

A Proposal for a Web Accessibility Course

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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ABSTRACT

Most websites online are inaccessible to people with disabilities since they fail to meet web content accessibility standards. Due to a gap in their education, many web designers and developers are unaware of accessibility concerns, so they fail to prioritize it while building applications. A proposal for a new web accessibility course at the University of Virginia addresses this education gap. It considers current courses and their curricula, and it incorporates suggestions from experts in the field. Many of the topics presented in the course outline are related to the Web Content Accessibility Guidelines (WCAG) and the use of assistive technology, which current computer science courses at UVA fail to teach. By taking this course, current or aspiring software engineers, web developers, and web designers will deepen their understanding of the challenges people with disabilities face and learn to prioritize inclusivity in their future endeavors. As for the next steps, the proposal will undergo multiple rounds of review before being approved for the computer science curriculum.

1. INTRODUCTION

Imagine waking up one day to discover that you have developed a visual impairment. For the first time in your life, you must rely solely on your computer's keyboard and auditory assistance tools to engage with digital content and access information. Your favorite

website, usually filled with vibrant pictures and stories, becomes challenging to navigate. Unfortunately, web developers overlooked accessibility concerns when building the site, so the HTML code is not clean enough for your screen reader to interpret properly. The pictures also lack descriptions, impeding your ability to visualize them.

This narrative is not just a hypothetical scenario; it mirrors the reality faced by billions of people worldwide living with disabilities. Shockingly, over 96% of websites on the internet fall short of meeting essential web accessibility standards, marginalizing a vast population (WebAIM, 2023). Despite most websites undergoing various rounds of revision, accessibility testing is often an overlooked or last-minute endeavor. Many designers and developers remain unaware of critical accessibility concerns, and this lack of awareness is partly a consequence of an educational gap within their training.

2. BACKGROUND

At the University of Virginia (UVA), only two computer science courses touch on web accessibility. The course description for CS 3205 (HCI in Software Development) reads:

Human-computer interaction and user-centered design in the context of software engineering. The course is heavily focused on user experience (UX) design and follows

a well-established process ensuring the usability of interactive products, systems, and services. (Apostolellis, 2021)

While this course claims to teach students how to design usable products, CS 3205 falls short in instructing students how to design products accessible to everyone, including those with disabilities. Remarkably, digital accessibility is addressed once in the course, confined to a singular slide on a presentation deck. Despite being a subject with substantial teaching material, web accessibility receives insufficient coverage in computer science curricula.

The content of another class at UVA, CS 4640 (Programming Languages for Web Applications), further supports this notion. The course overview states:

We will focus on the fundamental concepts of web development and how they can be applied to develop reliable and usable web software, regardless of the technologies, languages, or frameworks. Even though we will emphasize the concepts, you will develop dynamic web software with several commonly used programming languages and technologies. (Hott, 2023)

While it promises to teach students to develop reliable and usable software, the course neglects to address how to create software accessible to all users. It claims to cover common programming languages and technologies but fails to guide students in developing software compatible with assistive technologies like screen readers. The insufficient focus on web accessibility in the computer science curricula at UVA reflects broader trends observed in degree programs globally.

3. RELATED WORKS

A study by Dr. Shiya Cao examines how much exposure students taking software

development courses at universities have to accessibility. Surveys and interviews found that 55% of the participants had “not taken courses that discussed accessibility,” and “Nearly 60% of the participants were unfamiliar with national and international accessibility guidelines” like the Web Content Accessibility Guidelines (WCAG), Americans with Disabilities Act (ADA), and Section 508 (Cao & Loiacono, 2019, pg. 36; AlMeraj et al., 2023). This means that more than half of the participants did not learn about accessibility in their education, and they were unaware of the accessibility guidelines they should strive to meet when designing or developing products. These numbers highlight the pressing need for an increased emphasis on accessibility education in computer science curricula, ensuring that current and future developers are well-equipped to create inclusive digital experiences.

Experts like Dr. Richard Ladner, a distinguished computer scientist known for his contributions to assistive technology, advocate to integrate accessibility into computer science programs. Ladner emphasizes the importance of weaving accessibility considerations into various types of courses, spanning introductory computer science, web development and design, human-computer interaction, software engineering, artificial intelligence, and machine learning (Ladner et al., 2023, pg. 14). Ladner provides suggestions of specific topics to teach in these courses, many which align with the WCAG standards. These suggestions include maintaining adequate contrast between text and background, applying Accessible Rich Internet Applications (ARIA) attributes to HTML elements, conducting usability testing, and building user interfaces using ability-based design. Ladner’s proposed topics and other WCAG standards are fundamentals of the web accessibility curriculum proposal.

4. CURRICULUM PROPOSAL

The main elements of the proposal are outlined below.

4.1 Course Description

This course is designed to provide students with a comprehensive understanding of web accessibility principles, guidelines, and best practices. Participants will learn how to create digital content that is inclusive and accessible to individuals with disabilities, ensuring that websites and applications can be used by everyone, regardless of their abilities.

