for technology for adult literacy education is well below that which is provided for other educational sectors (Carter & Titzel, 2003). Ira Shor (1992) states that

unfortunately, "more money has always been invested in the education of upper-class children and elite collegians than has been spent on students from lower-income homes and in community colleges" (p.15). This view may be considered within the transformative framework whereas it encourages individuals to raise questions around their understanding of themselves within their lives. Educators within this study shared that adult literacy education is perceived by society as different from, and perhaps not as valid as, other educational sectors. They attributed this to a societal mindset that marginalizes certain populations. It was recommended that all learners should have access to computers and instruction. Further, it is important to consider the idea of "access" in a broad sense; Culp et al. (2003) state that accessibility "refers not only to the physical access, but also to access to relevant and appropriate content, to adequate support and training, and the ability to make use of technology to both create and consume information and ideas" (p.11).

The findings of this study appear to be consistent with other research in terms of barriers to technology integration. A lack of technology, access to support, and a lack of time (especially paid time) for professional development were cited as barriers to technology integration in other studies (Brickman, Braun, & Stockford, 2000; Carter & Titzel, 2003). However, this study differs from that conducted by Carter and Titzel, who found that over 40% of teachers surveyed did not identify a lack of up-to-date technology as a major barrier for integration. It did, however, report that many educators found a lack of paid time to develop comfort level using technology to be a barrier, which is consistent with this study.

Educators in this study indicated that the lack of appropriate software, unreliable and outdated technology, and a lack of funding for technology, support, and professional development also played a role in preventing the ease of technology integration, which is similar to other findings (Kunz & Tsoukalas, 2000). Brickman et al. (2000) found that educators' lack of knowledge about the Internet and how it may be used, as well as a lack of time to learn about it, were primary barriers to successful use of the Internet for instruction. Further, this same study found that lack of time and professional development were the primary barriers for all types of computer use within the classroom:

> training to learn how to use technology and applications, training to learn how technology can be integrated into teaching, time to learn how to use technology, time to practice, and improve technology skills, and time to build comfort and confidence with the use of technology in the classroom. (p.28)

Relationships between Adult Literacy Educators' Experiences with and Integration of Computer Technology

Although some research has found the relationship between educators' experience and computer use to be unclear (Kellenberger & Hendricks, 2003), this study explored this area in a general sense. Educators' experiences were addressed throughout the survey in terms of their general computer use, how they use computers, frequency of both home and work computer use, descriptions of certain interactions with computers, overall rating of their experiences with computer technology as well as their perceived extent to which those experiences impact their willingness to use computers during instruction.

This study found that the frequency of educators' use of classroom computers for any purpose was positively correlated with their use of computers for literacy instruction. None of the other items from the survey were significantly correlated directly with educators' practice of technology integration. However, analysis of the data may contribute to an understanding of the complex relationships involved between educators and technology.

It is interesting that the educators perceived the impact of their experiences on their willingness to use computers with learners to be substantial. Although the educators' rating of their experiences with computers was positive, their actual use of computers during literacy instruction was not as prominent (55.6%). This may suggest that there are other factors that play a role within educators' integration of technology, other than educators' computer experience. Kellenberger and Hendricks (2003) found educators' self-confidence using computers for work to be the strongest predictor of computer use for teaching but not for educators' own use or use for student learning. Self-competence was also found to be a strong predictor of using a computer for student learning in some studies (Kellenberger & Hendricks, 2003; Marcinkiewicz, 1993-1994). Additionally, Brickman et al. (2000) suggest that unreliable technology may inhibit educators' likelihood of technology integration.

This study indicated that the educators' frequency of classroom computer use for any purpose was related to their use of technology with learners. It was also found that the educators felt more comfortable and confident using computers for their own personal use than using computers for instructional purposes. The educators had reported using computers for work-related tasks at least a few times a week. Kellenberger and

Hendricks (2003) found that using a computer for teaching needs serve as a connection between educators' personal computer use and their use of computers with learners.

It was found that the educators generally perceived computer technology in a positive light. Research has found that there is a direct relationship between educators' experiences with technology and their attitudes toward technology (Loyd & Gressard, 1984; Mitra & Steffensmeir, 2000; Woodrow, 1994). This is encouraging for the field of adult literacy education whereas teachers' development of positive attitudes toward computers has been found to be a key factor for effective technology integration for enhanced learning (Woodrow, 1992; Yuen et al., 1999).

Although teachers' attainment of knowledge and skills around computer technology has not been shown to directly ensure the integration of technology in the classroom (Thomas, Tyrell, & Bullock, 1996), computer skill levels may impact *how* educators use technology with learners. For example, Carter and Titzel (2003) found that educators with limited computer experience and skill were more likely use technology for drill and practice software. They pose interesting questions with regard to this finding: "Is it because it is simple to use, or because they have more limited expectations about what technology can do?" (p.6).

Galloway (1999) found that teachers were unlikely to integrate technology in the classroom without using computers for personal and professional reasons. This may be related to their overall comfort level using computers. This study found that the educators' ease of computer use and their enthusiasm toward using computers were positively correlated. Bielefeldt (2001) felt that educators' beliefs around technology impact their actual use computers with learners. Whereas educators' comfort level and

attitudes toward computers have been reported to impact technology integration (Berge & Mrozowski, 1999; Rosen & Weil, 1995), it is important to consider this during professional development planning and implementation. This study's findings were consistent with those of Kellenberger and Hendricks (2003), who found that teachers felt more competent with regard to computer skills for their own personal use or for their own teaching needs when compared to using computers for instructional purposes.

The need for professional development was reported by educators in this study; further, 15.2% of the educators reported not feeling skilled enough with computers to use them with learners. Although this percentage is a concern and must be addressed accordingly, it is encouraging that 76.1% of the educators felt they were skilled enough to use computers with learners. An American study found that only 20% of educators felt adequately prepared to use educational technology in their teaching (U.S. Department of Education, 2000). Educators' interest in further professional development regardless of perceived skill level was evident within this study as 83.3% reported a desire to increase their level of computer use for literacy instruction, which is consistent with other findings (Carter & Titzel, 2003; Specht et al., 1999). However, it is imperative to consider the type and approach of professional development for adult literacy educators rather than solely the quantity. It has been suggested that professional development should involve interactive learning that focuses on conceptual aspects of technology integration rather than on exclusively gaining isolated computer skills (Brickman et al., 2000; Galloway, 1999). Further, Culp et al. (2003) found that there is a need to "emphasize content and pedagogy, not just the hardware requirements" (p.12). Consistent with the findings of

this study, the most favourable form of professional development was reported by Carter and Titzel to be face-to-face workshops.

Technology integration within adult literacy education is far from straightforward. The present research has shown that there are many contributing factors that play a role within technology integration. As there is no one solution to achieving successful technology integration within literacy education, it may require new approaches to problem-solving so that all learners may have more equitable access to technology and instruction. For example, Shayo et al. (2000) suggest that successful technology integration is "not solely determined by the characteristics of the individual teachers, software characteristics, training or work environment characteristics, but the result of interaction between them" (p. 35). Further, this same study found the following:

> The interaction between the individual, training, work, and system characteristics takes place within the context of the teachers' perceived usefulness of computer integration; perceived ease of use; computer knowledge; available training / learning support; proper training design and implementation; increased social status due to use; integration expectations. (p.35)

Conclusion

Most of the educators (88.9%) within this study reported that the definition of literacy has expanded to include interactions with multimedia technologies, which are increasingly becoming a part of society. Although a few educators claimed that computer technology should be used once learners have acquired a strong foundation of literacy skills, 95% of educators indicated that computers may actually facilitate literacy

development. The latter view supports the concept of literacy as a continual, interactive progression as opposed to the former, in which literacy consists of skills to be learned in isolation until they are attained. It is encouraging that most facilitators (86.7%) in this study considered computer technology as playing an integral role in the literacy development of their learners. In addition to the educators' beliefs that computers may facilitate literacy development, many other benefits were reported as a result of using computers with adult literacy learners: increases independence, employability, self-confidence, motivation, empowerment; increases access to print, information, and resources, facilitates individualized, self-paced learning; and provides variety for learners. These benefits were also found by other researchers in the literature reviewed.

