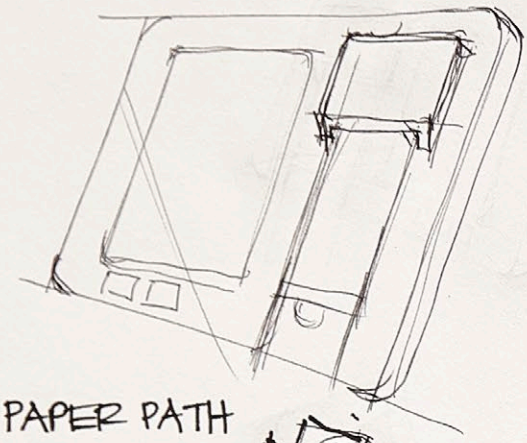
VOX Research Report

MARCH 2015

PORTRAIT A

FOR VOX RESEARCH 2



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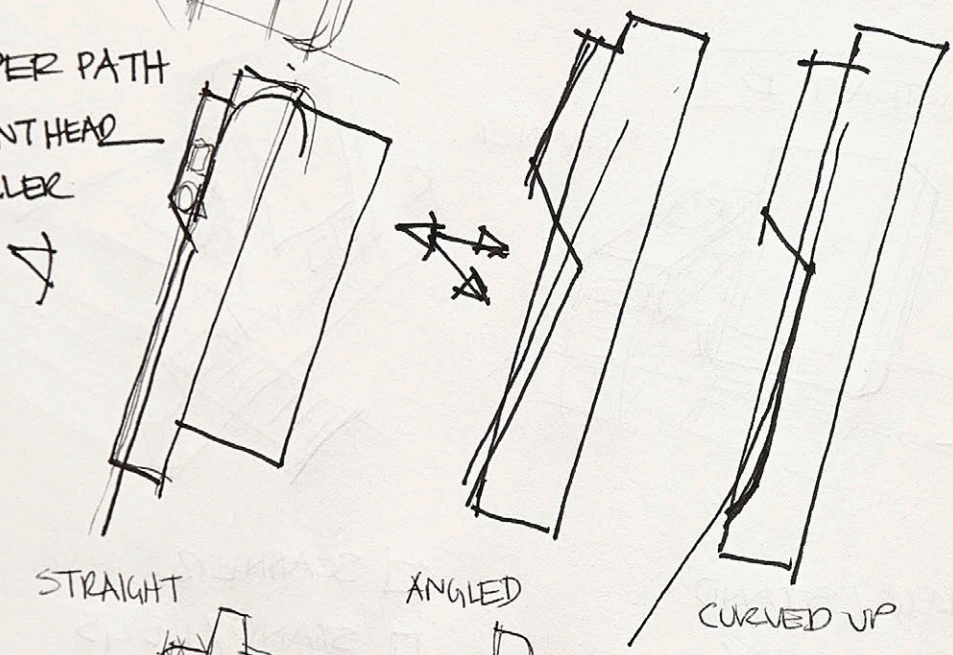

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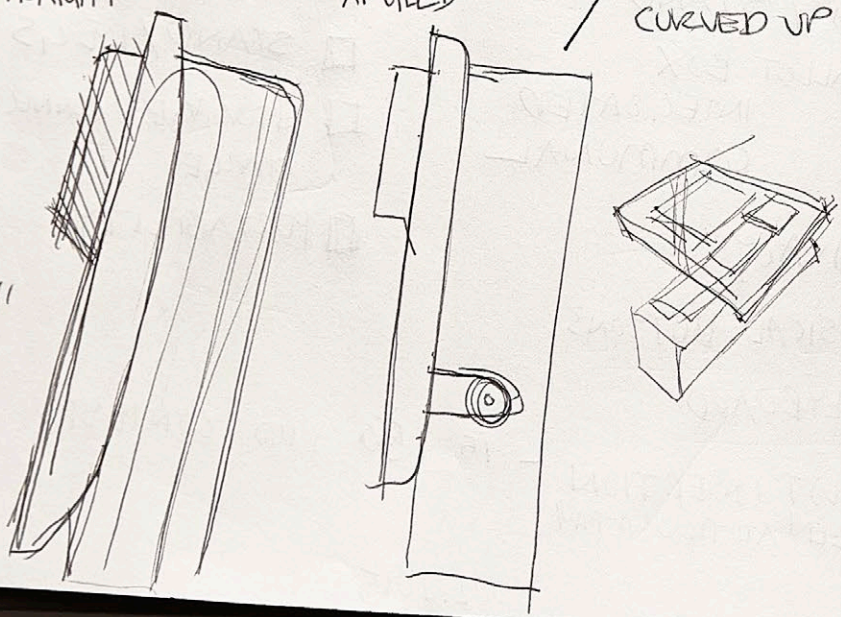
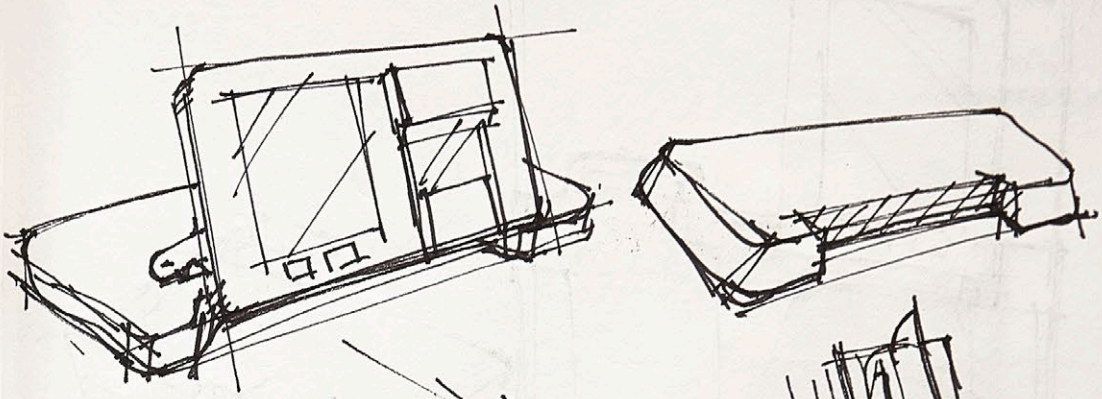
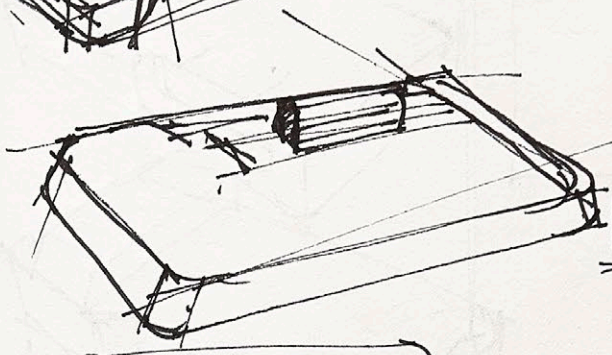
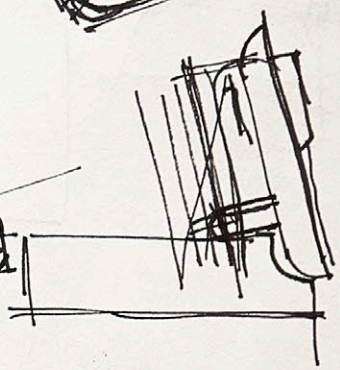
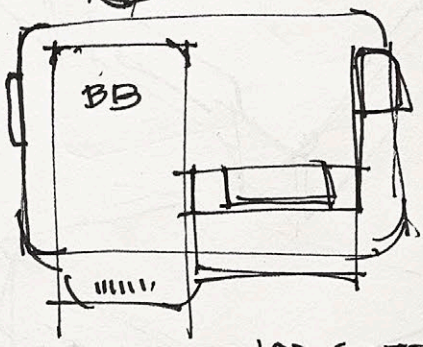
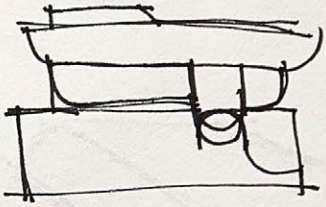




