Testing the accuracy of voter data collected through the "Your Voice" mobile app

and the study of the application's usability

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Testing the usability and accuracy of voter data collected through the "Your Voice" mobile app

Executive Summary

On February 3rd, 2020 our Democracy was introduced to technology. The 2020 Iowa Democratic caucus used a mobile application to gather and compile caucus votes. Unfortunately, the application did not produce results and was ultimately a failure. "The app that the Iowa Democratic Party commissioned to tabulate and report results from the caucuses on Monday was not properly tested at a statewide scale, said people who were briefed on the app by the state party. It was quickly put together in just the past two months, said the people, some of whom asked to remain anonymous because they were not authorized to speak publicly" (Corasaniti, Frenkel and Perlroth, 2020). This idea was not lost. If technology can be incorporated into so many aspects of everyday life then it should be incorporated into our Democratic voting process. Some would argue that our voting process isn't ready to transition to voting application via cell phone or computer because of security issues. The argument could also be made that voting booths have posed and continue to pose security issues. To combat this issue technology should be used to compensate voters in a securely encrypted environment. The technology that should be used to assist with secure voting issues are applications and websites.

The name of the application to be developed will be called "Your Voice." The application will be used to collect and verify voter decisions on an initially small scale (local elections). Users will also rate the usability of the application by taking a survey provided to them. This project application will be managed by me. The primary stakeholders in this project will be Dr. Lui, my instructor, and primary users. Secondary stakeholders will be government officials contacted to give advice on the democratic process and the future of voting applications. This

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application will be developed for use only in the state of Georgia and could branch out to other

states and eventually be used nationwide after verification and secure establishment. The

mission of the "Your Voice" project is to provide a stable and secure democratic voting

experience to users electing government officials to office.

Background

This project will be implemented with several tests and user tasks analysis to ensure the

user needs and individual requirements are met. The voter data analysis portion of this project

coincides directly with informatics studies. Once this application is designed it will test the

accuracy of voter data collected through a mobile application called "Your Voice." After the

votes are tallied via the website they will be confirmed and verified with the user. The votes are

data measured. The application is the technology being used to measure data and confirm it is

correct. The survey that will be given to all clients that use the app will contain questions

pertaining to the usability of the application. This portion of the project links directly to my

concentration in Human-Computer Interaction and will gauge the user experience so ongoing

adjustments can be applied. With any system constant updates should be made and ideas can

be derived from the user base.

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Adjustments were made as of 3/21/2020 due to the Covid-19 pandemic. The primary area of study where data will be collected is application usability. The covid-19 pandemic had a specific effect on the importance of this capstone project and the need for a mobile voting application in our society. This is echoed by both users participating in this capstone study in the user-task analysis videos. The objective of this project is to provide a secure mobile voting platform for users to access as a supplemental alternative to going to the polls in person or voting by mail. The scope of the project is to investigate what users would like to see in a mobile voting application and how they would use it. The clients/users of this application are registered voters that are 18+. This application is not an application for voter registration, but does include resource links to vote.gov so that voters can register and use the application. Survey questions that users answer after completing usability testing of the prototype and application will serve as data. Questions where an answer is required will serve as qualitative data and questions where a rating/scale answer is required will serve as quantitative data.

The proposed application system along with usability testing will give us insight into how a mobile voting application should be designed and how it can be effective and appealing to the large demographic this application needs to cater to. The usability assessed in this application will directly relate to the role of Human-Computer interaction. We are currently in a pandemic where the health of people is at risk when gathered in large crowds. This would particularly apply to voting precincts. Right now, voting precincts and mail-in voting are the only options available for electing government officials. Mail-in voting takes place in advance to ensure the vote can be counted by the deadline and can present an inconvenience if the voter wants to change their selection during the week leading up to election day. This application would serve

