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Digital Learning in Rural Ontario, Canada: An Evaluation of the Computer for Seniors Program

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Abstract

This article presents an evaluation of an educational intervention that provided computer skills training for a sample of n = 17 rural seniors in North Middlesex, Ontario, Canada. Due to the rural nature of the community, this cohort had limited access to and knowledge of computers. A total of N = 36 originally participated in a designed basic computer training intervention consisting of 8-week training sessions, offered sequentially in three smaller cohorts of 12 seniors. The evaluation included a pre and post-test using the Seniors Basic Computer Skills Scale (SBCSS) to assess the effectiveness of this training. The evaluation team developed the SBCSS to measure basic computer skills of seniors and pilot-tested it with the sample. Psychometric testing of the SBCSS showed exceptionally high degrees of reliability. The SBCSS measured 11 basic computer skills including: (a) talking about computers, (b) using computer technology, (c) using the Internet, (d) using an Internet resource such as Skype, (e) using a computer mouse, (f) using Web browsers, (g) manipulating the computer screen brightness and size, (h) using bookmarks, (i) sending and receiving emails with family and friends, (j) sharing photographs with family and friends, and (k) using social media such as Facebook. There were some encouraging results regarding increased computer skills for this sample of rural seniors. However, there were other areas where learning did not increase significantly. This article speaks to the need to identify and recruit rural seniors who may benefit from such targeted interventions to increase technological skills, and also to the need for a second-level enhancement of the municipally funded Computer for Seniors program (CSP). We contend that community workers have a unique role to play in such initiatives, as they may encourage local seniors to both

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explore their computer literacy in rural areas, and help to increase opportunities that are often missing in rural communities.

Keywords: rural seniors, computer technology, digital divide, community development

1.0 Introduction

This article presents the results of a designed educational intervention developed by a local multi-service centre to provide basic computer training to seniors in a geographic area of Canada which had limited access to computers: these seniors had little or no skills with such technology. The goal of improving basic computer skills and improving seniors' abilities to connect technologically with friends and family was the overall aim of this educational intervention carried out in North Middlesex, Ontario. A feature of this initiative was the lack of resources in this rural community, that also had no public transportation. Because of the rural nature of this evaluation, we believe that this study identified how rural community seniors are excluded by lack of opportunities and transportation. In this regard, we believe that this work provides an important voice for rural communities to be heard and understood by others, with little knowledge and experience with the limitations of residing in rural areas.

The need for access to resources and having connections with community, family, and friends had been previously somewhat alleviated by the North Middlesex Multi-Service Centre (NMMSC) who were able to allow seniors to access one computer within the centre's operating hours. While local residents were appreciative of this opportunity, it was not accessible, as it was heavily used. The constraints of only having one computer reduced the ability of local seniors to connect on Skype and, as a result, they began a 'bottom-up' initiative to request computer training from the NMMSC. As a result, the NMMSC recruited a local volunteer to work with them on preparing a funding proposal. This resulted in a university–community partnership between a professor from a proximal university and the local multi-service centre, who worked with the NMMSC to secure funds to purchase computers and course instruction and to implement and evaluate the Computer for Seniors Program. Funding was obtained through the Municipality of North Middlesex Community Development Fund which allowed the local multi-service centre to purchase 12 new computers, which were deemed necessary to implement the CPS, and hire a computer consultant to help design and deliver the program.

The evaluation was carried out using a participatory evaluation process which included the volunteer university evaluation consultant, two graduate research assistants, the director and staff of the organization, and the computer consultant. The purpose of the evaluation was to assess the perceived changes in computer technology skills of the sample who completed an 8-week computer course. The evaluation team developed a Seniors Basic Computer Skills Scale (SBCSS) primarily based on a literature review of the course content offered in the CPS.

2.0 Literature Review

2.1 Digital Gaps in Rural Communities

In many rural Canadian communities, older adults often face greater challenges with computer use and accessibility, due to a lack of telecommunication infrastructures.

Sparks (2013) addressed the digital exclusion of rural populations and defined the urban–rural digital divide, as a term "used to cover a broad range of social differences in access to and use of digital equipment and services" (p. 28). Hayes et al. (2019) echoed these same concerns in their study of older adults in rural settings. They also noted scant research about this population was sometimes marked with ambivalence and hesitance toward incorporating technology into newer interventions. Similarly, OConnor, Fuller, and Cortez (2018) found that technology use among older adults in rural communities is greatly lacking. In contrast, building social connectedness for older, rural adults through computer technology could improve more social connections and further reduce social and geographical isolation. Fundamentally, the high cost of Internet service and its rather intermittent reception throughout rural areas was also deemed as a barrier for both service providers and older rural adults, which further fostered digital exclusion (Philip, Cottrill, Farrington, Williams, & Ashmore, 2017).

