

3. e-Accessibility becomes specially important in some emerging areas such as, (a) cognitive impairments due to its significance for elderly people, (b) systems to consider the growing number of informal carers, (c) systems to address the real issues of hearing impairment, (d) Tracing/tracking of people mainly with mental disabilities and (e) enabling the full use of mobile telecommunication systems.

However, discussion on the final form of the 6th framework is ongoing. Only at the beginning of 2002, it will be fully clear where gerontechnology can be positioned in this program. Differently from the past, the various Directorate-Generals will have the opportunity to themselves initiating research

themes during the period covered by the program, thus addressing newly emerging issues immediately.

References

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Gerontechnology workshop in Japan

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H. Bouma, K. Sagawa, Gerontechnology workshop in Japan, Gerontechnology, 2001; 1(1): 70 - 72. Report on an international workshop Gerontechnology, as held in Tsukuba, Japan, March 2001. The workshop reflects the growing awareness in Japan that technology can contribute toward solving problems related to the aging society. Focus is on technological challenges resulting from aging human perceptual, cognitive, and motor faculties. Remarkable implementations from Japan include efforts by the broadcasting organization NHK to provide all older customers with optimum listening and viewing conditions, and an extensive lifelong-housing program by Seksui. Apart from products and services, a suitable encompassing technological environment is proposed for answering needs of the aging society.

Key words: aging, gerontechnology, Japan, technological environment

INTRODUCTION

Supported by Japanese ministerial bodies, the National Institute of Bioscience and Human

Technology NIBH organized an international workshop on Gerontechnology in Tsukuba, March 13-16, 2001. 26 Invited speakers

from Japan and abroad presented papers and 20 posters were shown. Focus was on the aging of perceptual, cognitive, and motor faculties in relationship with technological options for older people.

In Japan the proportion of older people rises relatively fast. Programs by public and commercial bodies should keep the older people integrated in their society that changes fast from technological innovations and mass distributions. The workshop should help lay out the scientific basis.

Ambitions and needs of older people are at the heart of gerontechnology; these are usually expressed in terms of health, social and financial independence, and relations with relatives, friends, and colleagues. Self-esteem and peer-esteem were proposed additionally by Dr Sadao Sugiyama (University of Hawaii). Translations are needed in terms of human concerns that can be supported by technology: private/public health, living/housing, mobility/transport, communication/information, and work/voluntary work/hobbies. Dr Don G. Bouwhuis et al. (Eindhoven University of Technology) discussed the concept of temporal discounting, in that the subjective value of future rewards decreases with increasing time delay. This relates to efforts older people are willing to invest now for benefits of new technology in the future.

COMPENSATION AND CARE SUPPORT

Care support and compensation for decreasing perceptual, cognitive, and motor faculties are a gerontechnological stronghold in Japan. Two impressive examples: Dr Yoshiaki Goto (Lifelong housing R&D Institute, Seksui Housing Cy) discussed the design of houses suited for lifelong adaptations, already implemented widely without extra costs; Dr Eiichi Miyasaki (NHK Science and Technical Research Laboratories) presented technology for the on-line slowing of speech, maintaining high speech quality, thus advancing listening comfort and recognition, and technol-

ogy for the on-line translation of ongoing speech into text captions. Dr Brian C.J. Moore (University of Cambridge) showed how knowledge on the physiology and pathology of hearing is being translated into sophisticated hearing aids: an excellent methodological example for gerontechnology.

PREVENTION:

Central role of the cardio-vascular system

But technology can do more. Timely measures may prevent or postpone the need for compensation. Dr Wojtek Chodzko-Zajko (University of Illinois at Urbana-Champaign) discussed the central role in prevention of the cardio-vascular system. This can be kept in shape by daily physical exercise and proper nutrition. However, many people remain below norm values. Temporal discounting is part of the problem. Dr Jim L. Fozard (Florida Gerontological Research and Training Services) derived from longitudinal studies that a poor cardio-vascular condition is predictive of future difficulties in hearing and in vision as well. This is a strong reason for daily physical exercise, either with or without sophisticated training technology, and monitoring sensors for heart rate and energy expenditure.

The normal aging of human functions is needed for assessing functional restrictions. Here, Japan is ahead of many countries. Dr Matsutaro Yoshioka et al. (Research Institute Human Engineering for Quality of Life HQL) presented part of his database; colleagues at NIBH are gathering precise psychophysical data on aging vision and hearing, also used for recommendations on Japanese Industrial Standards. Also the National Institute for Longevity studies at Nagoya collects databases from longitudinal studies. Two examples: a sound level meter based upon hearing data from aging people (Kenji Kurakata et al.), and colour perception that shows only age effects from the yellowing of the eye lens on short wavelength perception (blue) (Ken Sagawa et al.).

An interesting poster by Dr Yuki Akizuki and

Dr Youko Inoue (Nara Women's University) calculated required illumination levels from normalized visual acuity. On scotopic vision, Dr John Werner (Univ. of California, Davis) showed impressive data on the slowing of dark adaptation and the decrease of sensitivity with increasing age. These still await translation into levels and transitions for road illumination, both in daytime in tunnels and at night. Dr Munehira Akita (Nihon Fukushi University) had used visual data for improving the legibility of road signs.

Aging of the thermal sense was also covered. Dr George Havenith (Loughborough University) discussed thermal stress in aging people, for example when changing from cold to hot environments or vice versa. Both climate variables and cultural habits appear relevant. While extreme transitions and temperatures should be avoided, the body must remain used to changing thermal circumstances. Again, the cardio-vascular system plays a crucial part. Dr Yoshimitsu Inoue (Osaka International University for Women) discussed optimal thermal clothing and Dr Kazuyo Tsukuzi (NIBH) thermal comfort. New adaptive materials could perhaps be developed that improve thermal comfort and humidity regulation.

Design

The gradual decrease of human faculties occurs life-long, starting at young age. Restrictions become noticeable when environmental demands exceed remaining function levels. So the necessity of reading glasses at age 45, where eye accommodation amplitude has been diminishing from age 15. The message: diminish environmental demands. Information ergonomics tries precisely that: design user interfaces such that reliance on well-trained perceptual, cognitive, and motor functions is optimal, whereas weakening functions such as working memory are supported by proper feedback and feed-forward.

This ideal is still far from realization. Dr Neil Charness et al. (Florida State University) showed that principles for calculating task duration are rather well understood, but the unavoidable errors make these insufficient for proper design. There are recent indications of generation effects next to age effects: user interface procedures learned in the formative years (before age 25 or so) tend to persist. People that experienced electro-mechanical user interfaces during adolescence persist in a reflective, non-exploring attitude with present software interfaces (Docampo Rama et al, this issue). Dr Lorna Middendorf (Alloran Inc, Michigan) took on the concept of universal design, sometimes called inclusive design. Dr Hajime Ogi (NIBH) presented research on a matching evaluation program.

ENHANCEMENT

Enhancement of life's opportunities at old age is another aim of gerontechnology. Internet may provide many opportunities once user interface problems have been solved. Dr Fozard pointed to the extended opportunities for artistic expression; Dr Chodzko-Zaiko mentioned aerobic dancing and exercise games. There are also opportunities for an increased role in society and for new human networks.

CONCLUSION:

Shaping the daily environment

Finally, it was advocated that the whole daily environment awaits improvement, not just products and services. For example, in public places noises and deliberate sounds hamper speech communication for older persons; similar for background sounds on television. Gerontechnology then could move from compensation toward prevention and further toward enhancement.

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