

Senior CHI

The CHI 99 Development Consortium

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Introduction

Each year a development consortium is held as part of the CHI conference. The aim of this consortium is to bring experts into the SIGCHI community who are not typically seen as part of it. In 1999, the United Nations Year of the Older Adult, the CHI development consortium focused on senior citizens.

The Senior CHI Development Consortium examined Human-Computer Interaction issues as they effect older adults. It focused on three general questions:

1. How can computers become more accessible to older adults?
2. How can technology be used to support older adults?
3. How can technology be used to disseminate the wisdom and experience of older adults to the rest of the community?

As is well known, the number of older adults within developed countries is increasing faster than their younger counterparts. By the year 2000, 35 million Americans will be older than 65 years of age. By 2010, this will increase to 39.7 million [1,2]. Such a change in demographics brings with it unique challenges and opportunities for both the public and private sectors. Human factors and ergonomics have played, and can continue to play, a major role in meeting the challenge of designing for this community of users.

Recent research shows that 25% of seniors with computers are online and 70% are using their computers daily [3]. This is the fastest growing group on Internet. To design effective systems and training programs in support of age-related performance issues, we must answer fundamental questions concerning older users and the ways in which they approach and use computing technology. What myths and stereotypes about older users can we dispel? What non-obvious truths about older users can we uncover?

Cognitive changes that accompany aging are complex. Some aspects of cognition such as working memory and perceptual speed decline with age while others such as verbal ability and very long-term memory may improve with age [4]. Additionally there are individual differences in the rates of these aging-related changes and some individuals maintain their abilities longer than others [5]. Finally, certain aspects of personality remain constant over an entire lifetime.

Background

The SeniorCHI Development Consortium is the most recent in a long line of SIGCHI events that address issues of aging and technology.

CHI 95 first addressed the HCI interests of seniors with a panel called "From Our Past to Our Future: User Interfaces Over the Lifespan". Lead by Maddy Brouwer-Janse, this panel brought together a variety of experts on the design of technology for children and seniors – the two ends of the age spectrum.

After the conference, several of the panelists worked with others in the CHI community to write a set of short essays on designing for kids and seniors. Called "User Interfaces for Young and Old", this collection appeared in the March/April 1997 issue of *interactions*.

CHI 99 saw seniors' issues receiving more attention than ever. In addition to this development consortium, the conference featured a panel on seniors called "Senior CHI: How Can We Make Technology 'Elder-Friendly?'" The organizers of CHI 99 encouraged aging-related submissions in all categories as well.

As a follow-up to the work at CHI 99, Marian Williams has agreed to edit a column in the SIGCHI Bulletin. This column will discuss aging and will be featured regularly. Other potential new directions for SeniorCHI are listed at the end of this article.

Overview

Work presented at Senior CHI was split into four major sessions: Current and Potential Users of Senior CHI, Overcoming Limitations, User Involvement in Design, and Cutting Edge Issues. Twelve papers were presented, with each presenter giving a half-hour presentation of their work. Fifteen minutes were allotted for discussion of each paper. (These papers are available on pages 35-52 of the CHI 99 Extended Abstracts.) The Consortium opened with an introduction by organizers John Thomas and Jim Fozard, and concluded with a brainstorming session.

Current and Potential Users of Senior CHI

The development consortium began with introductions and some poetry read by John Thomas. We then moved into a role-play where several of the attendees acted out scenarios involving older users, technology and society. The role-playing helped sensitize the group to issues pertaining to seniors and technology, and provided momentum for the rest of the consortium.

After this, the first paper session began. This session looked at ways computing technology might give otherwise isolated seniors access to a larger community and new activities by bringing them online.

Building a Community of History

Jason Ellis presented his work in constructing an "online community of history." This work aims to build an Internet-based community that supports kids interviewing seniors to build up a shared database of oral history.

Ellis discussed two pilot studies that involved middle-school students sharing history with seniors using existing technology. The first study focused on World War II history (interviewing veterans) and the second on the Civil Rights Years (interviewing older African-Americans).

His early work found that, while face-to-face oral history is in some ways preferable to online, it requires a large amount of effort to orchestrate. Moving the work online has the dual advantages of allowing kids access to seniors all over the world and reducing teacher effort.

The pilot study results were quite revealing – there are many seniors currently online who have wonderful stories to tell, they enjoy sharing their stories with kids, and kids are excited to hear them. However, existing technology presents problems as well. Managing discourse and selecting seniors to participate with kids, for example, are both difficult with current software.

Ellis' next step is to design and implement a software system that reduces the amount of effort it takes to do online oral history projects, while enabling more robust interaction and artifacts.

