Technology Impacts Older Americans

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ABSTRACT. Americans are living longer, and technological processes are moving into many facets of their lives. Topics addressed include health, diagnoses and treatment, the use of X-ray, caregiving, electronic mail, voice recognition, fax modems, pen tablets and notebook computers, compressed technology, leisure and entertainment, and employment. Many older Americans are capable of learning and utilizing the new technological processes listed above. The use of computerized tools can help senior adults increase their interaction with others, acquire new information and knowledge, engage in creative pursuits, and strengthen problem-solving abilities. [Article copies available from The Haworth Document Delivery Service: 1-800-342-9678.]

INTRODUCTION

Technology, a term often used to describe the automation or computerization of manual processes, is changing the way Americans live. Technology can improve efficiency and productivity, save time and lives, and entertain.

Computers are dominant tools in daily life (e.g., banking, cooking, telephoning, faxing, home shopping, and driving). They are also prolific in medicine, education, and business. These new electronic changes create both an opportunity and a need for senior...
adults, the fastest growing segment of society, to become more involved in a highly mechanized environment. Education in the use of various technologies brings senior citizens information about available resources, diagnostic testing and treatment, medical advancements and benefits. The authors of this article address some of the impacts of automation on the health, leisure, education, and employment of older Americans.

**TECHNOLOGY AND HEALTH**

Americans are living longer; the fastest-growing age groups are people 75 to 84 and 85 and over. By the year 2000, about 5,000,000 Americans will be over 85 (Graham, 1992); by the year 2040, it is predicted that the 85 and up age range will number 24 million (Schneider, 1991).

Senior citizens have special concerns about personal health and their ability to remain viable and function in society; many of these concerns could be lessened through education and the use of technology. For example, half of those over 75 do not report health problems (e.g., loss of hearing, visual impairments, difficulty walking or standing, or dental matters) because they think these are inevitable (Cutler, 1990; Podolsky & Silberman, 1993). Pride, insecurity, and cost often keep older adults from reporting the aforementioned and similar concerns (Graham, 1992).

The American society values youth, so some of the elderly fear rejection, feel worthless, or see themselves as second-class citizens unable to fully participate in today’s technically advanced society (Graham, 1992). Others fear disability and a loss of independence. The use of Internet discussion groups, voice recognition technology, and computerized tools allows senior adults to gain valuable information on useful resources and services and helps them overcome fears of rejection.

Many seniors need special services provided by an individual or a group, but they are either unaware of benefits or unsure about tapping into the system. Educators encourage these citizens to obtain vital information regarding health, leisure, and employment
activities that can enrich their lives and reduce or eliminate some fears.

Elderly with Special Needs

An active campaign by the National Library Service for the Blind and Physically Handicapped, Library of Congress, promotes a talking-book program that meets some of the needs of older readers. Older Americans constitute more than half of the three million people with visual impairments or other physical conditions. Some examples of conditions that make the elderly eligible to borrow materials are paralysis, missing arms and hands, prolonged weakness, lack of muscle coordination, and vision and hearing loss. Items available for use are playback equipment, remote-control units, and auxiliary amplifiers with headphones. There has been a rapid expansion in the use of this program by the senior population in the United States, including nursing home residents ("Hear Any," 1994).

Diagnosis and Treatment

Advances in medical technology have prolonged the lives of many older Americans through controversial invasive procedures (Birenbaum, 1992; Pawlson, Glover, & Murphy, 1992). However, only eight of the nation’s medical schools require separate courses in geriatric medicine, and only recently are the elderly being included in research trials (Podolsky & Silberman, 1993). More education and research should be undertaken to assess the effects of technology on the quality of life of senior adults.

Pen tablets or notebook computers benefit the elderly during examinations, patient assessment, and monitoring. These tools make a patient’s health records mobile, reduce inaccurate patient history data, and help doctors more accurately diagnose patient problems. Seniors can be reminded to take medication, and their progress can be monitored from distant locations using programs like the Computerized Personal Emergency Response System (PERS). Doctors can pull up electronic charts in examining rooms and write out X-ray orders and prescriptions. They can send this
information to other institutions (e.g., diagnostic laboratories, hospitals, insurance companies, or pharmacies). Medical records can be linked with a billing package, thus reducing time and inaccuracy (Cook, Collins, Flynn, Guttman, Cohen, & Budiansky, 1994; Ogozalek, 1991). This automation leads to faster, more accurate, and more efficient service for elderly patients.