Additional research on the digital divide by Leedahl et al. (2019) revealed there was much computer anxiety among older adults, even though computer usage itself was increasing in this age group. Further, Friemel (2016) noted that for seniors older than 70 years, the relationship between age and Internet use seemed not to be linear, but rather exponential. Conversely, González, Ramírez, and Viadel (2015) disputed the popular notion that older people are often resistant to technology, as they found, "older people respond positively to using computers," and "given that seniors require more time to acquire knowledge, make more mistakes, and need greater support." Thus, "teaching methods must target these challenges and instructions must be task-oriented, involving older learners by using highly interactive teaching methods" (p. 1). When these population-specific needs were adequately addressed, they found "greater involvement and contact with computers lead to more positive attitudes toward using and learning to use them" (González, Ramírez, & Viadel, 2015, p. 5).

2.2 Challenges to Technology Use by Rural Seniors

Barbosa Neves, Franz, Judges, Beermann, and Baecker (2017) observed that "increasing social connections with close ties, particularly with family members, is a main motivation for Internet use in later life" (p. 51). Teine and Beutner (2016) found that the "elderly are generally receptive to new technologies [the use of which] increased independency and decreased symptoms of depression due to opportunities for socializing" (p. 85). Results of a study of N=131 rural seniors that explored patterns of technology use across Arkansas, Iowa, Kansas, North Dakota, Oklahoma & Texas found that learning computer skills may be of benefit to seniors in rural communities especially in the area of social support. Nevertheless, the results showed that a sizable minority of the seniors in this study did not use technology (OConnor et al., 2018).

Friemel (2016) reported data from a representative population survey in Switzerland (N = 1,105) and described the distinction for further empirical examination of the digital divide. He noted that the usage of technology was generally measured as a binary variable—adoption—while access and usage patterns were more suitable to be deemed as continuums for measurement. Both were described as 'first order' digital divides. 'Second order' divide variables included types of use, skills, and literacy. They also noted that a particular sub-population may have made significant progress toward resolving first order gaps, while second order gaps remained largely unresolved.

The nature of various marginalized populations seems to go hand-in-hand with challenges related to staying current with changing technology. For older persons, normal age-related declines in visual and auditory sensory processes, motor skills, and cognitive abilities create challenges for integrating technologies which are primarily designed for younger users (McMurtrey, Zeltmann, Downey, & McGaughey, 2011). These authors raised some important questions which are not fully answered, such as: "How much do the elderly actually use technology? Do they buy much online? How do they perceive their technology skills?" (McMurtrey et al., 2011, p. 23). Additionally, it was noted by many researchers that Information and Communications Technology (ICT) is a term applied to a range of tools and media rendering the term vulnerable to vagueness and inconsistent or insufficient definition (Bryant, Garnham, Tedmanson, & Diamandi, 2018). Nevertheless, there was general agreement in the literature that ICT solutions seem well suited to community developers, educators, and so forth, working with older people (Bryant et al., 2018; Friemel, 2016; Khosravi, Rezvani, & Wiewiora, 2016; McMurtrey et al., 2011).

Exploring current research on training older adults to use computers reveals a wide range of interventions ranging from individualized programs to small groups to class-based programs, all designed to increase technology skills. As noted previously by OConnor et al. (2018), there is a need for more research on computer training for seniors. It is not our intent to offer a detailed account of extant research conducted on a variety of computer training programs for seniors. However, our study examined existing research in this area in order to anchor the Computer for Seniors Program within contemporary research on this topic.

