Efficacy of Film for Raising Awareness of Diverse Users

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ABSTRACT

Technology companies are increasingly acknowledging the need to make their products usable for diverse users that include people with disabilities and aging populations; as a result, educators need to consider how to include accessibility-related topics in college level technology-based courses. In this paper, we present a study of the efficacy of short (10-minute) documentaries, created by student filmmakers, that portrayed three people with different disabilities. We evaluated the films with undergraduate and graduate students who were enrolled in technology-related courses to explore the films' abilities to raise awareness for concerns related to accessibility. We found that the films were effective at changing some incorrect assumptions about designing for diverse users and increasing recognition of the importance of designing for diversity.

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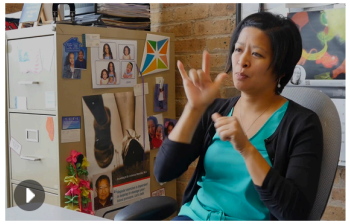
KEYWORDS

Accessibility; documentary; computing education; inclusive design.

AccessAbility: Kat



AccessAbility: Michelle

AccessAbility: Sammi

Figure 1: Screen Caps: Films available:
https://vimeopro.com/isthmusfilms/accessability
Closed Captions:
https://vimeopro.com/isthmusfilms/accessabilitycc
Audio Descriptions
https://vimeopro.com/isthmusfilms/accessabilityaudio

1 INTRODUCTION

Information and communication technologies (ICT) companies are increasingly acknowledging the need to make their products usable for diverse users that include people with disabilities and aging populations [1]; also referred to as inclusive design. 'Teach Access', for example, is an initiative aimed at ensuring that college graduates in technology-related fields have accessibility knowledge [2]. Originated by accessibility teams at Yahoo and Facebook, the group now includes several supporting ICT companies (e.g., Microsoft, Adobe and Google) and universities (e.g., Georgia Institute of Technology and Stanford University). The initiative requires supporting ICT companies to include accessibility knowledge as a job prerequisite in their recruitment materials. While Teach Access provides a spotlight on the importance of inclusive design knowledge, several educators have shared accounts of teaching accessibility-related topics.

Educators have discussed integrating accessibility topics using varied methods: (a) as an integral part of the curriculum where it is discussed in multiple courses [e.g. 3]; (b) as a stand-alone course [e.g. 4]; and (c) as a one-two week module in a larger course [e.g. 5]. One key finding of our earlier related work [6], in which we summarized 18 interviews with university professors who taught accessibility-related courses and modules in the US, was a desire for more shared resources, like videos/films, to aid in the teaching of inclusive design.

Documentary and fictional film/theatre have been used to effectively communicate user stories and raise awareness of end user needs in technology-based instruction. In a study closely related to the one presented in this paper, Carmichael et al. [7] created scripted videos with actors to communicate the needs of users who were elderly with the explicit goal of increasing awareness among ICT students. The authors found that their videos had a positive impact by changing some of their students' views about how to consider people who were elderly in technology design.

Building on [7], we created three short documentaries (about 10-minutes each) that profile women who had different disabilities. The films were created with undergraduate filmmakers who were taking a documentary-making course. We then showed the films to undergraduate and graduate students who were taking technology-related courses at DePaul University; the courses were in programs that did not have an emphasis on inclusive design. The films did not focus explicitly on technology use; instead, we allowed the films' subjects to guide the discussion. Our goals included (a) raising awareness about the needs of people with disabilities and (b) changing how students considered developing and designing technologies for diverse users.

1.1 Brief Film Descriptions

The first film followed Kat who demonstrated and discussed multiple challenges that she encountered in everyday life using her manual wheelchair. Topics included grocery shopping, commuting by bus and her own car, using ATMs (especially challenging with her partially paralyzed hands), domestic chores (e.g. cleaning house and cooking), and navigating the streets and parks of Chicago. The documentary captured Kat's wicked sense of humor and simultaneously

highlighted challenges that able-bodied people might not ever consider; e.g., the difficulty of finding an apartment that 'worked' for her as a single woman living alone.

The second film portrayed Michelle, who was born deaf, as she interacted with her family (husband and three daughters), performed her multi-faceted job in a social work-related field, and presented technologies designed for people who are deaf to the first author's graduate course focused on accessibility. As an ASL speaker, her use of technologies for communicating with others (both hearing and deaf) was highlighted throughout the film. Michelle's story included reflections about how it was to grow up as the only person who was deaf in a hearing family and how things are different (and similar) for two of her daughters who have hearing impairments.

