

University Libraries
Libraries Faculty Research

Texas Tech University

Year 2007

Overcoming Technostress in Reference
Services to Adult Learners

Brian A. Quinn
Texas Tech University, brian.quinn@ttu.edu

One of the most challenging problems that librarians face at the reference desk is working with adult students. Not only are their numbers growing at colleges and universities around the country (Speer, 1996), but they are appearing at a time when reference services are becoming increasingly automated. It is thus becoming ever more common for a busy librarian at a high traffic reference desk to be confronted with an older student who may have little or no knowledge of computers yet nonetheless needs to use the library to complete an assignment. Such students are typically at a loss for where to begin, and may even ask in a furtive voice, “Where is the card catalog?”

When told by the librarian that the card catalog no longer exists, or that it is now on computer, the adult learner may become visibly uncomfortable, and appear confused, disoriented, or anxious. Symptoms such as these are part of a more general syndrome commonly known as “technostress,” a term first used by Craig Brod in the early 1980’s. Brod, a clinical psychologist, defined technostress as “a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner” (Brod, 1984). Adult learners may have little experience with computers and may have managed to avoid using them, but now are faced with the realization that they can no longer do so. Adult learners often feel inadequate, embarrassed, and even frustrated by their lack of computer skills, especially if they compare themselves to younger classmates. Many realize they have a sizable handicap to overcome, and feel pressure not only to complete their assignment, but also to somehow learn computers in the process.

Students of all ages may experience technostress to some degree (Deloughry, 1993), but adult learners seem more prone to it than younger students. This is a result of what social scientists term a “cohort effect.” Many adult learners were educated in the

1940's, 1950's, or 1960's, during a time when libraries were not yet automated and PC's were not in widespread use. They never had a chance to learn computers, and information technology thus seems unfamiliar, and uncomfortable. In contrast, younger students now entering college have been exposed to computers from their elementary years onward. Because they have been involved with computers from an early age, they are far less likely to feel threatened by them (Elder, Gardner and Ruth, 1987).

Adult women may be even more susceptible to technostress because of their past. Computers have traditionally been a male dominated activity in American culture, and women have in the past been socialized at home and at school to regard computers, programming, data processing, and automation generally as unfeminine. This situation may be changing now, but older women may still harbor feelings of uneasiness around computers that stem from stereotyping women as being incompatible with computers, or less capable of using them than men (Mruk, 1987). The effects of gender as well as age may combine to make this group among the most challenging a librarian will encounter in reference services to adults.

It is important to note that although technostress is a subjective, psychological reaction to a social situation, its consequences are nonetheless very tangible and real. Feelings of anxiety, tension, and apprehension may interfere with basic psychological processes such as sensation, perception, and cognition, and the result is that the adult student's overall functioning and responsiveness is impaired (Laguna and Babcock, 1997). This may in turn have a negative effect on the person's ability to operate a computer, thus creating a self-fulfilling prophecy.

More importantly for the librarian, this suggests that the adult learner suffering from technostress may not be fully capable of conducting library research adequately. The librarian who encounters a technostressed adult learner cannot, therefore, treat the person like any other student. The condition of the adult must be noted and addressed, or at least taken into account, early in the course of the reference transaction. If this is not done and the librarian proceeds to ignore the person's condition it may compound the problem and add to the stress of the adult user.

Sources of Technostress

The most common reason that adult learners experience technostress is because of their having grown up in a largely pre-computer era. But there are other reasons as well. It appears that technostress may have its origins early in a user's life, and may be traced back as far as early childhood. One study has found that those users who were first introduced as children to technology by their mothers were much more likely to be computerphobic (Weil, Rosen, and Wugalter, 1990). Subjects tended to recall their mothers as uncomfortable with technology, which served as a negative role model. In contrast, those users who were introduced to technology by their fathers were much more likely to have positive attitudes toward computers and feel comfortable with them. These individuals tended to recall their fathers as being comfortable and encouraging with computers (Weil, Rosen, and Wugalter, 1990). Parental attitudes toward technology thus had an important influence on their children's perception and comfort with computers. Subjects that had an initial negative experience with computers later recall these negative experiences when confronted with a computer and anticipate frustration and failure.

