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OLDER PEOPLE AND INFORMATION TECHNOLOGY ARE IDEAL PARTNERS

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ABSTRACT
The population trend in Japan, the UK and worldwide is shifting the balance towards a predominantly older population. The current generation of older people has not achieved a familiarity with computer and information technology through their work and leisure. Information technology, however, offers older people an opportunity to participate more fully as citizens and to have a more satisfying social and leisure life. It has not proved to be true that older people reject computer technology. It is possible for them to learn to use it given suitable training methods and attention to improved access for them. This opens up enormous possibilities for them in terms of communication, entertainment, and support for declining functions. The social, political, and economic implications of this will be considerable.

KEYWORDS:
Information technology; aging; human-computer interaction

INTRODUCTION

The trends in population age profiles in Japan, the UK, and most of the world are consistent. We are becoming an older world.

Taking the UK as an example, out of a population of about 60 million :

In 1995 there were 2.3 million people aged over 80
by 2020 there will be 3 million
by 2030 there will be 4 million
by 2040 there will be 4.8 million
by 2050 there will be 5.5 million people aged over 80 -- over 2 million of them will be living alone
(UK Office of National Statistics, 2000)

Important dates which are approaching fast in the UK :

By 2008 - the number of pensioners will overtake the number of children
By 2016 - an additional 1 million people over 65 will be living alone
By 2030 - the UK will have 36,000 people over the age of 100 (compared with 300 in 1951)
By 2040 - there will be only two people of working age contributing taxes to support each pensioner
(Contact the Elderly, 2002)

This population shift will have profound effects on the economy, and on family and social life. It does not seem possible, and it is certainly not desirable, that this growing population of older people will be withdrawn from active participation in social and economic activity.

HOW I.T. CAN HELP OLDER PEOPLE TO LIVE A FULLER LIFE

Information technology (IT) has the potential to play a major role in assisting older people to take part more fully in life. What this technology does very well is to transform very small physical movements into powerful effects. It acts as an amplifier of human abilities. A robot can amplify human physical abilities, and information technology can amplify our ability to communicate and create.

IT has already demonstrated its capacity to transform the human activities of communication, entertainment, and shopping. Thus far, it has primarily been younger people who have benefited from this. An increasing number of older people are learning how to make use of IT to accomplish these aims, and with properly designed systems and good training and support, many more could participate. Keeping in regular touch with friends and family, shopping from home, and accessing high quality entertainment are all goals which older people are likely to want to achieve. When good ways are found to make these services easily and acceptably available to older people a big new market for them will be opened up.

There are clearly a number of special ways in which IT could be developed which would be of great benefit now to older people.

Communication and social connectivity

With the breaking up of extended family networks which live physically close to each other, loneliness and social isolation are increasing problems faced by many older people and their families. Current technology such as email and video-telephony can help to bridge this communication gap. The development of more ambitious forms of communication and contact at a distance will further help to keep older people in touch with families and friends.

Access to information and services

Being able to shop and access services from home is clearly an advantage for people who have difficulty getting out. If such services are to be in general use by older people they will have to be made easy to use by a generation who have not been brought up with computers. With such a widening of their functionality, a large new market could open up for providers of goods and services.

Promoting lifelong learning

The development of computer-delivered education and training could benefit older people who desire to keep their minds active. In addition to the direct educational benefit and enjoyment, taking on new learning challenges is believed to be one way of keeping mental faculties preserved.

Telecare and telemedicine

The increasing cost of medical care for a population which is growing older is an important concern. It is possible that providing remote access to a range of services could help to alleviate this problem, and could play a part in encouraging a self-help approach to keeping healthy.

Remaining economically active and productive

An economic concern about the aging population is that a large number of retired people must be supported by a shrinking number of working taxpayers. One solution for this is to allow and encourage people to remain economically active beyond the usual retirement age. IT offers possibilities for older people to accomplish this more easily, through opening up new information-handling job opportunities and allowing people to work from home.

PROBLEMS OLDER PEOPLE CAN HAVE WITH I.T.

If the potential for IT to transform the lives of older people is to be realised, then ways must be found to make this technology appropriate, usable, and attractive to older people. When the current

generation of young people grows older, they will have a set of skills and experiences in using this technology, and a familiarity with it as an everyday part of their lives. The current generation of older people, however, will need help in making use of IT. It does seem that there is no evidence that older people are particularly unable to master the technology, given help. It has been found that older people are willing and able to use computers in various contexts but they consistently have more difficulty than younger users (Czaja, 1996).

