# Computer Games for the Elderly

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The myriad of challenges that one faces in adapting to old age, and in leading a rich and rewarding life in the later years, have been described extensively (Fries & Crapo, 1981; Skinner & Vaughn, 1983). Older adults typically experience a wide variety of critical needs, and their overall well being depends upon the manner in which these particular needs may be met.

Technology holds great promise for enhancing the lives of elders generally. The American Society on Aging has taken a leading role in its efforts toward achieving greater awareness of the problems and issues in adapting technology to meet the needs of elders. Their National Forum on Technology and Aging has the goal of "improving the quality of life of our aging nation through the utilization of technology" (Technology and Aging Conference Brochure, 1987, p. 5). Today's elders have lived through many technological changes. They have been exposed to numerous innovations including the automobile, airplane, telephone, television, and the computer.

Retirement can be considered a time for further exploration in life, rather than withdrawing from it; and computer technology affords the elderly new and exciting ways to keep up with recent developments in many fields (Brady, 1987). Furthermore, computers clearly offer the prospect of improving the range and quality of public services, of which the elderly are heavy consumers (Elton, 1988).

Assuming that, in the years ahead, computers will increasingly be involved in the daily lives of Americans; determining how this relatively new technology can help to overcome the barriers to a good quality of life for older adults seems essential.

A number of different areas have been identified for computer applications involving elders (Ryan & Heaven, 1986). Included would be expanded opportunities for communicating and social interaction for the speech-impaired or hearing-impaired, monitoring vital life functions and emergency alarm systems, health education programs, and rehabilitation or cognitive therapy. Another vital aspect of life for older Americans would certainly be their opportunities for participation in leisure time or recreational pursuits.

However, older people appear quite reluctant to acknowledge the value of newer, less familiar forms of technology. A national survey covering computer use by elders has revealed that only 19% of Americans age 65 and over have used them (Brickfield, 1984). With such a meager proportion of seniors utilizing these high-tech products, the direct impact of computer technology on this population group seems limited, especially for the decade immediately ahead.

In endeavoring to explain the lack of involvement of elders with computers, Hoot and Hayslip (1983) underscored the marketing strategies of computer companies, which have dwelt on younger populations and those in the business world, even though older adults are capable of and interested generally in continued learning.

At this time there are a number of unresolved questions concerning the elderly and computers, with some of them formulated as follows:

(1) What activities involving computers are especially attractive and enjoyable for seniors?

(2) What are the effects on the elderly of participating in activities that involve computers?

(3) Will the attitudes of elders toward computers be modified after participating in activities involving computers?

This paper will address the question of how elders have responded to computer games, one form of computer-based activity that appears to hold considerable promise for reaching out to older Americans. Several studies will be reviewed that have involved elders in playing computer games in a variety of programs and organizational settings. The primary emphasis herein will be on the impact of these activities on the participants, and how the elders reacted to them. The two studies conducted at the University of South Carolina have not been published previously. Tentative conclusions based upon the limited research available will be presented as the final part of this paper.

**Related Research**

One of the earliest reported efforts to involve elders with computers took place at the University of Illinois in the mid-1970's (Jaycox and Hicks, 1976). A key principle of this program was that computers can aid and enrich the lives of elders. An outreach program was developed which incorporated working with elders as a new group of computer consumers. Younger

persons, who already had access to computers through the schools, were involved with elders in voluntary programs utilizing an intergenerational framework. A major result was that both of these groups reaped benefits through greater participation in computer-related activities. Cooperative games were one component of their overall approach, which concerned the role of computers in society.

A study by Hollander and Plummer (1986) involved seniors at an apartment building in Rockville, MD who played two computer games over a three-week period. This activity was intended to serve as a therapeutic and rehabilitative tool, and as a form of social and educational enrichment for the residents.

Twenty-one residents (17 females and 4 males) completed the program out of the 41 who started. The two games that held the residents' highest level of attention were Trivia and Hangperson. Trivia had questions on sports, history, movies, science, and literature presented in a multiple-choice format. An animated discussion took place on the new information they had been exposed to during this game. Both games tested the participants' knowledge and offered immediate feedback.

At the end of the program, 49% of the seniors who took part expressed interest in learning about new and more challenging software, and 26% were interested in computer programming. Skill development focused on perceptual-motor (eye-hand coordination, dexterity, fine/gross motor skills) and cognitive abilities (information processing, testing, reading, comprehending, and memory) and attention span. Therapeutic benefits were evident in greater constructive use of leisure time for the residents, and in the participants' feelings of success and achievement.

Clark, Lanphear, and Riddick (1987) noted the well-documented observation that there is an age-related decline in speed of tasks performed. This includes discrete movements, repetitive movements, simple reaction time, and sequential choice reaction time. The purpose of their study was to examine the possibility that the slow-down in performance of the elderly could be reversed through practice on videogames, one form of computer-based activity. Pac Man and Donkey Kong were the videogames chosen as they require a measured response selection, and have been regarded by elders as challenging. Both the experimental and control groups were tested on their reaction time.

The results showed that the weekly high scores on Pac Man nearly tripled over the seven-week period, and Donkey Kong improved almost fivefold. Also, the elders who played the videogames demonstrated a faster reaction time than the controls. The authors concluded that the decline among elders in speed of responding can be reversed, but not totally eradicated, with an appropriate intervention such as videogames.