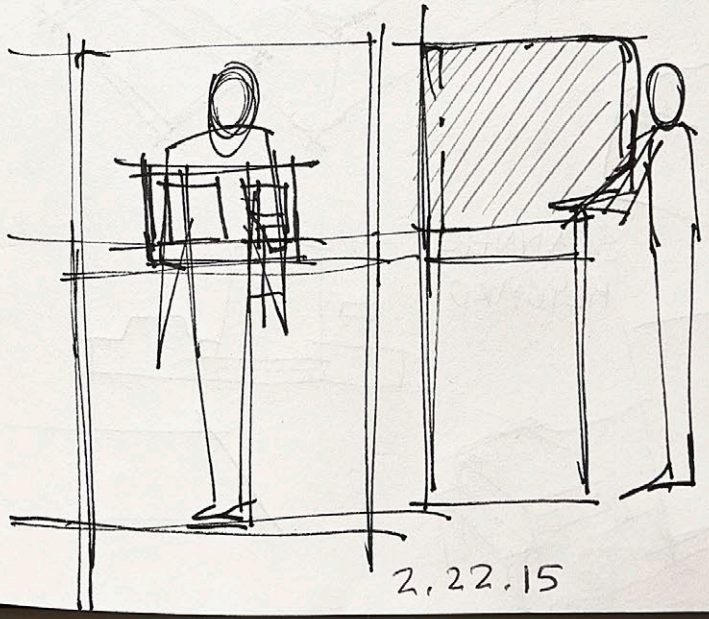


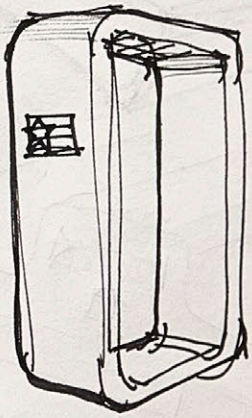


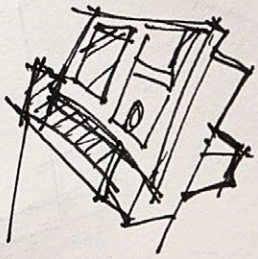




100 CONTEST BALLOT?







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VOX RESEARCH REPORT

USER TESTING RESEARCH. FEB. 27, 2015. V1.2. PROTOTYPE 5.1.2/3.1.2
THE HOLISTIC TOUCH VOTING EXPERIENCE

Summary

This randomized control trial of the voting experience provided the IDEO team with qualitative and quantitative data to inform our iterative design process. We engage 57 diverse participants in the process of voting using one of three voting systems, two experimental prototypes and one comparison system (LA County's current InkaVote). Data analysis led to the following insights:

- Although both central and integrated ballot boxes are acceptable options and both require more design work to make them truly intuitive, the integrated ballot box is more usable, private, and accessible.
- Voters who speak other languages preferred to see both the original English and the translation into their preferred language together. A monolingual experience is reasonably usable and accessible but would be substantially enhanced by the ability to easily toggle between preferred language and English.
- Ballot slot should be familiar (like the sidecar prototype) and enable voters to manage and review the ballot with ease (like the monolith prototype).
- Voters found the prototype's default settings fairly usable, in terms of screen angle, text size, and contrast. Letting them know that they can customize these things for their comfort and privacy will require better discoverability and clearer guidance.