We have been working regularly with older people who are learning about IT, both in practical instruction settings, and in focus groups. What we have found echoes what many other researchers are saying about the barriers that older people need to overcome to make good use of the new technologies. By far the biggest problem is lack of confidence. Many if not most older people encountering IT for the first time believe that it will all be far too difficult for them to make sense of at their age. This belief is reinforced by the attitude of many younger people. Negative stereotyping of elderly people can have a serious effect on those who are being stereotyped as well as the rest of us (Hausdorff, Levy and Wei, 1999). However, we have found, as have others, that once confidence levels are built up, that rapid progress can be made.

One feature of computer applications that older people often find difficult to master is the large number of details that must be remembered in order to accomplish tasks,. Each detail is small in itself, but all must be learned in order to make use of the software. Once this is pointed out to them, and their confidence established, they can then use strategies to master the software, such as having reminder sheets by the keyboard or making good use of online help facilities.

Another difficulty is knowing how to move confidently from switching the computer on to making use of the wanted application. Again, instilling confidence is an important factor here, as is a chance to confidently repeat the process of navigating from switching on, through the operating system procedures, to launching the desired application.

A physical skill that most older people find very difficult at first is using the computer mouse. Many report that this problem alone has meant they have abandoned attempts to do classes in introductory computing, since they care embarrassed at their slowness in acquiring this minor but important physical skill. We have found that 1-2 hours of practice with the mouse usually solves this problem, but this must be done before any real applications involving using the mouse are attempted, or confidence will suffer.

Peer support in learning is a well-established general principle and it is particularly important for older people learning about computing. Being taught, coached, or supported by another older person avoids the embarrassment the learner might feel with a younger person who knows all about the technology and who the older person might worry is becoming impatent with them. Also having an older person as a teacher provides a constant role model, and proof that the technology can in fact be mastered by someone who is no longer young.

The problem of difficulty in coping with the large amount of detail which older users report when trying to learn IT skills can be alleviated by providing regular sessions of training and support in an informal way, where learners are not embarrassed about asking for help repeatedly about the same thing. One project we are assisting with is a cybercafe specifically for older computer learners. Here older people who have just mastered a new skill can share it immediately with even newer learners. There is no worry about needing regular repetition and reassurance about the details of the software being learned.

APPLICATIONS CURRENTLY BEING USED

Despite some initial difficulties in learning how to use IT, many older people are beginning to enjoy the benefits that communication and information technology can offer them. As with most people who begin to make use of this technology, a primary interest is in using email to keep in touch with family and friends. Using the internet to investigate and book holidays is another popular application.

In the US the top internet activities of people over 55 are :

Email with family and friends	72%
Researching a particular topic or issue	59%
Accessing news and current events	53%
Vacation planning and travel arrangements	47%
Getting local / regional weather information	43%

(SeniorNet Report, 1998)

In the UK it is still the case that most users of the internet are younger. The current figures for internet usage by age group are :

Internet usage in UK by age :

16-24	87%
25-44	69%
45-54	58%
55-64	37%
65+	11%

The UK online population currently stands at about 13 million.

(WHICH, 2001)

However computer use by older people is growing. A number of organisations devoted to helping older people make use of the internet and new technology have developed recently. Probably the largest and best established is SeniorNet, based in the US (www.seniornet.org). At the present it is estimated that, out of a total UK population of 60 million, 4 million older people in UK have computers, and another 600,000 make use of them in libraries, colleges, and other public facilities. Whereas more young men than young women use the internet regularly, this pattern is reversed with older users, with about twice as many women as men being online

FUTURE POSSIBILITIES

Looking beyond simply satisfying daily needs, a number of commentators have put forward the view that with advances in medicine and health creating a large and relatively healthy old age population, the very notion of what old age is about is being transformed. Far from being a time of universal decline, they argue that the weakening of physical faculties is compensated for by an increase in holistic judgment, based on a lifetime of experience, and a release of creative abilities and energies, based on a loosening of inhibition and restraint produced by being tied to daily work and family responsibilities (Cohen, 2001; Friedan 1994).

