Older Adults and Community-based Technological Literacy Programs: Barriers & Benefits to Learning

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In this article, we briefly review national statistics on older adults and computer usage—statistics that led us to volunteer to develop technological literacy programs for older adults at local community centers. Because we recognize that all literacies are developed and used by specific people in specific contexts, we describe the community centers where we volunteered, our roles as teachers and later as researchers, and the technological literacy curricula we developed and revised based on extensive input from participants. We discuss the barriers and benefits to older adults' acquisition of technological literacies. We argue for the importance of building communities of practice based on relational support and interaction and for the importance of drawing from assets and needs existing within communities.

"No. No. I don't have a computer. And I really don't have a desire to get one because what is a computer going to do for *me* right now in my daily life? My children live close by and I call them all the time. There's nothing on the computer. I don't want to get emails from people I don't know. Bad enough to get telephone calls."—Sally

"And all of a sudden I saw the world was passing me by. I tried to get my Cape [Cod] phone set up to pay on my credit card—there's no way you can do that—you *have* to be able to do it by computer. I had a couple medical issues—a back problem—and the doctor said go online and look up this, that, or the other thing. And three or four things happened this year so I said, 'You know, I've *got* to get into the 21st Century.' So here I am."—Hannah

"I am E-mailing all of those six daughter[s] like crazy and even a couple of grandchildren who have been lazy about keeping in touch. Works like magic. I no longer feel like the neglected mother and grandmother. Plus I also keep in touch with friends so my life has truly expanded."—Mary

The above comments are from older adults speaking about their perspectives on computers and technological literacy. Sally's, Hannah's, and Mary's comments are representative of the continuum of perspectives we saw expressed by the over one hundred older adults with whom we worked in a period of five years in our respective community-based technological literacy programs (Heidi in Massachusetts, Kris in

Ohio). In this article, we begin by briefly reviewing some of the national statistics on older adults and computer usage, statistics that led each of us to volunteer as teachers to develop technological literacy programs for older adults at local community centers.[1] We initially did not set out to research or report on our work, but over time we realized that we were gaining potentially useful (and we hoped transferable) insights about technological literacy programs for older adults.[2] Because we recognize that all literacies are developed and used by specific people in specific contexts, we describe the community centers where we volunteered, our roles as teachers and later as researchers, the older adults with whom we worked, and the technological literacy curricula we developed and then revised based on extensive input from participants. We provide a more in-depth discussion of our individual contexts because what we find striking is that despite the geographical distance and cultural differences in our locations (New England and the Midwest), many of the barriers older adults encountered and many of the successful strategies they used for adapting/adopting technological literacies were the same.

Drawing from our experiences and from qualitative, interview-based research with participants, we seek in this article to discuss the barriers and benefits to older adults' acquisition of technological literacies. In our discussion, besides quoting extensively from participants, we also bring together scholarship from three areas: senior studies, literacy and technology studies, and adult education initiatives. In particular, we argue for the importance of building communities of practice based on relational support and interaction (Lave and Wenger) and for the importance of drawing from assets and needs existing within communities (Auerbach; Demetrion; Grabill). We also close by reflecting more fully upon our roles as technological literacy instructors and researchers, considering how our perspectives evolved toward more participatory design and describing what we would do differently were we to approach such teaching and research again so as to further promote rich, interactive community-based, participatory research (e.g., Ray; Strand et al.).

Older Adults and Digital Divides

Digital divides take many forms and impact diverse populations (Benton Foundation; Besser; Grabill; Moran; NTIA, "Entering the Broadband Age"; NTIA, "Internet Use in America"; NTIA, "Toward Digital Inclusion"; NTIA, "Defining the Digital Divide"). According to a recent Pew Internet & American Life Project report on "Older Americans and the Internet," older adults (those defined as age 65 and over in the Pew study) across all cultural and ethnic groups and across all socioeconomic classes are unlikely to use computers or to know someone who does use computers. Only 22% of older adults reported occasional or frequent use of a computer versus 58% of Americans age 50-64, 75% of 30-49 year-olds, and 77% of 18-29 year-olds (Fox, "Older Americans"[i]).

The digital divide based upon age is potentially just as detrimental to individuals and society as the divide based on cultural and economic resources. As more news and information, governmental business, and personal communications are conducted on-line, older adults who do not use the Internet are at an increasing disadvantage in terms of developing social relations, participating in civic discussions, and gaining valuable knowledge on issues such as health care. While some older adults' lack of access is certainly related to economic issues, much of it relates to not having the technologi-

cal literacies needed for using a computer, accessing the Internet, and navigating the Web. Whereas younger generations have work or school contexts in which to learn and use computers, older Americans have not had those opportunities (Carpenter; Fox, "Wired Seniors"; Fox, "Older Americans"). Community literacy programs and community centers such as libraries, churches, and senior centers are thus of particular importance for the senior population, serving as primary sites where older adults can turn to develop technological literacies (Fox, "Older Americans"; Ito et al.).

As computers and writing experts, as teachers with both K-12 and college experience, as daughters and granddaughters of older adults, and as citizens of our communities, we both were concerned with the digital divide faced by older Americans. We therefore sought ways to work with our local community centers to help develop and extend technological literacy programs for older adults. Neither one of us set out to research or report on our work; rather, we

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began our involvement in the community programs as volunteer instructors. Thus, we came to our work first as teachers, not as researchers. The research arose for each of us because we hoped to learn more about curriculum effectiveness and the learning experiences of the older adults with whom we worked. We came to the research more retroactively, unlike, say, a scholar like Ruth Ray who became involved with senior centers with a research intention from the outset and thus pursued a more in-depth participatory approach. Although in our methodology we did draw from some principles of community-based, participatory research, we did not set out to conduct a participatory study, a point we will return to at the end of this article. But before turning to describe the specific community centers and people with whom we worked, we want to discuss and define how we understand the term *technological literacies*, an important and ever-expanding area of literacy studies.

Technological Literacies

Robert Yagelski notes that "As more of us—students and teachers alike—venture into cyberspace both within and outside school settings, there is a growing need to understand the ways in which new literacy technologies might be redefining the value of literacy in our culture and in our lives" (135). However, the academy has given less attention to the needs of older adults, who are often left out of more recent discussions of the impact of technology on our definitions of literacy (e.g., Gee; Lankshear and Knobel). One notable exception to this omission, and one we will reference further in our discussion, is Angela Crow's *Aging Literacies* where she presents her research on technological adaptation and use (or lack thereof) by older academics. As Crow argues (and as we argue too), just as we must pay attention to technologies shaping youth literacies—both in popular and academic contexts—we must also pay attention to how older adults approach (or reject) developing technological literacies.

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We often use the plural term *technological literacies* because we both came to real-ize that in our work with older adults we were fostering within our respective curricula a range of literacies that fit within the tripartite categories identified by Stuart Selber: functional, critical, and rhetorical.[3] To avoid the trap of taxonomy, Selber acknowledges that "the categories are meant to be suggestive rather than restrictive and more com-plimentary than in competition with one another" (25). He calls for "multiliteracies," a form of technological literacy acquisition that encompasses all three types and does not inherently privilege one form over the other, but rather allows context to determine which category should be emphasized and which objectives strived for. In functional literacy, computers are tools, students are users, and the objective is effective employ-ment; in critical literacy, computers are cultural artifacts, students are questioners of technology, and the objective is informed critique; in rhetorical literacy, computers are hypertextual media, students are producers, and the objective is reflective praxis (25).