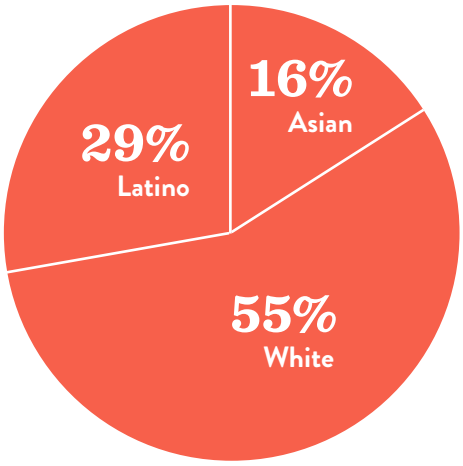
Participants

A total of 57 people participated. Participants were recruited using a non-representative sampling method called purposeful selection. Unlike representative sampling, which attempts to recreate the demographics of a particular community through techniques like random selection of households from all addresses in a zip code or random dialing from a complete set of phone numbers, purposeful selection intentionally targets people who represent groups of interest within a community. For this study we purposely selected participants who represent four groups of interest within the voting community: 1) Spanish speakers from diverse age groups, 2) elderly voters with diverse experiences with technology, 3) voters with a range of physical and learning disabilities, and 4) voters with design expertise. Some participants from the third and fourth group were drawn from within IDEO. In addition, Kenneth Bennett, Monica Flores and Adrian Avelar from VSAP core team within the RR-CC office were present for the test.

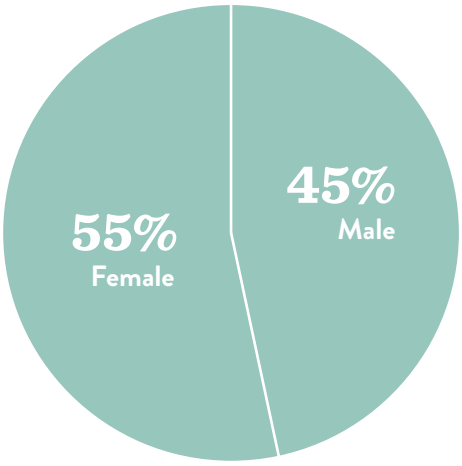
Participant Breakdown

Participants were diverse in terms of race/ethnicity, gender, age, educational attainment, ability, voting experience, technology experience, and financial status.

Race



Gender



Age

18-29	31%
30-39	23%
40-49	17%
50-59	2%
60-69	6%
70-79	10%
80-89	10%

Ability

Disability	20%

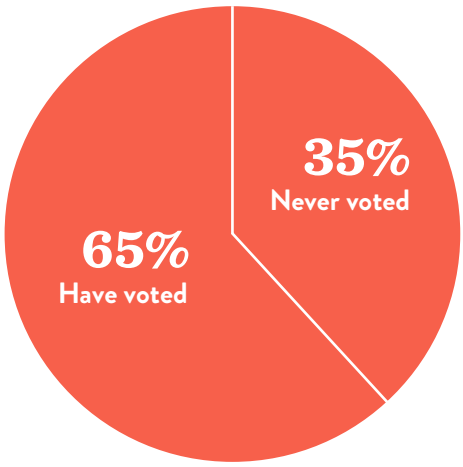
Educational Attainment

No formal schooling	0
1-8 Grade	10%
9-12 Grade	2%
High school	12%
Bachelors	33%
Masters	29%
PhD or professional	14%

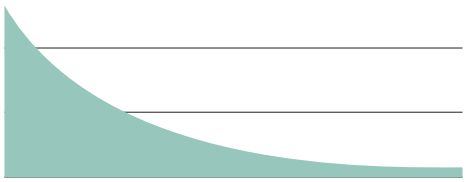
Voting Behaviors

Vote on big elections	42%
Vote on all elections	58%
Straight ticket	36%
Mixed ticket	64%
Vote on every issue	52%
Vote on issues I care about	48%
Vote by mail	52%
Vote in person	48%

Voting Experience



Computer usage



Financial Situation

Not enough for basics like food	2%
Not enough for bills	2%
Living month-to-month	22%
Enough but no savings	29%
Comfortable with a little left over to save	33%
Very comfortable & splurge	12%

Methods

This randomized experiment comparatively tested three voting systems: two experimental systems (A & B) and one control system (InkaVote). Upon their arrival, participants were randomly assigned to vote using one of the three voting systems at a 0.5:1:1 ratio. After randomization, groups were demographically and numerically comparable, including: 25 experiment group A, 22 experiment group B, and 10 control group (InkaVote).

Participants used the vote list method to make selections. This method, supported by the state voting system certification board, entails supplying the voters who are testing the system with a common list of choices for candidates and propositions and asking them to select only these choices.

At pre-determined times throughout the testing day, the prototype systems switched ballot box styles. Each time the switch was made, the user interface would change correspondingly and voters would be instructed to cast their ballot either within the booth in an integrated ballot box or outside the booth in a central box.

For all usability, accessibility, and privacy metrics, quantitative and qualitative data was collected by a team of 10 design researchers through two instruments: structured observation form and post-survey. During the post-survey, Spanish-speaking voters were probed on their preferences for language support. They were shown three interfaces for presenting voting information in their language, including Spanish with English subtitles, English with Spanish subtitles, and the Spanish only version they used in experimental systems A & B.

