

Designing for Accessibility: HFES Standardization Activities

By Daryle Gardner-Bonneau

Although human factors professionals have been involved in usability work for many years, their interest in accessibility has been relatively recent. Legislation such as the Americans with Disabilities Act, Section 508 of the Rehabilitation Act, and Section 255 of the Telecommunications Act has highlighted the need for products, services, and systems to be not only usable but accessible. In the United States, we tend to interpret accessibility narrowly in terms of disability, whereas accessibility is much more broadly defined internationally.

In countries like Japan, for example, the focus on accessibility has been driven just as much – if not more – by the accelerated graying of the population. In 2003, 19% of Japan's population was over the age of 65; by 2015, it is expected that 26% will be over age 65. Contrast this with the U.S. numbers: 12% of the population over the age of 65 now, versus an expected 20% by the year 2030.

Older adults have many difficulties using mainstream products and services that have often been designed based on data and/or usability testing results from populations in which the elderly were minimally represented, if represented at all. Nichols, Rogers, and Fisk (2003) discussed this problem and argued that empirical human factors papers should be required to provide significant data about the age distribution of their subject populations, so that someone designing for the elderly can determine the applicability of the data to older adults. Thus, accessibility is not a matter of designing for a relatively small population of exceptional users classified into narrow disability categories; it is a matter of designing to meet the needs of the broadest possible range of expected users of a product, service, or system.

Clearly, there is a need for ergonomics standards that address accessibility. The number of standards efforts in this area has skyrocketed within the past 10 years, so much so that the International Standards Organization (ISO) and the International Electrotechnical Commission established a joint working group on accessibility to catalogue the efforts and also to assess, if not ensure, the quality of the results.

HFES members are involved in a number of these standardization efforts, both nationally and internationally. In the remainder of this article, I describe some of these efforts and their current status.

Accessibility Work in HFES 200

The HFES 200 Committee has been involved in the large-scale development of a five-part standard on software user interface design, two parts of which address the issue of accessibility.

HFES 200.2 is dedicated to software accessibility and is the U.S. counterpart to an ISO standards effort (ISO 9241-171). This standard provides accessibility provisions for desktop software as well as software residing on mainframes and embedded in closed systems. HFES 200.4 concerns the user interface design of interac-

tive voice response (IVR) systems and has incorporated a number of accessibility provisions particularly relevant to making IVR systems accessible to the population of users who must access an IVR via a text telephone, as well as provisions that would help to meet the needs of older adults.

The HFES 200 Committee previously released some parts of the standard as ANSI Draft Standards for Trial Use and is in the process of preparing a draft that will be balloted as per the ANSI canvass process within the next few months. Those interested in reviewing or commenting on this draft standard during the public comment period should contact HFES.

Accessibility of Medical Instrumentation

A number of HFES members are involved in the design of medical equipment and systems and are participating in the Human Engineering Committee of the Association for the Advancement of Medical Instrumentation (AAMI). This committee is developing a human factors standard on medical equipment design (ANSI/AAMI HE-75).

To date, the work of this committee has not addressed accessibility to a great extent, except in areas such as anthropometry and biomechanics and, to a lesser extent, home health care. That may soon change. In October, the Rehabilitation Engineering Research Center (RERC) on Accessible Medical Instrumentation (AMI), sponsored by the National Institute on Disabilities and Rehabilitation Research (NIDRR), held a workshop to highlight accessibility issues and needs with regard to the design of medical instrumentation. A number of human factors professionals attended this workshop, including members of the AAMI Human Engineering Committee. In addition, a number of personnel from the RERC-AMI have joined the AAMI committee.

Human factors professionals working in the medical field are aware of the usability problems with devices such as infusion pumps, glucometers, and the like, but the workshop highlighted the fact that the accessibility problems cited most frequently by patients relate to hospital beds and dental and medical examination tables and chairs. It is hoped that the workshop will serve as a catalyst for incorporating accessibility guidance into the AAMI standard.

International Standards Efforts in Accessibility

It would be impossible to outline all the international accessibility standardization efforts that are occurring within ISO, the International Telecommunications Union (ITU), and other standardization bodies in this brief article, but they encompass virtually all products, services, and systems, including telephones and telecommunications services, software, and consumer products. In the following sections I discuss some of efforts ongoing in ISO Technical Committee 159 – Ergonomics, in which the United States is participating and which has made the commitment to address accessibility in the standards it produces. HFES members can be proud of its participation in these efforts, through the generous support of the HFES Institute.