Although some educators in this study emphasized some caution around using technology due to the more valued interaction with other people, this concern may be alleviated if computers and people are not considered to be dichotomous.   The communication between and among individuals may actually be enhanced when computers are used as teaching and learning tools within blended learning environments, where computer use is used in combination with face-to-face interaction.

The educators' experience with computer technology was found to vary. It was encouraging to find that all educators within this study owned a home computer. They generally used computers primarily for word-processing, searching the Internet, and e-mailing, which is consistent with other research. For the 55.6% of educators who used computers to teach literacy or reading, they most frequently used software, word-processing, and Internet, which is consistent with other findings.

The educators in this study gained their computer knowledge in ways other than professional development, whereas most had received very little professional development around technology. However, it was found that 15.2% of educators felt they were not skilled enough to use computers with learners while most educators' experiences with computers at school were rated lower than those at home; therefore, there is a need for professional development for adult literacy educators in terms of technology and its integration. Consistent with other research, the most preferred form of professional development was reported to be in-service workshops. Once educators have access to increased professional development opportunities to improve their comfort and confidence level in using computers with learners, perhaps their rate of technology integration (for those with access to technology in their learning centres) may be more likely to increase.

Research has found that pedagogical beliefs may impact how technology is integrated within learning situations. This is promising whereas 90% of the educators in this study felt that computers fit within their personal approaches to instruction. They also indicated that computers may be most effectively integrated when learning is both meaningful and relevant, which is closely aligned with former research. The educators and the literature reviewed noted an important difference between using computers as content and using them as tools for learning. It was found that 87% of the educators viewed computers as integrated within the curriculum, which research has found to be the most conducive approach to successful technology integration. Computer integration that provides opportunities for learners to engage in meaningful learning should be preferred over the more narrow focus of simply learning about computers.

It must be understood that technology integration is a complex phenomenon; there is no one factor that will ensure its occurrence. Both extrinsic and intrinsic barriers were reported, within this study, as well as in other research, to inhibit the integration of technology within educational settings. Integration is more complex than access to technology, as shown by educators in this study; not all educators with access to technology used computers for instructional purposes. Although educators in this study reported to have positive experiences with computers, almost half did not integrate technology. Even if all known barriers were eliminated, this would not necessarily guarantee integration whereas it is a combination of factors (including the unique relationships and interactions with individuals and the known barriers) that may determine the likelihood of integration.

It is important to recognize that the addition of computers to every adult literacy education classroom would not result in effective technology integration. The emphasis should be directed at using technology to enhance pedagogical practice rather than using technology for the sake of the technology itself. Authentic, meaningful learning with computers that engages learners through purposeful interaction may provide greater opportunities for literacy development in adult learners.

CHAPTER SIX: CONCLUSION

Our "perceptions and rules are constantly engaged in a grand dance that shapes

our understandings." (Brooks & Brooks, 1993, p.4)

This research may serve to inform practice and policy with regard to technology integration within adult literacy education through the attendance to and acknowledgement of educators' perspectives. Although there can be no universal definition of literacy, whereas it is fluid within its context, adult literacy programs have a responsibility to offer learners literacy instruction based on their needs and interests within their particular contexts. Many adult learners have expressed feelings of isolation and lessened self-esteem and confidence when they find themselves unable to participate in their lives to the extent they may wish. Whereas computer technology is becoming more prevalent in the lives of many adults, it must be integrated within adult literacy education. One educator voiced this same concern:

Adult literacy education is often irrelevant to adults' lives. Computer technology knowledge is increasingly needed in our lives. Computer technology can help adults expand their reading and writing practices as well as enable them to participate in the technology world.

In order for technology integration to become a reality within adult literacy education, certain changes must first take place. This research found that the perceived barriers to technology integration stem from a societal belief system that, in turn, impacts issues around program funding, access to technology, and program development, among

others. This belief maintains a central assumption of discrimination against marginalized populations, such as individuals with low literacy skills. Because of this mindset, educators perceived that adult literacy education as a whole is not valued in the same way as other educational sectors. Educators described this as being a major barrier to successful technology integration, a possible reason why adult literacy education has lagged behind other forms of education with regard to the uptake of technology.

Another change that must occur is an increase in access to technology through increased funding and the elimination of other reported barriers. However, access to technology does not in and of itself ensure technology integration within the classroom. Once technology is accessible to learners and educators within adult literacy education, there needs to be a continuous support system around using computers in the classroom. Additionally, there needs to be a focus on pedagogical practices with technology whereas computers should not be used simply as glorified worksheets. Technology should be integrated within adult literacy education in such a way that learners may be able to pursue literacy activities that are meaningful and relevant to their lives.

A narrow view of literacy may result in skill-based literacy instruction that promotes isolated literacy skills; however, the goal of adult literacy education should be to facilitate learners in using literacy to fully engage themselves within their contexts, whatever that may entail. Paulo Freire articulates the complexity of literacy interactions:

> Reading is not just to *walk on the words*, and it is not *flying* over the words either. Reading is re-writing what we are reading. Reading is to discover the connections between the text and the context of the text, and also how to

connect the text / context with my context, the context of the reader. (Shor & Freire, 1987, pp.10-11)

Technology integration within adult literacy education may be used in a variety of ways, although research shows that technology use in the classroom tends to closely reflect educators' pedagogical approaches. While some educators may use computers for drill and practice exercises, others will use them in meaningful and relevant ways that facilitate the construction of knowledge. Other educators may use computers in varying ways depending on the learners as well as the tasks at hand. For example, Ira Shor speaks of "parallel pedagogies", where "the teacher simultaneously employs a variety of classroom formats" (Shor & Freire, 1987, p.44). However, pedagogy may best suit learners when it assumes that individuals are constructors of knowledge, rather than passive recipients of transmitted knowledge (Jonassen et al., 1999).

It may be in the best interest of learners for educators to support their learning in ways that encourage and enhance their independence. Myles Horton claims that educators' job is "to try to figure out ways to help people take over their own lives" (Horton & Freire, 1990, p.177). When individuals become better equipped to live their lives in the ways in which they want, this may provide them with new life opportunities that they otherwise would not have. Educators who are guided by social constructivism offer a supportive role to learners rather than one of control; "they further inquiry, not orthodoxy" while continuously evaluating "themselves, the students, and the system in which they teach" (Gould, 1996, p.101). This results in a learning environment which lends itself to multiple opportunities for "concrete, contextually meaningful experiences

through which [learners] can search for patterns, raise their own questions, and construct their own models, concepts and strategies" (Fosnot, 1996, p.ix).

Adult literacy programs must extend beyond environments for learning technology skills for writing: "It must help literacy learners bring their communities into the programs, so that the uses of written language they are learning can be sustained by those communities" (Ewing, 2003, p.17). Computer technology may provide new opportunities for doing this whereas technology has the potential to support the unique needs of adult literacy learners (Pailliotet, 1998; Rose & Meyer, 1994).

Recommendations

This research has shown how awareness and sensitivity to issues around adult literacy and the need for technology integration on the part of government, policy-makers, funding agencies, and society in general may impact program development and funding. In order for positive changes to take place with regard to technology integration, such a mindset must be challenged so that adult literacy education is viewed as a priority. Once awareness around adult literacy is increased, there may be new opportunities for overcoming other barriers reported within this study.