Overall limitations and biases for the study include Hawthorne effect[1], social desirability bias[2], and sampling bias[3]. These limitations are somewhat addressed by experimental randomization and the inclusion of a control group for comparison.

1 People tend to act differently when they know that they are being watched.
2 People tend toward social acceptable behavior and statements in a new social environment, often avoiding giving negative critique.
3 This is not a random or strictly representative sample of individuals, so their experience and feedback might not be representative of others'.

Prototypes

Two hardware prototypes depicted below (Version 5.1.2) were fabricated, each running versions of the User Interface (Version 3.1.2). These prototypes are detailed in the March 2015 Prototype Deliverable.


“I’d rather take care of it all in one place.”

INSIGHTS & FINDINGS

TOPIC: Ballot Box
BIG QUESTION: How do central and integrated ballot boxes compare, in terms of usability (efficiency, ease of use, ease of learning, user satisfaction), perceived privacy, and accessibility?
WHAT WE'VE LEARNED: Although both are acceptable options and both require more design work to make them truly intuitive, the integrated ballot box is more usable, private, and accessible.
DESIGN DECISION: Continue forward with the Integrated Ballot box, refining the experience to enhance its intuitiveness and perceive trustability.
PRINCIPLES: Public trust. Private & Independent. Easy.

Background

One of the fundamental decisions affecting the design of the BMD is where voters should cast their ballot: in a ballot box integrated into the BMD itself, or in a ballot box centrally located within the polling place and shared by all voters. Previous focus group style research conducted by LA County found that voters may prefer a central ballot box experience, as has been an integral part of the voting experience for the past decade or more in LA County. However, advocates for communities of people with disabilities argue that only an integrated ballot box allows people with visual impairments and other physical impairments to cast their vote independently and privately. Findings from this study pose some support and some opposition to both arguments.

Findings

1.1 Integrated ballot box is more private

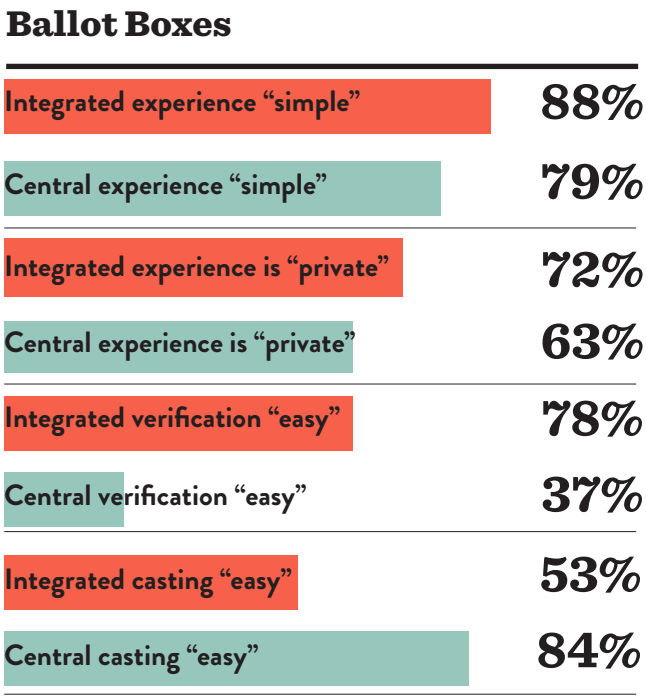
Principle: private & independent

Although this study did not include users from communities who struggle most with maintaining their independence and privacy while casting in a central ballot box (people with visual impairments and inability to hold paper), participants nevertheless found that the integrated ballot box was private and secure. During this study, 72% of the voters who used the integrated ballot box characterized their experience as private, as opposed to 63% of the voters who used the central ballot box. When asked specifically about how easy or difficult it was to protect their votes from being seen by others during the entire process of voting, 88% of the integrated ballot box users said it was "pretty easy" as oppose to 54% of the central ballot box users. Several voters who used the central ballot box noted that the printed ballot might be easy to read from a distance and they were interested in ways of keeping it private as they walked across the room to the central ballot box and they suggested using an envelope or folding the ballot in half.

1.2 Both ballot boxes are easy to use but the importance of the paper ballot must be clearer

Principle: easy

The overall experience of using an integrated ballot box was simple for voters but the actual process of casting needed more design work. Among those who used the integrated approach, 88% described their voting experience as simple. For those who used the centrally located box, 79% found it simple. However, when asked specifically about the part of the experience that involved casting their ballot into a box, 47% of the integrated users said that this design "was a little tough and needed more work" as opposed to 16% of the central box users. This voter viewpoint was reflected by observers, who noted that 61% of those who cast their ballots inside the booth had major challenges with the casting, as opposed to 11% of those who cast their ballot in the central ballot box. For many, the confusing aspect of this experience centered around recognizing that the paper ballot was still the ultimate ballot. People often made statements like "I didn't realize that there was one last instruction and I was about to walk away. The ballot felt like a receipt. So I didn't realize I had to put it back into the machine." When casting, several voters described feeling "weird about putting the ballot back into the same slot", since they understood this to be a slot dedicated to printing. Many of these voters felt that this confusion could be rectified by subtly suggesting that the slot was now in "casting" mode through color lights, decals, or indicators on the user interface.



1.3 The integrated ballot box is more convenient for all voters

Principle: easy

Those who had the integrated experience seemed to appreciate the fact that all parts of the voting process took place in one location and those who had the central experience found the second step of casting elsewhere to be a "hassle". A typical statement about the central box was: "I would rather cast it at the machine, somehow everything else was in one place and so I don't see why I have to take this someplace else."

