8-31-2016

Ethical Inclusion of People with Disabilities through Undergraduate Computing Education

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NSF Award #1540396
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Abstract

The percentage of the worldwide population with some form of disability is rising, and computing technologies, if accessible, could facilitate full participation in society for these users. However, the issue of equal access to technology is rarely included in curricula for computing students. While prior educators have implemented specific interventions to train computing degree students about accessibility, there is a need for a systematic comparison of these methods. Thus, we are empirically investigating the efficacy of various educational interventions for training future computing professionals about inclusive technology development. The goal of this work is to provide evidence of best practices and to share resources necessary to replicate our interventions at other universities.

Prior Work

A 2006 survey of over 200 computer science degree programs in the U.S. found that 55% included an entire course on ethics, including topics of information privacy, intellectual property, unauthorized access, and others. Few included content on making technology accessible for people with disabilities.

- In ACM's model computer science curricula, accessibility is included in the model Human Computer Interaction (HCI) course, but not in the model ethics course.

- In a recent survey of computer ethics courses in the UK and Australia, no coverage of disabilities was found.

When accessibility is taught in university computing programs, it is generally as an elective or part of an HCI course; various methods for teaching accessibility have been published:

- Lectures and homework

- Term projects in teams

- Direct interaction with someone with a disability

- Working with a team member with a disability

What is missing is an empirical comparison of the efficacy of these methods at encouraging computing students to consider accessibility issues when designing new technologies.

Methodology

In the Golisano College of Computing at RIT, many sections of HCI courses are offered to students in a variety of majors, including Information Technology and Software Engineering. We are conducting a controlled study in which different sections of the course use various methods of teaching accessibility topics:

Interventions	One week of lectures on accessibility	Team project on accessibility related topic	Interact with someone with a disability	Member of team has a disability
A – Baseline				
B	YES			
C	YES	YES		
D	YES	YES	YES	
E	YES	YES	YES	YES

We evaluate efficacy through various survey instruments:

- Design scenario for a voting machine

- Interaction with Disabled Persons (IDP) Scale

- Survey about familiarity with accessibility topics

They are administered at the beginning and end of the semester, and two years later when students take their "senior design project" course. As a control, we are also administering the instruments to 2nd and 4th year students in another computing major at RIT who are not receiving any of these interventions.

In addition, we are conducting qualitative analysis of the written reports that students submit at the end of the semester about their term projects in the HCI course and senior design course, to look for evidence that students considered accessibility.

We are in the data collection phase; the first courses with interventions were offered in spring 2016. In addition to evaluating the efficacy of the interventions, we will distribute the lecture content and assignments used in the courses (along with videos of student team projects on accessibility) to enable educators at other universities to replicate the most effective intervention methods at their institution.