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The Older Adult and Public Library Computer Technology: A Pilot Study in a Canadian Setting

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Six public library users aged 65 years and over were interviewed concerning their attitudes, experiences and issues with public library computer technology. Two participants used online public access catalogues regularly; four had some form of computer anxiety or aversion that inhibited use. Previous experience with computers or card catalogue use predisposed users to attempt to use OPACs. The reasons

for not using the OPACs included difficulty with the interface, insufficient librarian help, poor or absent written instructions, and inadequate time to learn. None of the participants used any other computer information sources. Results suggest that this cohort is under-utilising library computer technology despite an overall positive attitude towards computers.

Introduction

Computer technology has redefined many services in public libraries, including collection searching with online public access catalogues (OPACs), information requests on CD-ROMs and databases, Internet access, and so on. These innovations are expected to continue their present rapid growth. The benefits of computer technology are evident, but successful patron use requires a comfort level with computers, a familiarity with basic search methods, and an ability to adapt to constantly changing technologies.

These requirements may be of particular concern for the older adult users of public libraries. Lowe (1990) noted that there is a gap between generational cohorts in computer experience in that the large majority of those over 55 years of age are unfamiliar with computer technology. Research suggests that older adults have more trouble than younger adults do in learning to use computers (Kelley & Charness 1995) and may

have higher computer anxiety (Laguna & Babcock 1997). Age-related physical barriers may also be issues.

Griebel (1998) stated that the older generation has been hesitant to use new technologies, and emphasised that public libraries are in an excellent position to address this issue. Public libraries are prominent providers of the burgeoning array of information of use to seniors (Kleiman 1995) for whom lifelong learning is increasingly a priority (Turock 1987), and at the same time may be their first introduction to computer technology. Initiatives concerning library services to older persons, such as the Canadian Library Association's Interest Group on Services for Older People, include these electronic issues in their mandate (Middlemass & Crooks 1999). This is particularly relevant in 1999, designated the United Nations' International Year of Older Persons. There is thus a need to understand these technological issues from the perspective of the older public library user, and the implications for successful library visits.

Problem statement

The objective of this pilot study was to document older adult users' attitudes, experiences and issues concerning public library computer technology. This objective may be expressed as the following question: What are older adult users' attitudes, experiences and issues concerning public library computer technology? It was hoped that this information would provide insight into their use or non-use of electronic information sources, suggesting areas for further research and leading to improved service to these patrons.

Definitions

The *older adult* is defined as a person aged 65 or older.

A *user* accesses library materials in-house rather than supplied with library materials through any outreach program.

Attitudes are emotional or mental positions concerning a fact or thing (*Webster's* 1976).

Experiences refer to personal observations or encounters (*Webster's* 1976).

Issues are points of debate or concern (*Webster's* 1976).

Public library includes both main and branch libraries of public library systems. For this study they were, however, limited to those with online public access catalogues (OPACs) instead of manual indexing systems.

Computer experience is defined as proficiency on a computer to the point of comfort and ability to complete tasks the user wants to do. It does not imply that the user is proficient in all aspects of computer use. It is thus a personal judgement and abilities will range.

Review of relevant literature

Estimates of computer experience in older age cohorts vary, but two trends are noteworthy. First, the numbers of people with computer experience decreases as age increases. Lowe (1990) noted that, for 1989 statistics, 22% of Canadians aged 55–64 and just 6% aged 65 and older were able to use computers, compared with 66% of those aged 20–24. These older adults missed both the edu-

cational experiences of the younger cohorts and the work related computer experience of middle aged adults, perhaps because of retraining issues, or because of retirement before workplace computer use became commonplace in the 1980s (Temple & Gavillet 1990, Lowe 1990). More recent Statistics Canada estimates (1997) showed that computer ownership also decreases with age, with 12.9% of the population 65 and older owning computers compared to 35.8% under 35 years old. While comparison of 1989 and 1997 statistics show that familiarity is increasing in this age group, comparatively it is low.

Second, in the 65 and older age cohort, computer ownership increases with income: about 6% of households with incomes of less than \$25,000 owned computers, compared to 30% of those with incomes over \$45,000 (Statistics Canada 1997). While computer ownership does not necessarily translate to computer experience, it can be assumed that those who own computers are likely to be familiar with how to use them, and have more opportunities for practice.