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the us well for real-time and accuracy purposes. It serves as a specialized area of importance in the current pandemic climate where we are encouraged to distance socially.
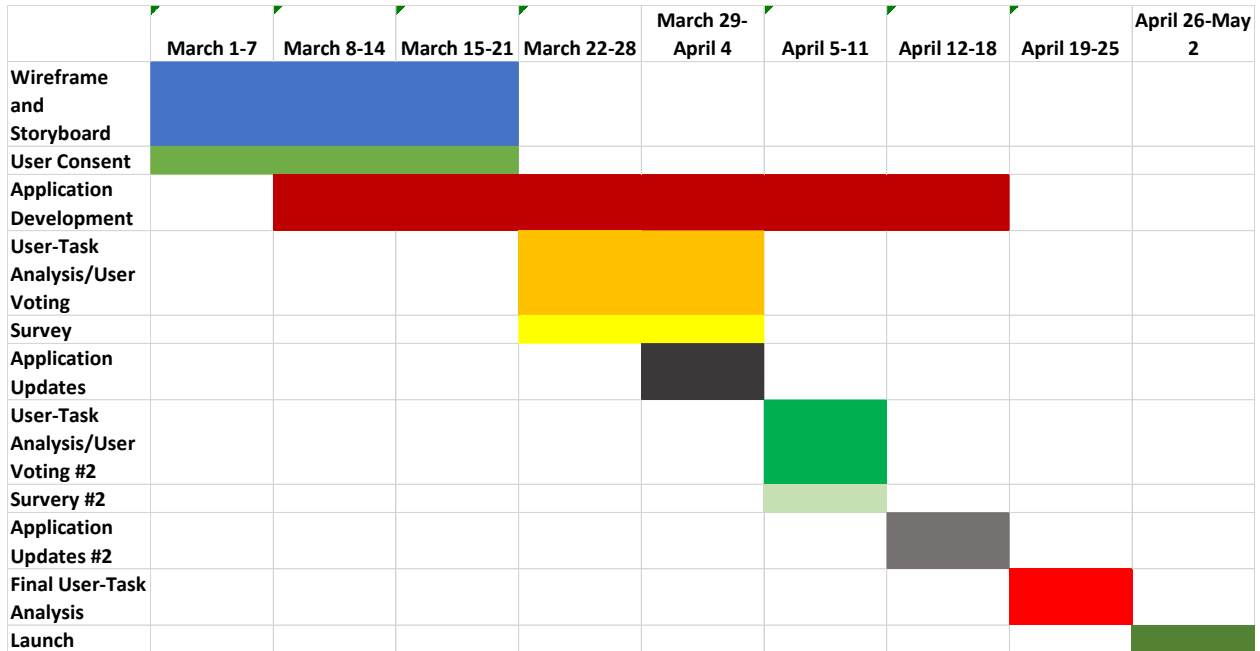
Project Planning Report

Purpose and objective – The purpose of this project is to develop a secure and accessible way for people to vote for political candidates. This will solve issues with long lines at voting precincts and current security worries with current voting machines used. This project is not meant to replace the current Democratic voting process, but to assist and improve upon the process. The confirmation process in this project will also be used in real-time with the final application system. Voters currently do not receive a confirmation of their vote and selections. The application system will produce this response for user personal record and to confirm numbers if a re-count is believed to be initiated.