For example, Sanders, O'Sullivan, DeBurra, and Fedner (2013) examined a four-week training program using a community participatory research approach that included a senior centre–university-based collaboration. Their program included four 1-hour sessions held weekly and delivered by occupational therapy students in their fieldwork placement. This study showed significant increases in three domains: "(a) adult computer skills, (b) comfort with the computer, and (c) perceptions of generativity in the short-term program" (p. 292). Barbosa Neves et al. (2017) conducted a feasibility study with an ICT intervention using tablets while embracing what they described as a "recursive approach to technology… in the wild" (p. 52), in which a convenience sample was used to consider acceptability and efficacy of this technology. One important consideration of their study was that each participant brought with them a family member or friend, thus substantially pre-fulfilling the quality component. That is, these participants had at least one high-quality social relationship to participate within the study. Also, of note, their study allowed significant time—over several weeks—for participants to gradually learn the new technology and become comfortable, largely at their own pace. Leedahl et al. (2019), while researching a cyber seniors program, found that older adults valued that the program is individualized to their interests and abilities, and reported that "classroom settings where content could not as easily be specifically tailored to meet individuals were less preferable" (p. 15). Indicative of this more specifically focused approach to teaching computer skills to seniors, Teine and Beutner (2016) developed an intervention using Micro Units, "defined as concise learning courses with clear learning goals that focus on a practically relevant topic [as well as contents which] strictly adhere [to] pre-defined elements" (p. 86).

In previous research, methodological approaches, data gathering, data analyses, and implementation of standardized measures have been rather inconsistent. McMurtrey

et al. (2011) noted difficulties with generalization since they used data from only one senior living facility. Many studies also used self-report data, which may be unreliable if seniors are not connected to a reasonable cultural baseline of user proficiency. These authors also noted a distinct lack of existing longitudinal research. Hagan, Manktelow, Taylor, and Mallett (2014) posited that the time-limited nature of their evaluation of group interventions was a serious limitation. Many authors in this area of study also noted that the frequency and use of different sample sizes, was a significant research limitation (Bryant et al., 2018; Khosravi et al., 2016; Leedahl et al, 2019; Teine & Beutner, 2016). Taken together, the empirical reality seems to be that neither the technology nor the theoretical validity of the intervention by itself guarantees the desired results. However, viewing seniors from a more inclusive, positive, and holistic perspective—where technology assists in empowering older people across many social domains—provides a more valuable portal for designing and implementing new programs incorporating new technologies.

3.0 Methods

3.1 Evaluation Design

The evaluation designed for this educational intervention used a participatory evaluation approach, including the evaluation consultants and the non-profit organization sponsoring the CSP. This collaborative approach gained popularity over the past several decades and is based on the foundational work in participatory program evaluation by Patton (1982). More recently, it has been defined as "a process for helping partners select the most appropriate content, model, methods, theory and users for their particular situation" (Patton, 2012, p. 6). The computer consultant hired was a technology educator who was instrumental in identifying the basic knowledge and skills needed for an introductory computer course. During a series of ongoing meetings, the evaluation team collaboratively agreed upon (a) the types of content questions to be assessed, (b) the selection and development of data collection methods, (c) who would be responsible for collecting and analyzing these data, and (d) how the results would be disseminated. The CSP was designed to assess whether the eight-week computer course using the SBCSS, increased seniors' skills and use of computers. It was collaboratively decided by the literature review of the subject and through many discussions with the team that the 11 computer technology content components of the course be identified as being appropriate for a basic introductory course for this target group.

The course was delivered weekly and sequentially for three different cohorts of seniors—12 in each—in this rural setting. A total of $N = 36$ seniors aged 62 to 84 years old residing in North Middlesex, Ontario, were participants. Participants were recruited by posting notices in the multi-service centre and library in North Middlesex. Inclusion criteria was intentionally broad as the only two requirements were a minimum age of 50 years and residency in the municipality. The evaluation protected the confidentiality and privacy of all the participants. All participants were provided with a formal letter of information stating that all information collected would remain confidential, and that no identifying information would be used when reporting study findings. Participants were then asked to sign a consent form, reiterating that no identifying information would be used in reporting any results of the study. In this consent form, participants were also advised that all participation was voluntary and that if they did not wish to participate in the evaluation, or if there were certain questions they did not wish to answer, it would not affect them in any

way. All participants were informed that the signed consent form would be detached from their completed questionnaires, so there would be no identifying information on any of the data collection instruments. All data collected during the three sequential courses was analyzed only by the evaluation consultants, who removed the completed SBCSS from the multi-service centre after each data collection point.

Data collection used four main sources:

- A literature review of content information about rural seniors and technology.
- specific census data collected from the municipality in Ontario, Canada.
- A participant profile data sheet containing sociodemographic variables.
- The pre and post-test questionnaire (SBCSS) assessing basic computer skills and their use.