Another formative experience that this study revealed has been associated with computerphobia and technostress and users is that their early encounters with computers were in a evaluative context that required them to perform. Usually these were educational settings in which the user was graded, which tended to create an uneasiness with technology. Users who are initially allowed to freely experiment and play with computers tend to develop much more positive attitudes toward computers generally. They are less apt to see using computers as a test or a threat and thus feel more comfortable with them. Removing performance pressure allows the natural curiosity of the user to take hold so that the user sees computer use as a form of recreation or entertainment.

This same study also found that technostressed users have a personality style that tends to make them give up when trying to solve a problem rather than persist in solving it. This tendency to quit easily often occurs in combination with another trait that prevents technostressed users from asking for help when they do not understand. Such individuals may be too anxious or proud or embarrassed to ask questions of a librarian and are thus less able to correct their errors.

The most common problems that adult users suffering from technostress face have to do with mastering the online catalog. Some users do not realize that OPACs do not automatically correct errors of entry and spelling. Many do not understand the basic principles of Boolean logic and will often type in a search string using natural language. The poor results that they obtain serve to frustrate them and discourage them, reinforcing their sense of inadequacy and aversion to technology (Bichteler, 1987).

Many times it seems like the most simple and obvious aspects of using computers are foreign to the adult user. Even something as simple as pressing the “Enter” key after typing in some search terms may be lost on adult users. Another very basic problem with web interfaces may be hand-eye coordination and the manual dexterity required to manipulate a mouse (Bichteler, 1987). Some do not know that highlighted text must be clicked on to go to the next document. Many difficulties also stem from the inability of adult students to understand the basic structure of bibliographic records and the difference between the title of an article and the title of a journal. There are also problems related to an inability to generate synonyms when the user discovers that his or her initial search terms are unable to produce an adequate number of hits.

Technostress may also result from the memory demands placed on adult learners. The adult user who is unfamiliar with computers must learn and remember various commands and principles that may seem basic to librarians but are nonetheless taxing to the mental capability of the naïve user. The adult learner must also learn a new vocabulary of technical terms and concepts that can seem fairly abstract to someone unaccustomed to using them regularly. Remembering proper sequences of commands and how to navigate databases and files in multiple formats may tax the adult learner’s memory capacity to such an extent that they heighten the stress level (Sharit and Czaja, 1994). Even web-based interfaces that rely less on command-based searching than on point and click technology nonetheless require that the user understand hypertext to successfully navigate it.

An additional source of technostress is the pace at which information technology changes. Few librarians need to be convinced of this, as they themselves struggle to keep

abreast of what sometimes seems like the almost daily changes that occur in hardware, software, databases, and formats. Yet while experienced computer users have learned to be somewhat flexible and adaptable to the myriad changes that are occurring all the time, the adult user trying to learn for the first time must find the pace of change an additional source of stress. No sooner has the adult learner begun to feel comfortable with a system than it is changed.

Recognizing Technostress in Adult Learners

Symptoms of technostress can vary greatly from one adult user to another. Some users will be refreshingly open and overt about their feelings and actually say to the librarian, “I don’t know the first thing about computers,” or something to that effect. A few may even adopt a confessional tone and identify themselves as a returning student, commenting, “Look, I’m a returning student and my kids fool with these things, but I’m lost.” Occasionally, an adult student will allude to their age or generational cohort and say, for example, “The last time I was in school, they still had the old card catalog.” In cases like these, it is easy to detect signs of technostress, as these comments may often be accompanied by a general nervousness or discomfort in the user’s overall tone and manner (Czaja and Sharit, 1993).

In other individuals, technostress may not be so obvious at all and may manifest itself in much more subtle ways. Some adults may be unwilling to admit or otherwise reveal their ignorance of information technology. Such an admission may arouse fears that it will date them or make them feel inferior or inadequate. Strong and deep-seated emotions like pride and a sense of independence may be at stake, making what would

otherwise be a routine exchange for the librarian into an emotionally charged encounter. More than other students, adult learners may feel threatened by feelings of vulnerability, a loss of dignity and control. In the minds of some adults, an admission of ignorance may relegate them to the status of “non-adult,” with accompanying feelings of helplessness and naivete (Czaja and Sharit, 1993).