Windows on the World: Expanding the View from the Nursing Home

Jennie Kay and Patricia Kay presented work concerned with the integration of the Internet into nursing homes and assisted living facilities.

The presentation began by pointing out that fully 5% of the US elderly population is institutionalized. Many of these individuals have limited mobility and feel very isolated from the outside world. They often have an acute sense of their loss of independence. While not a panacea, they believe that the ability to access Internet-based communities can help to foster a feeling of self-worth in seniors, and connection to the world around them.

A pilot project to investigate the potential of using Web TV in assisted living facilities is now underway. Initial results are promising though the Web TV interface has proven to be much more difficult for the elderly population to use than was expected.

Overcoming Limitations

This session looked at training. In particular, most of the presentations focused on understanding the special needs of seniors as they learn to use computing technology.

Technology Training for Older Adults

Wendy Rogers presented evidence suggesting that age-related cognitive, perceptual, and motor declines may necessitate the need for training that is designed to compensate for these deficits. Moreover, evidence suggests that the belief that older adults lack interest in new technologies is not well supported. Many older individuals, especially the healthy and well-educated, are very interested in using new technologies provided they receive adequate training.

In this study, a series of focus groups were conducted to identify the problems that older adults are having in their daily lives. A common theme that emerged from the data is

the impact of new technology on the everyday lives of older adults. Most relevant is the finding that many of the technology-related problems mentioned could be remedied by a combination of age-specific training and design. Participants' interest in technology was driven not only by demands made by the changing world that they live in (e.g. library card catalogs are only available online) but also by interest and curiosity.

These data argue against the stereotype that most older adults are unwilling to interact with new technologies.

Teaching IT for Seniors

Boba Mannová discussed the University of the Third Age, a university that targets senior citizens (retired and over the age of 55) in the Czech Republic. In particular, she described an information technology course for seniors that she taught that aimed to give seniors an introduction to computing technology. They learned how to use office applications like word processing and presentation packages as well as Internet applications like web browsers and e-mail.

At first, participants were apprehensive about using the technology, but they quickly lost their fear and were looking forward to future lectures. After a very short time (approximately 3 hours), users were using the systems independently – exploring the web and searching for personally useful and interesting information. Participants' attitudes were very positive and they were eager to learn more. In addition, they hoped to help their spouses, children and grandchildren learn about technology. Senior students are hardworking, interested and extremely capable of learning and using technology.

Mannová pointed out that motivation is a major issue when training seniors – seniors will not learn to use technology if they cannot see a direct benefit of that learning to their everyday lives. To this end, classes were structured so students learned at their own pace and were able to focus on topics of particular interest within the lessons.

Interacting with the Ceiling

Michael Peiper spoke on the special computer access problems of bed-ridden people. This project presented a human-computer interface enabling a person, almost completely paralyzed by ALS and on an artificial respirator, to independently compose literary text. The input interface was voice input to a speech recognition system. Since the user was on a respirator, they could only speak commands when the respirator allowed for an out-breath. The software was modified to account this as well as for the particular noises the machine added to speech. Output from the computer was displayed using a video projector, which projected against the white ceiling of the room.

The benefit of such technology is that, if well designed, it can afford greater autonomy and enable users to share in the social, cultural and economic activities of their communities in spite of their physical handicaps. This work makes a case for creating generic user interfaces that can be adapted to the

needs of all users. (A video of this system is available in the CHI 99 Video Reports.)

Designing Computer Systems for Older Adults

Sara Czaja posed the question: Can older users interact successfully with technology – do they have the necessary skills?

The factors that effect successful use of computers include user attitudes, training, and design of the interface. A study was done looking at the different attitudes people of different ages have towards computers. They also looked at how older users perform certain tasks like data entry, database query formulation, and accounts balancing. The results show that there are no significant age group differences in attitudes towards technology – all were willing participants. There was a difference in speed among the various age groups but not in accuracy, indicating a speed vs. accuracy trade off.

Performance improvements were found with various changes to the interface, including maximizing contrast, avoiding small targets and making minimal demand on working memory.

More research needs to be done in this area to better define and quantify interface needs for older adults. In addition, Czaja pointed out that many of the guidelines identified here apply equally to other user groups and echo general HCI tenets. It is important for researchers to work towards identifying user interface issues that apply specifically to older users.

User Involvement in Design

This session focused on studies of existing computer systems that seniors use as well as ways to involve seniors in the design of such systems.

The Network Communities of SeniorNet

Elizabeth Mynatt presented an ethnographic study of SeniorNet, an online community for seniors. Her study examined the social and cultural context of interaction within the community.