1.4 Verification was easier with the integrated ballot box

Principle: public trust

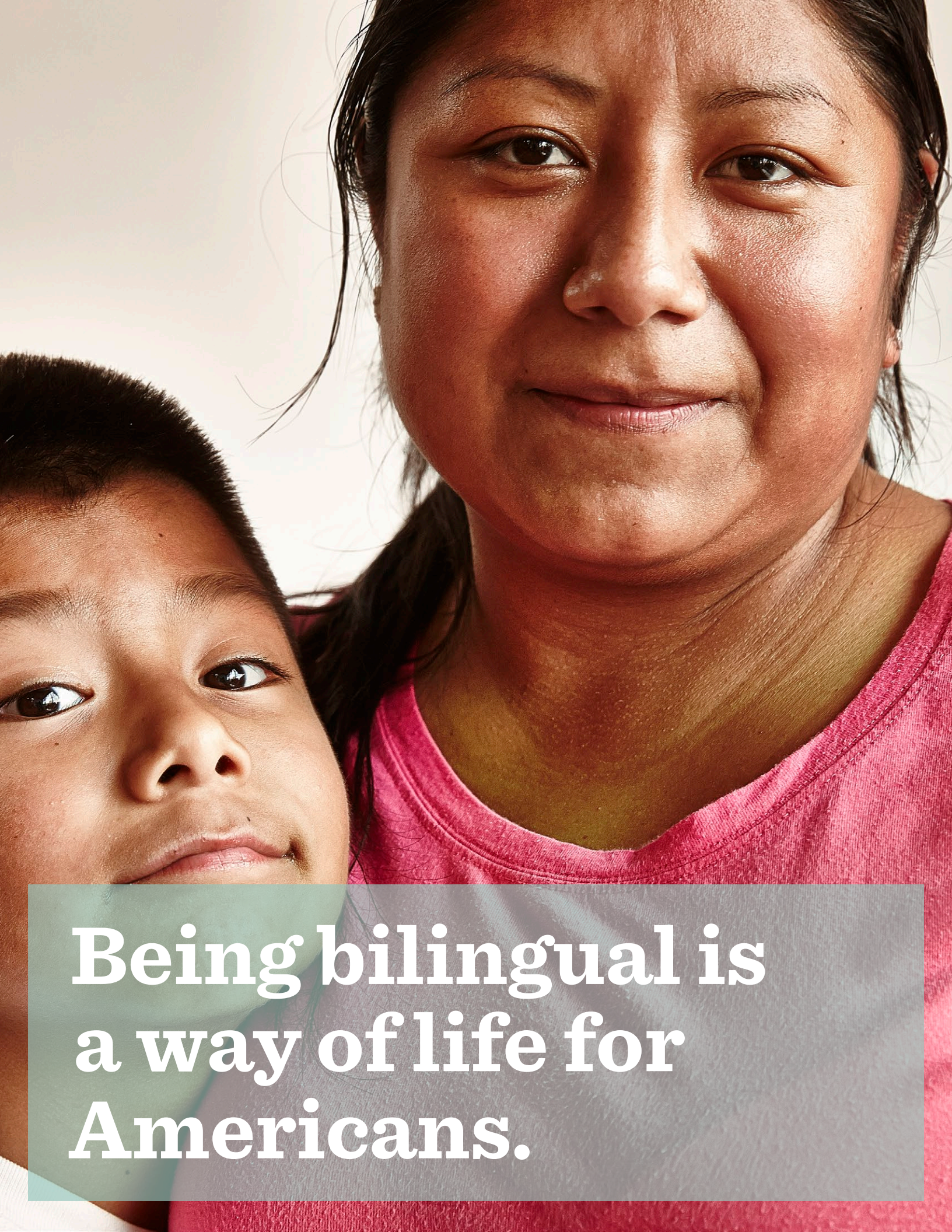
78% of those who used the integrated box found it "pretty easy" to make sure that their ballot had all of the right things printed on it before casting, as opposed to 37% of those who used the central box. This is an interesting finding because the review screen and the actual paper ballot was identical for integrated and central ballot boxes, so both offered the same tools for verification.

RECOMMENDATIONS

We recommend proceeding with an integrated ballot box. This study found that, compared to a central ballot box, the integrated ballot box was easy, private, and independent. Although LA County's research suggested that voters without disabilities might find the integrated ballot box to be unacceptable, as they expected the central box to be a part of the voting experience, our studies do not corroborate these findings. Furthermore, information and data gathered during subject matter expert interviews and past Vox studies indicated that integrated ballot box is a more accessible option for communities of people with disabilities.

Based on this cumulative evidence, the next steps for the design of the integrated ballot box experience include:

- Helping voters understand that the paper ballot is the official ballot, perhaps through illustrated/ animated screens;
- Clearer communication of steps to take after ballot is printed perhaps through illustrated/animated screens; and,
- Making the process of casting inside the booth vote feel more official.



Being bilingual is a way of life for Americans.

INSIGHTS & FINDINGS

TOPIC: Language Access.
BIG QUESTION: How do we provide a highly usable experience for speakers of other languages?
WHAT WE'VE LEARNED: Voters who speak other languages preferred to see both the original English and the translation into their preferred language together. A monolingual experience is reasonably usable and accessible but would be substantially enhanced by the ability to easily toggle between preferred language and English.
DESIGN DECISION: Continue to explore ways to make monolingual UI more bilingual, through quick and easy toggle to/from English and target language.
PRINCIPLES: Public trust. Private & Independent. Easy.

