Sample Report on the User-Centered Design Process Used for Voting Systems

This document provides a sample report on the user-centered design (UCD) process to meet the requirements under Principle 2.2 as part of the certification of a voting system to the Voluntary Voting System Guidelines (VVSG) 2.0.

It is one of ten companion documents to the [NIST VTS 400-5 Handbook for VVSG 2.0 Usability and Accessibility Test Strategies](https://doi.org/10.6028/NIST.VTS.400-5) and can be downloaded with the Handbook. All documents are also available on the NIST Voting Program website at <https://www.nist.gov/itl/voting/vts-400-5-documents>.

**Any content provided in this document is just a sample to show the type of information to include in any section.**

User-Centered Design Report for
ABC Voting System
for VVSG 2.0 Requirement 2.2-A

ABC Elections 1.0

Date of Report: December 25, 2022

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# 1.0 Overview

This report describes the user-centered design (UCD) process for ABC Elections Voting System version 1.0 conducted during the design and development process to meet VVSG 2.0 Requirement 2.2-A.

The scope of this work includes the design and development of the ABC Voting System ballot marking device.

## 1.1 UCD Scope and Participants

From January 1, 2022 – December 31, 2022, the UCD process included a variety of usability tests and other UCD methods, including:

* 4 usability tests with a total of 86 sessions
* 1 prototyping session with 9 participants
* 1 expert review with 5 accessibility experts
* 36 interviews and observations with voters and poll workers

Participants in these activities included:

* 90 total voters, including:
	+ [##] blind voters using the audio format and tactile keypad
	+ [##] voters with low vision using audio format with visual display
	+ [##] voters with low vision using screen text size and contrast
	+ [##] deaf or hard of hearing voters
	+ [##] voters with mobility disabilities
	+ [##] voters with dexterity disabilities using the tactile keypad
	+ [##] voters with dexterity disabilities using a dual switch
	+ [##] voters with low literacy
	+ [##] voters using alternative languages
* 18 total poll workers or other election workers

## 1.2 Impact

Many design decisions were made as a result of the user-centered design activities. They included:

* Designing the initiation of a voting session so blind voters can complete the activities themselves by changing the planned position of the audio headset jack and adding an audio message about how to start the session.
* Adding information to the audio format to help voters navigate more accurately and quickly.
* Changing the design of the keys on the tactile keypad to be more distinct and adjusting the Braille labels to more accurately identify each key.
* [And so on …]

# 2.0 Product Description

## 2.1 Full Product Description

This report is for ABC Elections Voting System version 1.0. Designed to present ballots to voters throughout the U.S. and collect voter responses, it consists of a touch screen tablet, a connected COTS printer, and optional accessibility devices including a 7-button tactile keypad, 2-button dual switch, and audio output.

[ There can be additional details such as details of the components, software, and illustrations of the voting system components.]

# 3.0 Timeline

#### Timeline and summary of UCD work on ABC Voting 1.0

| Date | Method  | Participants | Location | Activity detail |
| --- | --- | --- | --- | --- |
| 1/1/2022 | Interviews | 24 voters  | City, StateCity, StateCity, State | Conducted 1:1 interviews with voters about problems they have encountered using their current voting system |
| 1/15/2022 | Observations  | 12 poll worker teams  | City, State | Observed poll workers setting up and closing polling places during an election |
| 2/15/2022 – 2/25/2022 | Prototyping sessions | 3 election officials, 3 voters, 3 poll workers | City, State | A rapid prototyping session with invited voters, poll workers and election officials, working on different arrangements of the physical setup |
| 3/1/2022 | Usability test  | 6 voters with dexterity disabilities  | City, State | Early version of the dual-switch interface |
| 4/1/2022 | Usability test  | 20 voters  | City, State | Working version of the interface with voters with a range of abilities |
| 8/1/2022 | Inspection | 5 accessibility experts | City, State | Physical and digital disability experts reviewed all accessibility features |
| 9/1/2022 | Usability test | 8 voters | City, State | Usability test with blind and low vision voters using the audio ballot |
| 11/1/2022 | Usability test | 12 voters | City, State | Usability test based on requirement 8.3 |
| 12/1/2022 | Usability test | 36 voters | City, State | Usability test (report submitted as part of certification package for requirement 8.3) |

# 4.0 User-Centered Design Activity Detail

## 4.1 Interviews with voters

#### About this activity

| People | Process | Product | Principles |
| --- | --- | --- | --- |
| 20 voters including people who are blind or have low vision  | Usability test | First working version of the ballot marking interface with accessibility options | Principle 7 – Marked, verified and cast as intended |

#### Activity process and results detail

| Description  | Detail |
| --- | --- |
| Date and Location | 4/1-3/2022 in City, State |
| Method | **Usability Test**Conducted individual sessions with voters. They were briefly interviewed to learn about their prior voting experiences and their preferences for interacting with the ballot marking device. Because some of the ballot activation features were not yet complete, test facilitators set up the voting system for the voters. Then, the voters were given time to get familiar with the physical set up and asked to mark a ballot following instructions for how to vote. They were encouraged to try to solve any problems they encountered on their own, but were given the option to ask a “poll worker” for help if needed. As they worked, test facilitators observed how they interacted with the systems, any problems they had, and how they solved (or were unable to solve) them. Facilitators recorded any problems or errors in marking choices, including those corrected by the voter.The ballot printing functions were not complete, so the voting session in the test ended when they started to “print” the ballot.After the voting session, they were interviewed about their experience. This interview could include repeating portions of the voting session to review what happened, and collecting any input on how to improve the interface.  |
| Goals | Learn about problems for voters with and without disabilities encounter to improve the voter experience using the audio format with the tactile keypad or touch interface |
| What we tested | This was a test of the ballot marking interface using the audio format and tactile keypads or enhanced visual presentation. Participants used a working version of the ballot marking interfaceThe ballot was a shortened version of the NIST Standard Test Ballot.  |
| People | A total of 20 voters who are blind or have low vision or limited dexterity, including a mix of voting histories and demographic characteristics. Blind voters included people blind from birth and those with blindness acquired later in life. All participants were over the age of 18, eligible to vote in the U.S., and able to communicate in English. They included:[xx] voters who are blind from birth using the tactile keypad and audio  [xx] voters with low vision using the tactile keypad and audio[xx] voters with low vision using the touch screen with size and contrast options  |
| Recruiting | Participants were recruited through local community groups including the American Council for the Blind, Independent Living Skills Center, and Community Senior Center. |
| What we learned | Summary of the results of the activity: what was learned that was incorporated into the voting system. For example:* The edges of the switches had to be raised somewhat with a more defined bezel edge for voters to find them and use them accurately.
* Voters expect to control the speed of the audio and can go through the ballot faster than we realized.
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