4.2 Duration

- a. Total Units: 3.0
- b. Meeting Days: Tuesday/Thursday
- c. Meeting Duration: 1 hr 15 mins

4.3 Learning Objectives

Upon completion of the course, students will be able to:

- a. Understand the importance of web accessibility and its impact on users with disabilities.
- b. Identify and implement key accessibility principles, including proper document structure, alternative text for images, and keyboard navigation.
- c. Evaluate websites and applications for accessibility compliance using industry standards and guidelines.
- d. Demonstrate the ability to create accessible multimedia content.
- e. Develop strategies for testing and maintaining web accessibility over time.

4.4 Target Audience

This course is designed for students who want to enhance their understanding of web accessibility principles and practices.

4.5 Prerequisites

Participants should have a basic understanding of HTML or CSS. No prior knowledge of web accessibility is required.

4.6 Course Structure

a. Weeks 1-2

Introduction to Web Accessibility and WCAG

- Overview of accessibility and its importance
- Understanding the different types of disabilities (auditory, cognitive, learning/neurological, physical, speech, visual)
 - Examples of the disability
 - Examples of barriers for people with the disability and any assistive tools they use
 - Stories/personas of people with the disability
- Understanding Web Content Accessibility Guidelines (WCAG) and its four pillars (perceivable, operable, understandable, and robust)
- Legal and ethical considerations in web accessibility
- History of the Americans with Disabilities Act (ADA), Section 508, and WCAG

b. Weeks 3-4

HTML and Document Structure

- Semantic HTML and its role in accessibility
- Proper use of headings, lists, and landmarks
- Creating accessible forms

c. Weeks 5-6

CSS and Design Considerations

- Responsive design and its impact on accessibility
- Color contrast and font considerations
- Implementing accessible navigation menus

d. Weeks 7-8

Multimedia Accessibility

- Adding alternative text to images and multimedia content

- Ensuring video and audio accessibility
- Providing captions and transcripts

e. Weeks 9-10

Interaction and JavaScript Accessibility

- Ensuring keyboard accessibility
- ARIA roles and attributes
- Progressive enhancement for accessibility

f. Weeks 11-12

Testing and Maintenance

- Introduction to accessibility testing tools
- User testing and feedback
- Strategies for maintaining accessibility over time

4.7 Assessment

a. Weekly Quizzes

Assessing theoretical knowledge and understanding of concepts discussed in lecture

b. Assignments and Projects

Practical assignments focusing on implementing accessibility principles.

Sample projects could include:

- Semantic HTML Assignment
 - Task: Convert a given non-accessible webpage into a fully accessible one using semantic HTML elements. Highlight the changes made and explain the reasoning behind each modification.
- ARIA Implementation Project
 - Task: Develop a small interactive web application that incorporates ARIA roles and attributes to enhance accessibility for users with disabilities. Provide documentation on the ARIA features implemented and their impact on accessibility.
- Color Contrast and Responsive Design Assignment

- Task: Analyze an existing website for color contrast issues and propose design improvements. Modify the website to ensure responsiveness across various devices and screen sizes.

- Forms and Interactive Elements Project

Design Assignment

- Task: Create a complex web form with dynamic interactive elements. Ensure that the form is fully accessible, with proper error messaging, ARIA attributes, and keyboard navigation. Test the form with users of varying abilities for usability.

c. Midterm Exam

d. Final Project

Designing and developing a website from scratch, ensuring it adheres to WCAG guidelines.

e. Class Participation

Engagement in discussions, peer reviews, and collaborative activities

5. ANTICIPATED RESULTS

By implementing this course at UVA, computer science students will not only deepen their understanding of the challenges faced by individuals with disabilities but also expertly create websites that adhere to WCAG standards. As the need for designers and developers with accessibility experience grows, these skills will position students as industry leaders. The course will also reflect UVA's commitment to fostering inclusivity and staying at the forefront of technological advancements, positively impacting the University's reputation.

6. CONCLUSION

The proposed web accessibility course at UVA aims to bridge a critical gap in

computer science education. By addressing the pressing need for training in web accessibility principles, guidelines, and best practices, this course seeks to empower students with the knowledge and skills required to create digitally inclusive products. The current lack of awareness in accessibility education poses challenges for individuals with disabilities, and this course proactively works to mitigate the exclusion they face on the internet. Students will walk out of the course with a newfound understanding of designing, developing, and testing their products to ensure it is accessible to all users. They will know how to cater to people and their varying abilities, ensuring a positive experience for everyone. The course will pave the way for a more equitable digital landscape where the internet is a welcoming space for all.

7. FUTURE WORK

For the next steps, the proposal will be submitted to the CS Undergraduate Curriculum Committee at UVA for review. If approved, the proposal will move to the School of Engineering & Applied Sciences Curriculum Committee for review. If it receives approval again, it will then proceed to the UVA Faculty Senate.

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