Users such as these may try to hide their discomfort and inexperience and make comments about “not being able to find anything on this topic” even though the librarian may immediately recognize the topic as something very obvious and general. Some users may furtively ask, “Can you come out here (to the computer) for a minute?” not wishing to divulge anything more. The adult learner’s body language and tone of voice may reveal what the person cannot reveal about him or herself. Frustration or anger may be present in a person’s voice, and in some situations the user may avert their gaze, suggesting a sense of embarrassment or guilt at not being proficient with computers (Bichteler, 282). A halting or hesitant tone of voice may suggest unease. The librarian must be alert to such cues and recognize them as possible indicators of technostress.

Understanding Adult Learner Psychology

The quality of reference service that the librarian offers adult learners can be greatly enhanced by understanding their psychology. Adults think and learn somewhat differently than younger students, so it is important that the librarian understand the adult mind. Each individual adult user will be somewhat different, yet it is nonetheless possible to make some generalizations.

One important difference between adult learners and their youthful counterparts is that adults attend school for reasons other than that it is what their parents expect of them. Many are in the midst of a turning point in their life, whether it be the result of job loss, divorce, children leaving home, death of a spouse, or lack of success in a previous academic setting. Some may be seeking skills and credentials, but others may be seeking self-affirmation, greater self-esteem, and similar psychological benefits (Ross, 1993).

The experience of entering or re-entering an academic environment after many years away from school is stressful in itself. Adults who have not done much reading, writing, or critical thinking in their life off campus may suddenly find themselves surrounded by demanding faculty and competitive students. They may find it a strain to adjust to this new environment. Unlike younger students, adults often have job, home, and family responsibilities that add to their stress level. Many enter the library with sketchy memories of how to conduct research, only to discover that the traditional paper library they remember has undergone a dramatic transformation.

Surrounded by banks of OPACs, CD-ROM towers, and young students spouting Internet jargon, it is understandable how the adult learner might feel threatened or frustrated by having no option but to search the computers. Realizing that they must somehow adapt, they may be anxious whether they can comply. Feeling simultaneously lost in this high-tech world, and yet afraid or embarrassed to ask the librarian because of concerns that they may sound ignorant, the adult learner cannot help but feel some degree of technostress (Nordenbo, 1990). Much of this reaction may be involuntary, so that the person may be noticeably uneasy.

Sitting down at the computer terminal, the adult learner is confronted with a screen and keyboard that are complex and detailed in appearance. Psychologically, this situation places great demands on the user's attention because there is more information than the user can focus on easily. The user may be unsure what to do with it all, which can create a kind of mental overload. This mental strain is a key factor in contributing to technostress.

The adult user that is faced with this situation is in need of reducing all the technical clutter by narrowing his or her concentration. Although the computer is capable of a wide range of tasks and offers a myriad array of options, the psyche of the adult user tends to be pragmatic. It is looking for relevance and specifics rather than possibilities and potential. The older the adult is, the easier he or she will recall practical applications and the more difficulty he or she will have in remembering generalities and theory (Owens, 1988).

The adult learner needs specific information, but only if it can be imparted and absorbed at an optimum pace. Generally, this rate tends to be somewhat slower than younger students, but not always. The key consideration is that the pace is comfortable for the user, so that they do not have a feeling of being rushed or bored. Librarians working with adult users can expect them to take longer to use the system, require more help while learning to use it, and make more errors in the process.

The adult learner typically goes through a psychological process of adjusting to information technology that occurs in several stages. The initial stage is often one characterized by an awareness of computers and an aversion and avoidance of them. This is followed by an initial learning stage in which the user tries to learn the correct

keys and command sequences and processes that must be performed in order to search successfully. This is achieved mostly through a process of imitation, in which the adult user executes what the librarian tells him or her in a rote, mechanical fashion.

It is often at this point that the user discovers that although he or she may try to imitate the “recipe” of instructions exactly, mistakes nonetheless occur. Frustration and discouragement are common reactions, and the user requires considerable assistance by the librarian. This is usually the state when technostress reaches a peak, with anxiety and aggravation working in tandem. Only after struggling at this stage for a varying period of time does the user begin to enter the next stage, which is one of initial understanding.