Access to technology needs to be increased and improved. Educators cannot integrate technology if they do not have access to it. This study found that 67.4% of educators had access to a classroom computer (not all networked) while 80% had access to a computer within their learning centre. If the technology to which they have access is not adequate in quality, then both educators and learners may be deterred from its use. For educators with access to technology, there were concerns around the availability of

adult-appropriate educational software that they may use with learners. As indicated by educators within this study, there is a need for software, curriculum documents, and other resource materials that have been developed by educators in the field of adult literacy.

In addition to increased access to technology, it is essential that the levels of professional development for adult literacy educators are increased. Educators must be supported in their goals to integrate technology within their curricula. In-service workshops were found to be the most preferred form of professional development, as the characteristic of face-to-face interaction was appealing to most. In order for educators to continue their development, it is important that they be provided with paid time to learn about technology and its effective integration.

Technology integration within adult literacy should focus on using technology as a tool for literacy development rather than as content. Rather than viewing computers as tools to be used *after* attaining basic literacy skills, computers can be an integral part of literacy development. Whereas technology is often used to reinforce already-existing pedagogical beliefs, it is important for educators to examine their concepts of literacy education. The needs of adult literacy learners may be more adequately met if literacy is considered a contextualized, ongoing process rather than a set of isolated skills.

Once educators have networked access to computer technology, they may be able to effectively utilize the technology to maintain important connections with other educators to share ideas, experiences, and knowledge. This could also serve as a supportive network with regard to technology integration in the classroom through the sharing of lesson plans and materials. After educators are comfortable using the Internet, they may increase their access to resources that may support their teaching and learning.

The development of a technology integration framework for adult literacy education may be beneficial. Such a framework could include a series of stages along a continuum that would gradually make technology integration a reality within all adult literacy education programs. Collaboration among and between programs may enhance the solidarity of the framework. Support systems could be created to enhance its progress. Ongoing assessment of the framework in each stage of its implementation would also be important for ensuring its success.

Further research on how technology can be successfully integrated within the field of adult literacy education is needed. In addition to increasing the knowledge base around adult literacy education and technology integration, extensive research may provide funding agencies and policy-makers with research-based information regarding the conditions that promote the effective use of technology.

Implications for Future Research

The high level of interest shown by educators toward professional development around computer technology suggests that the quantity and quality of current professional development for adult literacy educators is currently insufficient. However, research suggests that educators' professional development is the primary step toward the successful integration of technology (Culp et al., 2003). Thus, it would be beneficial to further research what content and approach adult literacy educators prefer; this study offers preliminary findings in this area in that it was reported that face-to-face workshop approaches (during paid times) to learn about basic computer skills and specific software applications were preferable. Whereas more specific preferences may vary among adult

literacy educators, it is necessary to base professional development on individual interests and needs. However, all professional development should be offered with a common goal of increasing educators' overall comfort, confidence, and skill level with regard to using technology to enhance the learning experiences of their learners. Effectiveness of professional development should be researched so that it may better inform future professional development and support for educators. It is also crucial for relationships between computer technology and instructional approaches to be examined further to improve the understanding of how technology may be used to improve adult literacy teaching and learning.

All of these recommendations and topics for further research are centred around the underlying assumption that adult literacy education should be *negotiated with* and *for* the learners rather than *delivered to* the learners. Past experiences working with adult literacy learners have shown me the importance of prioritising value and respect for learners within their life contexts. Although this particular research has involved adult literacy educators, it is the learners who must remain central to all inquiry around their education. Pivotal in my development of a frame for thinking about technology integration within adult literacy education, is a comment made by a former learner. His words rang loud in the beginning but gained increasing power throughout this exploration:

"Times are changing – they're not waiting around for us illiterate people."

This comment made within a casual conversation epitomizes the sense of panic many adult literacy learners experience as they see their world changing before them. In addition to the obstacles learners already face with literacy difficulties, there are fast

approaching technologies that further complicate these issues. Adult literacy education

must be given the necessary support so that it may offer learners opportunities for

engaging with technology in supportive environments.

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Computer Use Survey for Adult Educators

Demographic information

Age: a) 20-29   b) 30-39   c) 40-49   d) 50-59   e) 60 +

Gender: a) Female   b) Male   **Language of Instruction:** a) English   b) French

Total Number of Years Teaching: a)1-10   b)11-15   c)16-20   d)21-25   e)26-30   f)31+

Current Teaching Position (course(s)): _____

Current Position: Volunteer: _____   Paid: _____

Location of Organization: Rural: _____ Urban: _____

a) New Brunswick b) Newfoundland / Labrador c) Nova Scotia d)Prince Edward Island

Number of years teaching:

Adult Basic Education	a) 0 b)1-10 c)11-15 d)16-20 e)21-25 f)26-30 g)31+
Adult Literacy	a) 0 b)1-10 c)11-15 d)16-20 e)21-25 f)26-30 g)31+
ESL	a) 0 b)1-10 c)11-15 d)16-20 e)21-25 f)26-30 g)31+
Vocational Education	a) 0 b)1-10 c)11-15 d)16-20 e)21-25 f)26-30 g)31+
Other	a) 0 b)1-10 c)11-15 d)16-20 e)21-25 f)26-30 g)31+

(please specify: _____)

Highest level of education: _____Secondary
 (check which applies)   _____Secondary plus teachers' college
                              _____Secondary plus some post secondary
                              _____College Diploma
                              _____Undergraduate degree
                              _____Master's Degree
                              _____Doctoral Degree

I. *General Computer Use*
1. How often do you use a computer for any of the following activities?
   (fill in the circle that best describes your level of use)

	NEVER	A FEW TIMES A YEAR	A FEW TIMES A MONTH	A FEW TIMES A WEEK	EVERY DAY
A. Searching the Internet………………………..	O	O	O	O	O
B. E-mail………………………………………	O	O	O	O	O
C. Word processing……………………………	O	O	O	O	O
D. Games………………………………………	O	O	O	O	O
E. Banking/shopping…………………………..	O	O	O	O	O
F. Chat-rooms…………………………………	O	O	O	O	O
G. Work………………………………………	O	O	O	O	O
H. Marking……………………………………	O	O	O	O	O

2. On average, how many **minutes** do you spend on the computer per week?

a)0   b)5-45   c)46-90   d)91-135   e)136-180   f)181-225   g)226-270   h)271+

3. In general, how at ease do you feel about using computers?

1	2	3	4	5
Very at ease		Neutral		Very Uneasy

4. In general, how enthusiastic do you feel about using computers?

1	2	3	4	5
Very Enthusiastic		Neutral		Very Unenthusiastic

5. Do you have a computer at home?   Yes_____   No_____

If yes, do you have:
a) Internet access?   Yes_____   No_____
b) Scanner?   Yes_____   No_____
c) Digital video camera?   Yes_____   No_____
d) Digital camera?   Yes_____   No_____
e) Palm pilot?   Yes_____   No_____
f) Notebook computer?   Yes_____   No_____
g) Printer?   Yes_____   No_____
h) CD Burner?   Yes_____   No_____

6. If you have a home computer, how often do you use the computer for any of the following activities?

		NEVER	A FEW TIMES A YEAR	A FEW TIMES A MONTH	A FEW TIMES A WEEK	EVERY DAY
A.	Personal Use…………….…….…………	….O…..	….O…	…O…	….O……..O..
B.	Job-related Tasks……………………	….O…..	….O…	…O…	….O……..O..
C.	Other Tasks/Functions……………………	….O…..	…..O…	….O….	….O……..O..