Referring to a national survey which indicated that a majority of elders suffered from a disability, Drew and Waters (1986) explained that perceptual-motor problems of elders may result from an illness or lack of exercise, but a decline in physical abilities may have a serious affect on all aspects of dally living. In their view, any means for improving hand-eye coordination, or for slowing deterioration, could be meaningful for countless numbers of seniors.

The goal for their study was to find out if playing video games could improve perceptual-motor skills and cognitive functioning, and would generalize to scores on a standard battery of tests. Subjects were selected from an apartment house complex in a suburban area of Northwest New Jersey.

As hypothesized, the experimental group demonstrated significant improvement in their scores on a game called Crystal Castles, and they became capable of playing for a longer period of time overall. Significant differences were also observed for before-after test scores on Rotary Pursuit, the Purdue Pegboard, and the WAIS-R full scale and subtests. Neither of the controls improved on any of these measures. After this project, the subjects said they had become more careful in their daily activities, including driving, and they had fewer household accidents.

A study focusing on the relationship between videogame play and the emotional states of elders was reported by Riddick, Drogin, and Spector (1987). They hypothesized that older persons involved in videogame play would have positive changes in pleasure, arousal, and dominance. The experiment was carried out at a senior center in Silver Spring, MD where that members were asked to volunteer for a project involving video games.

After playing Pac Man and Donkey Kong for two hours per week over a period of eight weeks, the experimental group showed a decline in pleasure and an increase in arousal, with no change in dominance. The frustration associated with learning how to play the games was offered as an explanation for the decline in pleasure that was evident. However, the investigators and staff observed that the games did serve as a social catalyst for the participants.

Weisman (1983) noted that, although computers and video games have become commonplace in our society, there was no literature concerning whether or not the frail elderly could also benefit from this technology. His view was that nursing home residents need to have additional opportunities to play games, experience some excitement, and be stimulated.

At the Hebrew Home of Greater Washington, fifty residents with an average age of 85 played several games on an Apple II computer. The four games adapted for use were chosen because each tapped a different kind of skill and ability. In order of interest to the residents, these games were Little Brick Out, Ribbet, Country Driver, and Hangman. All the residents who tried the games once liked them well enough to play a second time. In addition, playing the games with the residents gave the staff clues as to their physical and mental deficits that had not been identified before.

As part of a study by Beasley, et al. (1989) at the University of South Carolina, computer-based activities were introduced to

elders in two senior centers in Columbia, SC. Focusing primarily on social interaction and participation, the attitudes of the seniors toward computers were also examined in a before-after format. Wheel of Fortune and Concentration were the games played on a Macintosh computer.

Prior to playing the games, most of the 18 elders who participated in the project were hesitant about using a computer. In contrast, the post-test showed that everyone had enjoyed the experience; and most indicated they would like to use a computer in the future. The number of elders from these centers who took an active part in the games actually doubled as the activities progressed. In short, socialization was enhanced through friendly competition, and the computer afforded unique recreational opportunities for the elders in these centers.

A study by Bailey, et al. (1989), also at the University of South Carolina, measured the extent of participation in computer games by 28 elders in a large nursing home in South Carolina, and examined their attitudes toward computers in a before-after comparison. Brickles was one computer game chosen for this project as it involved hand-eye coordination ability, and Concentration was selected for its focus on short term memory for objects on the screen. Both of these areas of functioning have been identified as problematic for many elders.

Before the games were played, only 25% of the subjects said they would like to use a computer; whereas this figure climbed sharply to 64% after they had acquired experience with these two games. Most of the residents in the project took an active role in playing the games; however, about 25% limited their participation to observing the activity. A large majority of the residents who participated said they enjoyed both games.

**Conclusions**

The studies covered in this review found that only a limited number of computer games are enjoyable for the elderly. These included a few video arcade games, and a small number of games written for micro computers. In fact, many games have been judged unsuitable for elders for a number of reasons including the small size of the objects on the screen, rapid movements or reactions required, or the sound being inappropriate.

However, the available research suggests a wide array of positive benefits for elders who take part in well-selected games over an extended period. For example, social interaction is stimulated when these activities are introduced, and participation may increase as the activities continue. Enhancement of perceptual-motor skills such as eye-hand coordination, dexterity, and fine motor ability has been demonstrated. The elders' speed of tasks performed, including basic movements and reaction time, can also be improved. Transfer of these skills, from playing the games to other aspects of an elder's daily routine, has been noted for household chores and automobile driving ability.

Although enhancing cognitive skills has not been the main target for the projects reviewed, information processing, reading, comprehending, and memory have also been mentioned as positively affected. Having a feeling of success and accomplishment was another beneficial outcome observed which has a bearing on the self concept of the participant. In contrast, emotional reactions have been uncovered that may stem from the frustration in learning how to play certain games.

Research findings to date also suggest there are certain changes in attitudes taking place after elders are exposed to computer games. Initially, most elders express some hesitancy about computers, and many are ambivalent or show anxiety about using them. However, hands-on experience can stimulate interest in learning more about various aspects of computing, and most elderly participants in the projects reviewed wanted to use computers in the future.

Although computer games have been considered primarily recreational in nature, their wide-ranging effects in terms of enhanced functioning suggest the need for an expansion in program development in the years ahead that involves this new technology; and further exploration along the lines of the projects reviewed is warranted. Extending access of the elderly to computers in the future can hopefully contribute to an enhanced quality of life for this growing segment of our population.

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