An Assistive Technology Project for an HCI Course

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ABSTRACT
This presentation describes a project for a standard undergraduate human-computer interaction (HCI) course that incorporates issues related to users who are disabled. It is part of the 2-year project "Integrating Assistive Technology into an Undergraduate Computer Science Curriculum from an HCI Approach," funded by the National Science Foundation.

Categories and Subject Descriptors
H.5.2 [**Information Interfaces and** Presentation]: User Interfaces – *user-centered* design. K.3.2 [**Computers and Society**]: Computer and Information Science Education – *computer science education, curriculum*. K.4.2 [**Computers and Society**]: Social Issues – *handicapped persons/special needs*.

General Terms
Human Factors.

Keywords
Assistive Technology. Disabilities.

1. INTRODUCTION
One of the most common uses of computers today is e-mail. Those of us who have used it regularly for more than a decade largely take its simple functionality for granted today, to the point where we **expect** to be able to get access to our e-mail from wherever we go. We also take for granted the ubiquitous nature of e-mail: it appears to be available for anyone, from anywhere. While this may be true in a technical sense, there are certain groups of users for whom the *usability* of available e-mail systems is of paramount concern, and is largely still lacking.

Any user who cannot manipulate a standard mouse will have difficulty using standard e-mail systems. Those with disabilities who fall into this group include the visually impaired and the motor impaired. Both of these subgroups, as disparate as they are, must rely on the same use of alternative keyboard commands to perform the function of positioning the computer's focus. This can be a rather tedious task, often requiring the user to enter dozens of keystrokes to accomplish. In free e-mail systems such as Hotmail and Yahoo, the number of "tab" keystrokes required to get to a user's mailbox is more than 20. While it is possible to set up macro mechanisms to "skip" these preliminary tab stops, these systems are notorious for changing their interfaces, incorporating pop-ups, inserting ads, etc., all of which require reprogramming the macros each time there is a change (which is frequent).

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2. THE PROJECT
This project asks the students to design a new Web-available e-mail system optimized for users who cannot use a standard mouse. There are a number of objectives for this assignment:

- Identify specific problems of the visually and motor impaired with respect to mouse use
- Identify specific complications of available e-mail systems for such disabled users
- Identify primary and secondary e-mail functionalities
- Specify explicit requirements and guidelines for a "good" e-mail system for disabled users
- Develop a prototype of an e-mail interface that meets the specified requirements and guidelines
- Perform usability tests on the prototype
- Provide evidence of conformance to usability standards such as Bobby or Wave

There are several reasons why this makes a good project in an HCI course (in particular):

- The task is small enough to do in a single semester, especially if teams are used.
- The task is large enough to require significant effort.
- It introduces concerns about a specific user population
- It addresses issues that are likely to be outside the experience of most students, preventing them from relying on just their own internal concept of what "usable" means.
- The student's design can be at least partially tested with real users, whether disabled or not.

The project incorporates several key HCI concepts: task analysis, requirements development, universal design, prototyping, and usability study methods.

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