7. On average, how many **minutes** per week do you spend on your home computer for personal use activities?

a)0   b)5-45   c)46-90   d)91-135   e)136-180   f)181-225   g)226-270   h)271+

8. On average, how many **minutes** per week do you spend on your home computer for school work-related tasks?

a)0   b)5-45   c)46-90   d)91-135   e)136-180   f)181-225   g)226-270   h)271+

9.   On average, how many **minutes** per week do you spend on your home computer for other tasks?

a)0   b)5-45   c)46-90   d)91-135   e)136-180   f)181-225   g)226-270   h)271+

II. *Computer Use At Work*

10.   Do you have computers in:

a) your classroom?   Yes_____   No_____

b) a lab in your learning centre?   Yes_____   No_____

c) a library or resource room within your centre?   Yes_____   No_____

d) another location in your learning centre   Yes_____   No_____
    (please identify other location:_____)

11.   How often do **you** use a:

	NEVER	A FEW TIMES A YEAR	A FEW TIMES A MONTH	A FEW TIMES A WEEK	EVERY DAY
A.Classroom Computer……………………….……………	O	O	O	O	O
B.Lab Computer………………………….……………..….	O	O	O	O	O
C.Learning Centre Library/Resource Computer………..…	O	O	O	O	O
D.Computer in another Location in your Learning Centre	O	O	O	O	O

12.   What activities do you ask students to do when you use computers as part of a lesson? (please check all that apply)

a) None. I do not use computers as part of class lessons   _____
b) None. I use the computer for demonstration only   _____
c) Internet searches   _____
d) Prepared software   _____
e) Online discussion   _____
f) Online quizzes/assignments   _____
g) Other (please specify: _____)   _____

13.   How often do your **students** use a:

	NEVER	A FEW TIMES A YEAR	A FEW TIMES A MONTH	A FEW TIMES A WEEK	EVERY DAY
A.Classroom Computer………………..………………	O	O	O	O	O
B.Lab Computer…………………….………………….....	O	O	O	O	O
C.Learning Centre Library/Resource Computer…………	O	O	O	O	O
D.Computer in another Location in your Learning Centre (please specify:_____)…	O	O	O	O	O

14. Approximately what proportion of your students have computers at home?

1	2	3	4	5
100%	75%	50%	25%	Less than 5%

15. Relative to your own computer skills, how skilled are your students?

1	2	3	4	5
Extremely Skilled	Very Skilled	Skilled	Somewhat Skilled	Not skilled at all

16. Have you participated in professional development workshops on any topic in the past 3 years?

   a) Yes _____   No _____

   b) If yes, what percentage of these workshops was related to computer use?

   a)10% b)20% c)30% d)40% e)50% f)60% g)70% h)80% i)90% j)100%

17. What other forms of professional development about computer technology have you engaged in during the past 3 years? (Please check all that apply)

   a) Conferences _____
   b) Online training _____
   c) Talking with colleagues _____
   d) Videos _____
   e) Journals/books _____
   f) Courses _____
   g) In-service workshops _____
   h) Other (Please specify:_____) _____

   Of the sources for professional development listed above, please identify the most valuable source you have used:
   _____

18. Do you use computers to teach literacy or reading? Yes_____   No_____
   If so, how?

   _____

   _____

   _____

   _____

19.   How often have you experienced the following?

	NEVER	SOMETIMES	A MODERATE AMOUNT	QUITE A BIT	A GREAT DEAL
A. A student showed you how to use the computer, a software package or find an Internet site............	O	O	O	O	O
B. You experienced crashes when using computers in the classroom…………………................................	O	O	O	O	O
C. You planned a computer component of your class and did not have enough functioning machines to carry out the exercise…………...............................	O	O	O	O	O
D. Your students finished their computer exercises during class time…………………………………….	O	O	O	O	O
E. You asked a student to help you when there was a computer malfunction………………………………	O	O	O	O	O

III. *Your Views on Computers*

20.   Do you support the integration of computer technology for students in your

division?   Yes _____   No _____   Sometimes _____

Please elaborate.

_____

_____

_____

_____

_____

_____

21.   Does your learning centre administration support the integration of computer

technology for:

          a) you, as an educator?   Yes_____   No_____

          b) students?   Yes_____   No_____

Please explain briefly:

_____

_____

_____

_____

22.   Does the integration of computer technology fit within your personal instructional approach(es)/orientations? Yes_____   No_____

        Please explain briefly:_____

        _____

        _____

        _____

23.   Do you implement computer technology in the classroom? Yes_____No_____

24.   Do you see computers as:

                a) an integrated part of the curriculum?   Yes_____No_____
                b) a stand-alone activity?   Yes_____No_____

25.   Indicate your level of agreement with each of the following statements:

	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
a) I see computers as tools that can complement my teaching......…..	O	O	O	O	O
b) I believe that computer technology is only appropriate in specific topic areas……....................................	O	O	O	O	O
c) Computers provide variety in instruction and in content for my students…….…………………....	O	O	O	O	O
d) Computers are useful for students who have special needs...	O	O	O	O	O
e) I use computers to motivate my students…................	O	O	O	O	O
f) I'd like to use computers in the classroom but don't feel comfortable doing so…………................……	O	O	O	O	O
g) Having computers provides opportunities for individualized instruction	O	O	O	O	O
h) Computer technology allows me to bring current information to the class………………………….	O	O	O	O	O
i) Computers are an ideal reward for students	O	O	O	O	O
j) Computers allow students an opportunity to play while learning..	O	O	O	O	O
k) Computer technology has improved my effectiveness as a teacher………………………………....	O	O	O	O	O
l) I feel I am trained well enough to use computers when teaching………………………………….	O	O	O	O	O
m) I do not have enough support at my school to be able to use technology in the way others seem to be using it……………………………………………	O	O	O	O	O
n) I find computer equipment unreliable	O	O	O	O	O

o) Whenever I plan to use computers, the machines
crash or don't work.. ....O.........O.…......O.….....O...........O….

p) The computer equipment at my learning centre is not
up to date……………………………………….. ...O... .....O... ...O... .....O...........O….

q) Our learning centre does not have the resources
(human or financial) to maintain computers
effectively………………………………………. ....O... .....O.….....O… .....O.... .....O….

r) I'd like to use computers but I have trouble getting
access to them when I need them for my class……… ....O.........O... ...O... .....O...........O….

s) My students do not have the skills needed to use
technology……………………………….. ....O... .....O... ...O... .....O...........O….

t) I spend more time planning/preparing for classes
where I use technology than when I don't use
technology………………………………………… ....O.........O... ...O... .....O...........O….

u) My students often request opportunities to use
technology………………………………………… ....O... .....O... ...O... .....O...........O….

v) I feel frustrated more often when I use computers in
my classes than when I don't use them……………… ...O... .....O... ...O... .....O...........O….

w) I like to tinker or "play" with computers myself…….. ....O... .....O... ...O... .....O...........O….

x) When I use computers my teaching style changes…... .....O….......O… ...O... .....O...........O….

26.   What currently enhances your implementation of computer technology in the
classroom?

_____

_____

_____

_____

_____

_____

_____

27.   What currently inhibits your implementation of computer technology in the
classroom?

_____

_____

_____

_____

_____

_____

28. When you are planning a unit of lessons, do you assume that computer use by students will be part of your instructional plan?

1	2	3	4	5
Never		Sometimes		Always

29. When you are planning a lesson/unit, what <u>factors</u> make you decide to integrate the use of the computer?

_____

_____

_____

_____

_____

_____

30. In comparison to other teachers at your learning centre, how would you rate your ability to integrate computer technology?

Much More Skilled   More skilled   Equal Less Skilled   Much less Skilled
        1   2   3   4   5

31. If you had to define the personal characteristics of teachers who are excellent teachers, what would those characteristics be?

_____

_____

_____

_____

32. Considering your response to the previous question about excellent teachers, are there any features that you would see as different in excellent teachers who happen to integrate technology effectively, that differ from excellent teachers who do not integrate technology? Yes_____   No_____

If yes, please identify those characteristics.