It is evident, then, that while computer experience for this cohort is increasing, even in the younger and more affluent subsets the majority are not familiar with computers. The older members of this cohort, particularly those with limited financial means, are especially disadvantaged.

The combination of an ageing workforce, continued expansion of and dependency on computer technology, and the numerous benefits to seniors of computer literacy such as health monitoring, e-mail, and financial planning, have prompted several studies on teaching the older adult to use computers (Kelley & Charness 1995; Czaja & Sharit 1993). The large majority of studies in Kelley and Charness's review of research on older adults and computers (1995) showed that older adults have considerably more difficulty learning to use computers than younger adults in that they take longer to learn to use the system, make more errors, take longer to complete tasks, and require more help to master the skills. The reasons for these differences are not clearly defined or understood. Perceptual skills, especially changes in spatial memory with ageing, may affect ability to learn how to use computers (Kelley & Charness 1995). Other tentative possibilities include cognitive abilities such as the ability to remember new information, problem solving ability, and at-

tention-based processes (Kelley & Charness 1995), which decline with age. Reading ability may also be a contributing factor (Kelley & Charness 1995).

It is not known if older adults are able to reach the same level of overall performance as younger adults. Studies suggest that they cannot compete at speed related performance measurements, but older adults can meet the same standards if the measure is based on accuracy with no time constraints (Charness & Campbell 1988; Kelley & Charness 1995; Czaja & Sharit 1993).

Findings concerning advantages of previous computer experience for learning are somewhat contradictory and difficult to compare because the term *computer experience* can cover a range of skills and abilities (Borgman 1986). A more recent study (Czaja & Sharit 1993, discussed in Kelley & Charness 1995) suggested that previous experience might be as important as age in predicting success at learning new software. Building upon previous knowledge appears to be less difficult than novice learning.

Another concern of teaching older adults computer skills has been possible anxiety about computer use. *Computer anxiety* refers to a negative or stressful emotional state when thinking about or using computers (Kelley & Charness 1995). The hypothesis is that this anxiety impedes learning and compromises performance on computer tests (Laguna & Babcock 1997; Kelley & Charness 1995) and may cause avoidance behaviour (Kelley & Charness 1995). The construct of computer anxiety is not well defined, particularly since the rapid development and refinement of computers including ease of use has made some previously used standardised measurement scales for computer anxiety less appropriate to today's issues (Dyck, Gee & Smither 1998). The results of studies to determine relationships between computer anxiety and age are mixed, but generally it is believed that anxiety increases with age. Laguna and Babcock's study (1997) confirmed this and showed that while computer anxiety is unrelated to performance in computer tasks, it was related to performance measured by decision time. It is unclear whether the pressure to perform with time constraints causes anxiety, or whether the anxiety causes delays in decision making.

The cause and effect of computer anxiety and computer experience is also problematic. While computer experience seems to reduce anxiety, for

self-taught individuals lower computer anxiety may be the actual cause of more computer experience, in that they were more willing to try new technologies (Maurer 1994). This is particularly relevant because for many of the older members of the study cohort, computer familiarity has been self-motivated rather than imposed by necessities of the workplace. Temple and Gavillet (1990) found that increased computer experience did not seem to reduce anxiety levels though they speculated that the participants of their study might already have had lower anxiety levels as they volunteered for their study.

Direct and indirect involvement with computers can also affect feelings of computer anxiety. Dyck, Gee and Smither (1998) noted that questions concerning indirect experience with computers such as watching someone use a computer or listening to a news item about computers may evoke less anxiety than visiting a computer store or having to use a computer.

Physical constraints may also compound difficulties with computers. Changes in vision with age may make identification of icons difficult, while co-ordination, clicking and dragging of the mouse may be difficult for older users (Kelley & Charness 1995). Keyboarding may also present problems for the older, unskilled typist, mainly because of problems controlling repeating keys (Kelley & Charness 1995).

For older adults then, the dynamics of computer familiarity, anxiety, and willingness to learn are complex, but indicate several potential barriers to computer literacy overlaid with a decline in cognitive and physical skills needed for computer competence. The implications of these factors in the public library setting and seniors' use or non-use of computer technology are, for the most part, unknown. Borgman's two studies (1986, 1996) have addressed difficulties with online catalogues in general, and Sit (1998) studied online library catalogue searching by older adult users. The latter's sample, however, was selected based on those who already were experienced online catalogue users. Anecdotal evidence suggests that many seniors are reluctant to use the OPACs and other technologies (Griebel 1998). However, no definitive estimates of use or identification of these underlying issues that may determine use or non-use have been ascertained.