The first category, *functional literacy*, is often criticized for being too reductive, aimed at producing minimally competent, uncritical workers; however, as Selber makes clear, functional literacy is an essential component of any technological literacy (33). Before individuals can critique, challenge, and repurpose computers and online communication practices, they first must know how to use a computer and how to engage in those practices. In our work in the community programs, we initially under-played the importance of functional literacy. We each began our work with older adults with theoretical frameworks that privileged the critique and production we have often fostered with undergraduate and graduate student populations. That is, we were more prepared as instructors to help older adults analyze and critique the critical and rhe-torical aspects of Web communication rather than to work with them as they learned how to push on/off buttons, move a mouse, click on icons, etc.

We didn't realize just how important developing the most basic functional literacy was for older adults. Later in our projects, however, we each tilted too far in the other direction as well, overemphasizing functional literacy to the detriment of other impor-tant aspects of technological literacy development, such as fostering social networks of support. We want to emphasize, too, that at the time we were each involved with our respective senior community programs, we were not in communication with each other about our work. That each of us experienced the same difficulties in curricular design—underemphasizing and than overemphasizing functional literacies—is indica-tive, we think, of the difficulties other university-based scholars (both instructors and students) might face when working with older adults. Thus, as we describe and reflect in hindsight on our literacy work, we foreground the possibilities and constraints of our own local contexts, our curricula, and the biases that limited rather than expanded definitions of technological literacy, whether such definitions were those of our stu-dents, our campus and community partners, or ourselves.

Politics of Location: Technological Literacies in Cultural Contexts
Wood County, Ohio

Kris began a collaboration with the Wood County Committee on Aging (WCCOA) in the fall of 1999, resulting in a small grant funded by Bowling Green State University's Partnerships for Community Action. This first grant, "Re-Connecting Seniors Through Technological Literacy," proposed to educate older adults in Wood County about the

ways in which Internet technologies could help them maintain connections with family members and to create a sense of family history and cultural identity through the construction of online genealogies. Through a series of proposed technological literacy workshops offered in conjunction with the Wood County Senior Citizen Center and the Wood County Public Library, older individuals in this program would learn to use the newest forms of electronic communication and information—e-mail, Web research, and Web page construction and publication. Needless to say, these were ambitious, unreachable goals for a first five-week, two-hour class; basic desktop navigation and use of a web-based e-mail system was as far as the class of six students got.

As a teacher, Kris admittedly went into this project with an overly ambitious plan that not only did not meet older adults "where they were at" in their technological literacy but also did not acknowledge that the stereotype of "senior citizen" or even "older adult" was one that limited Kris' preparedness to work with and learn from the participants within her classes. Initially, Kris rather arrogantly thought, "If I can teach my mother to use a computer, I can teach anybody to use a computer," a misconception that came through loud and clear to Grace Nash, the long-time activities director for the WCCOA and one who knew the Wood County senior population well. Such "inattention to ageism" is, as Ray suggests, "an unacknowledged sign of privilege" (225), whether Kris was conscious of it or not. Although Kris had a good deal of experience teaching technology to a range of diverse populations in California, Indiana, Texas and Ohio, she was cautioned by Grace, herself in her late fifties, to both listen to what older adults actually wanted to do with technology and see what they actually could do, rather than prescribe a one-size-fits-all curriculum.

In other words, Grace suggested that Kris try to learn from the students she would teach in a manner consistent with models of service learning and community literacy that promote reciprocity rather than "othering" as well as Ray's call for feminist researchers and teachers to learn from differences. And learn Kris did. In the five years she taught computer classes in Wood County, her students were certainly more diverse than the ones she taught at the university: Bruce, a retired professor who took a class to see what all the fuss was about; Jean, a nurse who wanted to write her memoir, but didn't want to use a computer to do it; Jessica, a working secretary at the university who ultimately quit coming to class because of a disapproving supervisor; Betty Jean, a popular local painter who was bipolar and needed family support in several class sessions; Ida, an energetic Bowling Green resident who often had to miss a class because she was teaching classes of her own at the WCCOA; and finally, numerous couples (at least one in almost every class Kris taught) for whom the computer was a way to connect with their children, grandchildren, and perhaps with each other. In every instance one partner was invariably a helper to the other, particularly when one partner did not have the necessary dexterity to actually operate the computer on his or her own, or when another partner was extremely frustrated with his or her perceived lack of progress.[4]

While the first class in 2000 was limited to six people, word of mouth in the senior community created a demand for an entire series of computer literacy courses, from Basic Skills 1 & 2 to a specific Internet course, in order to make the technological training of seniors more progressive and more viable across time and curricula. By the second year, nearly 75 senior citizens attended a computer information night the

WCCOA hosted at the public library, and almost all of them signed up for the series of courses taught by Kris and several other instructors in spring 2001. Despite the clear interest in and enthusiasm for computer courses, the diversity of participants—their expectations and prior experiences—created a number of challenges in developing and delivering the curriculum. The first was a continuum among the attitudes of older adult participants, from "I know nothing about the computer" to "I think I know more than I really do." This led to problems with participants who wanted to "learn e-mail" or the Internet before they even knew how to navigate the desktop. Conversely, some participants were afraid to even touch the equipment.

Because Kris and the other instructors taught sections of the same course, ideological gaps existed that included some instructors' call for a pre- and post-test of students computer literacy acquisition during the courses. While this method on one level assesses the quality of the curriculum in purely functional use terms, it could potentially not capture attitude changes among participants. Ultimately, what proved most beneficial was a collaborative support system that balanced functional learning with opportunities for discussions (both written and oral) of feelings and attitudes about the course, computers, and individuals' learning needs and goals. In addition to the course curricula, more courses were scheduled at outlying senior centers, and for each series, Kris and her partners designed a series of "graduations" for those who completed courses, a ceremonial process that was more reflective of successful completion and accomplishment rather than of a functional certification of computer mastery.

When Kris began this project, she had no real intention of conducting formal research into older adults' acquisition of technological literacy. Rather, her goals were more personal and centered around her own role as a technology educator within the community and the desire to help others as she had her own mother, who had moved to Bowling Green several years earlier and had asked for a computer. In contrast to Heidi, Kris did not follow up with participants via in-depth interviews; instead, similar to teacher- and action-research approaches that foreground reflective practice, she began to observe various participants in classes, in some cases following up with video observations and short interviews along with traditional evaluations of the strengths and weaknesses of the course. All of these approaches were designed to enhance both technological literacy and attitudes about computers.

In the process of teaching several courses and working closely with older adults and WCCOA administrators (for a period of five years), Kris and her fellow instructors had an opportunity to user-test a variety of instructional modules for computer literacies, refining approaches so they were more participatory so as to meet the needs of individual participants. In this curricular revision, narrative played a large role in assessing older adults' attitudes. Researchers such as Karla Kitalong et al. advocate technological literacy narratives for several purposes, including "gaining access to a comparative body of knowledge about students' technological patterns and habits of mind … in their own words" (223). While Kitalong and her co-authors discuss opportunities for intergenerational learning through student interviews with older adults including parents and grandparents, such methodologies are useful to techno-rhetoricians seeking to conduct community literacy projects such as ours.