Scope – The "Your Voice" application will function on local and then national levels to securely and efficiently compile user votes with confirmation. The interface should be user friendly based on usability data collected. The interface should be secure based on journalistic article research on application encryption and live cybersecurity monitoring during the voting time period. The "Your Voice" application should only be used in supplement to traditional voting methods (voting precincts and vote by mail). The application was not created for voter registration, but a resource link is provided.
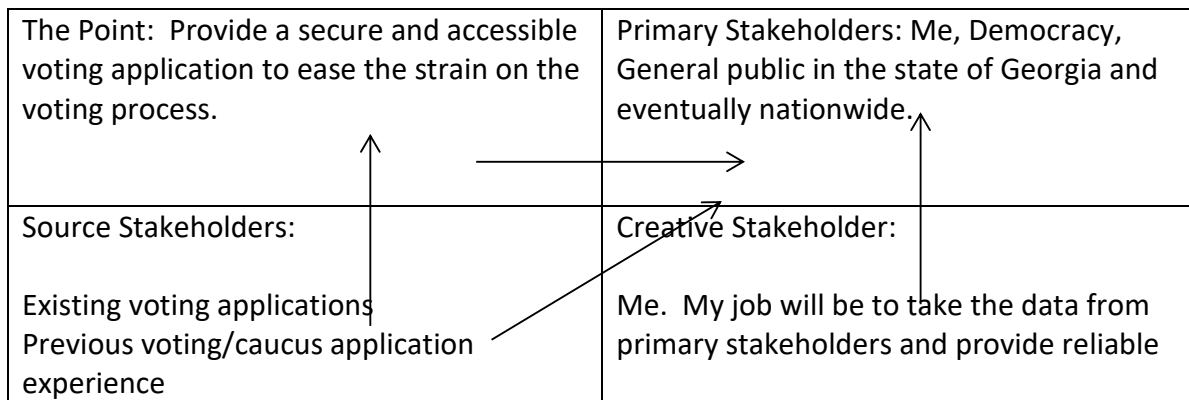
Timeline – The timeline for this project will be 8 weeks and 4 days. The project will run from 3/2/2020-5/2/2020. Updated 3/21/2020 due to COVID-19 pandemic. This application. The key timeline areas are listed in the Gannt chart below.

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	March 1-7	March 8-14	March 15-21	March 22-28	March 29-April 4	April 5-11	April 12-18	April 19-25	April 26-May 2
Wireframe and Storyboard	██	██	██						
User Consent	██	██	██						
Application Development		██	██	██	██	██	██		
User-Task Analysis/User Voting				██	██				
Survey				██					
Application Updates					██				
User-Task Analysis/User Voting #2						██			
Survery #2						██			
Application Updates #2							██		
Final User-Task Analysis								██	
Launch									██

<u>Resources</u>

The required resources will be the Mercer INFM server, Text pad application, Adobe XD software, Zoom video conference services, Survey Monkey services, and participation from all stakeholders. Stakeholders include me as the primary investigator and all user participants used for project development. The state of Georgia is the origin stakeholder for this application. The entire nation and democracy will be the final primary stakeholder. Please refer to the stakeholder map below for these connections.

The Point: Provide a secure and accessible voting application to ease the strain on the voting process.	Primary Stakeholders: Me, Democracy, General public in the state of Georgia and eventually nationwide.
Source Stakeholders: Existing voting applications Previous voting/caucus application experience	Creative Stakeholder: Me. My job will be to take the data from primary stakeholders and provide reliable

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Journalistic articles on feasibility of mobile application voting	voting results via the application with confirmation

Site Analysis

The "Your Voice" site will be analyzed on a year-round basis even though it is meant to be operational only during voting season. Security is of the upmost importance and constant updates will be needed to maintain a secure environment. A team of analyst will need to be up in place for it's ongoing operation as well as live analyst that are to monitor the system environment to ensure it stays secure during the voter democratic process.

Competitor Analysis

There are voting applications that have been put into place for various tasks, but there is not a current competitor in the space using a mobile application or website to vote on government officials live during a specified election time period. Live early voting dates and times may be decided upon for the ''Your Voice" application in coordination State and Federal government voting dates and practices. These dates will require live monitoring of a security analyst team as well.