Compression technology, another benefit for senior citizens who are ill, shrinks data and video for transport and storage and then expands it to full size when needed. One example of the exchange among remote users occurred years ago, when five rural hospitals in Kansas connected with the Kansas University Medical Center which is hundreds of miles away from these hospitals. Doctors analyzed X-rays, lab reports and other information, and then provided diagnoses. Ill patients currently remain in their own areas instead of driving or flying into Kansas City (Cook et al., 1994). This process reduces stress for the aged who do not feel like taking a long trip, may not desire to stay in unfamiliar facilities, do not want the same medical procedures repeated, and may not have a traveling companion to drive or fly with them.

In addition to compression technology, other high-tech solutions like Lifeline and cochlear aid seniors (Holm & Rogers, 1991). Older stroke victims recuperating at home might use Lifeline, a personal emergency response system to get assistance if they feel ill. Cochlear implants and listening devices may compensate for hearing losses and result in clearer communication with others.

The last diagnostic technique to be explored is X-rays. Though useful in the detection of cancerous cells, bone fractures, and other abnormalities, there are conflicting guidelines regarding how often this radiation technology is needed. The greatest controversy over X-ray use appears in the detection and prevention of breast cancer.

X-ray. The authors of this article believe that some recommendations for the use of technology need reevaluating. The American Geriatrics Society, an organization of physicians who treat the elderly, advises women over 65 to get mammograms at least every third year until age 80; the U.S. Preventive Services Task Force, "a quasi-governmental consensus-building group" (Podolsky & Silberner, 1993, p.73), recommends X-rays every one or two years until age 75; and the American Cancer Society encourages both
clinical examinations and mammography annually from age 50 up. For the women who follow these guidelines, there is concern that many X-rays may result in overexposure to radiation.

Only 29% of females over age 65 get regular mammograms, but they are twice as likely to have breast cancer (Podolsky & Silberner, 1993). "Older women are dying at six times the rate of young women from breast cancer each year." ("Mammograms, Pap," 1993, p. 3). A clarification of guidelines, education on the necessity for testing, better detection methods, and further advances in technology could save older women's lives.

**Alcohol Consumption**

Conventional testing and diagnostic procedures do not accurately measure drinking problems among those 65 and older ("Alcohol Illnesses," 1993). It would be helpful for older Americans to have readily available technology which effectively measures blood alcohol content. This could help prevent intoxication and alcohol impairment among some elderly drinkers (Howard, 1993).

Alcohol related illnesses are an underestimated and overlooked health problem for many older Americans. Seniors are admitted to the hospital for alcohol related health problems more frequently than for heart attacks ("Alcohol Illnesses," 1993). Alcohol abuse in this age group may be the result of depression, feelings of hopelessness, loss of memory concerning drinking habits, and the fact that a smaller quantity of alcohol inebriates an older person.

**Caregiving**

Caregivers of older adults use integrated software packages, decision support systems, and information technology to save time, increase reliability, provide services, save lives, and give support. Groups and individuals provide care for millions of seniors daily.

Many of these individuals utilize software which contains spreadsheet and database applications to record the cost of an individual's care, the number of visits to the doctor, the medications needed, and the progress of the senior patient. Others interested in gerontology and patient care are investigating the use of decision support system
prototypes like the Aged Care Expert System and California's Multipurpose Senior Services Program to assess the degree of patient impairment(s), evaluate needs, and develop a package of care (Miller, 1993; Nizza, 1992).

Caregiving can be an informal or formal activity. An informal network consists of adult children, relatives, friends, and neighbors. A formal network of care includes support groups and community-based services mandated by the Older Americans Act. The latter is more likely to be used when children, relatives, friends, and neighbors are unavailable (Logan & Spitze, 1994). Formal caregivers often use large, shared databases or information technology systems to handle the admission and discharge data of older patients. Other facts regarding the patient's mental state, activities of daily living, and medical diagnosis are collected in these systems. This information is easily summarized in systems like CLINCARE and CARE and made available for patient referrals (Holmes, Teresi, & Holmes, 1990; Pheby & Thorne, 1994).

The types of care received are directly related to the degree of physical disability (Guralnik & Simonsick, 1993; Quinn, 1992). Some formal services and programs are Meals on Wheels, visiting nurses, home-health aides, homemaking services, and paid companions ("Health-Care Managers," 1994).

Technology can ease long-distance care for the elderly or ill. Families may keep in contact with their senior relatives through visits and calls, and by using E-mail, fax machines, and other forms of computerized equipment.