Amherst, Massachusetts

In the spring of 2001, Heidi contacted Nancy Pagano, one of the directors of the Amherst Senior Center, to volunteer and to ask if there were any areas, particularly vis-à-vis technological literacy, that her experience as a teacher and a computers and writing scholar might be of use. Nancy responded with a resounding and enthusiastic "Yes!" then showed Heidi a computer lab with nine computers (four older machines without Internet capabilities) and five newer machines, one of which was connected to the Internet (though by fall 2001, all five were). Nancy explained that although she had volunteers teaching more advanced courses on word processing and digital photography, the older adults involved with the Center were in need of basic computer courses covering such things as how to turn a computer on and off, how to move a mouse, how to access the Web, and how to write, read, and send e-mail. Nancy had taught such a course a few times, but because of increased administrative duties she could no longer do so. After discussing with Nancy her prior experience, Heidi settled on four two-hour time blocks for a course, gauging that that would be enough time for people to get familiar with computer basics, but not requiring a longer commitment which may have been difficult for some people.

Because of her university bias, however, Heidi at first planned an overly ambitious curriculum, just as Kris had done. Heidi expected to provide the basics of word processing, surfing the Net, and using e-mail in just one four-week, eight-hour course. She even had thoughts of possibly working with older adults to develop Web sites. Heidi realized immediately in the first class that the curriculum was overly ambitious and, worse, not tailored to the needs of participants, causing her at that time and for the next five years to revise continually not only what she taught but also how she taught. Rather than begin courses with a set agenda, Heidi would first assess the needs and interests of participants (limited to five in each course). As she explained in the course announcement, "Topics to be covered will vary depending upon participants' interests, but may include: (1) a non-technical overview of the parts of a computer and how they work, (2) an introduction to the World Wide Web (WWW) and strategies for searching and for analyzing and interacting with Web sites, and (3) an introduction to e-mail."

During her years of involvement at the Amherst Senior Center (which ended in summer 2005 when Heidi moved to another state), Heidi taught one or two basic computing courses a semester, teaching a total of twelve courses to more than sixty individuals. The people with whom she worked ranged in age from 55 to 89. Their demographics represented the regional population, mostly white (approximately 10% of the older adults who enrolled in the courses were persons of color) and well educated (nearly 100% had some college education, if not advanced degrees). Many of the participants were concerned about budgets and although many talked of getting a computer—or already had one that had been given to them by one of their children—there were a number for whom owning a personal computer was not an option.

A small percentage of the older adults who enrolled in the courses had prior computer experience (either using a computer years before while still working or having been taught by a family member) and they just wanted to brush up on their skills or learn more about the Web, which had not been around when they first used a computer. But a larger percentage had never worked with a computer before. Thus, Heidi soon discovered that she would be teaching numerous technology literacies, which, as

we discussed above, fit generally with Selber's tripartite categorization. Like Kris, Heidi initially did not emphasize basic functional literacy enough. Later, as she and the older adults with whom she worked focused on such things as how to move a mouse, how to enter usernames and passwords to access free web-based e-mail, and how to read e-mails (to, from, subject lines, body messages), she realized that she needed to add explicit critical and rhetorical discussions back in as well. In the process of deciphering the often overwhelming amounts of visual, textual, and even aural information on Web sites, older adults did offer critical perspectives on the use of the computers, particularly on the ways in which Web sites and the equipment used to them were not user-intuitive and not designed with older adults in mind. And, finally, with the production of e-mail, which Colin Lankshear notes itself involves multiple literacies (146), seniors did have opportunities to move to rhetorical literacies of production as they wrote and sent e-mails.

In the process of teaching these courses and of working with so many older adults, Heidi gained a great deal of insights into what factors hindered and benefited seniors' development of technological literacies. She also learned more about what factors contributed to whether a senior would go on to be a "successful adapter" or someone who decided not to continue to learn and work with computers. To confirm and verify much of what she learned, during the last semester Heidi taught at the Senior Center, she conducted a person-based study (with individual consent and institutional approval) based on one or two-hour interviews with ten older adults who were currently or who had previously been enrolled in one of the courses she taught during the last four years. Heidi interviewed "successful adapters," such as John, who in his early eighties used a computer for the first time.

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Now, four years after his first computer class at the Amherst Senior Center, John was actively e-mailing friends and family, typing up monthly reports to post to his astronomy club's Web site, and still eager to learn more about how to use a computer. And Heidi interviewed those who, after completing the beginning computer course, chose to cease using computers, people such as Sally who felt that the use of computers added nothing to her life. In the interviews, Heidi asked open-ended questions about prior computer use before the course, present computer use, factors hindering and benefiting learning and usage, and suggestions for teachers, senior center administrators, and peers. In this article we quote extensively from the people Heidi interviewed, and we describe those people more fully around the context of their quoted interviews.

Purposes for Learning

When we (Kris and Heidi) first learned of the other's work with older adults in technological literacy programs, it was after we each had terminated our involvement with the programs (Heidi because of moving away from the area, Kris because of increased administrative responsibilities at her university). Through collaboration on a panel presentation on community literacy projects for the 2006 Conference on College Composition and Communication, however, we discovered that despite our differences in context, the purposes older adults had for developing technological literacy were similar, as were the factors hindering and enabling learning.

When discussing various approaches to literacy, Sylvia Scribner explains that "as ethnographic research and practical experience demonstrate, effective literacy programs are those that are responsive to perceived needs, whether for functional skills, social power, or self-improvement" (81). Similarly, Elsa Auerbach calls for literacy programs to be centered around emergent curricula, based on the real-world needs and goals of participants, not imposed from above. Knowing why learners have come to a program and what goals individuals have for their participation is obviously important for any learning situation, but we feel it is particularly important for working with older adults who seek to develop their technological literacies for a wide variety of reasons, many that are more social or affective.[5]

Of the older adults with whom we worked, the vast majority wanted to learn about computers and the Internet so as to be able to send and receive e-mail with family members scattered across the country and often around the globe. In this aspect, their purposes followed national trends. According to the Pew Internet and American Life surveys of older adults' use of computers and the Internet, older adults are more likely than any other age group to come to use a computer because of encouragement and prompting from family members. Ninety-four percent of all older adults who do use the Internet (the so-called "wired older adults") use e-mail to communicate with family (Fox, "Older Americans").

In addition to wanting to communicate, many older adults were curious about the Internet; others recognized the sheer necessity of learning to get online. For those of us who access the Internet frequently, we may not notice how thoroughly Web references have saturated our culture, but open any magazine or newspaper, read the scrolls beneath news broadcasts, or listen to radio announcers, and you'll see and hear these references frequently. If someone has never seen the Web and has no idea what it is, these references can often serve as a jarring reminder of one's dislocation from what clearly serves as an important spheres of social, cultural, and economic influence in American society. Sam, an avid amateur astronomer in his early eighties, explained that he came to the computer class because his astronomy club had moved all of its materials online and Sam was getting left out of the conversation. When he would contact the head of the club for information about upcoming events, "The head of our astronomy club finally said to me, 'You ought to get on a computer because you got to get on our Web site, you got to—all the information you need to know is on the Web site. Look at the home page of the Web site.' But I didn't know how to go to the Web site. So I came to the class."