The program was offered to three sequential cohorts of seniors with 12 per group. Sociodemographic information consisted of (a) age, (b) gender, (c) marital status, (d) number of children and grandchildren, (e) highest level of education, (f) retirement status, and (g) current residence. These were used to produce descriptive statistics for each cohort, including frequency distribution graphs, which allowed the evaluation team to formulate a summary profile of all participants. The study was conducted from December, 2013 to April, 2014.

3.2 The Regional Community Profile

North Middlesex is a municipality in Middlesex County, Ontario, Canada. See Figure 1 for a map of this municipality. According to the 2011 Canadian Census, it had a population of 6,658, a total land area of 597.90 sq. km, and a median age of 41.4 years (Statistics Canada, 2012). The population was distributed as follows: 0–19 years of age, 28%; 20–24 years of age, 27%, 45–64 years of age, 30%, and 65 years of age and older, 16%. Census data show that 63.3% of this population aged 15 and over, were either married (56.7%) or living with a common-law partner (6.5%), and of registered census families, 54.5% had children. According to the 2011 National Household Survey, the average household income in North Middlesex was $65,860, just slightly lower than the provincial average of $66,358 in that year. In addition, 32% of residents had completed post-secondary education, compared to a provincial average of 36% (Statistics Canada, 2013).

3.3 Seniors Basic Computer Skills Scale (SBCSS)

The SBCSS—developed by the team—was based on a literature review, course content, and desired skills related to using basic computer technology information. The questionnaire had 11 items and asked participants to self-report on their perceived skills using basic computer technology on a five-point Likert scale ranging from ‘1 = no skills’, to ‘5 = extremely good skills’. Table 1 lists the assessed technology related items which were: (a) talking about computers, (b) using computer technology, (c) using the Internet, (d) using an Internet resource such as Skype, (e) using the computer mouse, (f) using Web browsers, (g) manipulating the computer screen brightness and size, (h) using bookmarks, (i) sending and receiving emails with family and friends, (j) sharing photographs with family and friends, and (k) using social media such as Facebook.

Figure 1: North Middlesex Municipality.

Source: (Statistics Canada, 2012)

4.0 Results

4.1 Participant Profile Data (N = 17)

All three cohorts showed similar demographic data to the overall aggregated data of the three cohorts. Seniors who participated in the program and completed all course content and all questions on the SBCSS comprised the final sample (N = 17). Thus, data from the overall sample of the three aggregated cohorts were summarized from 36 to a final sample of 17 who satisfied both of these conditions. The ages of the participants ranged from 62 years old to 84 years old, a range of 22 years. The M = 72.5 years, with a SD = 6.2 years. Almost one quarter of participants, 23.6%, were 65 years of age and under, 29.4% were between 66 and 70 years of age, 23.5% were between 71 and 75 years of age, 17.6% were between 76 and 80 years of age, and 5.9% were 81 years of age and older. The percentage of female participants was 82.4%, and male participants comprised 17.6%. Over two-thirds of respondents, 70.6%, were married, and 29.4% were widowed. In terms of family status, 11.8% reported they had no children, 47.1% had one or two children, 29.4% had three or four children, and 11.8% had five or more children. Similar patterns existed in terms of grandchildren, as 11.8% reported they had no grandchildren, 29.4% had one or two grandchildren, 11.8% had three or four grandchildren, and 47.1% had five or more grandchildren. Levels of education were reported as follows: 5.9% attended grade school, 23.5% attended high school, 29.4% completed high school, and 41.2% completed post-secondary education. The majority of participants (76.5%) indicated they were retired, while 23.5% were not. Lastly, 70.6% of participants indicated they resided in the town the computer course was held, and the remaining 29.4% resided in a neighboring area of the municipality.

4.2 Seniors Basic Computer Skills Scale (SBCSS; N = 17)

We tested the psychometric properties of those in the sample who *both* completed each item on the SBCSS *and* completed each session in the intervention ($N = 17$). We conducted two reliability tests. The coefficient alpha was $\alpha = .93$ at pretest, and the split-half reliability test was $r = .69$. At post-test, the coefficient alpha was $\alpha = .92$ and the split-half reliability test was $r = .78$. Both were deemed very high, particularly the Cronbach's alpha.

