Senior adults can use computers for entertainment, enhancement of daily functions, education, creative endeavors, and business obligations. Computer training programs enable seniors to increase productivity, learn skills, enhance self-esteem, and boost short-term memory. Electronic mail, online services, and the Internet encourage socialization and the sharing of experiences and information. Disabled and ill seniors can use technology that recognizes and adapts to their special needs. Senior adults are capable of using computers at work and at home, and they need opportunities to develop computer skills.

America's population is aging. As the end of the century approaches, the fastest growing age groups are the 75–84 and 85+ age groups. It has been predicted that by 2000, about 5 million Americans will be over 85 (Graham, 1992). By 2040, the 85+ age group will number 24 million (Schneider, 1991).

Senior adults can operate and be served by computers. In this article, we explain how seniors can use computers to improve their productivity, entertain themselves, and enhance education and daily functions. Understanding how the computer can be used by seniors will be helpful to policymakers, gerontologists, educators, economists, physicians, senior adults, programmers, city planners, and others who have an interest in the needs and practices of this fast-growing population.
PRODUCTIVITY

Senior adults use computers at home and at work. As they learn new systems and software, their productivity increases.

Two projects in New York are designed to serve seniors. One program, Ageworks, was created for adults age 55 or older. Ageworks offers training sessions on computer skills and finding computer-related jobs in the New York area ("At Your Service," 1994). The second program, The Ability Is Ageless Job Fair, is sponsored by the Department for the Aging in New York each autumn. This fair brings together business recruiters and older New Yorkers who are seeking employment (Rosenberg, 1994). Other cities could use the New York projects as models as they organize and provide these types of programs for older citizens.

The computer is viewed by many seniors as a business tool, along the lines of the calculator, dictaphone, typewriter, and word processor. However, some seniors have discovered that this technology also entertains in many ways, including providing stereo sound, three-dimensional graphics, games, and additional avenues for socialization.

ENTERTAINMENT

Computerization has created new avenues of entertainment. Participation in computer games gives seniors an opportunity to feel better about life and have a greater sense of emotional well-being (Palmer, 1990). These games allow them to experiment with outcomes; practice motor skills by using a mouse, joystick, and keyboard; and experience color, sound, and graphics in a nonthreatening and playful environment. Games like Hangman entertain and encourage the user to practice spelling, memory, and concentration skills. Peniston (1990) found that seniors who played Hangman were comfortable guessing words, enjoyed the game, and had improved feelings of self-worth.

SOCIALIZATION

Seniors can play computer games with friends by using a network to link their computers. They can also entertain themselves and feel more connected and less isolated by using E-mail, posting messages online, and participating in online conferences (Shannon, 1993b).

SeniorNet Online, a forum on America Online, is a telecommunications service that allows participants to navigate the information superhighway; to dialogue with others; and to access information on available resources, programs, and projects (Shannon, 1993a). Senior-
Net, based at the University of San Francisco, began as a research effort in 1986. Users age 55 or older communicate in real time, exchanging advice on a variety of topics, including longevity, safety, recipes, support groups, services, and the meaning of life. Classes in computer applications are offered at 53 learning centers across the United States.

Several online services provide opportunities for seniors to talk. Prodigy has a Seniors Bulletin Board; Delphi and CompuServe both have a Senior Forum; GEnie has a Family Roundtable that addresses topics such as grandparenting and being over 50; and America Online has SeniorNet Online (Resnick, 1994b). The American Association of Retired Persons (AARP) offers an AARP Forum on Prodigy, CompuServe, and America Online that deals with issues of interest to seniors (“AARP Online,” 1995).

Computers may enhance social contacts and provide current information through telecommunications activities. In an article on seniors online in the New York Times, user Alice McLerran stated, “Thanks to E-mail, my social network is always rich, accessible, and active” (Shannon, 1993b, p. 9). New friends can be made, relationships can be formed, and family members can be contacted.