_____

_____

_____

_____

IV. *Your Views on Computers and Literacy*

33.   Do you think the idea of what it means to be literate has been changed by
       technology?   Yes_____   No_____

       Please explain.

       _____

       _____

       _____

       _____

34.   Do you feel that technology is a necessary component of adult literacy
       education?

       Yes_____   No_____

       Please explain.

       _____

       _____

       _____

       _____

35.   Do you currently use computers for literacy instruction within your
       classroom?

       Yes_____   No_____

       If yes, then how?

       _____

       _____

       _____

       _____

If no, please explain.

_____

_____

_____

_____

36. How would you rate your experiences with computer technology?

Very negative	Negative	Neutral	Positive	Very positive
1	2	3	4	5

37. To what extent do your experiences with computer technology affect your willingness to use computers during literacy instruction?

Very much	Somewhat	Not Sure	Very little	Not at all
1	2	3	4	5

38. Do you think computer technology may facilitate literacy development for adult learners?   Yes_____   No_____

Please explain.

_____

_____

_____

_____

39. Do you want to increase your use of computer technology for literacy instruction?

Yes_____   No_____

Please explain.

_____

_____

_____

_____

40.　　a) How do you envision computer technology within adult literacy education future, if at all?

_____

_____

_____

_____

b) How does this compare to what is presently happening within your adult literacy education centre?

_____

_____

_____

_____

_____

Additional Comments Are Welcome

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR PARTICIPATION

Adult Literacy Educators' Perceptions of Technology Integration Study

Dear Educator:

Lisa Langille, a Master of Education student at Acadia University, is currently undertaking a research project entitled 'Adult Literacy Educators' Perceptions of Technology Integration'. The purpose of this work is to obtain information which will contribute to the integration of computer technology within adult literacy programs. Specifically, this study will attempt to identify perceived relationships between literacy and technology and investigate educators' experiences with computer technology as well as technology integration in the adult literacy classroom.

The experiences and perspectives of individuals and community groups working in the field of adult education are invaluable to providing a forum for informed decision-making. As a stakeholder in this area, you are invited to offer your knowledge by participating in this research. Specifically, your participation would involve the completion of the enclosed survey to explore your knowledge and recommendations for technology integration within adult literacy education.

I would appreciate your assistance in taking the time to share your knowledge on these issues. If you have any questions or comments regarding this research study, please contact Lisa Langille (014639l@acadiau.ca; (902) 585-1397).

Sincerely,

Lisa Langille, B.Ed.
M.Ed. Student / Research Assistant
School of Education
Acadia University
(902) 585-1397

Project Title: Adult Literacy Educators' Experience with Computers

Dear Educator:

Dr. Heather Hemming, Dr. Sonya Symons, and Lisa Langille at Acadia University are looking for people to participate in a research study about technology integration within adult literacy education.

This project is an important step toward an improved understanding of the integration of computer technology within adult literacy programs across Atlantic Canada. The objective of this research is to gain insight with regard to adult literacy educators' experiences with and attitudes toward technology integration within workforce literacy education. Specifically, the following questions will be addressed: 1) What experience do adult literacy educators have with technology and technology integration?; 2) What attitudes do adult literacy educators have toward technology and technology integration?; 3) What reasons do some adult literacy educators provide for not integrating technology in their classroom?; and 4) Is there any correlation between adult literacy educators' experience with technology and their integration of technology? This research will provide a framework for further developments with regard to technology integration within adult literacy education in Atlantic Canada.

The survey will be completed at a time convenient for you. Once completed, the survey may be returned within the month of August 2003 using the provided self-addressed, postage-paid envelope. Please sign this consent form and return it along with your completed survey. This consent form will be immediately separated from your completed survey and stored separately in a locked cabinet. In this study, your responses are strictly confidential. If we find we are required by law to disclose information (e.g. child abuse, etc.), we cannot guarantee confidentiality. There will be no identification of you personally on any records. Researchers will use a code number on any printed or computerized documents, and store data in a locked filing cabinet or under the protection of a password in the case of computerized work to ensure confidentiality. Information gathered will be analysed as a group and reported collectively.

Your participation is voluntary; you may withdraw from the study at any time without penalty. However, the data collected by the time of withdrawal may be used for research while maintaining confidentiality. Your participation in this study will not jeopardize your current entitlements to care, education or other services. There are no known harms associated with your participation in this research. However, there may be harms that we do not yet know about. There are no known benefits to you associated with your participation in this research. Although you will not benefit directly from participation in this research, your data would contribute to an increased understanding of technology integration within adult literacy education in Atlantic Canada, which may therefore inform areas of professional development.

We would appreciate your contribution to this research. If you wish to participate in this study, please complete the following information. Please note that your signature may be taken as evidence that you have read and understood the information presented regarding this study, that you may ask any questions in the future, and that you have provided free consent to participate in the research entitled "Adult Literacy Educators' Experience with Computers". If you have any further questions about this study, please feel free to contact Lisa Langille at (902) 585-1397. Please return this signed letter of consent with your completed survey. Please keep a photocopy of this form for your records as your copy of consent.

Dr. Heather Hemming   Lisa Langille, B.Ed.
Director / Thesis Supervisor Graduate Student / Research Assistant
School of Education   School of Education
Acadia University   Acadia University
(902) 585-1229   (902) 585-1397

Legal Name (please print): _____

Signature: _____

Date: _____

Dear Educator:

Lisa Langille, a Master of Education student at Acadia University, is looking for people to participate in a research study about technology integration within adult literacy education.

This project is an important step toward an improved understanding of the integration of computer technology within adult literacy programs. The objective of this research is to gain insight with regard to adult literacy educators' experiences with and attitudes toward technology integration within literacy education. Specifically, the following questions will be addressed: 1) How do adult literacy educators view the role of computer technology within their definition of literacy?; 2) What experiences do adult literacy educators have with computer technology?; 3) How do adult literacy educators integrate computer technology within their classrooms, if at all?; 4) What barriers exist for computer technology integration as perceived by some adult literacy educators?; and 5) What relationships exist, if any, between adult literacy educators' computer experiences and their integration of computer technology within their classrooms?

This study will involve a survey (which you have already completed), at least interviews, and a focus group meeting. If you are interested in participating in the interviews and focus group, please sign this consent form. This consent form will be stored separately from data in a locked cabinet. In this study, your responses are strictly confidential. If the law requires a disclosure of information (e.g. child abuse, etc.), confidentiality cannot be guaranteed. There will be no identification of you personally on any records. Researchers will use a code number on any printed or computerized documents, and store data in a locked filing cabinet or under the protection of a password in the case of computerized work to ensure confidentiality. Information gathered will be analysed as a group and reported collectively.

Your participation is voluntary; you may withdraw from the study at any time without penalty. However, the data collected by the time of withdrawal may be used for research while maintaining confidentiality. Your participation in this study will not jeopardize your current entitlements to care, education or other services. There are no known harms associated with your participation in this research. However, there may be harms that are not yet known. There are no known benefits to you associated with your participation in this research. Although you will not directly benefit directly from participating in this research, your data would contribute to an increased understanding of technology integration within adult literacy education, which may therefore inform areas of professional development.

Your contribution to this research would be greatly appreciated. If you wish to participate in this study, please complete the following information. Please note that your signature may be taken as evidence that you have read and understood the information

presented regarding this study, that you may ask any questions in the future, and that you have provided free consent to participate in the research entitled "Adult Literacy Educators' Perceptions of Technology Integration". If you have any further questions about this study, please feel free to contact Lisa Langille at (902) 585-1397. Please sign the bottom portion of this letter of consent. Please keep a photocopy of this form for your records as your copy of consent.