The mean scores were higher for every question in the post-test compared to the pretest, indicating a perceived overall increase in self-reported computer skills (see Table 1). The highest mean score on the SBCSS was in response to using the computer mouse for both the pretest ($M = 2.62$) and the post-test ($M = 3.70$). The lowest mean score was about using an Internet resource such as Skype for both the pretest ($M = 1.25$) and the post-test ($M = 2.0$). The largest increase in mean score was in response to the question about using Web browsers, from the pretest ($M = 1.78$) to the post-test ($M = 3.12$), and next in response to manipulating the computer screen for brightness and size, from the pretest ($M = 1.69$) to the post-test ($M = 2.88$). The smallest increase was in regard to talking about computers, from the pretest ($M = 2.28$) to the post-test ($M = 2.64$), though the pretest score for this item was third highest at baseline.

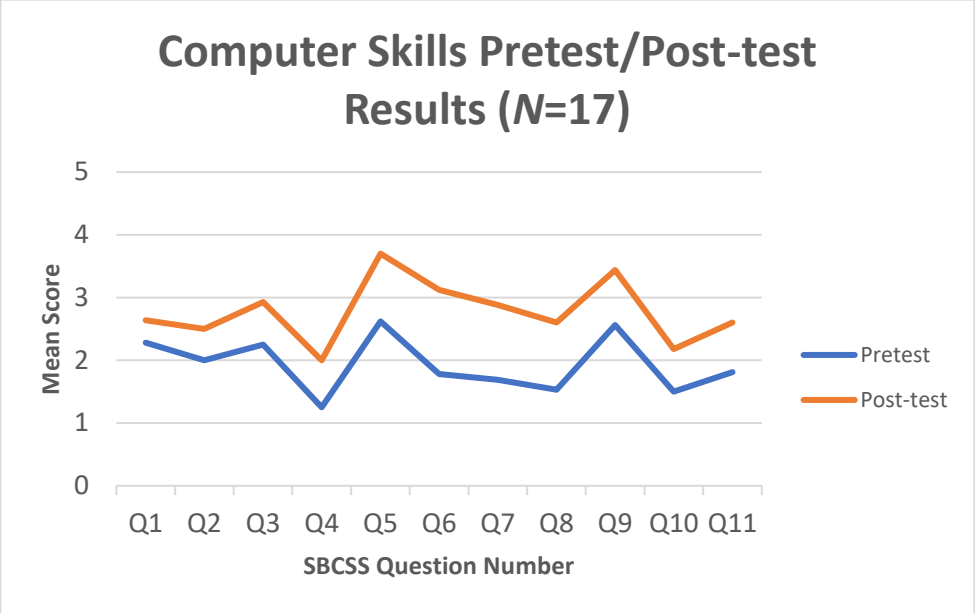
Table 1: *Rank Order Post-test Mean Scores*

Computer Program Topics	**Post-test Mean Score**
1. Using the computer mouse	3.70
2. Sending and receiving emails	3.44
3. Using web browsers	3.12
4. Browsing the Internet	2.93
5. Changing screen resolution and brightness	2.88
6. Using computer terminology	2.64
7. Talking about computers	2.60
8. Using social media	2.60
9. Using Internet bookmarks	2.50
10. Sharing photographs with family and friends	2.18
11. Using Skype	2.00

Overall, the consistency of the increase of all mean scores from the pretest to the post-test suggests that perceived computer skills increased in all 11 areas on the SBCSS. As Figure 2 demonstrates, a self-reported increase in computer skills was observed in each aspect of the assessed course. However, the rank order post-test

scores offer some important insights into which areas should be emphasized in the second phase of this course. Specifically, emphasis should be placed on using videoconferencing software such as Skype, as well as the skills required to share multimedia, such as photographs, with family and friends.

Figure 2: SBCSS mean pretest/post-test score changes.



Two tests were used to further assess pre and post-test score changes among the sample (N = 17). First, based on the encouraging results from the earlier noted split-half reliability test, we conducted Pearson's correlation coefficient and found the pre and post-test scores were highly inter-correlated (r = .81, $p < .002$). We then tested pre and post-test scores using a one-tailed—as we knew the direction of change indicated—dependent t test, which was t = 9.41(10), $p < .001$. In summary, these evaluation results show that all perceived computer skills significantly increased from the pretest to the post-test, as measured by the SBCSS in this sample. Overall, there was a successful content uptake of the program by the target population, and it appeared that the CSP was instrumental in increasing the computer skills of rural seniors in North Middlesex. The use of the descriptive profile data, and the pretest and post-test computer skills scale (SBCSS) yielded results that suggest a positive successful implementation.