In the third film, Sammi, who is blind and worked as a voice actor and dialect coach for other actors, demonstrated how she used voice-over technologies for her work and everyday tasks. The documentary also focused on transportation and other daily challenges where technologies might help e.g., cooking eggs. As a young woman in her 20s who lived with roommates, her story resonated with many of the students. In the final scene she tells the audience in a voiceover as she is filmed on her deck enjoying the Late Show on her phone: "*People put me on a pedestal and see me as an inspiration, and nothing else. if you want to compliment me, compliment me on my work or things I have achieved, not because I have learned how to use a cane.*"

2 METHODS

2.1 Participants

A total of 116 students taking computer science, information technology and information systems courses participated in this study; we chose to focus on programs that do not offer or require modules or courses on accessibility. Students were recruited in two ways: (1) we received permission from instructors to visit their classrooms; and (2) we posted a link to an online version of the study to a 'participant pool' where students receive credit for participating in research projects. Among the 116 students, 77 (66%) were male, 79 (68%) were graduate students; the remaining 37 were undergraduate students. Most (80%) were recruited through the class visits (nine classrooms in April-May 2017); the participant pool version was available in May 2017.

2.2 Data Collection

Participation in the study was voluntary. Students who consented to the study were given an ID number (for anonymity) and a questionnaire (students who did not participate still watched the films). Pre-film questionnaires asked "*Tell us about what you know about accessibility and designing for people who have a disability.*" This was followed by asking their level of agreement (Likert scale 1-5) to statements adapted from Carmichael et al. [7]; see the five-statement list in the sidebar.

We then watched the films. After the films, students were given a second questionnaire that asked (a) about their major takeaways from the films and (b) (again) their agreement to the five statements. This was followed by a short discussion of their takeaways. The online version of the study followed the same procedure using a survey and links to the films without the discussion.

Statements Adapted from Carmichael et al. [7]

1. Most interfaces are easy for most people to use.
2. Successful design, including technology design, for people with disabilities is a matter of following the appropriate guidelines properly.
3. People with disabilities are not interested in new technology.
4. Designing for people with disabilities is the same as designing for any niche market.
5. Specialist (rather than mainstream) companies should provide technology suitable for use by people with disabilities or impairments.

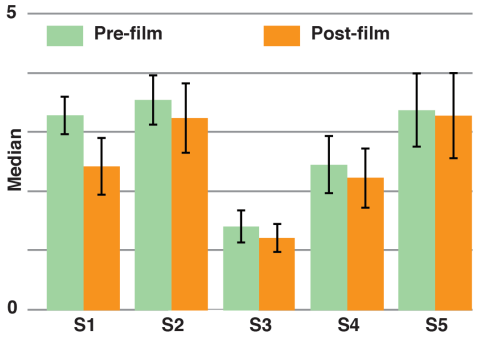


Figure 2: Agreement to Likert-scale Statements, Pre versus Post film. (Error bars = standard deviation (SD))

2.3 Data Analysis

To evaluate pre- and post-film agreement to the Likert-ranked statements, we conducted a Wilcoxon signed-ranked test for related samples. To evaluate the open-ended questions, two authors inductively coded the answers using ATLAS.ti. We then combined our inductive codes and agreed on operational definitions for common themes. Next, we created a codebook using our operational definitions and deductively re-coded the open-ended answers. We determined that a major theme was one in which we found in at least 17 (15%) of the written submissions. Finally, we used Cohen's Kappa for each major theme to assess inter-rater reliability between the two authors.

3 FINDINGS

3.1 Pre versus Post Film Likert Scale Statements Evaluation

Statement 1. "Most current interfaces are easy for most people to use." There was a statistical significance change, Z = -6.64, p = 0.001, with a large effect size (r= -0.63); pre-film agreement was higher (*median*=3, *mean*=3.24, *SD*=0.85) than post-film (*median*=2, *mean*=2.39, *SD*=1.02) indicating that students were less likely to agree that interfaces were easy to use after viewing the films.

Statement 2. "Successful design, including technology design, for people with disabilities is a matter of following the appropriate guidelines properly." There was a statistical significance change, Z = -2.57, p = 0.010, with a small effect size (r= -0.25); pre-film levels of agreement were higher (*median=4, mean*=3.53, *SD*=0.92) than post-film (*median=3, mean*=3.23, *SD*=1.28) indicating that students were slightly less likely to agree that creating accessible products was simply about following guidelines.

Statement 3. "People with disabilities are not interested in new technology." There was a statistical significance change, Z = -2.82, p = 0.005, with a medium effect size (r= -0.27); pre-film agreement was higher (*median=1, mean*=1.39, *SD*= 0.57) than post-film (*median=1, mean*=1.21, *SD*= 0.47) indicating that students were slightly less likely to agree that people with disabilities were not interested in new technologies after the films.