Background

Los Angeles' is one of the most deeply diverse communities in the world. The voting experience is supported in ten languages and LA County election officials look forward to being inclusive of even more languages in the future. Providing adequate information to speakers of other language is a complex process and there is no consensus on best practices. Most prominently, elections experts disagree on whether information on ballots, user interfaces, and other election materials should be monolingual or bilingual (English and other target language). Bilingual information is challenging to present, given physical space constraints on paper and increasing number of contests on each election. Bilingual presentation is also difficult to achieve from a software production perspective (Skye. Furthermore, the BMD experience is the foundation of other voting mechanisms, such as the audio-touch user interface and the interactive sample ballot. And, as such, the monolingual or bilingual approach to the BMD may need to be consistent across all these interfaces. For example, a bilingual BMD may need to then provide a bilingual audio experience, perhaps forcing all audio users to hear everything in both English and their home language, further lengthening the time and effort it takes to vote using the audio access features. Although our team understands these design constraints well, we needed to further understand the user experience and explore preferences in search of a solution that is both practical and desirable.

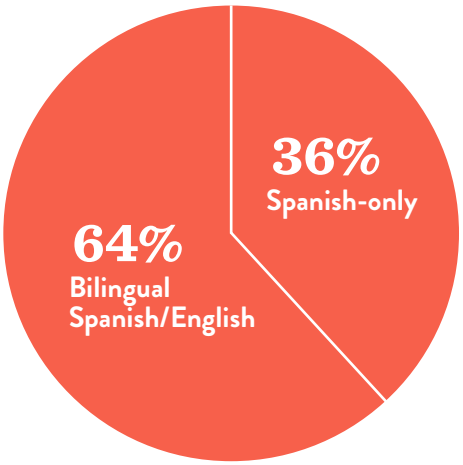
Findings

2.1 Voters trust information in English and their own language

Principle: public trust

Voters who tested our system came from diverse cultural and linguistic backgrounds and 28% preferred to vote in a language other than English, specifically in Spanish. When we demonstrated different ways that written information might be presented to those voters on a touchscreen interface, the majority preferred bilingual English-Spanish (64%) and a smaller percentage preferred Spanish-only (36%) information. Future studies might probe into why bilingual information is preferred. However, during anecdotal conversations with Spanish speakers participating in the study, some explained that they did not always trust the translations provided by elections officials and others reported that they were sometimes more familiar with specific elections terminology in English.

Language Access



2.2 The monolingual experience is simple and accessible

Principle: easy

Although most preferred bilingual information, the experimental system prototypes provided a monolingual user experience and most found this Spanish-only version highly usable. 85% of Spanish speakers felt it was easy to get information in their language and 93% of Spanish-speakers described the system as "simple". Interestingly, Spanish speakers rated usability high despite the fact that none discovered the ability to toggle between Spanish and English during their voting session.

RECOMMENDATIONS

We recommend continuing to explore a monolingual UI for the time being. This study found that Spanish-speaking voters preferred a bilingual user interface, yet they found the Spanish-only interfaces in experimental systems A & B as easy to use, which suggests the preference may not be a strong one. Taking into account the challenges a multilingual UI presents to the holistic voting experience, we recommend continuing design work on a monolingual UI that still allows voters to take advantage of their own bilingual ability to increase trust in the translation.

Next steps for the design of the non-English UI include:

- Improving the discoverability and ease of switching between languages during a voting session in the UI, perhaps through an accessible and persistent button on the top of the screen.

Like a firm hand-shake, putting your ballot in tells you a lot about what to expect.

INSIGHTS & FINDINGS

TOPIC: Ballot slot.
BIG QUESTION: What are usable, accessible, and private ways to manage the paper ballot?
WHAT WE'VE LEARNED: Ballot slot should be familiar (like the sidecar) and enable voters to manage and review the ballot with ease (like the monolith).
DESIGN RECOMMENDATION: Move forward with t he sidecar approach, incorporating the benefits of the monolith such as ease of verifying and casting paper ballot.
PRINCIPLES: Private & Independent. Easy.

Background

To optimize our system's usability and accessibility, our design team needed to understand how diverse voters manage their paper ballot, including the process of using a specially designed ballot slot to insert, print, validate and cast the paper ballot. We compared three options: the monolith, the sidecar, and the InkaVote as depicted below. The monolith was designed to enhance accessibility. It is located at about shoulder-height, keeping the potentially long paper ballot from dangling in a way that would require fine motor skills or muscular control to manage as the voter reviews the printed selections and also keeps the ballot out of the way of a wheelchair or a seated voter's knees. The sidecar was designed for intuitive simplicity. It uses a slot familiar to any ATM user and an insertion point at about elbow height. Since inserting the paper ballot is one of the preferred mechanisms for activating the appropriate ballot group on the BMD, this first gesture starts the voting process and introduces users to the system. Neither the monolith nor the sidecar prototypes performed perfectly, however both offered desirable features that might be strategically combined to create an accessible and usable solution.

These prototypes were developed in response to two previous Vox research sessions: February 5th inspiration session with five users who have access challenges and February 20th inspiration session with seven users with cerebral palsy. Insights from the first session are described elsewhere (link report). Insights from voters with cerebral palsy include: (1) The sidecar concept made the ballot return and verification process awkward for people with limited use of their arms. Furthermore, placing the slot at this relatively low position resulted in ballots hitting the knees of voters in wheelchairs. (2) The sidecar model is relatively intuitive for ballot insertion among people with varying cognitive capacity.