System Design

User Interface Design and Storyboard

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Figure 1

Figure 2

The application logo was generated from a common knowledge symbol. People can relate to a

check mark in a box equating to a vote or a selection being made. This simple image was

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created using Microsoft Whiteboard and hand drawn with shaping characteristics using a digital

pen. The font was added to state the "Your Voice" name. The prototype and storyboard app

designs had very little color. The application logo was altered to include red, white and blue

colors for patriotism. The application design and color scheme also reflect the red, white, and

blue colors. These colors and evenly distributed throughout the app design in an appealing
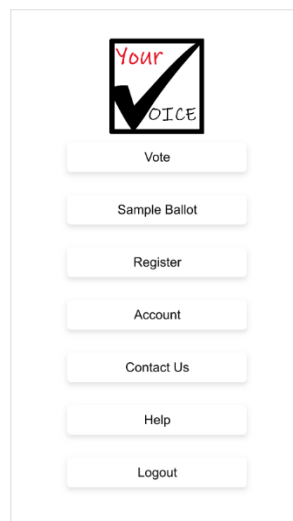
manner.

Functions Design

Figure 3

The "Your Voice" voting application includes 6 functions and 1 primary function totaling 7 as

seen in Figure 3. The functions of the application are listed below and described in detail.

Vote (Primary) - Voting is the primary function and purpose of the application. This function is

the first to appear on the home screen and takes voters through preparation to vote as well as

the actual task. The vote function opens up to first verifying that a voter is registered and

confirms this with the voter registration database. This function also opens up to the "Register"

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function if needed. After confirming the user as a registered voter, the option to "Cast your

vote" or "View a Sample ballot," another function is introduced. After selecting the "Cast your

vote" tab a reminder is given to make sure you are in a private and quiet environment. The

primary purpose of the voting function is revealed after confirming this reminder allowing the

user to access select districts and place their vote.

Sample Ballot - Sample Ballot is the second function introduced from the home screen. This

function allows the user to view the ballot before making selections. It can also be accessed

after initiating the "Vote" function above. Placing this function in two accessible areas of the

application prior to voting provides education to the user about what to expect before making

important selections.

Register - Register is the third function accessible from the home menu. This tab takes the user

away from the "Your Voice" application to the official Vote.gov website where voter

registration takes place ("Your Voice" is only a voting application and not a voter registration

app). This offers the user the opportunity to register so they can use the "Your Voice"

application to place their vote. The "Register" function can also be found by accessing the

"Vote" function leading into confirmation of voter registration. If the voter is not registered this

function is accessible in this portion of the app as well.

Contact Us - Contact Us is the fifth function located on the home menu. This function allows

users to leave comments for the "Your Voice" customer service team related to any issues they

may experience. The function leads to a subject and body message submission layout. After the

contact is submitted a confirmation appears and the user can return to the home screen.

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Help - Help is an area of the application that shows frequently asked questions. This area works in conjunction with contact us to display frequently arising issues. This helps the user to find answers they seek relating to the "Your Voice" application.

Logout - This is the final function located on the home screen and is self-explanatory. It offers the user the option of logging out securely and leaving the application.

Scenarios Design

The scenarios design is comprised of a scenario storyboard showing a scenario where the "Your Voice" application would be used. There are several other scenarios where the application can be used in addition to the one exhibited in the design. Some voters are elderly and don't want to go through the hard work and preparation of taking a trip to the precinct. They also may be undecided as to who they would like to select up until the actual election date, which would rule out mail-in voting by ballot. In this instance the "Your Voice" application would a great voting alternative for them. The scenario doesn't just fit the elderly. In the User 1 task analysis the user stated that this application should be used as a primary replacement for both voting in person and mail-in voting. See Appendix

Database Design

The database design outlines the defined variables for the application and how those defined variables come together to form a concise database. See Figure 4 below.