In the early stage of understanding the user begins to grasp what the various sequences of commands mean and how to utilize them in particular situations. The peak technostress reaction begins to subside, and the first feelings of familiarity and comfort with the technology may evidence themselves. This may be accompanied by a new feeling of confidence, and even a degree of euphoria stemming from early success (Russell, 1995). The user has gradually moved from an initial stage of dependency to one of growing autonomy in which he or she no longer needs to depend on the librarian as much.

While this overall process usually occurs over a period of weeks or months, the same stages may occur in miniature in abbreviated form in the reference encounter. Technostress is initially strong and begins with anxiety and unease, then grows as the adult user struggles cognitively to master the technology and grows frustrated and discouraged by the difficulty of it. Faltering confidence and growing self-doubt may plague adult users to such an extent that it may actually inhibit their ability to learn and

thus become a kind of self-fulfilling prophecy. Negative expectations feed on themselves and can tend to erode crucial motivational resources which are necessary if the adult learner is to mount a sustained effort and persevere long enough to make it past the most stressful stage to the subsequent early stage of success and confidence.

These initial encounters of the adult learner with computers are critical ones. If the adult learner is so overwhelmed or frustrated or confused by one or more formative experiences that they give up, it will be much more difficult to alleviate whatever technostress syndrome they may develop. Proper intervention by the librarian in the reference encounter is crucial, and can play an important role in the adjustment of the adult learner to information technology.

Interventions to Alleviate Technostress

Technostress is one of the most difficult problems that a reference librarian is likely to encounter in working with adult learners. It makes the reference encounter doubly difficult because not only does the librarian have to convey the proper research strategy necessary to meet the user's information need, he or she also has to teach the user how to use computers in order to successfully execute the strategy. In addition to this dual teaching responsibility, the librarian must also address the problem of how to reduce the adult learner's technostress level so that it does not interfere with the reference encounter and the adult's ability to learn and move toward self-sufficiency. Before any of this can even begin, the librarian must be adept enough to be able to "read" the student and recognize the symptoms of technostress.

This may sound like a formidable challenge, yet it is possible to offset whatever inexperience or age deficits the adult learner brings to the reference encounter through a combination of training, practice and design. Training is the first and most critical element in overcoming technostress, and begins with the personal qualities of the librarian. It is not enough for the librarian to impart content, how the content is communicated is also extremely important. The overall tone and manner of the librarian, the physical and verbal cues that he or she uses, can play a vital role in reducing the stress level of the adult learner.

The best way a librarian can defuse the stress that the adult user may exhibit is to be open and relaxed (Grupe and Connolly, 1995). This should have the effect of gradually lowering the user's stress level, because calm is contagious. As easy and obvious as it sounds, the busy reference librarian who has multiple users competing for his or her attention may find it hard to exude calm in the face of an anxious adult who needs in-depth, continual attention. However, the success of the reference encounter often hinges on the ability of the librarian to establish a psychologically supportive atmosphere. This includes giving them full undivided attention, listening to them carefully, and allowing them to vent whatever fears and frustrations they may have welled up within them. Often the adult learner will be painfully aware of their own shortcomings and inadequacies, but the librarian must allow them to feel comfortable enough to ask even the most obvious questions without feeling ignorant or embarrassed. Above all, the librarian must at all costs resist the temptation to show off by playing the role of the omniscient power user, and try to impress the user with a dazzling display of technical wizardry and impressive technospeak that leaves the adult learner bewildered

and discouraged. Nothing is more essential than to treat the adult user with respect and as an equal and to assume a role of facilitator rather than expert. Perhaps the best approach is to adopt an attitude of unconditional positive regard, so that the user will feel as relaxed as possible (Boswell and Dodd, 1994).

Occasionally, it may not be clear at the outset just how much the adult user knows about computers. Some individuals do not show much emotion of any sort, technostress or otherwise, and in cases like this it may be necessary for the librarian to try to gauge the general level of the user's sophistication. Sometimes it is possible for the librarian to get an idea of where the user is by observing how they handle the computer and navigate the library's computer system. But other times it may be necessary to probe gently and say something like "have you worked with computers much?" or "have you used the library's system before?" to get an idea of how much assistance the user may be in need of, or what skill level to employ with the user. It is important to make sure initially that you are working at the same general skill level as the user, so that the adult user does not get lost or simply does not comprehend what you are trying to convey. In situations where it is not possible to sense the user's level of sophistication, the safest approach is to assume no prior skills or knowledge. This means avoiding technical jargon as much as possible and explaining things in the simplest possible terms (Hemby, 1997). There is always the risk that the librarian will underestimate the skill level of the user and come across as condescending or patronizing, but this is preferable to talking over the user's head and leaving them more confused than when they began.