Statement 4. "Designing for people with disabilities is the same as designing for any niche market." There was a statistical significance change, Z = -2.91, p = 0.004, with a medium effect size (r= -0.27); pre-films agreement was higher (*median=2, mean*=2.44, *SD*=1.15) than post-film (*median= 2, m*ean=2.22, *SD*=1.30) indicating that students were slightly less likely to agree designing for disabilities was the same as other niche markets.

Statement 5. "Specialist (rather than mainstream) companies should provide technology suitable for use by people with disabilities or impairments." This was the only statement in which there was no statistical significance change, Z = -0.82, p = 0.378.

Table 1: Inter-rater Reliability

		Cohen's Kappa
Pre-film Themes	1	.76
	2	.86
	3	.77
Post-film Themes	1	.64
	2	.48
	3	.49
	4	.71
	5	.48

3.2 Pre versus Post Film Open-ended Question Evaluation

Using Cohen's Kappa, we had moderate (0.40) or better agreement for eight major themes, indicating that we interpreted the codebook similarly, see Table 1 in the sidebar. We did not include the discussions here because the students had largely reiterated their written submissions.

3.2.1 Pre-film Themes

We agreed upon three pre-film themes: (1) Awareness; (2) Know-nothing/little; and (3) Societal reflections.

Theme 1: Awareness. Forty-seven (41%) of students claimed to have 'some' awareness about accessibility. This included 12 students who submitted a definition; for example, a graduate student wrote: "*Accessibility is about how to let people with disabilities to access and use features of a tool that normal people can use.*" This theme also included a large subcategory of 37 people who mentioned specific accommodations; for example, an undergraduate student from a class we visited submitted: *"Like having a ramp so people in wheelchairs & stuff."*

Theme 2: Know nothing/little. About a third of participants (n = 42, 36%) of participants claimed to know very little or nothing. For example, a graduate student submitted: *"I don't know much about accessibility at all. I just know it's designing for people who have disability."*

Theme 3: Societal Reflections. About a fourth of participants (n = 27, 23%) responded to the pre-film question with general societal reflections; common reflections were about how accessibility was often ignored. For example, one student wrote: *"It is often overlooked because most people do not have issues that are most commonly thought of when accessibility is mentioned, like blindness."*

3.2.1 Post-film (Takeaway) Themes

We organized the most common takeaways into five major themes: (1) Call to action; (2) Post-film societal reflections; (3) Reflections on challenges that people who are disabled face; (4) Personal reflections about how the films impacted them; and (5) Comments/ reflections about the film's three subjects.

Theme 1: Call to Action. Fifty-one (44%) of students responded to the films with a call to action; the most common responses included a need for better accommodations, and more research and regulations that consider people with disabilities. For example, a student wrote: "*There needs to be more conscious effort to make physical spaces accessible. School systems need to be adapted for those who are deaf and foster a culture."*

Theme 2: Post-film societal reflections. Fifty-one (44%) of students included societal reflections in their responses. Students told us they were not previously aware of many of the issues presented in the films and that designing for accessibility was too often overlooked; for example, a graduate student submitted: *"My major takeaways from watching Kat, Michelle and Sammi are, we don't really think about how hard people with disabilities have it. We take things for granted, as far as, accessibility because we don't face those challenges."*

Theme 3: Reflections on challenges that people who are disabled face. Twenty-four (21%) students included reflections about the challenges faced by people who have disabilities; for

example, a graduate student submitted: *"People with disabilities are really struggling with the most current interfaces."*

Theme 4: Personal reflections about how the films impacted them. Twenty-four (21%) students also included personal reflections about the films. Most were reflections about their previous ignorance; an undergraduate student wrote: *"I never noticed how much technology needs to improve or be made for people who have disabilities. Also, how much changing simple procedures can help/improve the lives of people who have disabilities."*

Theme 5: Comments/reflections about the film's three subjects. Seventeen (15%) participants reflected directly about the positive attitude demonstrated by the films' subjects and/or the independence of the three women who were profiled in the films. An example of this theme included: *"However, I was struck by their upbeat and positive attitudes. I can only hope that these films encourage others like me to think more about what we can do with the skills that we have to make the world more accessible to ALL people."*

4 CONCLUSIONS

In this project, we aimed to create and evaluate the efficacy of short documentaries for raising students' awareness about designing for diverse users; i.e. goals that parallel the goals of the Teach Access [2] initiative. Our findings indicated that the films were effective at changing some incorrect assumptions about accessible technology design and increasing students' awareness of the importance of considering diverse users. In future projects, we hope to expand on this work by building collaborations with other like-minded educators towards the creation of information sharing and material repositories aimed at helping instructors constructively include accessibility concerns in their classrooms.

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