



# Making the Web Accessible to the Aging Population

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## ABSTRACT

There is evidence that nearly half of the children born in industrialized economies will live beyond 100 years old. While aging populations are not occurring at the same pace in every nation, nearly all nations are experiencing longer lifespans. There will be one in five people in Africa, Asia, and South America over the age of 60 by 2050. Globally, there may be more adults over 60 than children under 15 by 2047. [1] Among the most marginalized groups, older adults are the fastest growing. Each of us will be a member of this group someday. Participants will be provided with objects that simulate visual impairments and arthritis. These aim to generate empathy to understand how older adults may experience the same websites and interactions differently due to their physical limitations, and will also explore ways in which the current interactions can be made better keeping this population in mind.

Do we believe that when we are over the age of 70, we will be able to book a cab and buy groceries online with the same ease as we do today? Do we think older adults are comfortable using technology they are expected to use to perform tasks necessary to function in today's world? Have you ever wondered why older adults need to click on a touchscreen multiple times in order to successfully complete a task? This course will equip you with the tools you need to empathize with the pain points older adults have while navigating the web as well as brainstorm and apply techniques that can make their experience better.

## CCS CONCEPTS

• **Human-centered computing** → **Accessibility design and evaluation methods.**

## KEYWORDS

Accessibility, Aging, Interaction Design, Computer Science, Gerontology

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## 1 INTENDED AUDIENCE

This course is intended for students, researchers, or working professionals who have an interest in the space of user experience, computer science, user research, gerontology, psychology or human factors.

## 2 PREREQUISITES

None

## 3 LEARNING OUTCOMES

By the end of this course, attendees will be able:

- Create unique tools that will act as simulators to help other designers and software engineers. Introduce awareness regarding the abundant career opportunities that exist in the aging space.
- Use web-accessibility guidelines published by the Web Content Accessibility Guidelines (WCAG) to design interfaces that are accessible to the aging population.
- Evaluate existing websites/ applications/ softwares to see if they follow the accessibility guidelines.
- Empathize with the aging population by stepping in their shoes to see how they experience the current versions of the digital interfaces.
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## 4 COURSE MATERIALS

### 4.1 Required Readings

- WCAG 2 Overview | Web Accessibility Initiative (WAI) | W3C [5]

### 4.2 Optional Readings:

- Accessibility: Guidelines for Information Architecture, UX Design, and Visual Design | by Manasi Vaidya | IBM Design | Medium [4]
- Accessibility: 4 easy-to-follow methods for everyone [3]

## 5 PRACTICAL ACTIVITIES

Examples of some activities that will incorporate an active-learning atmosphere in the class environment:

### (1) Exercises for Developing Empathy: 75 mins

Based on the backgrounds of the participants, everyone will be divided into teams of 3 and will have the opportunity to select a website of their choice. After a brief introduction to some guidelines and best practices to design for accessibility, participants will be asked to redesign the website they

have chosen. They will be provided with objects that simulate visual impairments and arthritis. These aim to generate empathy to understand how older adults may experience the same websites and interactions differently due to their physical limitations. The class will culminate with short 3-5 minute presentations from groups highlighting the changes they realize should have been there in order to accommodate older adults.

Intended Learning Outcomes from the activity:

- Understanding how natural aging and various cognitive and physical changes that take place due to aging affect the way we react to the digital environment around us.
  - Gauging how universal design can be applied to our homes to accommodate our changing needs as we age.
  - Be able to empathize with the various daily challenges older people and their caregivers in the society might face.
- (2) Select a website or product or a software of your choice, and evaluate it to check if the chosen product follows the WCAG guidelines published by the United States: 75 mins
- Go through the WCAG guidelines (link and handouts have been placed on the table in the first row of the room)
  - Select a website or a product or a software of your choice (digital product).
  - Set up your system to simulate either vision impairment, audio limitation, restricted hand movement or no hand movement based on your interest within the field of web accessibility.
  - A criteria for each set of accessibilities will be given to you, based on which you will assess the chosen digital product.
  - Once you complete your assessment, make a list of recommendations for changes the company should consider making in order to meet the minimum web accessibility criteria.