Pacing and Cues

It is also very important in working with adult learners that librarians pace themselves carefully. Not only is it very easy to assume that an adult learner knows things that may seem obvious to the librarian, but the librarian that assumes such knowledge will be more likely to explain options, functions, commands, and sequences, much faster and more casually than the user can absorb at a comfortable rate. In order to avoid this, it is a good idea to watch the user carefully and particularly what he or she is doing with the computer to see if they are able to keep up. In some instances, it is not the user but the computer that cannot keep pace, and a slowed response time may suddenly mean that the librarian's instructions are no longer in sync with the machine. The librarian's verbal narrative should always match the pacing and sequence of the commands, connections, and transitions that are occurring on the computer screen as the user is typing.

It helps to look for behavioral cues that the adult learner may exhibit that indicate that he or she is following along, or conversely, confused, uncertain, or lost. Any sign that the user is not understanding is a signal to the librarian to stop and check with the user to make sure they grasp what is being said. A certain amount of repetition may be helpful if it appears that the learner is very inexperienced, or is slow to catch on (Weil and Rosen, 1997). Repeated instructions should always be delivered with enthusiasm and respect, free of any traces of boredom or condescension. Empathy can be very helpful, because it helps the librarian to see the situation through the adult user's eyes, rather than selfishly. In the interest of clarity, it is a good idea not to digress or overexplain, because

this may confuse or distract the user. Try to determine what the user really needs, then get to the point early and stick to it.

Emphasize Action and Discovery

It is a good idea to use active learning and stay with the technostressed adult learner through the initial phase of the reference transaction. Rather than merely demonstrating how to search a computer at the reference desk, accompany them out to a terminal and let them execute the search commands as you explain them. Resist the urge to demonstrate your proficiency or to conduct the search yourself just to get it over with. The adult learner will learn more and better by experiencing the search firsthand than by observing the librarian search. Adult learners tend to remember commands better when they initiate the commands themselves rather than sit by passively and watch someone else do it (Kelley and Charness, 1995). Do not let adult users try to get you to conduct their search for them by playing dumb or acting helpless. It will only make it more difficult for them when you leave and they are forced to search on their own. By encouraging active learning you are setting the stage for the adult to eventually become an independent learner who can be largely self-reliant.

A related approach that has proven successful in training adult learners to use computers is known as discovery learning. Using this method, the librarian encourages users to proceed at their own pace. Students are asked to do the bulk of the searching themselves, and the librarian is careful to give immediate feedback relevant to the student's search progress. The overall amount of verbal instruction is kept to a minimum so as to minimize the amount of irrelevant information (Charness, Schumann, and Boritz,

1992). Adult learners should be encouraged to not be afraid to make mistakes, and the librarian should never criticize or deride any errors that the student makes in the search process, no matter how obvious they may seem. The more the librarian is able to downplay mistakes and minimize errors, the more it will tend to bolster the self-confidence of the adult learner. Similarly, any successes, no matter how small, should be praised by the librarian.

It is essential for the librarian to maintain a positive, supportive approach throughout the reference encounter. Adult learners do not respond well to being challenged, so it helps to avoid this method, because it will only increase technostress. One of the key contributing factors to technostress is negative thinking. By exuding a positive attitude, the librarian is modeling a form of cognitive coping that the adult learner will hopefully adopt and retain after the transaction is finished. Occasionally the user may verbalize some of the negative thoughts that are running through his or her mind as they perform a search, and the librarian should be quick to counter these with positive statements (Bloom and Hautaluoma, 1990). Mindset is a very important aspect of technostress and should be addressed whenever possible during the reference encounter.