SeniorNet is a good model of seniors helping each other to become more comfortable and effective online, and shows how a supportive community can foster learning about technology. This study looks at affordances of online communities for seniors and the design dimensions relating to community development.

The findings showed that users were motivated to communicate with each other due to shared interests and expectations. Another, less obvious, finding is that users of SeniorNet were not particularly intimidated by the technical knowledge required to participate in the web-based community, but by their feelings about their literacy level. Some users did not post much because they felt they could not express themselves as well as others on the site.

Presence Project

Kay Hofmeister presented the Presence Project, which works closely with older adults to create a high-visibility representation of their lives, relationships, needs and aspirations. The hope is that this will give them more of a voice in their community and, thus, help them remain connected to it.

The project undertook a number of initiatives, one of which was called “cultural probes.” Cultural probes are packages that include postcards with questions, a camera, maps, journals, and others. These packages were mailed to seniors who responded by answering the questions on the postcards, writing in the journals, taking pictures of important parts of their lives with the camera, and the like. The probes were then returned to the researchers who used them to create computerized scrolling displays, posters, and other artifacts around the community.

This project attempts to focus on the things seniors can do and enjoy doing rather on their limitations. How much do we know about what older people really want? Designers will increasingly have to design products with this age group in mind and it is important to understand the needs and wants of this user group. Kay noted that this could benefit the rest of the population – suggesting that as we develop a deeper understanding of the needs and aspirations of older adults, we will become able to design more effectively for all.

Practices to Encourage Participation

Darrin Ellis discussed a series of strategies for recruiting older adults for participation in research projects and design sessions. He argued that knowing and understanding the older user will be critical to the development of computer and information technology in the years to come.

To date, Ellis’ findings help lay to rest the myths that “to be old is to be sick” and that seniors have little interest in technology. In fact, the proportion of older adults living relatively free of impairment is on the rise.

Ellis found that seniors are very interested in using technology and capable of learning how to use it. The keys to success include generating a presence in the user’s community, eliminating barriers to participation (such as transportation), communicating the importance and relevance of the project, and engendering a culture of partnership and mutual respect.

Technology and Learner-Centered Design: Reaching out Across the Lifespan

Jean Gasen pointed out that it is more important than ever to focus on the learning needs of older adults. Her two areas of interest are the design of health care oriented learning systems for older adults and design for low literacy and minority populations.

New methods for designing interactive multimedia for use in the screening of older women for breast cancer are being developed to motivate learning, promote active engagement and a positive behavioral interaction. The challenge is in

understanding how to use technology to provide accurate content in ways that aid learner-centered information gathering while also building an empathic support community.

Cutting Edge Issues

The final session looked at ways in which next generation software technologies might aid older users.

Smart Technology

Dominic Bouwhuis discussed his work on designing intelligent agents to support the special needs of seniors. He began with the premise that there is no clear point in time when one becomes a “senior.” Instead, continuous development and change characterize our lifetimes. Thus, instead of simply targeting a single type of “senior user”, we must design computing technology that can, through users’ behavior, understand their special needs.

Bouwhuis argued that smart technology should help improve autonomy and well being – essentially, improving quality of life. The challenge for such technology is to integrate with the current lifestyle of older user. To this end, he argued that locus of control should always be with the user.

Smart technology should offer support for human decision making by presenting a set of options based on the users’ behavior. Ultimately, he explained, the question we need to ask about “smart” technology is not whether it can think, but whether it can change its mind.

Making Interaction Visible

Angus Whyte’s presentation described ongoing work with seniors on “social browsing” in the Living Memory Project. The Living Memory Project runs from 1997 until 2000 as part of the European Commission’s Connected Community research into intelligent information interfaces.

Social Browsing explores ways of augmenting everyday activities by capturing, sharing and exploring the knowledge or “working memory” of other local people. The identification of relevant applications involves parallel streams of ethnographic inquiry into local communities-of-practice and low-tech prototyping to address potential needs for new media. These feed into the evaluation of scenarios and design of novel interfaces and software agent architectures.

Whyte has been working with seniors to clarify how internet-based applications may augment their capacity to find like-minded others, and to evaluate representations of these relationships, perhaps using off-the-shelf concept mapping tools to visualize and manage their ties with acquaintances. A second form of representation is required for users to visualize patterns of interactions between networks of acquaintances, and extract what is pertinent to activities that they want to share with others. Interactions may be in the form of public postings to a local bulletin board, or semi-private exchanges between acquaintances and their acquaintances in turn. Whyte has found a high level of interest

among seniors who have reasons to seek new acquaintances (for example those recently retired).

Where Do We Go From Here?