The Monolith design is a more ambitious development effort than the Sidecar. Because the paper path, and thus the integrated ballot box, is joined to the screen, the mass of these parts (plus the mass of the ballots) must be supported by the hinges that suspend the display. The hinges require friction to hold the mass in place, or the display would drop and fall either forward or backward to 90 degrees of 0 degrees. With a heavier Monolith design, more friction is required. This additional friction can be applied all the time, which would make the display generally harder to position (perhaps so hard that some voters would be unable to do it independently). Alternatively, the increased friction could be selectively applied by using a lock that can be temporarily released by the user to reposition the display. This latter approach was employed in the Monolith prototype and reduces the force required for the user to reposition the display but

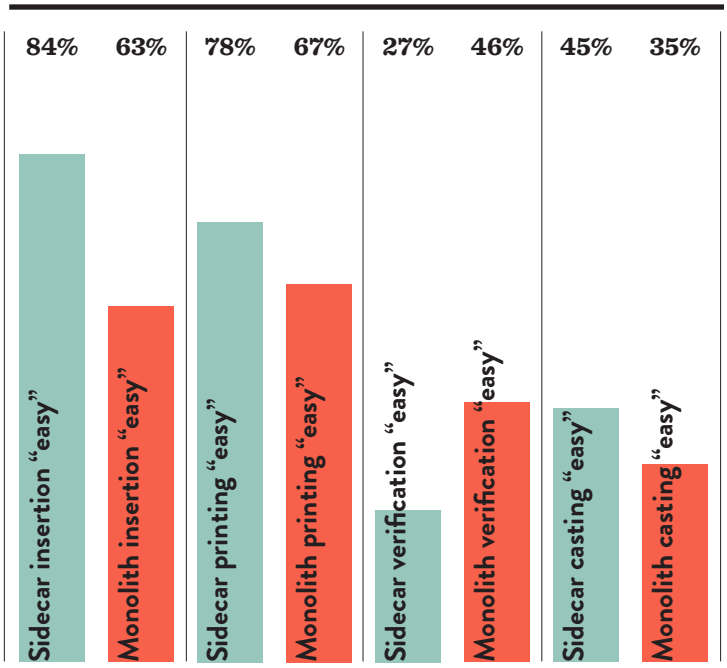
adds the complication of a latch that must be discovered by the user. The monolith prototype also employed a spring counterbalance system to further reduce friction forces, but the counterbalance cannot be made perfect because the mass to be counterbalanced is variable (as the number of ballots in the box will vary over the course of the day). The Monolith's paper path is significantly more challenging than the Sidecar's paper path because the Monolith requires a 180 degree bend. It also limits the length of a ballot that could fit packed behind the height of the display, such that a 4" ballot would be untenable and a 6" ballot would be a concern for scenarios where more than 50 contests are required.

Findings

3.1 Voters found the sidecar concept easier to use

Principle: easy

Inserting the ballot into the sidecar ballot slot was preferable to most voters. 84% of users who voted with the sidecar ballot slot found it easy to use. Ease of use was next highest for the InkaVote (78%) and then the monolith (63%). Mirroring these results to a degree, testing observers found that the process of inserting the ballot into the sidecar was slightly easier for the sidecar users (77%) than the monolith users (73%). Opinions about ease of use may be influenced by how well the intended use is communicated. Both the sidecar and the monolith designs could likely be made more intuitive through the use of instructional text, on-screen graphics, and printed or illuminated graphics/instructions on or next to the paper path.



3.2 Activating a session by inserting a ballot needs to be more intuitive

Principle: easy

Overall, the concept of inserting a paper ballot into a machine was completely foreign to users and, so, they often described being unsure about how the session started -- with inserting the ballot or touching the screen. Confusion about this first touch made voters feel "intimidated" and "afraid I was going to do it the wrong way." On the monolith, voters were especially confused by the presence of a clear plastic sheath over the slot, unsure about whether their ballot went below or above the plastic.

3.3 Printing a ballot is easy, but why a ballot is printed needs to be more clear

Principle: easy

Similarly, the concept of "printing" a ballot was new to users. 78% of sidecar users found this process easy, as opposed to 67% of monolith users. These early prototypes are not yet capable of printing a ballot and so the cast of observers and Pollworkers had to fake the process, handing users a printed version to replace their blank ballots when they emerged from the slot. Even at this low fidelity, most users pointed out they were surprised by printing and unsure of the relationship between the paper ballot and the BMD. They typically made statements like "I didn't know it was going to be printed. It was a little strange."

3.4 Validating the paper ballot is easier on the monolith concept

Principle: private/independent and easy

The next step in managing the paper ballot is verification. As previously described, this prototype was not capable of printing on blank paper ballots and, to provide a similar experience, observers gave voters a printed ballot and asked them to pretend that it just came out of the BMD. According to our data, observers reported that the process of verifying the ballot worked more seamlessly for the monolith users (46%), as opposed to sidecar users (27%) and InkaVote users (10%). However, it is difficult to estimate the impact or bias that our mocked-up process might have on the verification experience.

3.5 Voters were confused by the need to cast the paper ballot

Principle: easy

Then, the process of casting the printed ballot was unintuitive with either slot option. Unaware of the legal requirements for paper ballots, most users thought the process of casting the paper seemed redundant. As one voter put it, "if you are dealing with a voting machine, why would you want a paper ballot at all? Isn't the electronic age supposed to replace that?" Adding to the confusion around the roll of the paper ballot, voters were perplexed by the mixed functionality of the slot. As one user described it, "It felt unusual to put the piece of paper back into the printer again." For both the sidecar and the monolith, users tended to feel that "it wasn't clear what I supposed [sic] to do next." Voters provided various suggestions for clarifying these mixed functions, such as indicator lights with different colors, decals on the slot itself, and UI graphics.

