Overview

- Designing for accessibility
- Poll worker education for accessibility
- Poll worker assistance through better design
- Evaluating accessibility
Why should accessible design be considered during the design of voting systems?

- Usability testing is recommended by the Voluntary Voting Systems Guidelines\(^1\) to enable voters to independently cast votes as intended.
- Voters with disabilities should be treated equitably in terms of privacy, convenience, usability, and respect.

... so that people with disabilities are not singled out and are treated equitably.

Source \(^1\): (VVSG 3.2.1.a)
How should we include people with disabilities?

- Identify accessibility issues with existing systems via
  - Post-election surveys
  - Usability testing

- Ethnographic research: Observe disabled voters at polls (with consent)

- Solicit input from community support groups for specific disabilities.

- Develop design tools such as personas and video walkthroughs.
Design Tool Development

- Personas describe all of the relevant characteristics of a user
  - Goals, traits, expectations, knowledge, skills, [dis]abilities, etc…
- Designers should develop a wide variety of personas to represent variability in the population

Design Tool Use

- Perform a task analysis to identify performance requirements, information requirements, and potential errors.
- Determine whether each persona could perform the tasks successfully.
  - Perform Cognitive Walkthrough or similar techniques.

Human centered design should in include the full range of human experience.
The design of voting systems should include all aspects of the system.

- Setup and maintenance.
  - Poll worker accessibility.
- Embedded help and documentation.
- Social etiquette and disability awareness.
- Ballot design.
- Poll environment.

Accessibility of the voting device is just one part of the system.
Poll workers should be knowledgeable of:

- How various disabilities impact voting
- Social stigma experienced by some individuals with disabilities
- Assistive devices that voters bring with them
- Assistive features of the voting machines

Training based on *personas* rather than *disabilities* may engender a more compassionate attitude.¹

Poll workers should receive training on the full range of disabilities they may encounter, especially *hidden disabilities*, which may include:

**Cognitive**
- Age-related cognitive impairment (mild, Alzheimer’s, dementia, etc…)
- Traumatic brain injury

**Social/Cognitive**
- Autism Spectrum Disorder
- Anxiety and panic disorders

**Physical**
- Arthritis
Poll Worker Assistance through Better Design

Ideally, voters should never need poll worker assistance at the voting machine.

- Empower voters by delivering just-in-time, contextual help from the voting machine.
- Provide graphical instructions, which will especially benefit those with low English literacy or cognitive impairments.

When poll worker assistance is inevitably necessary:

- Design machines to be physically accessible to voter and poll worker simultaneously.
- Display system states/modes clearly to help poll workers identify problems and solutions.
Deficiencies in the Voting Machine Accessibility Evaluation Process

- Lack of standardization of test methods
- Low prioritization in the design process
- Design-based vs. performance-based criteria
- Inclusiveness of the participant population
- Focus is only on one aspect of the system
Problem: Prioritization in the design process

- Accessibility testing is often conducted in late design stages.
- Issues discovered in late stages can be difficult to address, and design solutions may be poorly integrated.

Solutions

- Consider accessibility in early design phases (e.g., using personas and task analysis).
- Conduct iterative accessibility testing throughout design phases (formative and summative testing).
**Problem: Lack of standardization in samples**

- What constitutes a *representative sample* of disabled users?
  - Should *all* disabilities be tested?
  - What about combinations of disabilities?
- How many users should participate in the evaluation?

**Solutions**

- Empirical studies might help to establish guidelines.
- Examine lessons learned from accessibility studies in other domains (e.g., websites, kiosks, in-home medical devices)

*Standardization of test procedures will enable fair comparison among vendors.*
**Problem: Insufficient evaluation criteria**

- Many evaluations use design-based criteria, which may not translate to successful user performance.

**Solution:**

- Standardized user performance criteria should serve as benchmarks for success.
  - Successful task completion rates
  - Error rates, error recovery rates
  - Time on task

**Challenge:** How should we objectively establish pass/fail criteria? What is “good enough?”