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Hannah, an artist in her mid-sixties whom Heidi interviewed during her enrollment in a computer course, explained that she came to the Amherst Senior Center because she felt that the world was passing her by.

> *Hannah:* Well, I know nothing about computers. Absolutely nothing. And all of a sudden I saw the world was passing me by. … You see more and more, they [businesses] don't even give you a phone number, they just give you an e-mail to deal with. I've become a pest to friends because I don't have an e-mail address. I belong to several clubs, and they say, "If you can just give me an e-mail address, I can push the whole thing and send it all out at one time without making separate phone calls." So for all of the reasons I decided I was being a nuisance and the world was passing me by.

In Sam's and Hannah's explanations are a number of reasons echoed by many older adults, including the desire to catch up with the times (to not just hear about eBay, for example, but to actually go there), the recognition of the need to do business on the Web, and the urge to not be a nuisance to family members, friends, and club members who advocate communicating online rather than via phone or postal mail.

A small percentage of older adults with whom we worked also wanted to learn more about computers and the Internet so as to brush up on job-related skills, either because they were still in the workforce or because they were looking to rejoin it. Such was the case of Jessica, in her fifties and employed by a local midwestern university as a secretary. Although Jessica had some basic computing skills, she saw the free computing course at the senior center in part as a possible refresher of her skill set and something that could help her at work. Joan, a retired secretary in her 70's who had worked at a university, wanted to rejoin the workforce after her husband's death. When she left her university, she had used e-mail and the Internet, but the department where she worked was Macintosh-based and she had never used a PC. She came to the class because "a lot of companies do not have Macintosh. So I thought I better learn something new." Although working older adults are rare in our classes, their role is an important one, particularly because they counter the stereotype of the "senior citizen" and because they generally have more technological literacy experiences that they can share with others in the course and in the community center, a point we return to below.

Developing Technological Literacies: Barriers & Benefits

Physical and Material Barriers

Older adults often face physical and material barriers to accessing computers because of their financial circumstances and their health. According to the US Administration on Aging's "A Profile of Older Americans: 2004," a significant percentage of older Americans (age 65+) live below the poverty level (10.2%) and another 6.7% are classified as "near-poor" (3). The median income for older adults is $14,664 ($20,363 for males and $11,845 for females), and for fully one-third of all older adults, Social Security benefits constituted 90% or more of their income (Administration 3). Given these statistics and judging from our conversations with older adults, for many, the option of purchasing a computer and/or paying a monthly Internet service provider fee is simply not an

option. Hence the importance of publicly-accessible computers in communities.

But leaving one's home to come to a community center might also be difficult for many older adults because of health-related issues. As the Pew Internet and American Life project reported, "Older adults are also more likely than any other age group to be living with some kind of disability, which could hinder their capacity to get to a computer training center" (Fox, "Older Americans"). Whereas 65.8% of Americans aged 18-64 assessed their health as excellent or very good, only 37.4 % of older adults did so and more than half (54.5%) reported having at least one disability (Administration). While there is much work that can be done to help older adults develop technological literacies in community centers, there also needs to be recognition of the many homebound older adults who, because of various health-related issues, may not be as mobile.

One older adult with whom Kris worked recognized the barriers many older adults face because of limited mobility, and he was concerned that many of his fellow rural community members could not make the twenty-minute drive to the Wood County Public Library where the courses were held. This student in consultation with a local pastor decided to approach the WCCOA about mobilizing and extending this technological initiative to his rural community through the creation of a computer-training facility in the basement of a local church. During summer and fall, the pastor was successful in working with local community businesses to secure a donation of eight Dell computers (provided by Cooper Tire) and eight chairs ergonomically appropriate for computer-mediated instruction. In collaboration with the pastor, Kris and her community partners helped to design a computer facility suitable for offering classes for up to eight students with opportunities for one-to-one tutoring as well. That the impetus for expanding the initial computer literacy initiative came from one of the "student" participants is indicative of the potential for older adults to serve as active, reciprocal partners in the curriculum development and assessment process.

A number of older adults may be in good enough health to come to a community center, but finding the time to do so is another matter because of caregiving duties. According to a recent study published in *The Gerontologist*, an estimated 7% of America's grandparents provide extensive care giving to their grandchildren, including more than 20% of those caring for the pre-school aged children of working parents ("Larger Number"). In addition, many older adults care for a spouse, partner, or family member who is in poor health or disabled. One couple with whom Kris worked attended every class together, but Mr. A. never participated in the class because of cognitive and dexterity limitations caused by a recent stroke. Each week, Mrs. A. brought Mr. A. along; he sat in silence and watched. While Kris did not ask, she surmises that Mrs. A. brought her husband along simply because she couldn't leave him alone. In Massachusetts, one senior with whom Heidi worked, Sam, explained that one of the biggest barriers he faced in learning to use the Internet was time. He didn't have the time to "tinker" as he'd like because his wife's health was not good and he could not leave her alone for more than an hour or two.[6]

In addition to barriers of access, physical factors such as arthritis or poor eyesight potentially pose huge barriers to older adults depending upon their health. Neither of us in our teaching was prepared for this issue, having previously worked primarily with traditionally-abled college students. The sheer physicality of computing surprised

us and our bodies began experiencing computers in a new way, such as when we demonstrated and described how to sit properly at a keyboard so as to lessen bodily strain. Similarly, we held older adults' hands as they first used a mouse in order to show them how to hold and move it correctly (not in a death grip, which is exhausting, but also not too tentatively). Our failure to recognize the incredible physical dexterity (and stamina) needed to sit at and use a computer initially left us unprepared for working with older adults using computers for the first time. Even such seemingly simple actions as tracking a cursor icon as it moves across the screen involves physical dexterity, as Cathy, a mother and grandmother in her eighties described: "A few years later, my son said you need a new computer and he got me one. He would give me lessons—tutorials. Very little of which I understood because he was able to work so fast, and I looked at him and I said, 'How can your eyes move that fast?' My eyes couldn't keep up with what it was he was doing. So that was a setback."

To lessen the setbacks caused by technical and material barriers, community technoliteracy workers should work with older adults to advocate for more computers, better connections, and ergonomic, adjustable furniture. Ideally—and this is something neither of us was able to initiate—a technoliteracy program for older adults would also have a mobile, home-visiting unit that could reach out to older adults who are not easily able to come in to use the community center. Unfortunately all of these suggestions require money and in this era of increasing cutbacks in social services, money is often hard to come by. However, as with any critical literacy initiative, awareness that a problem exists is a crucial first step. Furthermore, money is not needed for creating a curriculum that follows principles of Universal Design. Both of us realized that even more so than when teaching traditionally-aged college students, when working with older adults we needed to present information in multiple ways: providing handouts as well as talking through directions and, most importantly, providing a great deal of one-on-one, hands-on practice.

The Barriers of Fear and Ageism

Besides physical and material barriers, many older adults experience a great deal of fear about learning computers and developing technological literacies, fear caused in part by ageism, as this selections of statements reveals.