Help Screens, Tutorials, and Interfaces

Another way the librarian can help the adult learner overcome technostress and move toward greater self confidence and self reliance is by encouraging use of help screens and online tutorials. This is a strategy that is all too easy to forget in the course of a fleeting reference encounter. Yet many of the newer web-based interfaces offered

for OPACs and online databases now come with fairly extensive and elaborate help screens that the adult can benefit from. It takes but a moment to demonstrate how to access, but it can open up worlds for the novice. For those adults who appear to be embarrassed asking for assistance, help screens can be particularly useful because they allow the user to maintain a degree of independence (Gist, Rosen, and Schwoerer, 1998).

Many help screens have the added advantage of offering print capability, so that the adult learner can make a copy of various commands. Having a printed copy that can be taken home, studied, and referred to when necessary is something the adult learner will especially appreciate. Most adult learners grew up in a primarily paper world, and having a paper copy in a high-tech world can be a source of familiarity and reassurance for an older student. It also serves as a memory aid that can be vital for a student who is struggling to comprehend a strange new world of screens, commands and technical jargon.

While it appears that graphical user interfaces are becoming increasingly common in libraries, many libraries may offer several different interface options. Adult users tend to have more difficulty using the older command-driven interfaces. Because commands have to be keyed in, they place heavy demands on user memory. Menu-based systems that use icons are much easier to use because all the possible commands appear on the screen. The drawback in using iconic menu systems with adult learners is that many require the use of a mouse. This demands a considerable amount of hand-eye coordination on the part of the user. Moving, clicking, and dragging with the mouse requires some practice before it can be utilized effectively. Yet lack of coordination may be less stressful than the strains on memory that are generated by command-driven

systems. Overall, menu-based interfaces give the adult learner more control, and since adult learners tend to be more self-directed and independent, they generally tend to be preferable to other types of interfaces (Bates, 1996).

Repetition, Simplicity, and Humor

It is important to keep in mind that many adult learners may be encountering a computer for the first time. That means that in some cases, remediation may be required, even for something as basic as typing skills. It also means that the librarian may have to repeat the same command sequence or procedure more than once, and to be especially careful to proceed at the learner's pace, not the librarian's. What seems like a long time to the librarian may not be to the student. It helps to simplify, but never to the point of being patronizing. Proceed one concept at a time, explaining in jargon-free language, and take advantage of any slow online connections by viewing them as opportunities to summarize any important points mentioned previously.

Finally, it may help to defuse a technostressed adult learner or a tense reference transaction by injecting a little warmth and humor into the situation. An excellent way to accomplish this is for the librarian to make some reference to his or her own initial experiences with computers. No librarian is that old that they cannot remember how fumbling and tentative they were at first, and mentioning this to an adult learner can help to make them feel less fearful and less unusual. Knowing that even the seemingly omniscient librarian was at one time lost can be comforting and reassuring. Indeed, it may help to explain technostress, what it is, and how to cope with it. Above all it is important to remind adult users that technostress is a normal, common reaction that

everyone experiences to some degree (Carter and Honeywell, 1991). This simple gesture can itself aid the adult user greatly in coping and realizing that it is just a phase on the long and challenging path to autonomy and mastery.

Conclusion

With adult students growing in numbers, they are likely to appear at the reference desk with increasing frequency. Many did not grow up with computers in their developmental years, which is why they present such a challenge to reference librarians. Lack of early exposure to information technology makes adult learners particularly vulnerable to technostress, which often takes the form of a general feeling of discomfort and unease around computer technology. Yet older students are frequently more motivated to learn and more mature than their younger counterparts. Though age may limit some abilities, adult learners are generally as capable of learning and understanding computers as younger students (Garfein, Schaie, and Witlis, 1988). Technostress can interfere with this capability if it is not addressed and controlled in the reference encounter.

The reference librarian can play a pivotal role in helping the adult learner overcome technostress. By recognizing the symptoms of technostress, and responding in an appropriate manner, the librarian helps the adult learner realize that computers are not to be feared or avoided, but can serve as useful, even invaluable tools in the research process. This realization comes about not only by means of the instructional content that the librarian conveys, but also the manner in which it is conveyed by the librarian. Although technostress takes years to develop and is difficult to eliminate in the brief

course of a reference encounter, it can nonetheless be minimized by the librarian so that the adult learner can better focus on research strategy and information content rather than be distracted by concerns about format and medium.