Lisa Langille, B.Ed.
Graduate Student / Research Assistant
School of Education
Acadia University
(902) 585-1397

Legal Name (please print): _____

Signature: _____

Date: _____

Appendix E: Interview Guide

Note: During this interview, "computers" refer to 1 or more computers (e.g., laptop, desktop, network computers, etc.) in a learning centre.

1. How do you define literacy?

2. Do you think computer technology plays a role within literacy? Please explain.

3. Please describe your experiences with computers in general.

4. a) How comfortable are you using computers?

   b) How does this compare with your comfort level using computers in the classroom? Please explain.

5. a) Do you feel computers belong in adult literacy classrooms? Why or why not?

   b) What aspects of computers are important for adult learners?

6. Do you currently use computers in your classroom? Why or why not?

7. If so, in what ways have you integrated them?

8. Do you feel computers may facilitate literacy development with adult learners? Why or why not?

9. Have you observed any changes in learners' literacy development that you would attribute to computer use? Please explain.

10. a) Would you like to increase the level of computer use in your classroom? Why or why not?

    b) If so, what do you feel is necessary to achieve this goal?

    c) What personal and professional development would you need to increase your comfort level with computers in the classroom?

Adult Literacy Educators' Perceptions of Technology Integration
Focus Group Meeting
Lisa Langille (M.Ed. candidate)

Welcome

Purpose:
The goal of this focus group meeting is to work toward an understanding of how adult literacy educators perceive computer technology integration. The information gathered from this focus group meeting will be used to supplement that already attained from the survey and individual interviews; all data sources will contribute to a Master of Education thesis designed to answer the following questions:

1) How do you view the role of computer technology within adult literacy education?
2) What experiences have you had with computer technology?
3) How do you integrate computer technology within your classrooms, if at all?
4) What barriers do you feel exist for integrating computer technology?

As the topic directly addresses the perceptions of adult literacy educators with regard to technology integration, there may be some potential for more evidence-based professional development as well as curriculum development and implementation.

Guidelines:
All viewpoints are encouraged and welcomed throughout the meeting. In order to hear everyone's point of view, as each of your experiences and opinions are valuable, it is important to respect each other's turn to speak although there will be no particular order of participation. As our time together is limited, our discussions may need to be re-directed periodically.

Warm-up Activity

Clarification of Terms:
Technology: during this meeting, technology will be used broadly used to mean computers (either networked or not) although it is recognized that the literal definition of technology encompasses much more than computers (i.e., pens, elevators, etc.)

Integration: the use of computers within the context of learning (i.e., having learners use e-mail during class time)

Literacy: although this term may involve reading, writing, and numeracy, it may be expanded to include the ability to use and understand ways of meaning-making in order to communicate through a variety of media.

Learning Centre: the location or environment in which you provide literacy instruction to adults (e.g., classroom, community building, church, etc.)
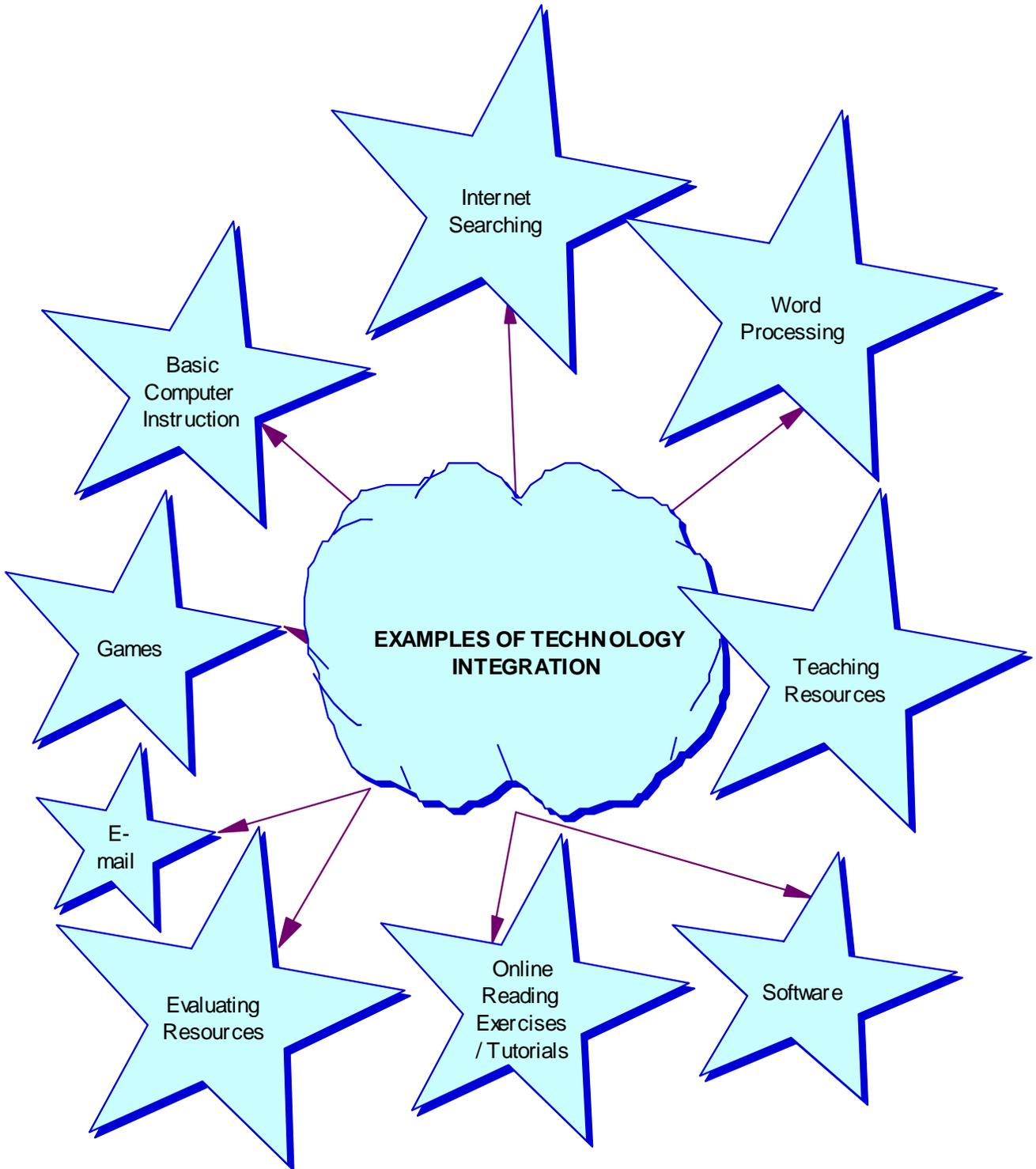
Guided Discussion:
1. The ways in which computers are used by educators vary [page 3]. How does this list compare with your own practices? How would you order this list in terms of most to least frequently used?

2. Reported benefits of technology integration are shown on page 4. Do you agree with these as being positive aspects? Are there any additional benefits that should be added to this list? Which 3 aspects do you feel are most influential in your decision to integrate technology?

3. A list of barriers to technology integration is provided on page 5. Do you agree that these are in fact barriers? What makes them barriers? Which 3 barriers do you feel are the most significant? What are some suggestions for overcoming these barriers?

4. Educators' confidence levels using computers were found to be higher for personal use than for classroom use with learners. Do you feel there is a gap between your confidence or comfort level using computers on your own versus using them with learners? Why?

5. Most educators reported an interest in learning more about technology and technology integration regardless of their level of expertise. To increase your knowledge about technology, what specific aspects would you like to learn about? What would you like to learn how to do?

6. The survey and interview revealed a greater need for professional development that focuses on technology integration. Do you agree with this finding? What are the barriers to professional development in this area?