The development consortium ended with a brainstorming session covering potential future directions for Senior CHI as well as important research directions.

Future Directions

Web Page. Provide information and links on our web page to help make others aware of the issues. (Visit our current web page at <http://www.rowan.edu/~jkay/seniorchi>)

Product Outreach. Find ways to interact and form partnerships with those who are developing products for seniors.

New SIG. Create a special interest group focusing on HCI for seniors (CHI-Aging?).

Form Alliances with Other Aging Organizations. Possibly exchange findings with American Institute for Graphic Analysis, American Institute of Design, Usability Professionals Association, or International Federation for Information Processing (IFIP).

Curriculum Development. Work towards a curriculum that will teach design with a particular focus on seniors.

Design for Aging Network. Write an article for the aging newsletter from the Royal College of Art in London.

Policy Issues on Usability. Address issues on usability for seniors through the ACM Policy forum.

Column on Gerontechnology. Marian Williams has agreed to edit a column in the SIGCHI Bulletin on aging as a regular feature.

International Journal on Gerontechnology. A journal dedicated to gerontological research is planned by Jim Fozard and Dominic Bouwhuis for introduction this Fall.

Research Issues

Aging and Culture. How do intercultural issues play into computers and aging? Comparisons of older computer users in different cultures may help us gain a better understanding of this.

Aging and Performance. Studies have yet to address the particular effect of aging on performance while accounting for all other variables. We need to partial out and identify correlates of performance (novice versus cognitive decline perspectives on aging and computer use) and learn more about the heterogeneity characteristic of older adults.

Next Generation Interfaces. Much research is devoted to exploring next generation interfaces (NGI) with features such as multimodal input, 3-D displays, and intelligent agents. Will such interfaces work for older adults? What are the next generation interfaces for seniors?

Aging In-place. How can computing technology help seniors live in their homes as long as possible. We need to do long-term monitoring of physiological and psychological behaviors to learn how technology can help sustain an autonomous living environment and improve quality of life.

Technology Cost vs. Long-term Benefits. We need to do a cost/benefit analysis that looks at the cost of technology in comparison to its long-term benefits (e.g., allowing our elders to age in place). We should monitor how much money is spent on health care and attempt to capture changes in well being as well.

Computers and Isolation. We need a better understanding of the effects of computer technology on social integration. Can computers provide a meaningful social outlet for seniors or do they simply increase feelings of loneliness and isolation?

Translating Research on Training into Curricula. Several projects presented at Senior CHI looked at training for seniors. Can we translate these materials from small-scale research programs into a generalized manual for people doing the training?

Understanding Perceptual Declines. What are the causes and impacts of perceptual declines? We might use a systems approach to help understand the causes and psychological effects of these perceptual declines. Finally, the use of virtual reality might prove to be a useful method to realistically simulate aging.

Conclusion

The unavoidable reality is that populations across the world are getting older. Fully 2/3 of all the people who have ever been 65 years of age are alive today [2].

From ATMs to health insurance systems, technology has already had an impact on the everyday lives of older adults. We need to be able to leverage our knowledge of seniors and technology to improve the quality of life, enhance work, home and social interactions, and help to maintain autonomy.

However, what it means to age in terms of physical and cognitive changes and how these changes effect behavior are open issues. In addition, we are still working to understand how to best serve the needs of the population as it grows older.

As we design, it is important to remember that there is no one "senior" profile. Older adults cover a broad range of cognitive and physical abilities since aging effects everyone differently. Ultimately, in order to design software that is usable by all, we must strive to understand the special needs of many different types of seniors.

A number of existing groups address various issues related to designing technology for the elderly. However, we feel that the importance of this topic requires a more organized

effort. We hope the CHI community can play a significant role in bringing all the available resources to bear on the research issues discussed here.

References

1. U.S. Bureau of the Census. 1996. 65+ in the United States. Current Population Reports, Special Studies. 123-190. Washington, D.C.: U.S. URL <http://www.aoa.dhhs.gov/aoa/stats/growthchart97.gif>
2. Andrews, Gary. "An aging world in a new millennium." Invited address, Morton Plant Mease Health Care, Clearwater, FL 33756, March 8, 1999.
3. Morris, D. C. (1996). Ownership, use and non-use of personal computers by older adults. *Journal of Educational Technology Systems*, 25, 5-12.
4. Craik, F. I. M., and Salthouse, T. A. (1992). *The Handbook of Aging and Cognition*. Hillsdale, NJ: Erlbaum.
5. Schaie, K. W. (1996). Intellectual development in adulthood. In J. E. Birren and K. W. Schaie (Eds). *Handbook of the psychology of aging* (pp.266-286). NY: Academic Press.

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