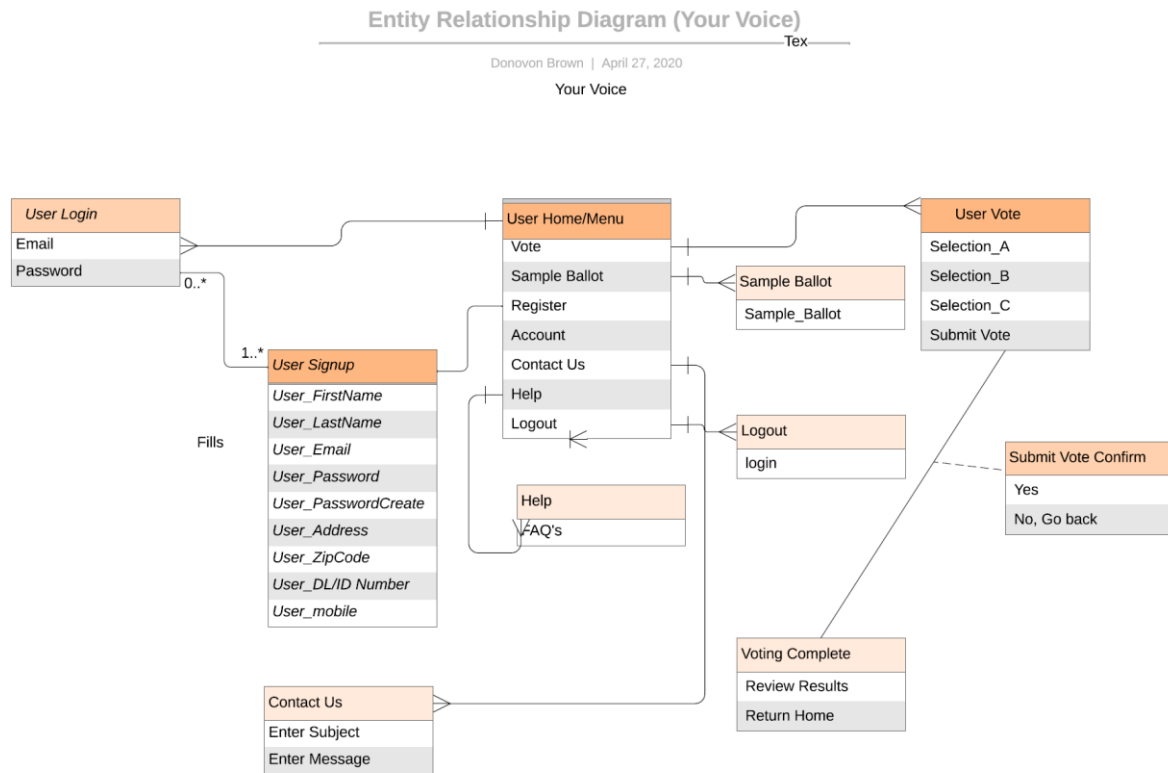Testing the usability and accuracy of voter data collected through the "Your Voice" mobile app

Entity Relationship Diagram (Your Voice)
Donovon Brown | April 27, 2020
Your Voice

Figure 4

Usability Study Method

Proposed Research Methodology

Study population – The overall study population will consist of 180-200 Male and Female voters

between the ages of 18 – 62 in the Metro Atlanta area. This group is a true representation of

U.S. voter demographics. A smaller sample group will be selected for the development of this

project from the overall study population to reflect diversity in all areas.

Data Collection – Quantitative data will be collected using the "Your Voice" application. The

quantitative data will be confirmed using a survey from Survey Monkey. After the confirmation

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of quantitative data section within the survey is complete another section will ask questions to

gather qualitative data relative to usability and human-computer interaction.

Data Analysis – Quantitative data processing will be processed from each user and compiled to

determine a final selection based on user voter data in each category. The confirmation should

reflect the exact same numbers and confirm the data selection. Qualitative data will be

assessed by survey to gauge usability and human-computer interaction issues. This qualitative

data gathered from research questions will be compiled and the most frequent issues, changes,

and suggestions will be applied to the application for improvement over time. Survey questions

should allow for repetition and continuous assessment of issues. Qualitative data will be used

in application updates.