7. Opportunities for professional development are shown on page 6. What kind of professional development do you feel would be most beneficial? Why?
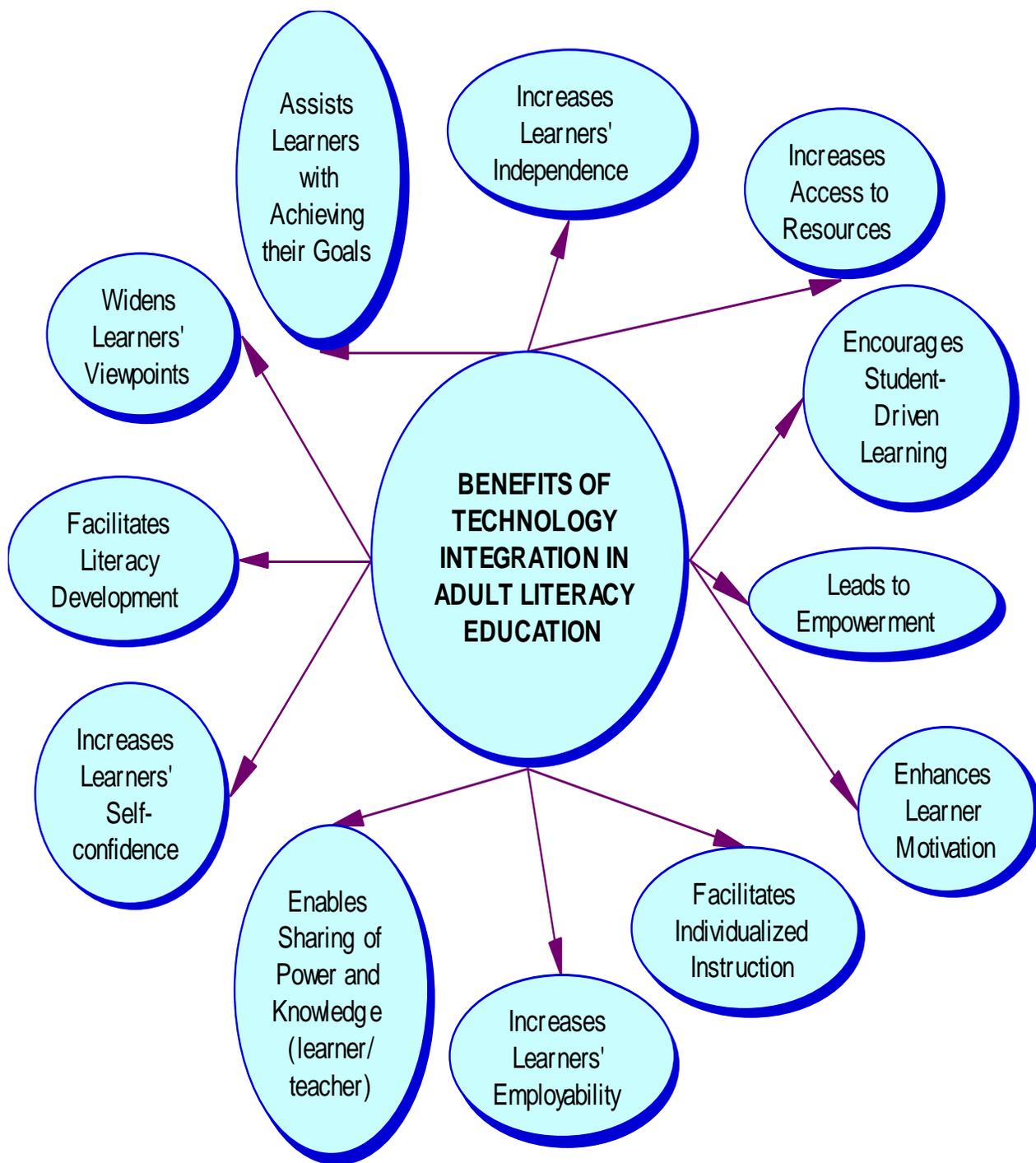
Wrap-up / Summary
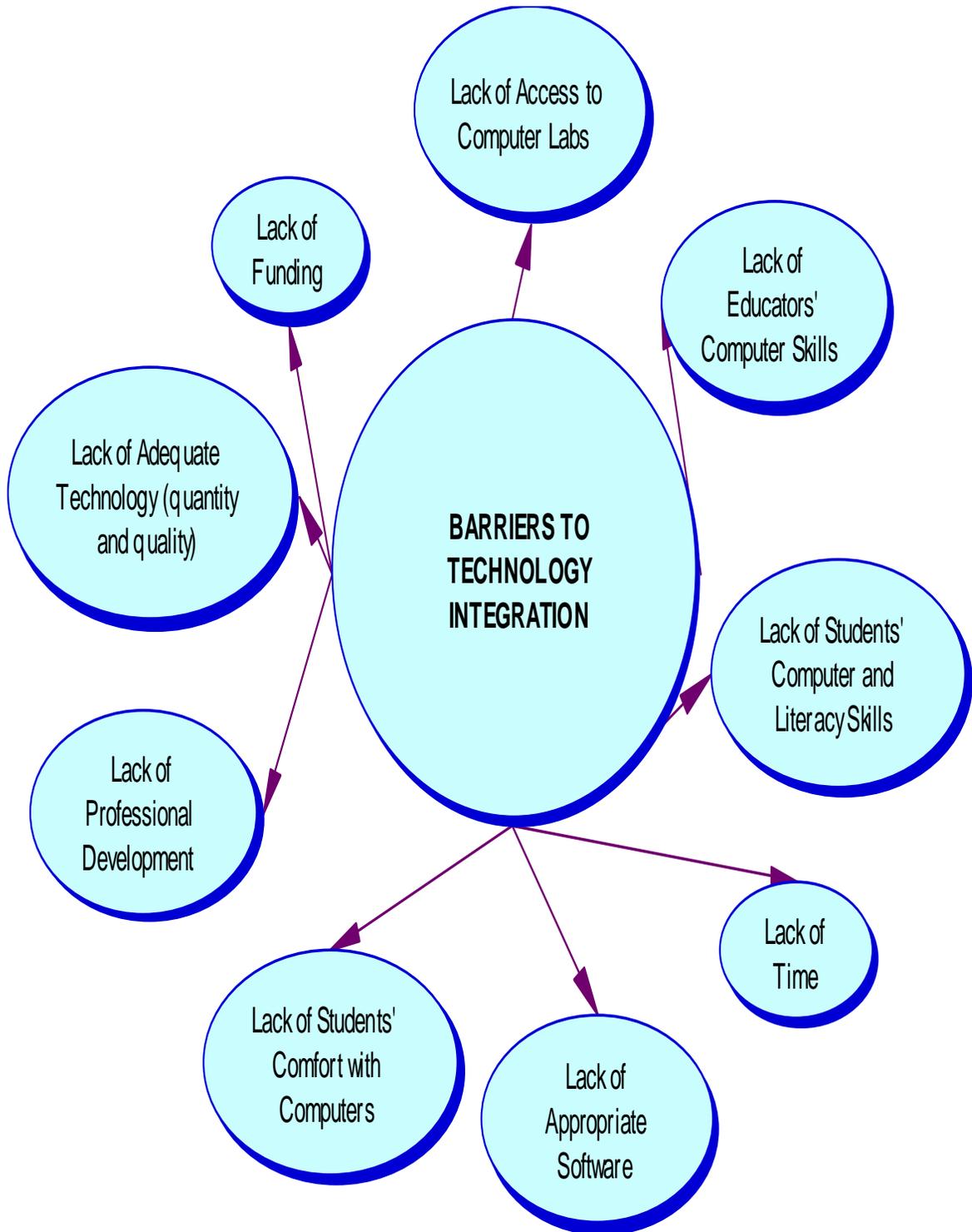
Thank you for your participation.