> I looked at the keyboard and the keyboard seemed to be the same [as a typewriter keyboard], but I was scared to death. I was just so nervous. I was so tied up I could hardly think.—Cathy

> We[older adults] do talk about it—I mean, the fact that our grandchildren start with computers at three and four years old and there's grandma and grandpa standing there feeling very stupid, very intimidated. But the skills the kids are learning very early come harder for us.—Mary

> It's a psychological thing when an older person—and it doesn't happen with young people because they grow up with the computers—when you look at the computer you just feel totally overwhelmed,

like this thing is some kind of monster. It's got all these wires and god only knows what's going to happen. We have, I guess, a little bit of a fear like—I hate to say this, but even for women, especially, you know because it was just a totally different society… I mean people thought differently about what women should be doing and what they shouldn't.—Rachel

I had my four-year-old [granddaughter] in my car one day and I asked her if she knew how to work on a computer. She said, "Yes, we do that in school." I said, "What do you do?"—and all of a sudden I felt like that big [holds out fingers to indicate tiny height]. You don't realize that it's like coming out of the womb. I feel like I know nothing. I'm so far out of it—that to me it's almost overwhelming to think that I can actually break through and do what I want to do. I'm not sure how learnable I am.—Hannah

Running through these comments, which are similar to those both of us heard repeated frequently by older adults, are fears of breaking the machine, of not being smart enough, of appearing stupid, all fears shaped in part by ageism.[7] Older adults made frequent references to their age and their beliefs that computers were for "young people." Our society, particularly the entertainment industry, certainly fetishizes young people—you don't see grandma dancing with an iPod, for example—and the message that technology is for the young is something that many older adults seem to have internalized. In addition, many older adults expressed fears of not being able to learn because of their age (e.g., Hannah's comment about "I'm not sure how learnable I am").

In *Aging Literacies*, Angela Crow devotes an entire chapter to chronicling and challenging ageist stereotypes of older adults, relating not only to their technological usage but also to their potential as learners. She calls for further awareness and study of ageism: "Our research should assess how we internalize stereotypes as we age, and the interpretations others make about us as we age" (64). As Crow shows in her research and as we experienced in our years of working with older adults, ageism is not only internalized but externalized as well. That is, it is imposed on older adults from others, including, we are upset to admit, well-intentioned volunteers. Both of us realized as we reflected on our work that we came in with ageist perspectives that we inadvertently imposed on the older adults with whom we worked. In particular, even though we didn't set out to be crowned as experts, we were because we initially did not do enough to challenge such perspectives. At the Wood County Committee on Aging and the Amherst Senior Center (institutions that are hundreds of miles apart), older adults felt that because we were "young" ("you young people")[8] scholars of computers and writing studies, we knew everything there was to know about computers and that we never had to learn.

What we realized we had to do—and it's something Crow advocates for her in her work—was to explicitly name, address, and debunk stereotypes of older adults as learners and as technology users, citing the many studies and statistics that prove older adults are still capable of learning and that many older adults use computers. We mentioned many sites for older adults on the Web and we spoke of older adults in the community who were actively involved with computers. (What we should have done,

however, is involve some of those "wired seniors" in the co-teaching of the courses, an issue we discuss later in this article.) We also learned to work more actively to resist the "expert" trap, to talk of how we first learned computers (Heidi used her first computer as a college student, Kris as both a student and a secretary) and to model our own learning processes. To show participants that they knew more than they expected, Kris began several courses with an icebreaker activity in which participants were asked to name one aspect of the computer, from monitor to tower to keyboard and mouse.

This activity showed participants that they did in fact know something about the machinery. As well, it helped them critique larger myths of who is good with technology (white, male, young) that, as Selber contends, serve as "technological impasses" (68) to those who don't fall within these long-privileged demographics. Through such strategies, we sought to foster in older adults confidence that they too could learn how to use computers and that the many literacies they already possessed could indeed be adapted to digital environments.

The Benefits of Confidence

With learners of any age and in any context, confidence is key. Older adults who became successful adapters of technology developed confidence, particularly in the realm of functional literacy. For example:

> The biggest thing I learned in your class was that I cannot break the machine. Now if I get into difficulty, I know I can close all the windows and programs and start over.—Jacob

> What I liked about your class, you said this is the way you turn on the computer and you had class 1 and class 2 and you had the handout for each class and you went slowly and step by step. I got so I wasn't afraid that the computer might blow up when I pushed the button the wrong way, whether I'd destroy the world or something.—Sam

> The thing I got out of your class is somebody saying to me "You can do it." That's probably the best thing that you can say to anybody. Even though they may not realize it the time, but that's what we need to build our confidence. That we're not going to bust anything, that the computer's not going to blow up. And we're not going to make a fool out of ourselves.—Rachel

Another example is of Betty Jean, a successful local painter who was very creative and eager to tell stories but was equally anxious about Kris's 2004 digital storytelling class because of the computers. To ease her anxieties (which were compounded by her being a person with bipolar disorder), Betty Jean brought her own "technical support" in the form of her granddaughter (session 1) and her husband (session 3). This support only served to augment the classroom support because in this very small class of five women, support came in the form of conversation and laughter, all of which created a low-pressure environment for learning the basics of Microsoft PowerPoint as a viable format for a digital story along with basic scanning skills to enhance the overall presentation. As Betty Jean noted afterward, "I never thought I would say this, but I

think I've gained somewhat of a bit of confidence in foolin' around with the computer. I totally was ready to throw it out the window to begin with, so I'm excited about that, and also thought I had to use a pencil, I write quite a bit, and I'm surprised when I read back over [my computer work] I say what I mostly wanted to say."

In addition to gaining confidence that the computer would not "blow up," that in the process of learning they would not look "stupid," and that they could use computers to say what they "mostly wanted to say," successful adapters (those who several years after the initial computer class are still using computers) also gained confidence to use computers in locations other than the senior center.[9]

> We went to Prince Edward Island this summer and you said you could use— and I went to the local library in the little dinky Canadian towns and I was able to get my e-mail and that was great. I went there for an astronomical event plus we had a little vacation. And I got online from PEI to people back here. Neat to have that ability to walk into a place in another country and go to their library and say, "Can I use your computer?" "Sure, just sign here" and walk in the room and use the computer.—Sam

> Yeah, I can walk up to any computer and feel totally comfortable that I'm not going to screw anything up for anybody. You know, like any library I can go into, any friend's house, I can say, "Oh, can I just check my e-mail?" They don't usually like you to do that much, but I feel confident.—Rachel

As we have acknowledged, both of us initially planned too ambitious curricula, but we fast realized that many older adults were afraid to touch the computer, lacking the confidence and belief that they could learn. Thus, we recognized the importance of teaching functional literacies tailored to learners' needs in a supportive, reduced-stress environment.

The Benefits of Scavenging and Persistence

In addition to having or developing confidence in their learning abilities vis-à-vis digital technologies, older adults who continued to use the computer for years after the initial computer classes identified persistence and a learning technique we call *scavenging* as key benefits to their success. We don't use scavenging in a derogatory manner, but rather in the way that Michelle Sidler does when identifying scavenging as an evolving research methodology in a digital age. Unlike researching in the age of print texts, Sidler explains that online research leads to a form of scavenging that "requires a scavenger's cunning, locating multiple textual spaces and publishing venues in various academic and non-academic contexts." The older adults with whom we worked who developed the most proficiency at using computers and the most robust technological literacies collected information and learning from whomever they could, not being afraid to ask questions of those they thought might be able to teach them something. Such learning certainly requires persistence.

