Including Cognitive Disabilities in International Standards

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Abstract

This paper speaks to the issue of international perspectives and approaches to developing technologies, and in particular software, that can be used by persons with cognitive disabilities. It explores the role of international standards in software accessibility and the degree to which they address the needs of users with cognitive disabilities.

Keywords

Accessibility, cognitive impairment, disability, ISO

ACM Classification Keywords

K.1 [Standards]

Introduction

Over the past decade there has been increasing interest in ensuring people with disabilities have access to new technologies, in particular personal computers. Internationally, this has been marked by a dramatic increase in the past five years in the development of International Standards that support accessibility features in technology. The year 2006 will see the publication of a new draft international standard for software accessibility, ISO 9241-171 [5].

Unfortunately, other than an increased awareness that users may experience "disability" due to the limitations of the environment, much of this effort has been

traditionally directed to the more "stereotypical" user groups: the deaf / hard of hearing, persons who are blind / low vision, and persons who experience various mobility challenges. These areas of research tend to be very well known with a large body of established best practice guidance. In comparison, the needs of persons with cognitive disabilities have hardly been addressed.

Why Cognitive Disabilities are not well addressed in International Standards

ISO/IEC Guide 71 is designed to assist standards developers to ensure consideration of the needs of persons who experience disability, and include guidance that support the needs of persons who experience disability. Guide 71 contains discussion specific to the needs of persons with cognitive disabilities. It outlines specific design considerations to address users' cognitive abilities in standards development: intellect, memory, and language/literacy [6]. Standards such as ISO 9241-171 claim to follow Guide 71, yet it lacks guidelines dealing with these design considerations.

The ISO JTC1 Special Working Group on Accessibility (SWG-A) has recently begun efforts to develop a framework that identifies the needs of users with disabilities as they relate to accessibility of information and communication (and related technologies). Their "User Needs Summary" [4] considers the task requirements and needs of users across several dimensions: perceiving information, product operation, understanding of product use, and ability to use one's own assistive technologies. This summary is intended to be used as a metric for identifying gaps in existing standards coverage across product domains. All 16 of the identified "needs" discuss how they relate to users with sensory and physical disabilities, but only 11 discuss how they relate to users with cognitive disabilities. Where provided, discussion of cognitive disabilities is brief and does not deal with the whole range of cognitive disabilities.

One reason users with cognitive disabilities are included only in a limited manner is the broad definition of the term "cognitive disability". There is a very wide range of users who fit this class of disability with a wide range of causes including: brain injuries, genetic disorders, and some types of mental illnesses. It is important to recognize that these labels do not reflect specific cognitive conditions, but *sets* of cognitive conditions.

Identifying the needs of such a broad group of users would appear to be a daunting challenge. This challenge may be managed through the use of relevant models or frameworks of user-system interactions.

The Universal Access Reference Model (UARM) [1], originally developed to evaluate the content of ISO TS 16071 [3] (the precursor document to ISO 9241-171), provides an approach to the identification of user needs. The UARM focuses on the user's abilities and addresses the role(s) played by assistive technologies, task context, and environment. The UARM defines accessibility in terms of parings of user and system abilities (including cognitive conditions) that are connected by communication channels. Abilities required by the system which the user does not have are barriers to system accessibility. Accessibility can be improved by transforming the abilities required of the user to meet the abilities possessed by the user. This approach deals with meeting the needs of cognitive conditions which may result from various forms of cognitive disabilities.

A good taxonomy is needed that maps different cognitive disabilities to individual cognitive conditions, which can then be addressed by prescriptive guidelines. Such guidance can then be collected into International Standards as recommendations for universal usability. Guidelines based on abilities (including cognitive conditions) have broader impact, can benefit multiple groups of users, and are easier to construct.

Existing Coverage

Since there exists little understanding of how to help users with cognitive disabilities, experts in the field of software accessibility have proposed only a few guidelines for software standards. Of its 130+ guidelines, ISO 9241-171 has only *four* guidelines that are specifically directed to the support of persons with cognitive disabilities. These guidelines are mostly targeted to users experiencing memory deficits.

Some other guidelines in ISO 9241-171 can directly impact persons with cognitive disabilities simply due to similar needs with other forms of disabilities. For example, users with dyslexia may benefit from guidance regarding text-to-speech systems in the same manner as users who are blind. Users with language disorders may benefit from guidance for clear and simple language in documentation, software notification, and object labels originally intended to support users with limited literacy or using software written in a second or other language [5].

The Web Content Accessibility Guidelines (WCAG) also contains very limited guidance to support users with cognitive disabilities [2]. Checkpoint 14.2 provides general guidance suggesting the supplementing of text with images and audio to help make pages more comprehensible.

Why Cognitive Disabilities should be included in International Standards

Developers may not often access research in accessible computing as part of their "job". However, it is often part of the job of a developer to comply with applicable International Standards and/or legal requirements. (In some countries an International Standard *is* the legal requirement.) When used, International Standards can provide developers with a resource that condenses established research and best practices in a way that is accessible to them. In particular, since such standards are often translated by national bodies, expertise that is widely available in specific languages becomes more accessible to developers who use other languages.

Users with cognitive disabilities could benefit from inclusion of their needs within International Standards both through increased visibility and awareness of the issues, and through specific design guidance. Even though standards compliance is usually voluntary, standards guidelines can become a tool that can be used to advocate for change since the existence of applicable standards does not allow developers to claim that they do not know how to help.

Questions to address in the workshop

There are several questions that the *Designing Technology for People with Cognitive Impairments* workshop might be able to address. The questions that this author would most like to be answered are:
1. Is there a common framework / taxonomy of users' cognitive needs / conditions that can be used to structure guidance intended to meet these needs /

conditions?

2. Are there any guidelines and best practices that are well accepted by the research community and/or consumers with cognitive disabilities that can be adapted into international standards guidance?

Conclusion

Generating interest in contributing to international standards is a perennial problem throughout the HCI and ergonomics community. Subject matter areas with limited available expertise, such as technology access for people with cognitive disabilities, are either overlooked or badly serviced by less knowledgeable experts.

It is this author's opinion that the needs of people with cognitive disabilities need to be addressed in technology standards. While, it may be that our knowledge of their needs is currently immature, it is hoped that through discussion within this workshop and future discussions to follow, that a body of knowledge can be collected into a central document such as a relevant International Standard.

Biographical Sketch

David Fourney is a researcher with USERLab (the Usability Engineering Research Lab) of the Department of Computer Science at the University of Saskatchewan. As a hard of hearing person, he is both a consumer of, and researcher concerned with accessible computing experiences. In International Standards development, he helps bring together current knowledge, research, and best practices to develop guidance that will affect software products worldwide. USERLab is concerned with the intersection of software engineering with human-computer interaction and conducts research in various areas including universal accessibility and the development of software ergonomics standards.

Acknowledgements

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