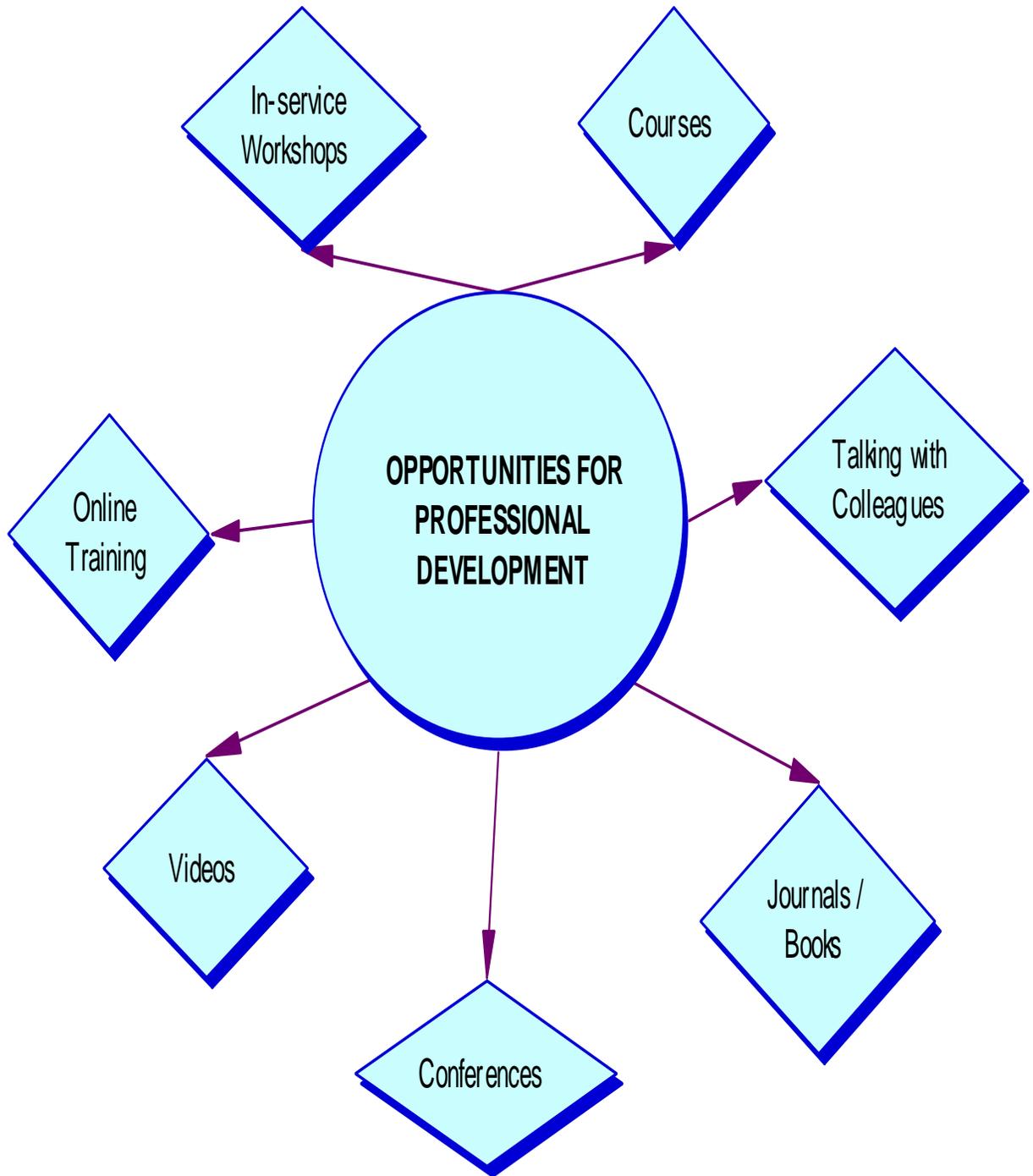# Examples of Technology Integration

Internet Searching

Word Processing

Basic Computer Instruction

Games

EXAMPLES OF TECHNOLOGY INTEGRATION

Teaching Resources

E-mail

Evaluating Resources

Online Reading Exercises / Tutorials

Software

Benefits of Technology Integration in Adult Literacy Education

Assists Learners with Achieving their Goals

Increases Learners' Independence

Increases Access to Resources

Widens Learners' Viewpoints

Encourages Student-Driven Learning

Facilitates Literacy Development

BENEFITS OF TECHNOLOGY INTEGRATION IN ADULT LITERACY EDUCATION

Leads to Empowerment

Increases Learners' Self-confidence

Enhances Learner Motivation

Enables Sharing of Power and Knowledge (learner/teacher)

Increases Learners' Employability

Facilitates Individualized Instruction

Barriers to Technology Integration

Lack of Access to Computer Labs

Lack of Funding

Lack of Educators' Computer Skills

Lack of Adequate Technology (quantity and quality)

BARRIERS TO TECHNOLOGY INTEGRATION

Lack of Students' Computer and Literacy Skills

Lack of Professional Development

Lack of Students' Comfort with Computers

Lack of Appropriate Software

Lack of Time

Opportunities for Professional Development

In-service Workshops

Courses

Online Training

OPPORTUNITIES FOR PROFESSIONAL DEVELOPMENT

Talking with Colleagues

Videos

Conferences

Journals / Books

Adult Literacy and Technology Integration Resources

Canadian Literacy Resource Organizations:

- National Adult Literacy Database: http://www.nald.ca
- Centre Alphaplus Centre: http://alphaplus.ca
- ABC Canada : http://abc-canada.org
- Movement for Canadian Literacy: http://www.literacy.ca
- National Literacy Secretariat: http://www.nald.ca/nls/htm
- Frontier College: http://frontiercollege.ca

American Literacy Resource Organizations:

- National Institute for Literacy: http://novel.nifl.gov
- Adult Literacy and Technology Network:
  http://www.otan.dni.us/webfarm/alt/home.html
- ERIC Clearinghouse on Adult, Career and Vocational Education:
  http://ericacve.org

Resource Catalogues

- Internet Directory of Literacy and Adult Education Resources:
  http://literacy.kent.edu/Midwest/Resc/Litdir/index.html
- Adult Education Teachers' Place: http://forum.swarthmore.edu/teachers/adult.ed
- The Adult Education Teacher's Annotated Webliography:
  http://www2.wgbh.org/mbcweis/ltc/alri/webliography.html

Lesson Plans

- Study Web Teaching Resources:
  http://www.studyweb.com/Teaching_Resources/toc.html
- The Adult Literacy Clearinghouse:
  http://www.cdlr.tamu.edu/projects/tcall/link2.htm
- Harnessing Technology to Service Adult Literacy:
  http://www2.wghb.org/mbcweis/ltc/alri/integratech.html
- Adult Literacy Research Research Institute's Literacy:
  http://www2.wgbh.org/mbcweis/ltc/alri/LiteracyList.html
- Learn2.com: http://www.learn2.com
- Adult Education and Literacy Periodicals:
  http://www.ed.gov/offices/OVAE/daelnews/newsltr.html

Follow-up Interview Guide

1. After reflecting on your participation in this study, how do you view the role of computers within adult literacy education?

2. The focus group meeting revealed that all barriers related to computer integration can be traced back to the overall mindset of stakeholders (e.g., discrimination, short-sightedness). Do you agree with this statement? Is this consistent with your experience in adult literacy education?

3. Do you feel the lack of computer integration in adult literacy education is perpetuating a digital divide for learners? Please explain.

4. How would you recommend closing the digital divide?

5. In terms of further research, what topics would you prioritize around adult literacy and technology?

List of Tables

List of Figures