5.0 Discussion

The CSP was conducted in a rural area of southwestern Ontario, with seniors over the age of 50 years with a goal of increasing basic computer skills for this sub-population. In the CSP, most of the seniors (70%) indicated their residence was in the town where the computer intervention took place. Consistent with the literature, this was deemed a positive enticement for them to participate in the program. Selected demographic information from previous research on technophobia and seniors indicated that, when compared to older adults, computer and Internet users are generally younger, male, have more years of education and are working to some extent (Nimrod, 2018). In relation to issues of technophobia among older users,

some researchers have suggested that technology interventions should target less educated seniors (Ma, Chan, Teh, & Poon, 2016; Powell, 2013). The advancement of ICT highlights "the diversity of positive psycho-social outcomes for older people:" who are able to socialize with friends and family despite geographical distance (Warburton et al, 2014, p. 148).

As indicated in the range of reported scores for computer skills in the pretest, not all participants attending the program began at the same level. Consistent with effective models of computer instruction for older learners, literature suggests that the content of such programs should encourage seniors to explore their computer interests beyond just basic skills (Nycyk, 2020). In this pre-designed pilot test, the CSP was purposely described as being basic, and locally, the three cohorts of seniors who participated rapidly filled the community wait list. This attendance volume alone speaks to both the need and current interest in this topic for older adults in this rural community.

The ease of accessibility to the multi-service centre was also deemed an important factor in the successful uptake of the program. As noted, it was promoted and advertised by the multi-service centre within its own central location, and at the local public library. The program was also over-subscribed from its onset, indicating a severe lack of computer resources for this population in this community. After purchasing 12 new computers, the multi-service centre was able to increase the ability of local seniors to access local technology and, perhaps, this helped them reduce their perceived social isolation, in our ever-increasing and rapidly changing digital age. More importantly, the multi-service centre enabled seniors to boost their perceived skills and 'relative' confidence, in being more competent to use technology in more enjoyable and productive ways.

While it may seem obvious given these statistically significant positive results that the CSP should continue as it is, there are other alternative issues that need to be mentioned. First, this was a very homogeneous sample of seniors who were educated and obviously were all interested and open to learning. It may be that a 'second level' CSP should be implemented which would allow further development of new knowledge and skills regarding the technology for those who completed the 'first level. Despite these relatively encouraging results, there were some content areas where perceived computer skills did not increase as much as was expected. But where they did not increase, neither did others in the sample. On the other hand, the overt homogeneity of the demographic characteristics underscored that each member was characterized as basic. This was also echoed in the results.

These targeted areas of minimal increase in basic computer skills could in turn form the basis for second level courses for those who completed the initial CSP. The multi-service centre could also develop a simple follow-up survey for the initial participating seniors to assess their self-identified training needs for the second level course content in computer technology. The sample attending this first introductory intervention indicated to the multi-service centre that they would like a second-level course, to further improve their computer technology skills in areas of least improvement. Likewise, other instructional models could offer computer skills to seniors in areas such as: (a) technology mentoring, (b) completing financial applications online, (c) finding health information online, (d) finding new recipes, and/or (e)accessing maps to locate needed services.

Anecdotally, one of the outcomes of this program, unique to this rural community, was that many of these participating seniors also attended local high schools together

in the past. As such, the CSP created an opportunity for people in the sample to reunite and enjoy their times together in the classroom just as they had many years previously. In fact, there were a few occasions during the classroom time when the 'students' became quite animated and recalled their high school days, and also resorted somewhat to their previous classroom antics and nicknames, thus re-connecting with old friends and reducing social isolation at least during the CSP.

The results of this study revealed that there is a need in this local community to continue to identify and recruit those seniors who may not be 'early adapters' to basic current technology; that is, they need more encouragement to participate. One mechanism for bringing these reticent seniors into such computer programs might be to first develop a Computer Literacy Interest Survey, a screening tool that could be distributed to seniors assessing what they would like to learn about computer technology. Thus, a local computer teacher could tailor various topics and sessions to a more homogenous cohort of seniors—a main finding of success in this study—to make sure they may learn what they say they needed. This might prevent the less confident seniors from becoming overwhelmed with too much information and encourage them to overcome their fears about computers by moving along the learning continuum at a slower pace. In addition, consideration of a volunteer transportation program to and from the classes may increase the accessibility of such programs for more isolated rural seniors. Further, more widespread intentional and proactive advertising and purposive, targeted recruitment of seniors through local doctors' offices, post office locations, government offices, libraries and other locales frequented by seniors, may expand the catchment area of potential future participants in this rural community, and others.