Location – This data analysis related to this project will be recorded live via Zoom video chat

and/or at the Atlanta Campus AACC Building

Research Design – The research design is experimental for continuous improvement in the

voting process. The design is also quantitative and quantitative as stated earlier. The focus

group will vote and cycle through a user-task analysis 3 times (March 28th, April 11th, and April

25). April 25th will be the final vote for users in this project development process.

Improvements and updates will be made between the 2 preceding dates based on quantitative

and qualitative data gathered.

Rationale – The reason this project is being created is to enable our Democracy to have multiple

secure voting options in our process. This project incorporates both quantitative and

qualitative methods because both need to be assessed in this course of project development.

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The quantitative methods of this project need to be addressed to maintain accuracy. This is the main concern with current voting approaches and assessing the accuracy of voting data is essential. The qualitative area to be analyzed is to ensure the application has an effective user interface that feels comfortable for the user to navigate. Therefore, both methods are being measured to produce the "Your Voice" application. Using both research methods can also help to fine tune each. One may offer assisted data to help adjustments to the other and vice-versa.

Obstacles/Risks – The largest obstacle to avoid with this project is incomplete data collection. Incomplete data collection could result from voting ballot in the app being partially filled out and/or surveys not being completed used to gauge usability. The best way to avoid these foreseeable obstacles is to provide education and detailed instructions to participants in the study about the importance of complete data sets.

Observations – Observations will be made using recordings from user interaction with the voting application software during the user-task analysis. These recordings will be paired with their qualitative usability surveys for confirmation. Participants will be notified of times when recording begins and ends and will be asked if consent is given. Participants will also be notified that the answers they submit in surveys will be compared to others.

System Development

The scenario story board was developed using Microsoft Whiteboard. The scenario prompted the creation of an app that can assist with an employee that works during precinct voting hours and hasn't taken the time to file a mail-in ballot. Sketched figures were assembled and dialogue boxes were added to illustrate. This presented the problem and the "Your Voice"

Testing the usability and accuracy of voter data collected through the "Your Voice" mobile app application as the solution. The application logo was created using this application. The "Your Voice" prototype was generated using Adobe XD consisting of 34 total slides.

Testing and Observation Report – (Qualitative)

<u>User 1</u>

In Task 1, "Create an account," The user took an initial pause when the task was given, but navigated smoothly until Step 2 of the "Create an account," process. The user verbally stated filling in additional information required to complete step 2, but did not state the "next" button needed to be selected. At the final step the user was able to proceed without pausing or errors.

In Task 2, "You want to login," the user was able to navigate without any errors or issues.

In Task 3, "You want to change your address," the user was able to navigate without any errors or issues.

In Task 4, "Where would you go if you had a question about the site?," the user was able to navigate without any errors or issues.

In Task 5, "How would you contact 'Your Voice' Customer Service team?" the user was able to navigate without any errors or issues.

In Task 6, "You want to place a vote for John as senator for district 3," the user was slightly indecisive about whether to select confirm (confirm they are in the voter registration database) or register (register to vote), but ultimately selects confirm, which is the correct choice.

- This prompted me to add better button descriptions in the final application and also define selections with blue buttons and white font so everything stands out.

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After this brief pause the user was able to navigate without further errors or issues.

In Task 7, "You need to register to vote," the user briefly states to select the "Vote" tab, but then changes their mind to select the "Register" button. The user is able to proceed further without errors or issues.

- This prompted me to change the "Register" button to "Register to Vote" in version 2.0 so that this is well defined.

User 2

In Task 1, "Create an account," The user was confused about entering an email and password, but did select the sign up option, which was correct. On step 2 of the "Create an account" task the user didn't know what DL or ID # (Drivers License or ID number) meant. Version 2 of the app design clarifies this.

In Task 2, "You want to login," the user was able to navigate without any errors or issues.

In Task 3, "You want to change your address," the user was able to navigate without any errors or issues, but continued beyond the task after editing the address.