ISO TC159 SC4 WG5. Significant accessibility-related work is taking place in ISO TC159 SC4 WG5, a subcommittee in which

the standardization efforts focus on software user interfaces. At present, the most developed document is ISO 9241-171 (mentioned previously), which focuses on software accessibility. Several U.S. experts have contributed greatly to this effort, and international representation on the committee is significant and active. Several drafts of ISO 9241-171 have been produced and reviewed, and the U.S. participants have worked many hours to ensure that the U.S. version of the document (HFES 200.2) harmonizes with the international version. It is anticipated that ISO 9241-171 will be balloted as a Draft International Standard in spring 2006.

A second working document in this committee is ISO 9241-151, focusing on World Wide Web user interfaces. The release of this document has been delayed, partly because the drafts produced have not yet sufficiently addressed the issue of accessibility. The reluctance of the committee to release this document attests to the importance that WG5 (and TC159, generally) are placing on accessibility.

ISO TC159 WG2. Because of TC 159's commitment to incorporating accessibility in all its standards, Working Group 2 was established directly under the Technical Committee itself. ISO TC159 WG2 is working on a draft technical report with an ambitious goal: to provide relevant ergonomics data and general principles to be considered in the design of any product, service, or system so that it will be accessible to people with special needs, including the elderly.

The basis for work in WG2 is ISO Guide 71 – *Guidelines for Standards Developers to Address the Needs of Older Persons and Persons with Disabilities*. This document provides a framework for standards developers to use in ensuring that design standards promote the accessibility of products, services, and systems. It largely consists of tables that lay out the ergonomic factors relevant to four broadly defined categories of human abilities (sensory, physical, cognitive, and allergy) for each of seven aspects of design typically covered in standards (e.g., packaging, materials, user interface, maintenance). The task of WG2, using ISO Guide 71 as the structural framework, is to fill in the cells of these tables with relevant ergonomic data and design principles.

The working group is divided into four subcommittees, each representing a human abilities category. The United States is leading the subcommittee on cognitive abilities, perhaps the most challenging area in which to provide accessibility guidance because of limited (and scattered) data and design expertise related to design of systems for people with cognitive limitations. Progress is being made, however, largely based on the research literature related to cognitive performance and the elderly.

In addition, the subcommittee chair (Daryle Gardner-Bonneau) has been collaborating with personnel on several NIDRR-funded projects related to the design of consumer products like PDAs and smart phones to meet the needs of people with cognitive disabilities, to develop relevant guidance for the cognitive section of the WG2 document. Somewhat surprisingly, the design recommendations emerging from these NIDRR-funded projects, which focus on designing for people with traumatic brain injury, mental retardation, and other cognitive disabilities, are largely consistent

with many of the recommendations in the human factors literature for designing for older adults. The overlap, which was much greater than expected, may assist in developing formal design guidance in this area.

Given the size of its task, WG2 is sorely in need of additional participation, both from the United States and other countries. In particular, expertise is needed in the cognitive area to synthesize the data from multiple, disparate sources to provide useful guidance. WG2 plans to release its first draft in late spring 2006. However, it is anticipated that significant work to further develop and refine the document will continue beyond that point. Anyone interested in becoming involved in this work should contact Daryle Gardner-Bonneau (jdnbonneau@cs.com).

What the Future Holds

There is no doubt that accessibility is a hot topic, standardization-wise, at the moment. For many countries in Europe, standards are being developed with the goal of driving legislation (which the United States already has). In Japan, one major goal is to manage the design problems that have arisen in a population that is aging at an accelerated rate.

Although the graying of America is occurring at a somewhat slower pace, it *is* occurring, and the United States will eventually face what Japan is dealing with now. As they age, vocal American baby boomers will become a powerful voice, insisting that products, services, and systems be accessible, given the age-related disabilities that nearly all of us eventually experience – the arthritis, the bifocals, the cognitive slowing. When one considers that much of the human performance data that currently guides design were acquired from subject pools that included few older adults – and even fewer people with specific disabilities – there is ample reason to revisit those data to determine whether they still apply and to acquire additional data, as necessary, to ensure that products, services, and systems will truly accommodate the full range of expected users.

References

- International Standards Organization (ISO). (2001). *ISO Guide 71: Guidelines for standards developers to address the need of older persons and persons with disabilities*. Geneva: Author.
- Nichols, T. A., Rogers, W. A., & Fisk, A. D. (2003). Do you know how old your participants are? Recognizing the importance of participant age classifications. *Ergonomics in Design*, 11(3), 22–26.

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Human Factors Standards: Still Time to Get Involved

By Alan Poston

Recently, the Executive Council reaffirmed the importance of HFES participation in standards development as a vital component in meeting the Society's strategic goals as well as bridging

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