# Foundations of Digital Accessibility

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"Society expects a standard of competence, professionalism, and accountability from its doctors, nurses, and other professionals who hold lives in trust. Yet anyone can write software that can appear in or interact with critical systems, so what does 'software professional' mean, and what are society's expectations for those individuals?"

#### What Every Engineer Should Know About Digital Accessibility

### Scope and audience

- What should every engineer know about digital accessibility?
- What is an engineer? Does that encompass all impacted roles?
- What is accessibility to an engineer in the digital context?
- What are those foundational topics that *every* engineer should know?

#### What *Everyone* Should Know About Digital Accessibility

# Part 1: Foundations of Digital Accessibility

Building blocks of digital accessibility, who benefits from accessibility and in what ways, and overarching approaches to addressing accessibility needs.

- Introduction to Digital Accessibility
- Disability and Digital Inclusion
- User Accessibility Needs
- Assistive Technology
- Core Attributes
- Guiding Principles
- Accessibility in Practice

# Part 2: Methods for Engineering Digital Accessibility

Proactive, holistic approach to accessibility, with creative, user-centered methods and tasks to be performed by all roles on the product team in all phases of the product lifecycle.

- Requirements Specification
- Core Requirements
- Design and Development
- Testing and Evaluation
- Documentation and Support
- The Future of Digital Accessibility

### Themes for today's session

- Theme 1: Universality
- Theme 2: Accessibility needs versus disability
- Theme 3: Disability inclusion, language, and representation
- Theme 4: Shared responsibility

# Theme 1: Universality

# "I may have invented the web, but all of you have helped to create what it is today."

# Web concept diagram from first proposal



Fig 2. A client/server model for a distributed hypertext system.

Tim Berners-Lee, Information Management: A Proposal

# Web timeline from proposal to World Wide Web

- 1989: Information Management: A Proposal
- 1990: <u>WorldWideWeb: Proposal for a HyperText Project</u>
  - WorldWideWeb software up and running at CERN
  - First website published
- 1991: Public access to the web

# Universality and technology diversity

- Universal readership
- Universal authorship

"This notion seemed impossible until I realized that the diversity of different computer systems and networks could be a rich resource — something to be represented, not a problem to be eradicated."

# Evolving to encompass human diversity

• 1997: Launch of Web Accessibility Initiative

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

"The IPO will ensure the Web can be accessed through different combinations of senses and physical capabilities just as other W3C activities ensure its operation across different hardware and software platforms, media, cultures and countries."

World Wide Web Consortium (W3C), <u>World Wide Web Consortium Launches International Program</u> Office for Web Accessibility Initiative Universal design is "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."

# Principles of Universal Design

- Equitable Use
- Flexibility in Use
- Simple and Intuitive Use
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use

Flexibility in use — the design accommodates a wide range of individual preferences and abilities.

# Theme 2: Accessibility needs versus disability

Focus on user accessibility needs over pathology of disability.

### User accessibility needs

- People who rely on alternatives to the visual channel.
- People who need to adjust display to make content perceivable.
- People who need alternatives to audio content or to adjust volume of audio.
- People who need to adjust display or hear content spoken in order to understand it.
- People who need efficiently designed interfaces that don't require significant physical effort to operate them.
- People who need applications that don't require significant cognitive effort to understand them.
- Older adults, who may experience combinations of age-related change in visual, cognitive, hearing and physical capabilities.

Accessibility needs are individual, and dynamic.

# Secondary beneficiaries of accessibility are secondary

People who don't identify as disabled but also benefit from accessibility, for example:

- the person using voice input while driving their new BMW.
- the parent holding their crying baby in one hand and operating their smartphone in the other.
- the nervous traveler trying to use a kiosk to scan their passport at airport immigration.
- the people in a noisy bar watching the Vikings game with captions on.

#### "Essential for some, useful for all."

# Assistive technologies as a component of digital accessibility

- Text-to-speech output
- Display customization
- Tactile output

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- Speech to text input
- Switch-based input devices
- AI tools to generate or edit content

#### Avoid creating a "disability dongle."

Jackson, Haagard, and Williams, Disability Dongle

Videos of people using assistive technology are powerful. Watching people use assistive technology is even more so. Get to know the assistive technology in your pocket — whether or not you're disabled.

# Digital accessibility is essential to inclusion for people with disabilities.

# Theme 3: Disability inclusion, disability language, and representation

# Digital accessibility is more than meeting a set of technical requirements.

Laws, policies and professional codes provide a valuable framework — but that's often insufficient to guarantee accessibility. The cost of inaccessibility — the COVID-19 pandemic, the rapid shift online, and the harm that was caused.

Digital accessibility means barrier removal.

# Digital accessibility is an extension of the disability rights movement.

The social model of disability helps emphasize the power of digital resource creators in reducing or removing barriers.

#### Authentic disability representation is part of digital accessibility.

Appreciate the language of disability; avoid ableist terms, and help others learn from mistakes.

# Theme 4: Shared responsibility

"It has taken all of us to build the web we have, and now it is up to all of us to build the web we want — for everyone."

# Foundational awareness and understanding

"Given that responsibility for digital accessibility and effective communication is distributed, it is essential that we establish a common awareness and understanding of digital accessibility and sustain that foundation as technology evolves."

# Accessibility Skills Gap

The gap between the demand for digital accessibility skills in the workplace and the supply of workers who are knowledgeable and skilled in accessibility.

- 56% reported that it was "difficult or very difficult" for their organization to find job candidates with accessibility skills, and only 2% felt it was easy or very easy.
- 44% reported their current staff don't have the accessible technology skills to meet their organizations' goals.

"We find that there is a significant disconnect between understanding accessibility standards and creation of content that actually adheres to them."

# Accessibility Skills Hiring Toolkit

Qualifications common to all roles (examples):

- Knowledge of digital accessibility and disability inclusion
- Knowledge of regulations related to digital accessibility (e.g., Section 504, Section 508, ADA)
- Knowledge of WCAG 2.x requirements



# What Every Engineer Should Know About Digital Accessibility

- 20% discount with code EFLY03
- Taylor & Francis provides ePubs through Vital Source
- We are working with Taylor & Francis to improve accessibility in their digital editions
- To receive a native ePub for use with your preferred reader, email us:
  - Dave Sloan: <u>sloan758@gmail.com</u>
  - Sarah Horton: <u>sarah.horton@gmail.com</u>

Thank you!

# Further Reading

- Sarah Horton and David Sloan, <u>What Every Engineer Should Know About Digital</u> <u>Accessibility</u>
- Phil Laplante, <u>A Brief History of Software Professionalism and the Way Forward</u>
- Center for Universal Design, State University of North Carolina, <u>Principles of</u> <u>Universal Design</u>
- American Foundation for the Blind, <u>Learn Tech: Assistive Technology Videos</u>
- W3C Web Accessibility Initiative, <u>Web Accessibility Perspectives Videos</u>
- Liz Jackson, Alex Haagard, Rua Williams, Disability Dongle

# **Further Reading**

- United Nations, Convention On The Rights Of Persons With Disabilities (CRPD)
- US Department of Justice, Guidance on Web Accessibility and the ADA
- Association of Computing Machinery, Code of Ethics and Professional Conduct
- Sarah Lewthwaite, Sarah Horton, and Andy Coverdale, <u>Workplace approaches to</u> <u>teaching digital accessibility: establishing a common foundation of awareness</u> <u>and understanding</u> and <u>Teaching Accessibility in the Digital Skill Set</u>
- Teach Access, <u>Bridging the Accessible Technology Skills Gap</u> and <u>Accessibility</u> <u>Skills Hiring Toolkit</u>