Methodology

Time constraints limited the study to a small sample size. Six adults participated in the study; four agreed to when asked, and the other two volunteered. The two criteria for choice of participants were the age restriction of 65 years or more, and in-person users of the public library.

Interviews were chosen as the research method best fitting a qualitative investigative pilot study dealing with attitudes and feelings (Powell 1994). Interviews provided both the opportunity to identify patterns and allowed individual in-depth probing that helped in understanding the motivations behind some behaviours. Preferred personal interview locations were away from the library to reduce situational bias (Powell 1994). Notes rather than tape recordings were used to record comments, as the researcher saw this as less intimidating.

The interview schedule consisted of 14 questions using both closed and open format. The interviews were semi-structured to allow each participant the opportunity to direct the conversation and delve into issues that were most important for them. The first questions attempted to quantify library use and identify interests. The next questions identified familiarity with computers to determine if there was any carry-over between this familiarity and the subsequent issues raised. Further questions attempted to delineate overall emotional reaction to computer technology, both in general terms such as positive, negative or indifferent, and in more specific terms such as interest, fear, etc.

The second half of the interview discussed the specific issue of computers in the public library. Past library search methods were described to identify any possible changes in behaviour since the introduction of computers. Several questions addressed experiences with computer technology in the library. The interview also sought to identify physical limitations such as vision problems, arthritis, and so on, which may be a barrier to computer use in the library.

The last two questions gave participants the opportunity to suggest initiatives that might help them in using public library computer technology, and to discuss topics of importance to them that were not covered in the interview schedule.

A pre-test was conducted to ensure that the questions were unambiguous, non-judgmental, and accurately covered the research objective. Some of the wording was redone to ensure neutrality, and recognition of the importance of past library use was noted. The questions were not submitted to the participants in advance, as this may have reduced spontaneous and candid responses.

The interviews took, on average, about twenty minutes. Three of the interviews were conducted in person in the participants' homes, and three, for logistical and personal reasons, were conducted by telephone. While some body language cues were missed with the telephone interviews, generally the quality of responses was the same, and the participants may have felt more comfortable with the less formal aspect of telephone versus in-person interviews.

Phone calls to the libraries mentioned by participants found that all provided access to some additional computerised information such as CD-ROMs, Internet access, and online searching.

Data analysis included coding written comments to identify trends, and chronological analysis to look for patterns of behaviour regarding computer use or non-use.

Results

Participant profiles

Most participants were active and frequent users of the public library. Five of the six made visits ranging from every week to every two or three weeks. The sixth used the library rarely because of difficulties in understanding how to find material. Reading interests were wide ranging. Fiction was popular, particularly mysteries, and the non-fiction topics mentioned were gardening, biographies, financial information, health issues, general reference, and travel. The most popular format was books, although again, taste ranged from magazines as the only format read, to CDs and videos.

Computer experience

The number of participants in this sample with computer experience was significantly higher than the Statistics Canada (Lowe 1990) average.

Table 1. Computer Anxiety and Regular OPAC Use.

| Some form of computer anxiety | Regular OPAC users | | |
|-------------------------------|--------------------|----|-------|
| | Yes | No | Total |
| Yes | 0 | 4 | 4 |
| No | 2 | 0 | 2 |
| Total | 2 | 4 | 6 |

While only one could type, three of the participants were able to use computers. Two had taught themselves at home and one had had extensive work experience. All who had experience also owned computers, substantially higher than the 12.9% average for this age cohort (Statistics Canada 1997). Two of the home computers were PC (Windows), and one was a Macintosh; all had a mouse and used a menu interface. Home computers were used on average at least once a week for e-mail, word processing, and financial spreadsheets.

Attitudes towards computers

Attitudes towards computers were overwhelmingly positive; all participants thought them highly useful and were impressed with their capabilities. However, most hesitated before answering this question, indicating that a variety of emotions may have arisen with the question before an answer given. None of the participants chose to articulate these feelings in any depth.