> What did I do to learn it [the computer]? I just got into it and figured

it out. If I had a question, I just asked someone … And if there's nobody here to ask, I just try again. Try and try again. Like this morning the e-mail [Yahoo] said my password wasn't right. And I kept working at it and I shut the machine off and started over and it finally let me get in. I don't give up. I'm persistent. … My advice for newcomers is, be persistent. Don't give up. The more you use it, the easier it will get. Use is the key. —Joan

I'd tell older adults [who are new to computers], go to the Senior Center and take a class. Or go to the library and take a class. Take as many classes as you possibly can. Don't ever stop. I will never stop taking classes. Because there's a lot of things I don't know, number 1 and number 2 it keeps changing. —Rachel

[J—], he's the president of our club. A good amateur astronomer. He was the one to first show me how to send an attachment. One night after our [club] meeting I asked him. Since your class that's how I've learned. I ask who I can when I can.—Sam

Being persistent and asking whom they could when they could were key strategies for older adults, but so too was simply having the opportunity to observe others using computers. During an interview, Mary showed Heidi an insert she found in her paper copy of the magazine *Vanity Fair* advertising the magazine's Web site. On the insert, the Web site was listed as www.VanityFair.com with two capital letters. But when Mary entered the address she typed www.vanityfair.com. When Heidi asked her, "The address here had a capital V and a capital F—how did you know that you didn't have to put those in?" Mary replied, "Because my grandson doesn't use capitals at all. I just figured it was okay." This type of keen observation of others' Web literacies helped many older adults become successful adopters/adapters.

The Benefits of Family Support
Mary's comment reveals another key factor in older adults' development of technological literacies: family support. Many literacy scholars and advocates argue for the importance of involving parents in their childrens' learning. For example, the federally-funded Family Literacy Commission studied the crucial connection between parental involvement and children's literacy development, arguing that family literacy must be studied and supported (Morrow). In *Technology and Literacy in the Twenty-First Century*, Cynthia Selfe devotes a chapter to the roles that parents play in the development of their children's technological literacy. In the approaches summarized by Selfe, however, the focus is most often upon what parents can offer their children, rather than on what children (and with older adults, grandchildren) can offer parents (and grandparents).

Children and grandchildren play key roles in helping older adults develop and participate in technological literacies. The AARP commissioned a study in 2003, *Wired Generations*, of how younger generations (those age 25-44) assisted older generations (those 50+) with using computers and accessing the Internet. This study found that nearly three-quarters (71%) of respondents had helped their parents with computers within the last two months (2). Of those, 78% reported that they were the first person

their parents turned to for help, and nearly 50% said they were contacted at least twice a month by their parents (2). In addition, over 50% of respondents with kids age 11-24 reported that their grandchildren were providing help to their grandparents (p. 2).

The older adults with whom we worked in Ohio and Massachusetts often spoke of their family members and of computer equipment and/or assistance they had received. While some family members had simply given parents or grandparents an old computer with little instruction (thus saddling the recipient with often an obsolete computer that they would never learn how to use), some family members did provide extensive (and actual) help.

> My son is a computer geek [works in Silicon Valley]. He has taken care of all kinds of difficulties with the computer. I don't—I don't really know what he's done, but viruses and Internet set up, he's taken care of all these things. He's got Skype [and] a program where he can tune into my set. He can look at what is on my screen and talk to me through the computer. It's exciting and he helps me a lot. I don't know—without [him] I'd go through torture. So I would save my questions for him. But I try not to ask for his help too often because he is busy. —Cathy

> He [my husband] likes to just show me, but I say let me do it. My husband just does things in a very different way than I do things, so we sometimes don't understand each other as to what I should do. He'll just take the mouse and keyboard from me and go this-this-this-this and do it. Then he gets very frustrated if I don't get it right away. So if I run into trouble, I just turn the computer off and wait until I can ask one of my three children when they come to visit.—Isabelle

Being persistent and asking whom they could when they could were key strategies for older adults, but so too was simply having the opportunity to observe others using computers.

These statistics and comments highlight the importance of family members to older adults' learning, an issue that community literacy workers need to consider and should try to build into any well-designed technological literacy program. Unfortunately, neither of us in Ohio or Massachusetts had developed a family component to the programs during the course of instruction, but sometimes it happened in *de facto* ways, such as when older couples took classes together. In many ways, the collaborative learning that sometimes took place among such couples is similar to the types of technological buddy systems, mentoring relationships, and friendship groups advocated by the AAUW and others (Tulley and Blair).

What can hinder these efforts are the ways in which seniors themselves may reinscribe a functional literacy paradigm, as Kris saw with one particular couple, John and Emma. Each week John and Emma attended class, with John becoming increasingly frustrated with the ways in which the basic skills class was not teaching him the e-mail

platform he had at home to use with his family. Although Emma often tried to assure her husband that he would be able to use his recently purchased home computer and worked to alleviate his growing anger, as John declared in his evaluation:

> I am very disappointed in this class. I have e-mail at home and did not learn to use it. I am as confused now as when I started. The teacher said we would learn without her … that she wasn't teaching us computers. I don't feel we learned a thing.

Yet even though John felt he hadn't learned a thing, his confidence with computers, especially because of his wife's support, increased such that he was able upon completion of the course to continue developing technological literacies in what will surely be a life-long process (as it is for all of us in this digital age). The following note sent via e-mail from John several months after the class reflects this: "Thank you so much for attaching the picture from graduation.… As you said, we learned a lot, whether it felt like it or not. Thank you." Because the Wood County Ohio program included a class graduation ceremony where older adults who completed the computer class received certificates, there was the potential at least for a strong sense of community and family support as well as personal sense of accomplishment, as John's final e-mail suggests. At this graduation ceremony a number of older adults' family members attended, providing Kris with the opportunity to share with them the learning that older adults had done and to provide some ideas of how family members could help support and extend that learning.

Although the graduation ceremonies were an excellent idea—a way of building confidence and promoting achievement—it is also important, we think, if possible to involve family members *sooner* in the process of developing technological literacies. Older adults could be invited to bring family members with them to classes, as Betty Jean did; community literacy workers could hold teaching workshops for family members interested in learning more about how to work with and teach older adults about the computer and the Internet. Computerized technologies provide an excellent context for involving younger family members in the senior centers, and any robust, sustainable program of technological literacy should seek to foster intergenerational connections.

Barriers of Social Isolation and Benefits of Social Connectivity

Whether with family members, with peers, or with community volunteers, fostering connections between people is important. Learning is not an individualistic activity but rather a relational activity, as a number of scholars, drawing particularly from the work on communities of practice of Jean Lave and Etienne Wenger, have noted. Ito et al. state that "failure to learn, whether it is about learning to read or learning to use technology, is often about whether one relates to and identifies with a social group that embodies the expertise in question. Learning goes hand in hand with participation in a community of practice" (18). Creating and sustaining a community of practice around computer usage and technological literacies is particularly difficult when working with older adults because of their distance from computers. According to the Pew Internet and American Life survey, older adults are the population most likely not to know anyone who uses the Internet (Fox, "Older Americans"). There is often a perception

that computers have nothing to offer older adults—that they are, as we mentioned, something for the "young." Mark Carpenter, the founding director of AARP's "Older, Wiser, Wired" initiative, remarked that AARP undertook this initiative in part to connect older adults to the Internet and to each other because "there is a lack of perceived relevance [about the Internet] by this demographic. Even today, older adults are unsure that there is anything online for them that is of any value." We saw this sense in a number of older adults who either dropped out of the computer classes or who did not continue to use computers after the course was complete. Sally, a grandmother in her seventies who took one computer course and stopped using the computer, described her feelings this way (as we quoted at the beginning of the article):

> Sally: No. No. I don't have a computer. And I really don't have a desire to get one because what is a computer going to do for *me* right now in my daily life? My children live close by and I call them all the time. There's nothing on the computer—I don't want to get e-mails from people I don't know. Bad enough to get telephone calls.