## 6 DEVELOPING EMPATHY

### 6.1 Activity with Yellow Vision Glasses:

We will try to look at the highlighted areas financial documents and understand what colors are the worst for highlighting important sections.

### 6.2 Activity with Impaired Acuity Glasses:

When we use extremely small fonts (lesser than 12px) it is very hard for people with compromised vision to read it. Usually the text on websites is readable to an older adult with impaired acuity when it is at 175% zoom level. When and if we design and evaluate websites in the future, we should make it a point to see how they look when they are zoomed in by 175% and ensure that they are accurately coded in a responsive manner so that the content is readable even at 175%. We will wear the glasses that simulate impaired acuity and experiment with them to see what zoom level we need to view our mailbox in for the text to be legible.

### 6.3 Activity with Tunnel Vision Glasses:

Experience how a privacy page looks like with these glasses, the text is presented end-to-end which makes it really hard for anyone

with tunnel vision to read it. If this same text was presented in a way that the left and rightmost columns are empty (like most websites do as a best practice) and if the text was divided into columns like how a newspaper usually has many columns along the width of a page, it becomes easier to go through as you don't have to move your vision along the entire length of the page while reading each line.

## 7 IMPLEMENTING STRATEGIES FROM TANNER (2013) [2] WILL ENCOURAGE, DEMAND, AND ACTIVELY MANAGE PARTICIPATION FROM ALL ATTENDEES AND WILL HELP BUILD AN INCLUSIVE AND FAIR COMMUNITY:

### 7.1 Use of varied active-learning strategies:

This will ensure that every participant engages. Some participants may not be the best at raising their hands and answering questions, but they may be good at researching and talking about their approaches to certain problems. Similarly, not all participants may perform the best while in pairs or groups. Varied active learning strategies will ensure that all are given a fair chance to contribute.

### 7.2 Integrating culturally diverse and relevant examples:

When it comes to this course, which is based on designing for web accessibility, various accessibility related issues around the world and diverse examples will be included. We will also ensure to use the accurate words at the time when referring to persons with disabilities (there are a few variations of this word that keep changing).

## 8 INSTRUCTOR BACKGROUNDS

Manasi Vaidya is a Research Assistant with the MIT AgeLab, her thesis is focused on developing design guidelines for the privacy content of smart home devices. She has spoken about web-accessibility at multiple international IxDA workshops.

Sheng-Hung Lee is a PhD Researcher at MIT, and was the teaching assistant for MIT's SCM.287J Global Aging and the Built Environment class in 2022 taught by Dr. Joseph F. Coughlin. Lee taught product design at Fudan University Shanghai Institute of Visual Art and Detao Masters Academy as an adjunct associate professor from 2015 to 2019.

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## REFERENCES

- [1] Joseph F. Coughlin. 2017. *The longevity economy: Unlocking the world's fastest-growing, most misunderstood market* (1st ed.). PublicAffairs, New York, NY, Chapter Introduction: the longevity paradox, 11–40.

- [2] K. D. Tanner. 2013. Structure matters: twenty-one teaching strategies to promote student engagement and cultivate classroom equity. *CBE Life Sci Educ.* 2013 Fall;12(3):322-31 12, 3 (2013), 322–331. <https://doi.org/10.1187/cbe.13-06-0115>
- [3] M. Vaidya. 2020. *Accessibility: 4 easy-to-follow methods for everyone*. Retrieved December 9, 2022 from <https://medium.com/ux-planet/accessibility-4-easy-to-follow-methods-5236146c5cc6>
- [4] M. Vaidya. 2020. *Accessibility: Guidelines for information architecture, UX Design, and visual design*. Retrieved December 9, 2022 from <https://medium.com/design-ibm/accessibility-guidelines-for-information-architecture-ux-design-and-visual-design-5ae33ed1d52d>
- [5] WAI. 2005. *W.C.W.A.I. WCAG 2 Overview. Web Accessibility Initiative (WAI)*. Retrieved December 9, 2022 from <https://www.w3.org/WAI/standards-guidelines/wcag/>