Use of computer technology in the public library

Two of the six participants reported competence and frequent use of OPACs, with *competence* defined as being able to get the information they wanted. Two other participants reported trying the OPACs but had found them difficult to use to the point of walking away from them. The remaining two had never tried the OPACs (see Table 1). The reasons given for never trying the OPACs were, for one participant, "I'm too old to learn", while the other felt "overwhelmed by them". The two who tried but did not continue to use the OPACs had been active on their own computers for some time (at least two years) before attempting the OPACs. While neither of them articulated their reasons for this delay, they both said many seniors were "scared stiff" of the

Table 2. Computer Experience and Initial OPAC Use.

| Computer experience | Have tried OPACs | | |
|---------------------|------------------|----|-------|
| | Yes | No | Total |
| Yes | 3 | 0 | 3 |
| No | 1 | 2 | 3 |
| Totals | 4 | 2 | 6 |

library computers. This remark may reflect their own initial feelings about the OPACs as well as indicating the prevalence of these sorts of feelings amongst their cohort. As well, the contradiction between the positive attitudes towards computers in general, and this hesitation in the library, may reflect the differences in anxiety linked to indirect or direct involvement with computers (Dyck, Gee & Smither 1998). Some form of computer anxiety, in avoidance behaviour or reluctance to try, then, seemed to be present in these four participants, and none of these participants went on to become regular OPAC users.

Data were then analysed to identify any patterns in initial attempts to use the OPACs.

Prior computer experience was associated with initial attempts to use the OPACs. Table 2 numbers show that all those familiar with computers had tried the OPACs, compared to one out of three not familiar with computers. The data also show that three out of the four who had used the OPACs had earlier computer experience. It is evident that prior computer experience can help to overcome initial hesitation with the library computers. However, as stated previously, the relationships between computer experience and computer anxiety are somewhat problematic in that self-taught individuals may be more likely to try the new technologies.

Previous card catalogue or microfiche use as the dominant search method was also associated with willingness to try the OPACs (Table 3). Three of the four who had used card catalogues had tried the OPACs, and three of the four who had tried the OPACs were card catalogue users. Those who found card catalogue or microfiche indexes the most appropriate method of finding materials would likely be more motivated to learn the new technologies.

Two of the four participants who tried the OPACs became competent users while two abandoned them after frustrating results and said

Table 3. Previous Card Catalog or Microfiche Use and Initial OPAC Use.

| Previous card catalog or microfiche use | Have tried OPACs | | |
|---|------------------|----|-------|
| | Yes | No | Total |
| Yes | 3 | 1 | 4 |
| No | 1 | 1 | 2 |
| Total | 4 | 2 | 6 |

that they use them only rarely or not at all. Reasons for abandoning the OPACs after trying them were well articulated by these two participants. Both stated that they found the text-based interface significantly different from their home computers, which use a mouse and a menu system user interface. This is of concern as it was predicted that previous software experience would make learning new programs an easier task (Czaja & Sharit 1993). Evidently it is a complex relationship and may be dependent on the similarity of programs. They commented that the OPAC interface was difficult to use and one noted that it often turned up disappointing results, particularly in subject searches. Borgman's two studies (1986, 1996) outlined in detail the difficulties of using information retrieval systems for all users, particularly in subject searches, and these results support these statements.

Both participants had also felt that, while their librarians were very helpful in finding materials, the assistance they provided on the OPACs had been given too quickly. One participant commented that the librarians' familiarity with the system might make them unaware of how it looked to a beginner, and also remarked that older patrons need to learn more slowly. This supports previous research findings that older adults take more time to learn computer systems than younger adults do (Kelley and Charness 1995). Both participants felt that they would be disturbing the librarians, who seemed busy with other work, if they went back with further questions. Swope and Katzer (1972) found that most library patrons do not feel comfortable going to the librarian with questions, possibly because asking reinforces the users' feelings that they are "a bother or ... stupid" (Swope & Katzer 1972, 164). Kelley and Charness (1995) stressed that older adults make more mistakes than younger adults and need more instruction, and these

Table 4. Appropriate Librarian Instruction and Regular OPAC Use.

| Appropriate librarian instruction | Regular OPAC users | | |
|-----------------------------------|--------------------|----|-------|
| | Yes | No | Total |
| Yes | 2 | 0 | 2 |
| No | 0 | 2 | 2 |
| Total | 2 | 2 | 4 |

needs are of concern because of the politeness of these participants, the feelings of inadequacy, and the many demands on the librarian's time.