Sally saw no use for computers because computers were not woven into her social networks. In addition, when she did initially try to use computers after the first class, she did not find a social support and learning network to help foster and sustain her. As she explained, "After taking your class I was very enthused, I did come here [to the Senior Center] several afternoons, but then I'd get into trouble and there would be no one to help me. I asked them [the staff] but they are so busy. They have other jobs to do. I became very frustrated and gave up." Heidi interviewed Sally four years after she had taken the beginning computer class and she had not used a computer since. Hannah experienced similar frustration; Heidi interviewed Hannah while she was taking the class, who said: "I spent an hour and half here [the Senior Center] last Wednesday in total frustration. I kept losing the cursor. I need somebody there with me." Without greater support networks outside of the specific computing classes, older adults often do not have the social networks necessary to turn to for assistance. Because of the frustration she experienced at feeling helpless, Hannah may choose the route that Sally did and just give up on computers. A community center can have state-of-the-art computing equipment and facilities, but if there isn't a culture and community of support, one that fosters the development of literacies within social networks, fewer older adults will be able to, in Hannah's words, "break through."

To begin this socialization, many older adults need to see that their peers are using computers and have developed technological literacies. Cathy explained that she first came to take a computer class because "I think there was an ad in the bulletin with a photograph of older adults sitting in front of computers and that sort of got me thinking that I might be able to do that myself. And that's what started me." Sally felt that if a senior were to assist in the computer classes, it might be more helpful because "If someone is retired, your perception of the person is 'Hey, he's 75 years old or he's 65 years old, just retired, and he's teaching us old people how to do this, but he can do it, so we can too.'" Having older adults help other older adults not only would benefit those who are learning but also those who have the opportunity to share their experiences. Sam, who first took a beginning computer class four years before Heidi interviewed him, described a recent experience helping a fellow senior: "The other day I was in here

and a lady did not know how to open an attachment. I was able to tell her how to do it. That felt good. Like I knew something I could share."

What we each wish we had done more of was to bring more wired, computer-savvy older adults into our classes and into the senior center, perhaps through having a series of guest presenters, developing a peer mentor and support program, and/or participating in the establishment of a computer club, a group that would meet to talk about computers and to share tips and ideas for developing and sustaining technoliteracy learning. In addition, not unlike other technological training programs within both the academy and industry, future technological literacy initiatives for older adults could foster a "train the trainer" model by developing a knowledgeable pool of older individuals capable of tutoring and training beyond the initial course. These mentors could continue breaking down cultural and individual assumptions about who is "good at computers" and who is not. Ultimately, by providing older adults with an opportunity not only to learn but to teach, we can actually enhance technological literacy development and reaffirm the value of older individuals as community resources to themselves and others.

Reflections on Older Adults' Technological Literacies: Curricula and Research

We want to close our discussion by first sharing one more communication from an older adult. One year after completing a beginning computing course, Mary sent Heidi the following e-mail (quoted in its entirety with permission):

> Dear Heidi,
>
> Had to send you a note of thanks. I am E mailing all of those six daughter like crazy and even a couple of grandchildren who have been lazy about keeping in touch. Works like magic. I no longer feel like the neglected mother and grandmother. Plus I also keep in touch with friends so my life has truly expanded.
>
> I am now in a six week program working mainly with the internet. You are still the best teacher. I have vacillated over and over about buying a laptop for myself. Youngest daughter, W— , is getting together the material but then I realize that I can come here [Amherst Senior Center], or to the library and no fuss, no expense. I also happened to go to the Smith College library with friends and we were all typing away on their computers. Now[A—]—remember the woman with the Dutch accent? She happened to be roaming around the Amherst College campus and found that they have a room with about twenty computers and we can use those as residents of Amherst. Probably a better way to go.
>
> Hope things are going super well for you. Love, Mary

■■■

In Mary's e-mail we see her commenting on many of the benefits and strategies for overcoming the barriers to developing technological literacies for older adults that we noted earlier: support of family, scavenging and persistence, social networking, and use of community resources. In an ideal world, every older adult who enrolled in beginning computer courses and who set out to develop and extend technological literacies would be as successful (and as satisfied) as Mary. And in our respective projects, despite the various cultural, curricular, and technological barriers we have outlined in this article, many of the older adults with whom we worked found the resources and support to transition from print-based to digital literacies. To better foster and sustain such a transition "across the digital divide," we offer the following summary of recommendations:

- Scaffolding curricula to balance functional, critical, and rhetorical literacies and to counter ageist attitudes and fears,
- Developing social networking and support systems (e.g., older adult mentors, computer clubs, computer help hours, etc.),
- Providing intensive hands-on experience,
- Building from and fostering community assets and partners,
- Expanding outreach to provide more mobile options and to include family members,
- Advocating and helping others advocate for more material and technical infrastructure.

Overall, the learning and the benefits were not simply for the older adults with whom we worked. Our lives too, to use Mary's words, have "truly expanded." As teachers, public intellectuals, as citizens, and as technological literacy specialists, our sense of our roles and responsibilities have changed. In terms of curricular assessment and community impact, we each learned from our community partners, many of whom were the older adults we served. To explain it at the most personal, familial level: Kris was in a very unusual situation because her mother Angela was enrolled in two classes, including the most recent digital storytelling class she taught. At seventy-three, Angela was the oldest member of the class and the least physically able to access the computer. However, Angela's determination to tell her story was an inspiration to younger members of the class, including women in their fifties, not to mention Kris herself, who watched as her mother developed a presentation titled "Memories."

At the end of presentation, Angela wrote, "Why am I writing this. I want my child to remember the things that she was a part of. Also the only legacy I can leave behind is the memories that she will conjure and I hope that she recalls all with a smile and laughs. This is the best legacy I could leave my child." As Angela shared her PowerPoint with the group of five women, there was a strong sense that roles had shifted. Just as much as Kris had provided a forum to re-imagine technological literacy as something beyond the functional, the participants, including Angela, had provided Kris with an opportunity to re-imagine her role as a teacher, a reminder that our roles as citizens, as parents, and as children are equally important in how we can and should define ourselves as public intellectuals.

■■■

Our roles as teachers and researchers changed as a result of working with those outside the academic community. To think critically about technology, as Selfe has advocated, involves more than just bringing technological training to those with limited access; rather, it involves seeing literacy as a series of cultural processes and practices in which university teachers, students, and researchers have as much to learn from the community populations they serve as they do from us. With such a thought in mind, it is clear that researchers in these environments should consider a range of issues that better encourage participatory, reciprocal models of literacy involvement:

- How should we define and document technological literacy? At what point can and should such as process involve skill sets and/or foreground technology as cultural and rhetorical practice?
- In what ways do teachers' and participants' attitudes toward computers enable and constrain such definitions?
- What is the role of participant feedback (textual, audio, video) as a methodology for understanding technological literacy as a set of practices based on materials and social conditions?
- To what extent is the concept of participatory design present in the community technological literacy project? What role does it play in creating and sustaining such initiatives?
- How can we foster a broader definition of teaching and learning that encourages more reciprocal, recursive relationships between the university and the community and fosters an equally recursive relationship between functional, critical, and rhetorical literacy?