Hokusai, the remarkable Japanese printmaker, lived to an old age, and continued to produce innovative and astonishingly beautiful work as he got older. Perhaps his most famous work outside Japan is *Thirty-six Views of Fuji*, which you can now find all over the world in reproduction, even on teatowels and coffee mugs! Hokusai produced this magnificent and ambitious set of prints at the age of 70. At the age of 75 he produced a subsequent work, the *Hundred Views of Fuji*, which has been described as having an ‘amazing wealth of invention’ (von Seidlitz, 1910). At this time he returned with fresh vigour to book illustration, to which he had made major contributions throughout his life.

In his 70's he produced a large amount of energetic and wonderful work, including a beautifully printed set of erotic illustrations. Interestingly, Picasso, another artist who continued to produce innovative and energetic work throughout old age, at the age of 86 produced a remarkable series of etchings containing a group of images of lovemaking, infused with sexual passion and a wild sense of humour.

Even if we take a more conservative view of possible futures for older people, it is clear that well designed communication and information technology systems have a great potential to enhance the quality of life and independence of elderly people within the community by:

- Providing communications infrastructures which could substantially reduce social isolation
- Allowing them to retain a high level of independence and control over their lives
- Keeping them intellectually and physically active for much longer, and
- Providing appropriate levels of monitoring and supervision of "at risk" people, without compromising their privacy

Centres of excellence in developing this technology are being established by a number of research groups throughout the world. In Scotland we are planning to establish, at Dundee University, The Queen Mother Research Centre, which will :

- Become a focus for research in the use of information technology to assist older people, and to facilitate a significant and continuing increase in research in this area in the UK and Europe
- Provide a world-wide information service to researchers working in this field, and training opportunities for researchers wishing to move into this field
- Extend the "inclusive design" concept through innovative research and development into how all information technology products can be designed so that they can be used by everyone including older people, and those with disabilities.

The Queen Mother Research Centre will take forward two important new ideas which our group has proposed to guide the development of improved IT systems for everyone : designing for the dynamic diversity of users, and designing for extra-ordinary people in order to help all of us.

Systems and interfaces should be designed from the beginning with the aim of being usable by people with a large range of functionality, and that it should be possible for these interfaces to change automatically, or be changed, gradually as the functionality of the individual user changes. For example, as people grow older their visual capabilities reduce. Interfaces should thus provide an easy and progressive way of increasing font size without the necessity to make radical changes to the interfaces (Newell and Gregor, 2000) Similar considerations apply to memory capabilities of users. Experiments with older people have shown that the concept of a dynamic system allows poor memory levels and lack of confidence to be factored into the design of a product effectively and efficiently (Gregor, Newell, Zajicek, 2002).

The vast majority of people have some functionality which is significantly less than the norm, and most people go through phases were they are temporarily disabled either by accident, alcohol, drugs, fatigue, or stress. People can also be handicapped by their environment. An extreme example of this is a soldier on a battlefield who may be blinded by gun smoke, deafened by gunfire, mobility-impaired because of the terrain, dexterously impaired because of protective clothing, and cognitively impaired due to high stress. This also applies to pilots of high-performance aircraft. A person in a high-workload environment, and a disabled person trying to do an ordinary job, can both be constrained by the low bandwidth between the operator and the computer. The pilot of a high-performance aircraft may not be able to see and hear enough information, nor be able to move the controls as fast as necessary to fly the aircraft really well. This is the same problem faced by an elderly or impaired

person who may find it difficult to see enough of a word-processor file or be unable to operate the keys fast enough to do an effective and efficient job.

The concept of ordinary and extra-ordinary human computer interaction, is that of a continuum of human functionality, with everyone having a mix of ordinary and extra-ordinary functionalities at any one time. This mix of abilities changes with time, both in the long term and the short term, and due to environment. Extra-ordinary (*disabled)* people operating in ordinary environments, pose similar problems to able-bodied (*ordinary*) people operating in extra-ordinary (*high workload, environmentally unfriendly)* situations (Newell, 1995).

Examining the extremes of human computer interaction, such as elderly users or users with disabilities, can tell us a great deal about design generally, and informing designers that some of their users may be disabled encourages user-centred design because the designers then become aware that the users may be very dissimilar to themselves.

CONCLUSION

Current and emerging technology has a great potential to assist older people to participate more in social and economic life. Older people can learn to use new technology, given sensitive and effective teaching and support. New developments in this technology offer the possibility of considerably enhancing the lives of older people, in terms of productivity, communication, and support. In realising these possibilities, attention paid to developing technology specifically for older people will not only bring social and economic dividends in itself, but will help in the design of technology which is more accessible for all of us.

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