3.6 Voters found InkaVote to be unintuitive

Principle: easy

Although the InkaVote has an entirely different process of managing the paper ballot, it is important to point out that voters tended to find it unintuitive. They noted that "knowing what to do next was difficult" and "I wasn't sure what to do with the perforations," and "although I am sure the booklet had lots of details, it was just easier to ask what to do when it was unclear."

RECOMMENDATIONS

We recommend moving forward with a sidecar approach, but incorporating the benefits of monolith such as improved ease of verifying the paper ballot. This study found that voters felt sidecar was easier to use, however, we know from our experience with voters with cerebral palsy that ballot access would need to be improved, both for handling verifying the paper ballot.

Next steps for design include:

- Exploring ways to evolve the sidecar concept to make verification of the printed ballot easier, especially for voters with disabilities
- Improving the discoverability of how to activate a voting session
- Explore ways to reduce confusion about the process of printing, verifying and casting the paper ballot


When it comes to voting, there’s no one size fits all.

INSIGHTS & FINDINGS

TOPIC: Customizing preferences
BIG QUESTION: How do voters want to customize their experience, in terms of making the screen angle and user interface comfortable for them?
WHAT WE'VE LEARNED: Voters found the prototype's defaults fairly usable, in terms of height, screen angle, text size, and contrast. Letting them know that they can customize these things for their comfort and privacy will require clearer guidance.
DESIGN DECISION: Refine a mixed approach to managing preferences, prioritizing a select few preferences to welcome all voters and enhancing the discoverability of all preferences.
PRINCIPLES: Public trust. Private & Independent. Easy.

Background

Previous Vox studies suggested a relatively comfortable set-up for most voters, in terms of height, screen angle, text size, and contrast. However, past studies also indicated that allowing users to customize these defaults is essential. For example, many past testers demonstrated a desire to tilt the screen to enhance accessibility for voters of different heights, viewability under different lighting conditions, and privacy during key moments in the voting process. The design team wanted to test two mechanisms for articulating the screen, two ways to customize user interface settings for text size and contrast, and to further understand what circumstances might inspire voters to customize their set-up.

Findings

4.1 Voters didn't discover they could customize their experience

Principle: easy

The vast majority of voters did not use the customization features built into the prototypes -- including the screen articulation mechanism, interface for setting preferences, and physical buttons for changing preferences. Quite simply, they did not know that these were adjustable and several made statements like "The angle thing on the side? I didn't know if I should touch it." Another voter told us, "It was not intuitive that I could change it. My kids messed with the buttons and that's how I realized that I could make the text bigger. And I liked it better that way." Observers witnessed several users squinting close to the screen, taking reading glasses on and off, while not discovering any of the settings options that allowed the text to be larger or more contrasting.

For the majority of the sessions, voters started with the screen positioned at 45 degrees. For about 45 minutes in the middle of the day, the team tried starting the screens at 0 degrees (flat, parallel to the ground) to see whether this seemingly awkward position would make it more likely that voters would try to adjust the screen angle. We found that it did not have this impact. People completed the voting session

with the screens flat, as they found them, without trying to reposition them. One notable incident, though, was that a wheelchair voter did attempt to change the angle of the display. She reached out to change it from 45 degrees to 90 degrees--perpendicular to the floor--so that she would be able to reach all areas of the touchscreen.

4.2 Most found the default experience comfortable

Principle: Private/independent and easy

One plausible explanation for the general lack of awareness of these customization features was that most were comfortable enough with defaults. While the default set-up might not have been not optimal, the settings were adequate and the voting session was fairly fast at 15 minutes or less. Observers noted that the height was comfortable for 98% of voters and screen angle was comfortable for 70% of voters. Similarly, observers found that 96% of voters were able to read the text, although only 5% really succeeded at changing their settings preferences. One voter noted, "I am color blind, so things aren't always easy for me to see. But, I didn't have a problem seeing this and did not even know that there was an option to change the colors."

4.3 Customization is still valuable

Principle: easy

When observers informed voters that they could customize aspects of their experience, many appreciated the adjustability. One voter, who brought her two children to the session, adjusted the screen so that it would be out of her children's reach. "They immediately started touching the screen when we got to the booth," she described "and I moved it back so they couldn't get at it." As reported above, a voter in a wheelchair attempted to adjust the angle so that the screen was accessible to her. Several felt that laying the screen flatter enhanced the privacy of the voting session. As one described it, "Once I knew how to adjust it, it was easy, and it would have been miserable the way that it was set up."

RECOMMENDATIONS

Voters found the prototype's defaults fairly usable, in terms of height, screen angle, text size, and contrast. Letting them know that they can customize these things for their comfort and privacy will require clearer guidance.

We recommend a mixed approach to managing preferences, prioritizing a select few based on our accumulated data. Preferences can be divided into two groups: welcome preferences and special preferences. Welcome preferences are those that should be introduced at the beginning of every voting session. Introducing, in this sense, means overtly communicating their presence and enhancing their overall discoverability throughout the remaining session. Those settings in the special preferences group will also need to be highly discoverable but we will not need to draw every users' attention to them. All preferences must be easy to implement, requiring users to do as little as possible. For instance, to minimize the number of things that must be discovered for a voter to make screen adjustments, we

recommend moving forward with the screen-holding approach used in the sidecar prototype. This prototype does not have a release clamp, so altering the screen angle is a one-step instead of two-step process.

Next steps for design will include:

- Confirming the list of "welcome preferences," which is likely to include language, text size, and screen angle.
- Confirming the list of "special preferences."
- Exploring ways to enhance the discoverability of preferences.
- Further refining the screen-holding mechanism for screen articulation so that the angle adjustment is easier for voters to achieve.