Opportunities arise for retirees to share their knowledge and skills with others. The Senior Corps of Retired Executives is composed of adults who provide advice to new businesses through meetings on America Online (Resnick, 1994a). Their expertise filters into every forum. In return, seniors are appreciated and become part of the future. America Online member Muriel Christen noted, “Thanks to America Online, I feel like a modern woman, very much connected to my family and today’s world” (Resnick, 1994a).

Using E-Mail

Costs may be associated with using E-mail and other online computer resources. Some bulletin boards are free, but long-distance phone calls might be required for access. Other services are available for a registration fee or monthly fee, plus an hourly charge. CompuServe, Prodigy, and America Online impose monthly and hourly fees. Outside the United States, a communications surcharge is often levied.

Senior adults who are university students are able to send and receive E-mail free. They also have free access to a variety of additional computer services through the Internet.

Accessing the Internet

The Internet (short for International Network) is a global network of 4.8 million computers used by 30 million people worldwide. It provides access to e-mail, news, and a variety of information sources. The World Wide Web, a component of the Internet, allows users to access hypertext documents that can include images, audio, and video. gateway and email services.
seniors with information that can educate, entertain, increase productivity, and enable socialization (Elmer-DeWitt, 1995; Humphrey, 1995; Shell, 1994). Seniors may access

- Files and computer programs (by using the File Transfer Protocol),
- Reference works and databases (by using search engines and browsers such as Gopher, the Wide-Area Information Server, and Archie),
- Other computer systems (through Telnet),
- E-mail,
- Newsgroups (through USENet),
- Live discussions (through Internet Relay Chat),
- Mailing lists of messages from others with similar interests, and
- Text and multimedia images (through the World Wide Web) (Clark, 1994; Engst, 1994).

The Internet is a massive resource for seniors. It is also an essential part of the business and education communities.

**Warnings**

Online services and the Internet offer opportunities for socialization, but these activities also present risks. Participants may use dishonest techniques to secure another person’s credit card and phone numbers and passwords for computer accounts. They may misrepresent their age, sex, income, marital status, or personal appearance to project a certain image (Smolowe, 1995). “Like a novelist imaging a character,” a participant may create a false persona in order to experience the adventure and danger of deceiving others (Sagan, 1995, p. 80). Onliners can also mislead others simply by using pseudonyms. Electronic interaction eliminates important visual cues that are part of personal communication and alert one to misrepresentation. Seniors must be cautioned to be aware of the possibility of misrepresentation when becoming involved in friendships, personal relationships, or business ventures with others.

**ENHANCEMENT OF DAILY FUNCTIONS**

Computer application is prevalent in all segments of American life, for example, medicine, business, government, and education. Common experiences such as shopping and banking involve computerization. Thus, seniors need information on the benefits and limitations of this
technology. They need to become computer literate, which means they need to (a) develop the ability to operate computers successfully, (b) become aware of computers and their capabilities, and (c) learn and develop a basic knowledge of computer systems.

A basic computer literacy program combining language, writing, and word processing was offered to 24 multicultural seniors age 65 or older in Erie County, Pennsylvania. As users progressed through the program, both their self-esteem and their desire to learn more about the computer increased (Burke, 1993). Participants’ performance increased on the Test of Adult Basic Education by an average of 2.5 grade levels. Seniors were enthusiastic about their progress; for example, an 80-year-old discussed the significance of the computer in editing a newspaper, a 78-year-old was amazed by his ability to complete writing assignments on the computer, and a 70-year-old decided to use the computer to chronicle her years growing up in Mississippi.

In another project, participants at a Las Vegas senior center were given a computer literacy/confidence course. After the 12-hr course, the seniors increased their computer literacy test scores and had a desire to operate and explore computers (Temple & Gavilet, 1987).

Computer activities provide mental, creative, and psychomotor challenges for users. Mental challenges for senior adults may help enrich the brain’s abilities and lengthen the dendrites or information receptors (Jenevein, 1993; Stevenson, 1993). Researchers at the University of California at Los Angeles’ Brain Research Institute detected anatomical differences in the brains of 20 deceased adults who had been well educated and challenged mentally. These individuals’ dendrites were 40% longer than the dendrites of individuals who had had less than a high school education and had experienced few mental challenges (Stevenson, 1993). Certainly, computers are mentally challenging.

