Chapter XI

Adaptive Technology in a Computing Curriculum

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Abstract

This chapter describes how adaptive technology (AT) for the disabled can enhance a computing curriculum. It argues that computer professionals will naturally have an increasing role in the support of AT, as a result of economic, legal and social pressures, and that as a consequence AT topics should be covered within a standard computing curriculum. Ideas for integrating AT topics into computing courses are presented, along with an outline of an advanced course on AT from a computer science perspective. A model AT laboratory for supporting these efforts is described. The author hopes that this chapter will encourage computing educators to use AT topics as examples within their courses, ultimately leading to a computing workforce that is ready, willing and able to provide fundamental AT services to those with disabilities.

Introduction

The term *diversity* is most often used in relationship to either gender or ethnicity, along with all of the thorny issues of discrimination, imbalanced economics and social conflicts. Computer systems, however, typically work the same regardless of a user's gender or ethnicity. While design bias in a particular system might be shown at times to favor or discourage a particular group, by and large computerized systems are accessible to any user regardless of gender or ethnicity—problems of accessibility tend to be social or economic, not technical.

The same cannot be said, however, for those with disabilities. Basic accessibility, e.g., being able to start a program, issue commands, access media, etc., is a problem with computer systems used by those with disabilities, resulting in a large percentage of the population encountering significant difficulties in using modern technology. This chapter introduces this problem along with curricula aimed at educating future computing professionals on how to develop universally accessible systems. It shows how incorporating systems for the disabled into standard computing degree programs not only serves the need for better accessibility, but also provides interesting applications for computing students that enhance the overall learning experience.

Background

Adaptive technology (AT—also known as *assistive technology*) is computer hardware and/or software used to increase, maintain or improve the functional capabilities of individuals with disabilities. Although AT actually has a much broader definition, including, for instance, mechanical devices such as standard wheelchairs or walkers, foam supports for arranging posture, etc. (Cook & Hussey, 2002), the focus of this chapter is clearly on computerized devices and software.

It doesn't take a very long look at disabilities statistics (Cunningham & Coombs, 1997) to give one pause. Nearly 20% of Americans are disabled, with half that number being classified as "severe." There are some 700,000 newly disabled Americans each year. One of each 100 babies born in this country has a disability. By the year 2030, 26% of Americans will be over age 65, virtually all of whom will be coping with age-related disabilities or

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