An additional consideration for lack of success was that written instructions were either confusing or non-existent. Written instructions may be of particular use to older adults as this cohort takes longer to learn and may need more instruction (Kelley & Charness 1995), and therefore step by step printed guides may be a useful adjunct to one on one instruction.

Finally, the OPACs were on stand-up counters and were in constant demand. This promotes rapid turnover of users but discourages longer practice times, which are, again, needed for older adults.

Appraisal of the two participants who had become competent on the OPACs showed strikingly different scenarios. Patterns for success showed that both felt they had had appropriate librarian instruction compared to those who were not successful (Table 4). One had adequate written instructions, and the other had not felt the need for them. Neither had expressed any hesitation or anxiety about trying which may have made them more tolerant of initial mistakes.

Finally, the role of individual differences amongst participants in determining behaviour cannot be overestimated. One successful OPAC user thought that the only thing that made the difference in success from other people was the desire to try. Individual differences may override many other factors previously discussed, and people's reasons for use or non-use may be very complex. Additionally, individual differences in personality and learning patterns may make learning to use information retrieval systems inherently easier for some than for others (Borgman 1986).

Table 5 summarises participant information discussed in the previous paragraphs, showing

Table 5. Factors in OPAC Use and Individual Participant Chronology.

| Participant | Past card catalog or microfiche index use | Computer experience | Hesitation to try OPACs | Attempt OPAC use | | Competent OPAC use |
|-------------|---|---------------------|-------------------------|-------------------------|------------------------------|--------------------|
| | | | | Adequate librarian help | Adequate written instruction | |
| 1 | No | Yes | Yes | No | No | |
| 2 | Yes | No | Yes | | | |
| 3 | Yes | Yes | Yes | No | No | |
| 4 | Yes | No | No | Yes | Yes | Yes |
| 5 | No | No | Yes | | | |
| 6 | Yes | Yes | No | Yes | Yes | Yes |

the chronology of each participant’s prior card catalogue or microfiche use, experiences with computers, and experiences with public library computer technology.

The interviews also showed that none of the participants used any other computer-based information in their libraries, and, in fact, were not aware of its existence.

Physical constraints

None of the participants had any major physical limitations they felt hampered their ability to use computers. One mentioned problems with contrast on the monitors, one had had some initial difficulty learning to use a mouse on the computer, and several said they would prefer to sit down when using the OPACs. There was agreement, however, that health issues were certainly a concern for some other older adults.

Summary of findings

The main findings of this study were:

- Two of the six participants used the OPACs regularly.
- Four of the six participants had some form of computer anxiety or aversion such as avoidance behaviour or hesitation to try, and none of these were regular OPAC users.
- All of those with previous computer experience tried the OPACs; three of the four who had tried the OPACs had previous computer experience.
- Three of the four participants whose dominant method of finding materials was card catalog or microfiche indexing systems had tried the OPACs; three of the four who had tried the OPACs had used card catalogs or microfiche indexing systems as the dominant method of finding materials.

- Reasons for not continuing to use the OPACs were:
 - OPAC user interface was too different from the home computer.
 - OPAC interface was difficult to use and results were disappointing.
 - Librarians gave instructions too quickly.
 - Participants felt they were disturbing the librarians if they went back for more instruction.
 - Confusing or absent written instructions.
 - Standing at OPACs discouraged long term learning.
 - Anxiety may have impeded learning.
- Patterns for success on OPACs were:
 - All successful users had appropriate librarian instruction.
 - Adequate written instructions.
 - No anxiety and no hesitation to try.
- The role of individual differences in determining behaviour, and the complexity of behaviour cannot be overestimated.
- None of the participants used any other computer-based information sources.
- None had any physical limitations that affected computer use but many thought this was an issue for other older adults.

Conclusions

These participants showed an overall low use of public library computer technology, both of OPACs and other information sources. This may compromise their abilities to find information in their public libraries. What is of particular concern is that for two previous card catalogue users, non-use of the OPACs meant a loss of previous

ability to find what they wanted. One noted a feeling of being left behind, despite a lifelong history of frequent library use.