Short-term memory is strengthened through the use of computers (Palmer, 1990). Peniston (1990) conducted a study on the short-term memory ability of senior adults and found that after a 6-week microcomputer training program their performance on a memory assessment instrument improved.

EDUCATION

Additional computer resources, such as reference software, edutainment (programs that both educate and entertain), and tutorials, help enrich seniors’ knowledge and growth. Photographs, illustrations, animation, audio, and video are integrated as multimedia to create a learning experience that is novel and tailored to meet each user’s
needs. Electronic encyclopedias, language-training programs, music tutorials, and other software can be a part of this experience.

Some seniors are expanding their educational horizons by returning to colleges and universities, where they may be required to complete a 3-credit-hour computer course. Generally, students learn basic computer literacy, computing terminology and history, file management skills, one or more software packages, and telecommunications. After this introduction to computers, they understand and are able to use university and business computing facilities.

Many older adults are changing the educational experiences of students and teachers across America. They help schools acquire new computing facilities and volunteer as tutors, aids, counselors, and instructors. These volunteers serve a variety of roles in their local schools: readers, storytellers, models of behavior, and school helpers. One retired computer executive is creating a computer program that will teach children how to read (Rosenberg, 1994). He works with first graders to test the program.

Computers are educational tools for seniors. The National Eldercare Dissemination Center, funded by the Administration on Aging, offers multimedia materials that target older Americans' educational needs. Topics of instruction include grief management, depression, and alcohol abuse. Online training manuals and other products may be obtained from the center ("New Dissemination Center," 1993).

ASSISTANCE FOR DISABLED SENIORS

Computers can also help disabled and ill senior adults perform tasks that otherwise would be difficult or impossible. For example,

- Voice recognition software enables the user to enter text or commands into a computer without touching a keyboard. One voice recognition computer package has a vocabulary of 60,000 words; a second system provides for continuous speech so that the participant does not have to pause between words (Cook et al., 1994).
- A head-controlled keyboard/mouse permits hands-free computing by allowing a person to type by using head movements (Apple Computer's Worldwide Disability Solutions Group, 1994).
- Text-to-speech software reads documents aloud, providing assistance to visually impaired users (Hendricks, 1991).
- Braille printers provide output for seniors with limited vision (Hendricks, 1991).
• Online grocery, prescription, and other shopping services permit seniors to order specific products by computer and have them delivered from a local store within hours (Horowitz, 1995).
• Electronic access to health information enables senior adults to make educated decisions about self-care, illness prevention, and treatment. Within the next decade health care costs will be lowered, because many visits to the doctor will be replaced with interactive computerized sessions (Flower, 1994).

THE ADDITIONAL CHALLENGE FOR SENIORS

Disabilities challenge some seniors, but a greater challenge may be overcoming the prevailing myth that senior adults are incapable of learning new technology and using computers (Moloney & Paul, 1992). Many seniors value employment and are capable of developing the computer skills necessary to compete in the workplace.

Negative notions about older workers’ attitudes toward computing technology and ability to use it were challenged by a 1988 report of The Conference Board (Moloney & Paul, 1992). The Board’s research revealed that there are many reasons for hiring or retaining seniors: Older workers learn equally as well as younger workers, except under stress; seniors have lower job turnover rates than do their junior counterparts; and retraining and improving older workers’ skills is less costly than hiring new college graduates.

Seniors who are healthy, desire employment, and want to increase or maintain their standard of living should be retrained in the workforce. They make valuable contributions to America’s economy and its ability to compete successfully in the growing global marketplace.

CONCLUSION

Computers can play a major role in senior adults’ productivity, entertainment, socialization, daily functions, and education. Many seniors citizens are capable of learning and using computers to enrich their lives and maintain their breadwinning roles. More research is needed on aging populations, their computer use, and the availability and accessibility of computer systems and training programs. Societal policies and attitudes regarding the elderly and their contributions need to be closely examined.

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