- This let me know that the confirmation on editing a profile wasn't strong enough.
  Version 2!

In Task 4, "Where would you go if you had a question about the site?," the user was able to navigate without any errors or issues.

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In Task 5, "How would you contact 'Your Voice' Customer Service team?" the user was able to navigate without any errors or issues, but I noticed that "form" in the suggestive text box didn't register and needed to be updated to

- "Enter Message here" in version 2.

In Task 6, "You want to place a vote for John as senator for district 3," the user was slightly indecisive about whether to select confirm (confirm they are in the voter registration database) or register (register to vote), but ultimately selects confirm, which is the correct choice. The user then selects the "View Sample Ballot" option instead of the "Cast my vote" option which should be selected. The user is able to view the sample ballot and eventually navigate back to the home screen, selects the "Vote" option, "Confirms" registration, and selects "Cast my vote."

The user then proceeds and is able to complete the task without further issues.

In Task 7, the user was able to navigate without any errors or issues.

System Usability Analysis Report

User 1 data – (Quantitative)

User 1 completed "You want to create an Account" (Task 1) in 1 minute and 54 seconds.

User 1 completed "You want to login" (Task 2) in 5 seconds.

User 1 completed "You want to change your address" (Task 3) in 53 seconds.

User 1 completed "Where would you go if you had a question about the site?" (Task 4) in 24 seconds.

User 1 completed "How would you contact 'Your Voice' Customer Service team?" (Task 5) in 32 seconds.

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User 1 completed "You want to place a vote for John as senator for district 3" (Task 6) in 50 seconds.

User 1 completed "You need to register to vote" (Task 7) in 20 seconds.

When combining these tasks the user took 4 minutes and 58 seconds.

User 1 Post Task Analysis Questions – (Qualitative)

*These Post Task Analysis Questions were answered in the recording video right after

prototype User/Task Analysis

1. Do you think a mobile voting application would be an asset in the democratic voting

   process?

   Yes, As long as it's done securely

2. Do you see this as an alternative to mail-in voting or physically going to the polls?

   Yes, I think it would great to use the application to replace it all. It can be supplemental,

   but I can see the potential for the app to replace all voting methods

3. Do you use mobile applications regularly?

   Yes

4. What features do you expect to see in this application moving forward? None for now.

User 1 SurveyMonkey Q&A – (Qual and Quantitative)

*These Survey Monkey questions were answered 24 hours after User 1 had an opportunity to

navigate the Your Voice application. They were able to express opinions that may not have had

right after navigating through the prototype.

Q4

How would you rate the navigation of the application?
- 5/5
Extremely Effective

Q5
With the existing features does the application allow you to achieve your goals? How?
Yes, it allowed me to sign up to register and then allowed me to vote.

Q6
What areas of the "Your Voice" Application require improvement?
Just a data sync with the voter registration so voters wouldn't have to pick district.

Q7
Rate your experience using the application
- 5/5
Extremely Effective

Q8
Rate the intuitiveness of the application icon
- 5/5
Extremely Effective

Q9
Rate the loading speed of the mobile application
- 5/5
Extremely Effective

Q10
Rate the visual appeal of the application
- 5/5
Extremely Appealing

User 2 data – (Quantitative)

User 2 completed "You want to create an Account" (Task 1) in 1 minute and 10 seconds.

User 2 completed "You want to login" (Task 2) in 8 seconds.

User 2 completed "You want to change your address" (Task 3) in 50 seconds.

User 2 completed "Where would you go if you had a question about the site?" (Task 4) in 20 seconds.

User 2 completed "How would you contact 'Your Voice' Customer Service team?" (Task 5) in 31 seconds.

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User 2 completed "You want to place a vote for John as senator for district 3" (Task 6) in 2 minutes and 15 seconds.

User 2 completed "You need to register to vote" (Task 7) in 21 seconds.