References

- Bates, Reid A. "Principles of CBI Design and the Adult Learner: The Need for Further Research." Performance Improvement Quarterly 9 (1996): 3-24.
- Bichteller, Julie. "Technostress in Libraries: Causes, Effects and Solutions." The Electronic Library 5 (1987): 282-287.
- Bloom, Arvid J. and Jacob E. Hautaluoma. "Anxiety Management Training as a Strategy for Enhancing Computer User Performance." Computers in Human Behavior 6 (1990): 337-349.
- Boswell, Donald L. and David K. Dodd. "Balance Theory: A Social Psychological Explanation of the Therapeutic Value of Unconditional Positive Regard." Journal of Psychology 128 (1994): 101-109.
- Brod, Craig. Technostress: The Human Cost of the Computer Revolution. (Reading, Massachusetts: Addison-Wesley Publishing Company, 1984).
- Carter, Janet Hauser and Robert Honeywell. "Training Older Adults to Use Computers." Performance and Instruction 30 (1991): 9-15.
- Charness, Neil, Cynthia E. Schumann, and Gayla M. Boritz. "Training Older Adults in Word Processing: Effects of Age, Training Technique, and Computer Anxiety." International Journal of Technology and Aging 5 (1992): 79-106.
- Czaja, Sara and Joseph Sharit. "Stress Reactions to Computer-Interactive Tasks as a Function of Task Structure and Individual Differences." International Journal of Human-Computer Interaction 5 (1993): 1-22.
- DeLoughry, Thomas. "Two Researchers Say 'Technophobia' May Affect Millions of Students," Chronicle of Higher Education 39 (April 28, 1993): A25-A26.

- Elder, Victoria B., Ella P. Gardner, and Stephen R. Ruth. "Gender and Age in Technostress: Effects on White Collar Productivity," Government Finance Review 3 (1987): 17-21.
- Garfein, Adam J., K. Warner Schaie, and Sherry L. Willis. "Microcomputer Proficiency in Later-Middle-Aged and Older Adults: Teaching Old Dogs New Tricks," Social Behaviour 3 (1988): 131-148.
- Gist, Marilyn, Benson Rosen, and Catherine Schwoerer. "The Influence of Training Method and Trainee Age on the Acquisition of Computer Skills," Personnel Psychology 41 (1988): 255-265.
- Grupe, Fritz H., and Frank W. Connolly. "Grownups Are Different: Computer Training for Adult Learners," Journal of Systems Management 46 (1995): 58-64.
- K. Virginia Hemby. "Teaching Adults in the Business Education Classroom," Business Education Forum 52 (1997): 36-38.
- Kelley, Catherine L. and Neil Charness. "Issues in Training Older Adults to Use Computers," Behaviour and Information Technology 14 (1995): 107-120.
- Laguna, Kerrie and Renee L. Babcock, "Computer Anxiety in Young and Older Adults: Implications for Human-Computer Interactions in Older Populations," Computers in Human Behavior 13 (1997): 317-326.
- Mruk, Christopher J. "Teaching Adult Learners Basic Computer Skills: A New Look at Age, Sex, and Motivational Factors," Collegiate Microcomputer 5 (1987): 294-300.
- Nordenbo, Sven Erik. "How Do Computer Novices Perceive Information Technology? A Qualitative Study Based on a New Methodology," Scandinavian Journal of Educational Research 34 (1990): 43-76.

- Owen, David. "Designing Instruction for Older Adults," Programmed Learning and Educational Technology 25 (1988): 23-27.
- Ross, Gary Earl. "Strategies for Addressing Technophobia in Nontraditional Freshman," Collegiate Microcomputer 11 (1993): 120-122.
- Russell, Anne L. "Stages in Learning New Technology: Naïve Adult Email Users," Computers in Education 25 (1995)
- Sharit, Joseph and Sara J. Czaja. "Aging, Computer-Based Task Performance, and Stress: Issues and Challenges," Ergonomics 37 (1994): 559-577.
- Speer, Tibbett L. "A Nation of Students," American Demographics 18 (1996): 32-45.
- Weil, Michelle M. and Larry D. Rosen. Technostress: Coping With Technology at Work, at Home, at Play (New York: John Wiley and Sons, Inc., 1997).
- Weil, Michelle M., Larry D. Rosen, and Stuart E. Wugalter. "The Etiology of Computerphobia," Computers in Human Behavior 6 (1990): 361-379.