Part of the problem with computer training models is that they can be exactly that: training and not teaching. This distinction is important, for it also foregrounds the distinction between mastering versus mentoring (Haas, Tulley, and Blair), with the ultimate distinction between facts versus processes that are driven by the context and the participants themselves. Such concerns are clearly consistent with Selber's recent call for us to "re-imagine computer literacy" and Selfe's earlier call for us to "pay attention." Indeed, as technological literacy specialists, we must consider current and future projects as a way of better understanding "peoples' lives within the context of region and culture as well as within various personal domains of their lives—work, community, home, and family, to understand the strategies that people use to meet the literacy and technology demands they encounter in their daily lives" (Merrifield et al.). Only then can we as university faculty successfully provide services to and collaborate with the community to better foster technological literacy as something transformative and sustainable, not for its own sake but rather for the way in which such literacy can potentially enhance the quality of life of older adults.

Similar to earlier moves in the field to privilege qualitative methods as an appropriate approach to studying literate practices in its many contexts, it is certainly clear that our own understanding of the technological literacy acquisition of older adults benefited from listening to the older adults who took our classes, not to mention the professionals who worked with them on a day-to-day basis. At the same time, sustaining our efforts to enhance the functional, critical, and rhetorical literacies of

participants not only involved time and in some cases money, but also support from the agencies with which we worked. Not unlike other academic or workplace studies, a triangulation of methods that breaks down the binary between the qualitative and the quantitative (Johanek) may help to show granting agencies as well as social service professionals that our efforts can and do make a difference in the lives of older adults. We need to show that their literacy skills improve and that their confidence does as well; such efforts are consistent with the goals of national organizations that include the AARP.

At the same time, research methods employed in community technological literacy projects must foreground the voices of participants through such methodologies as the interview-based and narrative-based approaches we used and also through commitment to the principles of sound community-based research.[10] Developing a research process based on mutual trust, respect, empathy, flexibility and shared goals (some of the key principles we sought to follow and which are identified by Strand et al.) is crucial to creating dynamic community research projects that serve not only to extend research knowledge, but to also benefit and empower the lives of the people who work and use the community program. When considering older adults' technological literacy programs and the development of community resources (both social and material) to foster the development of technological literacies, it is our hope that the research we have presented on the barriers and benefits to learning will serve to expand the role of technological literacy beyond our initial programs to have a more sustainable impact on the lives of older adults.

Acknowledgements

End Notes

[1] Although the term *senior* is used in some publications and by the community centers in which we both worked, in this article we use the term *older adult. Senior* is an age-biased and age-based term, often carrying negative connotations of individuals aged 65 and above. The term *older adult* recognizes that being older is an aspect of a person's adult identity and not their entire identity. As well, older adult is not as age-based, an important fact since we worked with individuals ranging in age from their early fifties to their late eighties.

[2] In the process of drafting this article, we shared drafts with the staff and administrators in the community centers where we worked. Their responses to our findings and recommendations were positive, and we hope that others in other centers and in other contexts might find them useful.

³ Selber's tripartite approach to literacy (functional, critical, and rhetorical) parallels Sylvia Scribner's discussion of her three metaphors of literacy: adaptation (minimal skills necessary to function), power (critical perspectives), and state of grace (rhetorical acumen).

⁴ Not all of Kris's participants above are featured in this article, but they are all individuals who changed Kris as an educator, helping her, as Ray urges, develop a more "nuanced understanding of the relationships between age, diversity…adult development" (10) and, in our respective cases, technological literacy acquisition.

⁵ The reasons older adults seek to develop their technological and computer-based literacies are similar to the four reasons for adult literacy programs the National Institute for Literacy found in its extensive study project, "Equipped for the Future." Drawing from surveys and interviews with administrators, students, and teachers at more than 6,000 adult literacy programs across the United States, the EFF found that adults' reasons for seeking to increase their literacy fell into four broad categories: (1) Learning for access and orientation: adults go into education "to place themselves on the map of daily life roles and responsibilities, to place themselves in relationship to the world around them"; (2) Learning for voice embraces all aspects of communication—written and oral—needed to present oneself to the world; (3) Learning for independent action… learners expressed their desire to be able to act for themselves, make informed decisions, and not have to rely on others to tell them what to do; and, (4) "Learning as a bridge to the future reflects learners' sense that the world is changing. A prime purpose for learning is to be ready for the changes—to learn how to learn and prepare oneself for lifelong learning" (Demetrion 160-164).

⁶ Older adults who are able to come to community centers to use computers still face significant physical and material barriers, especially centered around usability. At a minor, but still significant level, the computers at community centers are often outdated with slow computer connections, meaning that many Web sites are practically inaccessible. (If you haven't used a telephone modem in a while to connect to the Internet, dial up and remember how maddeningly slow it is compared to other connections.) More importantly, whether working on a computer in a community center or at one's home, computer technologies and digital documents are not designed with older adults in mind. The American Association of Retired Persons (AARP) commissioned two reviews of usability and the Internet (Chisnell and Redish, "A Review of Recent Research"; Chisnell and Redish, "Expert Review of Usability").

These studies recognized the diversity of older Americans (which they defined as those age 50+), noting that prior experience with the Web and physical status were key factors in determining whether a site was usable by a particular individual. An older American in her eighties who is in good physical health and has been surfing the net for ten years will be much more able to use a site than someone in her fifties who is new to computers or who suffers from severe arthritis.

⁷ Rachel's comment identifies as well the impact of a sexist society on women, particularly older women who were often told that women don't work with machines.

⁸ Both of us are near forty, but in our work with learners in their sixties, seventies, and eighties, we were seen as "young." This was an interesting change from when we work with traditionally-aged college students.

■ ■ ■

[9] Gaining confidence working with computers often carries over to other aspects of older adults' personal and professional lives, including the use of other technologies. In an interview with Heidi, Mary explained her learning processes and her relationship to computers and how as it has changed, so has her relationship with other technologies:

M: I was totally intimidated by computers.

H: How come?

M: I don't know. I am 79, and I can't explain it. In my generation, I was intimidated by anything that works. I had seven kids; I never even turned on the TV. If a clock has to be reset, my grandchildren would do [it]. I was technically crippled. Since I started using the computer, now I get the messages on my phone and now I use my DVD player. It's really been—it's changed my life.

[10] As digital rhetoricians, we also think digital technologies could be used to more richly represent community members' voices via video and audio, which was a large part of Kris's data collection process. As Ray suggests, the emphasis on narrative is a strong fit within the older adult population, one that is largely female (something consistent with both Kris's and Heidi's student populations) due to aging demographics in which women continue to outlive men. As well, women have often played a gendered role as the keeper of the family history through scrapbooks, photo albums, and family trees, genres that have become increasingly technological across generations. In this sense, the representation of technological literacy research must itself become technological, relying on future trends in digital scholarly publishing.

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