The elderly, just as the young, vary in age, physical health, memory, behaviors, and attitudes. Therefore, the job of a caregiver involves using technology in a variety of tasks: driving, shopping, record keeping, paying bills, completing and filing medical insurance papers, cooking, advising, answering the telephone, corresponding, serving as a companion, and other jobs.

Caregivers handle many pressures, and they may need advice, training, and assistance from others to alleviate stress, reduce burnout, and enhance their coping skills (Wilber & Specht, 1994). Support groups are expanding, and they provide caregivers with the experiential and emotional support necessary for their tasks. Robert Butler, M.D., Chair of the Geriatrics Department at Mt. Sinai Medi-
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...cal Center in New York City, reported that some groups teach caregivers practical skills and guide them to services like transportation, adult day care, or nursing homes, but their greatest value is moral and emotional support (Barnhill, 1994; Sterns, Barrett, Czaja, & Barr, 1994).

Caregivers may also need technical support. Classes at colleges and universities as well as workshops and seminars are avenues for assisting this group as they gain technical expertise.

**TECHNOLOGY AND LEISURE**

Computer use is growing in popularity. Within the United States, “There is roughly one computer for every four Americans compared with one for every 10 Germans, one for every 12 Japanese, and one for every 1,500 Chinese” (Cook et al., 1994, p. 46).

Computers can enrich the lives of the elderly (Shannon, 1993a). The next section of this paper reflects four ways technology benefits seniors: electronic mail, voice recognition, fax modems, and other leisure programs.

**Electronic Mail**

One leisure opportunity used by more than 9,000 participants who are 55 years of age or older is a section of America Online called SeniorNet. This service began as a nonprofit research project in 1986 at The University of San Francisco.

Participants exchange advice, counsel each other, and share ideas on longevity and the meaning of life. Fifty-three learning centers across the United States are a part of the SeniorNet Project. These centers offer classes in common computer applications. Older adults who use services like SeniorNet can feel more connected to the real world by keeping abreast of current information. Alice E. McLerran wrote “Thanks to E-mail, my social network is always rich, accessible, and active” (Shannon, 1993b, p. 9). Another SeniorNet user made the following remark “How it pleases me to find someone who knows what I’m talking about when I say ‘dustbowl,’ Roosevelt, NRA, the years of the godforsaken, ‘Okies,’ the bank-
Voice Recognition

Voice recognition software enables the elderly, disabled, and others to enter text and numbers into a computer without touching a keyboard. One computer package has a vocabulary of up to 60,000 words, and a second system provides continuous speech so that the user does not need to pause between words (Cook et al., 1994).

This technology can be very helpful; senior adults may vocalize letters or requests and have these converted into electronic messages. Those with hands, fingers, or arms which are weak or less dexterous can use this medium as an alternative to the keyboard or mouse. They can also benefit from computers which recognize voice output (e.g., calculators, computer controlled household appliances, lighting, and security systems).

Convenient Communications

A fax modem is an essential component for communicating conveniently with others locally and globally. This technology converts printed information into digital and analog signals which are transmitted over telephone lines to recipients in another locale (e.g., different office, state, or country). The user never leaves home or work to send or receive information. Communicating by fax can save time, energy, and irritants by cutting back on transportation, reducing the time that one waits in line, lowering the number of incidents when one is placed on hold while telephoning, and eliminating transfers to find the right recipient.

Other Leisure Programs

Various technologies can be used to improve the quality of life for older adults. These include video disks, computerized tutorials, and databases. On September 30, 1992, the Older Americans Act was amended, making federal grant money available at the state...
level for many demonstration projects and services for the elderly ("Recreational Opportunities," 1993).

Programs which target leisure counseling, recreational activities, music therapy, and multigenerational recreational projects that allow older volunteers to interact with elementary and secondary students may receive funding ("Recreational Opportunities," 1993). Databases help administrators organize state programs. Records of the skills and preferences of older volunteers can be created and used to match adults with school needs (e.g., living historians, teachers, playground supervisors, and tutors). These activities allow seniors to spend their leisure time participating and interacting positively with children in their community.

**TECHNOLOGY AND EDUCATION**

Technology can serve as an educational tool for older adults. Online training manuals, videos, and other products of interest may be obtained from the National Eldercare Dissemination Center ("New Dissemination," 1993). This center, funded by the Administration on Aging, has multimedia materials that target the educational needs of the elderly. Topics of instruction include grief management, depression, and alcohol abuse.