There is a considerable amount of reluctance to try the OPACs despite a positive attitude towards computers. OPACs are considered difficult to use for most library users (Borgman 1986), and this may be coupled with a lack of computer experience and possible declining learning skills. There may also be a feeling of "everyone else can do it but me" similar to library anxiety issues discussed by Mellon (1986) in her study of library anxiety. It is understandable that there would be a reluctance to try and a subsequent feeling of discouragement. However, a positive attitude seems to overcome many barriers, and the participants were forward moving in their general attitudes towards computer technology.

The fact that none were aware of the alternative computer-based information is puzzling, and may indicate either a lack of advertising, or that the computer format discouraged further investigation. This is unfortunate as several participants had information needs that these sources could have addressed.

To improve service to these older adult users, the two themes of age appropriate library instruction and the provision of enough time to learn were pivotal. There appear to be two sequential hurdles: initial hesitation to try, then successful searches. The importance of success in the first attempts is critical as those anxious about their abilities need this positive reinforcement; patrons learning to use an information retrieval system will often leave after one error message (Borgman 1986). Easy to follow instructions are also of major benefit as they allow users to move along at their own pace without the embarrassment of continual returns to the reference desk for assistance.

The use of classes to deal with these issues is problematic. Most showed some interest although two mentioned the problem of cost, and one made the remark that people usually are interested in principle but "getting there was another thing". Additionally, Temple and Gavillet's work (1990) showed that those with lower computer anxiety are the most likely to sign up for classes, while those with higher anxiety avoid them. Miller (1986) felt that bibliographic instruction often causes library anxiety rather than alleviating it

because there is an expectation of user independence that may be unrealistic. Impromptu learning sessions where there is no expectation and no time frame, and no lead-up time to increase anxiety may be more to the point. A chance comment from one participant supported this, whose only experience on a computer was at a display in a shopping mall for anyone to try. While it was mainly considered a confusing experience the fact that the attempt was made is significant. Peer training was suggested by another participant as suitable to this group because they would understand the learning issues of older adults. Swope and Katzer (1972) noted that library users are often more comfortable asking a peer than a librarian for help. Turock (1987) also noted the value of older adult library employees or volunteers to serve their peers.

The following adjustments may also encourage this cohort to experiment with and use the library's electronic sources: the provision of larger easy to read monitors for the OPACs; chairs to sit while using them (Middlemass and Crooks 1999); OPACs with seating designated as training computers; and locating OPACs and other computer information sources near the reference desk.

Finally, this group was accidentally somewhat select in that half of them owned computers, five of them were frequent library users, four were competent at using the card catalogues, and they were all in good health. Yet these people were not, for the most part, using the available computer technology. This suggests that those less advantaged may be even more left behind in the shift toward computer technology in libraries thus increasing the split between the information rich and the information deprived (Kleiman 1995). Nuckolls (1992) stressed the importance of remembering the human factor at all times in the shift to electronic systems, because success is measured, not by the information systems, but by their abilities to provide users with their information needs.

Suggestions for further research

The interview methodology was useful for developing an appreciation of the participants' feelings about their library experience in general and their issues concerning OPAC use, and thus helped point the way toward further research.

However, the participants did not, or could not, articulate their many feelings towards computers in general and their reasons for use or non-use. This may have been a result of the interviewer's lack of expertise. Alternatively, they may have been unable to put the feelings into words. A standardised test for computer anxiety (see Dyck, Gee & Smither 1998, for review) may have been a useful addition, to identify these emotions through situational questions or other indirect means. A written instrument is also one step removed from the interview process, which may seem somewhat confrontational. As well, interviewing from a librarian's perspective may have biased results in that the participants may have felt that they needed to be positive about public library computer technology.

Finding participants was problematic. The formality of the covering letter and the consent form, and the formality of an arranged interview may have intimidated some of the participants. One potential volunteer withdrew after receiving the covering letter and consent form, and another preferred the telephone format. Several thought they should not participate because they did not use the OPACs. Asking for volunteers may also have provided a biased sample. Approaching users in the library may have been a more effective means of finding participants.

More research quantifying library computer use or non-use and important determining factors is needed to determine the extent of use and non-use for this cohort. Additionally, more research into the most effective means to overcome initial hesitation and enhance success could help to address how best to reduce this age cohort's reluctance to use the library computers.

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