When combining these tasks the user took 5 minutes and 35 seconds.

User 2 Post Task Analysis Questions – (Qualitative)

*These Post Task Analysis Questions were answered in the recording video right after

prototype User/Task Analysis

1. Do you think a mobile voting application would be an asset in the democratic voting

    process?

    Yes, I think it would be beneficial as long as there is a secure method

2. Do you see this as an alternative to mail-in voting or physically going to the polls?

    Yes, I hope that is the direction we're headed in. I wish voting were already that easy.

3. Do you use mobile applications regularly?

    Yes

4. What features do you expect to see in this application moving forward? A hover over

    feature that gives the details of tax increases and certain referendums.

User 2 SurveyMonkey Q&A– (Qual and Quantitative)

*These Survey Monkey questions were answered 24 hours after User 1 had an opportunity to

navigate the Your Voice application. They were able to express opinions that may not have had

right after navigating through the prototype.

Q4
How would you rate the navigation of the application?

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- 5/5

Extremely Effective

Q5

With the existing features does the application allow you to achieve your goals? How?
Yes, I especially appreciated the sample ballot

Q6

What areas of the "Your Voice" Application require improvement?
Maybe a password reset feature

Q7

Rate your experience using the application
- 5/5

Extremely Effective

Q8

Rate the intuitiveness of the application icon
- 4/5

Very Effective

Q9

Rate the loading speed of the mobile application
- 5/5

Extremely Effective

Q10

Rate the visual appeal of the application
- 4/5

Very Appealing

Analysis Summary – (Quantitative)

Task 1 was complete an average of 1 minute and 32 seconds with a max/min deviation of 44 seconds.

Task 2 was complete an average of 6.5 seconds with a max/min deviation of 3 seconds.

Task 3 was complete an average of 51.5 seconds with a max/min deviation of 3 seconds.

Task 4 was complete an average of 22 seconds with a max/min deviation of 4 seconds.

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Task 5 was complete an average of 31.5 seconds with a max/min deviation of 1 second.

Task 6 was complete an average of 1 minute and 32.5 seconds with a max/min deviation of 1 minute and 25 seconds.

Task 7 was complete an average of 20.5 seconds with a max/min deviation of 1 second.

Average time to complete any task was 43.5 seconds.

Average max/min deviation between users varied 20.14 seconds.

The quantitative data concludes that there was limited deviation between users and tasks were

completed in a generally comparable time frame relative to one outlier, Task 6, which has a

longer deviation. Even with this outlier the deviation time was limited.

Navigation Rating 5/5

User Experience 5/5

Application intuitiveness of icons 4.5/5

Loading speed of application 5/5

Visual Appeal of application 4.5/5

Conclusion

The qualitative data produced these suggested areas of improvement for Version 2

-Password Reset feature

-Hover over features to preview districts and laws/taxes being voted on in the ballot

-Data sync with voter database to make sure districts and voter options are preset

-Suggestive text for "Contact Us" should read "Enter Message Here"

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-Clearly defined confirmation that Account changes have been saved after editing

-Clearly defined button descriptions. Change "Register" button to "Register to Vote"

The user-task analysis presented security as a major concern for launch of the live application on Election Day. The security issue should be addressed with vetted DOD cybersecurity analyst the monitor mobile election results in real-time to ensure the security and safety of the application and Democratic voting process. This is a component of the project that was not able to be addressed in real-time during an actual election.

The Covid-19 pandemic has a severe impact on the time allotted for user/task analysis and data collection. A week was lost due to suspension of classes. Time was also lost due to users who experienced hardships and/or work in healthcare such as myself. Data was thoroughly vetted between users, but more were needed to formulate a more complete analysis for the application. The next phase of this application should initiate another round of user/task analysis with a larger sample group, interview party committee chairmen/women, local politicians, and application developers to finalize a well-established foundation for the "Your Voice" Application. I would once again like to thank the acknowledged parties I recognized above.

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