The National Eldercare Dissemination Center used database technology to create a repository of recent products. Studies, reports, technical assistance documents, audio-visual products, and training materials helpful to older adults are included. Database contents are indexed into eight categories: access to services, coordination and linkages, client diversity, management, training, generating resources, advocacy, and educating the public ("New Dissemination," 1993).

Many seniors are expanding their educational horizons by returning to colleges and universities as non-traditional students. These students, like others, are often required to take one or more computer classes. In these courses, they learn computer terminology, file handling, applications software (e.g., database, word processing, and spreadsheets), and telecommunications. Higher education introduces students to computer technology and prepares them to use comput-
ers in university facilities for library searches, word processing, and graphics.

Older citizens are changing the educational experiences of students and teachers across America. Many are helping schools acquire new technologies, volunteering as instructors, and helping change curricula. A Nobel laureate in physics is leading an effort to change the mathematics and science curricula in Chicago, Illinois. Seventy-one year-old Leon Lederman is spearheading a Teacher’s Academy which will retrain thousands of teachers in one of Chicago’s school districts. Math and science teachers are learning new methods of integrating these disciplines into the everyday experiences of children. Lederman’s three-year-old Teacher’s Academy emphasizes small group activities, illustrates basic principles, and provides hands-on experiments using various kinds of technologies (McAuliffe, 1993).

**Implications for Education**

The rapid growth of computers in the United States and the increasing use of technology can result in more practical applications of this service for seniors. However, many of the elderly will need education to operate or activate technology. Training classes could be established at a variety of convenient sites, or housed in mobile units.

Computer generated services may enable the elderly to live independent and productive lives for longer periods of time. People in their 90’s can have memory, cognitive skills, and other brain functions that remain keen. To enrich the brain’s abilities, senior citizens need to spend time on problem-solving activities like instructional games, simulations, and tutorials. These and other forms of educational software can provide opportunities for seniors to increase their cognitive skills. “Asking questions and getting answers stimulates nerve cells” (Jenevein, 1993, p. 9). Education and mental challenges throughout life lengthen the brain’s information receptors or dendrites.

Scientists at UCLA’s Brain Research Institute discovered anatomical differences in the brains of twenty deceased adults (Steven son, 1993). The deceased adults who were mentally challenged and well-educated had 40% longer dendrites than those who were not.
Theoretically, a larger number of dendrites increases the reception and processing capability of the brain. Interacting with others, learning new facts and information, and undertaking creative pursuits are challenges for the brain. Learning how to use new technology can help fulfill some of the recommendations proposed by Dr. Jenevein, a neurologist with Baylor University Medical Center in Dallas, Texas (Jenevein, 1993).

**TECHNOLOGY AND EMPLOYMENT**

Employment is important to many older adults, and they are capable of learning the new technology required to compete at work. “Nearly half of the non-working adults report that they would have preferred to continue on the job full-time” (Moloney & Paul, 1992, p.17).

However, many companies have policies which make retirement mandatory at or before the age of 65, and economic downsizing forces many senior workers under 65 into early retirement (Lewis, 1994). This policy is fueled by negative stereotypes of older workers: incompetence with new technologies, inflexibility regarding new tasks, less competitive and aggressive natures, and an inability to learn new skills quickly (Moloney & Paul, 1992).

Moloney and Paul (1992) report that older workers learn as well as younger workers, except when stress is applied; older workers have lower turnover rates, and updating the skills of older workers costs less than hiring and training new college graduates. Ogozalek (1991) concurs that seniors are capable of working in high-tech environments. Initially older workers may be slower than their younger coworkers at computerized tasks, but with practice they operate and use computers equally as well as others.

Jay (1989) indicates that seniors who directly use computers have more positive attitudes about enhancing their computer knowledge and skill. Seniors who are healthy and desire employment should be retrained and kept in the workforce. “Employment is associated with better social networks and better health of older adults” (Mor-Barak, Scharlach, Birba, & Sokolov, 1992, p. 156). The invaluable contributions of seniors can help combat employee
shortages, increase social interaction, and provide supplemental income.

CONCLUSION

Technology continues to play a major role in health care, education, employment, and the use of leisure time. Many seniors are capable of learning the new technological processes required for employment and self-enrichment.

Efforts to lead healthy, productive, and satisfying lives can be aided through education in applicable technologies. A reexamination of societal policies and attitudes regarding the elderly is recommended.

REFERENCES

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