The program evaluation of the CSP found positive results with respect to increased computer skills gained by the entire sample (N = 17) who completed each session and each question pre and post. Finally, here, the popularity of this computer intervention for the sample was demonstrated by full capacity classes, and a waiting list that further confirmed the need for, and apparent interest in, such local programs. Because of the risk of social exclusion for rural older adults, it is important that the CSP in this rural community reached this particular seniors population.

6.0 Limitations

The results of this study cannot be generalized to other multi-service centres primarily due to the lack of a control group. In addition, the sample who participated in this intervention self-selected to participate, which suggests they may have been less technophobic about computer technology than other seniors residing in this rural area. That being said, this small study of a computer training course for rural seniors may offer some encouragement to other program planners to develop their own local similar programs.

This limitation could be mitigated to a small extent by analyzing the complete participant data set. However, this could not be done as 19 of the participants only partially completed either or both of the pretest or post-test evaluation. Therefore, all participant demographics, course evaluations, and instrument psychometric analyses are based on data from 17 selected participants rather than the original 36 known attendees, who completed the course. This study was a pilot-test in every sense of the word. Throughout the intervention the research team made certain assumptions that may have been unfounded, as the literature reviewed was very scant on this particular subject matter. Issues such as: (a) defining rurality, (b)

barriers to accessing services, (c) defining 'basic' knowledge and skills, (d) subject and participant expectancy, (e) resources needed and, (d) most effective ways to teach such content, were always challenges that required much important discussion and resolve. Additionally, more traditional threats to internal validity were very real obstacles that required additional discussion. These were: (a) history, (b) maturation, (c) testing, (d) instrumentation, (e) selection and (f) mortality (Holosko & Thyer, 2011, pp. 126-127). Taken together, this pilot-study was just that, 'a pilot'. We encourage others working in this area to proceed with caution in such processes—be age-centric foremost and work collaboratively—which assisted us greatly in this initiative.

7.0 Implications for Practice

As previously noted, because of the perceived overall increased vulnerability and potential risk of social exclusion for many rural older adults, it is important that such programs reach such at-risk groups. Community workers residing in rural areas require particular knowledge and skills relating to issues of (a) local transportation needs (b) lack of services and resources, (c) social isolation, and (d) developing and managing relationships, when building community engagement with local people who have a shared history with older generations. Building trust and understanding the unique specific social issues affecting such rural areas and the individuals who reside within them, requires competency in community development which is the lifeblood of community work.

Strategies to expand the geographic catchment area of residents further than the town where the computer classes were held were deemed critical to this rural project. Community workers in rural areas could introduce community development activities in local communities that would facilitate and support more involvement of rural seniors to learn more about how to use computer technology and to connect with family and friends. Based on this study, some suggested community development strategies include: (a) develop a volunteer transportation program to and from computer classes to increase the accessibility of the service for isolated rural seniors, (b) explore alternative learning opportunities to assist older adult participants in maintaining their personal computer knowledge and skills, (c) provide further opportunities to acquire new computer skills, (d) build in social time for seniors taking computer classes or one-day workshops, (e) provide mechanisms whereby seniors can receive personal assistance or offer assistance to others who are interested in computer technology, and (f) carry out community development activities that will lead to the implementation of a youth mentor component of such programs. Having youth mentors who individually support the learning of seniors within classroom settings and offering mentoring by email was one aspect missing in this particular rural program studied. The proactive inclusion of a youth mentor component is designed to benefit seniors and youth by bringing together diverse generations who can build mutual understanding and foster positive attitudes toward each other (Leedahl et al., 2019; Lee & Kim, 2019).

All of these community development activities provide excellent opportunities for community workers to reclaim their roles as social justice advocates, working toward reducing the pervasive digital divide for rural seniors. Such community development models of practice promote community engagement, and the development of strong bonds between members of rural communities who are isolated from each other by expanses of geography. The lack of transportation and

network capacity requires innovative community development practice that may reduce the digital divide in rural communities and provide avenues for people to connect around their common interests and goals (Gutiérrez & Gant, 2018; Ohmer, Coulton, Freedman, Sobeck, & Booth, 2019; Twelvetrees, 2017).

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