

STAFFGAUGE

Usability Test Report

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Team: Programming Staff

UI design description:

StaffGauge is a web App for citizen scientists to upload and visualize staff gauge hydrology data. The scientists utilize the data for their research in analyzing the water level of different water stream. The app is designed with user's sign in and login UIs. User can upload data via manual text or by taking pictures. For manual text submission user has to insert the gauge reading in cm and the gauge number in order to complete the form. Or they can just take a picture and upload it. After submitting the gauge reading/picture a graph is generated showing previous user's input results corresponding to the user's current input. High school students, who are amateur in technology usage are considered as one of the potential users of this app's manual/taking picture mode. Scientists can view the graph of their desired gauge by only inserting the corresponding gauge number.

Test concerns:

The usability test was conducted to evaluate the UI's efficiency in performing a task in the least amount of steps and time, to check if the UI design is comprehensible to the amateur users, to identify bugs in the system. After evaluating the test results suggestion were given, which included in this report.

Since the backend was not implemented during the testing, so some of the UI's usability testing were not performed.

Test environment setup:

- Mobile device: Nexus 5
- Version: Android (4.4.2)
- Mobile Web Browser: Chrome
- Observation:
 - *Notes*
 - *Video recording*
- Total 6 users
- 3 scenarios per user
- Location: Rekhi 323

Test Plan:

Test set up details for all the scenarios:

Test was performed at Rekhi323 beside the window to get enough light (trying to mimic the water gauge location). While the user performs the test in an Android phone, the whole performance was video recorded using another phone. Side by side notes were also taken for the detailed report. For every task the time was measured from the video recording or by using a timer. The users were told to start the testing through browsing the app from Chrome mobile browser. Prior to testing a consent form was signed by each of the users. The consent form is included in Appendix C. A brief introduction about the purpose of the app and testing was given to every user. Each user had to answer a set of pre-test question before starting the test and a set of post-test questions after completing tests.

The set of pre-test and post-test questions that were provided to each student is given below:

Pre-test questions (given before any scenarios):

1. For how many years have you been using a smart phone?
2. Please indicate your level of agreement to the follow statement:

I am very interest in the testing of this android application.

1. Strongly agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Strongly disagree
3. Have you ever used any similar type of web application?

YES/NO

4. What do you expect from the app?

1. Post Scenario interview or questionnaire questions:

Please indicate your level of agreement to the follow statement:

1. Overall, this web application was easy to perform the task.
 1. Strongly agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Strongly disagree
2. I enjoy using this web application.
 1. Very much
 2. A little bit
 3. Neutral
 4. Not very much
 5. Not at all
3. I would use this web application again.
 1. Strongly agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Strongly disagree
4. Performing the task on this app took very few steps, couldn't have been any shorter.
 1. Strongly agree
 2. Agree
 3. Neutral
 4. Disagree
 5. Strongly disagree
5. What did you like about the app while performing the task?
6. What are the things that you thought were frustrating or confusing?
7. Mention the things that you thought could improve the app's usability

Test Scenario 1: Creating a new user account and logging in

2. Test Goals:

To determine if the users can easily and effortlessly create a new user account of the StaffGauge Web App. Measure the average time required to successfully complete the task by all the participants. To identify bugs and complexities of the app while performing the particular task.

3. Quantitative measurement list:

- a. Total time to create an account and successfully login
- b. In case of failure, measure the percentage of task completed
- c. Number of failed/error clicks
- d. Time and steps to recover from an error
- e. Number of buttons/pages not used
- f. Number of times the user needs assistance

4. Scenario description:

“For this task imagine yourself as a student who is involved in a high school hydrology project. Your teacher took you to read hydrology data from a specific location and upload those using the ‘StaffGauge App’. To begin with you have to first create your login account. Open the app from your mobile browser and find how to sign up for an account. Enter the necessary information and submit. Then login with your name and password to use the app”

5. Task list:

- a. Browse the StaffGauge App’s Home page
- b. Tap ‘Login/Sign up’ button from the top
- c. Tap ‘SignUp’ button from the top
- d. Enter Email, Username, Password and Confirm Password text fields
- e. Tap ‘Sign Up’ button at the bottom

Qualitative measurement list:

- a. User’s Facial expression
- b. Spontaneous verbal expression
- c. Level of attention towards the task
- d. Activities showing reluctance (looking elsewhere, doing nothing etc...)

6. Potential observations of participant

- a. User may have difficulties to differentiate between a button and the page label at the beginning
- b. While inserting text in the account page the user might find the font size too small and might take more time
- c. Observe user to see if they search for user/password formats

7. Bug Report Form

Attached in Appendix D

Test Scenario 2: Submitting Hydrology data manually and view graph

1. Test Goals:

To determine if the users can submit the hydrology data from the app and also be able to view the graph. The test will be performed to evaluate the app design on the basis of user's effortless and fast performance of accomplishing the task. To check if all the fields, buttons, pages and their interactions work properly. To measure the average time required to successfully complete the task by all the participants. To identify bugs and complexities of the app while performing the particular task.

2. Quantitative measurement list:

- a. Total time to enter data and submit the data
- b. In case of failure, measure the percentage of task completed
- c. Number of failed/error clicks
- d. Time and steps to recover from an error
- e. Number of buttons/pages not used
- f. Number of times the user needed assistance
- g. Number of times the Graph did not appear
- h. Check for the confirmation messages to ensure successful task completion

3. Scenario description:

Task-1:

“For this task imagine yourself as a student who is involved in a high school hydrology project. Your teacher took you to read hydrology data from a specific location and upload those using the ‘StaffGauge App’. Your task is to read the meter and also the number of the meter and submit the data to upload it to the ‘StaffGauge’ site. Open the app from your mobile browser and find how to enter the required information and submit to see the graph view and enter data”

Task-2:

“Now suppose you are a scientist who is working on a research project that involves getting the data of a particular river’s water level. You want to view the graphical change of a particular river’s staff gauge; you do not wish to upload any data but only get the graphical view. Your task is to get the graph view of a particular staff gauge from the app”

4. Task-1 list:

- a. Browse the StaffGauge App’s Home page
- b. Tap on the ‘Measure in centimeter’ field to enter the reading
- c. Tap on the ‘Staff Gauge Number’ field to enter gauge number
- d. Tap on the ‘Submit’ button
- e. The app directs to the Graph View
- f. Tap on ‘Submit’ for a successful upload

Task-2 list:

- a. Browse the StaffGauge App’s Home page or press back button after completing task-1
- b. Tap on the ‘Staff Gauge Number’ field to enter gauge number
- c. Tap on the ‘View Graph button
- d. The app directs to the Graph View page
- e. Tap on ‘back’ button to go to the home page

5. Qualitative measurement list:

- e. User’s Facial expression
- f. Spontaneous verbal expression
- g. Level of attention towards the task
- h. Activities showing reluctance (looking elsewhere, doing nothing etc...)

6. Potential observations of participant

- d. User may click the back button instead of the submit button in the graph view page; thinking that they have already clicked the submit button while entering the readings.
- e. To only see the graph view user might try to enter the gauge reading too which is unnecessary.
- f. User might find the graph from the graph view too small and as a result might squint their eyes.

Bug Report Form

Attached in Appendix D

Test Scenario 3: Uploading water gauge picture

1. Test Goals:

To determine if the users can upload a picture of the water gauge correctly. The test will be performed to check if the user can differentiate between submitting the data manually and taking a picture. To check if the camera button and retake button works properly. To measure the average time required to successfully complete the task by all the participants. To identify bugs and complexities of the app while performing the particular task.

2. Quantitative measurement list:

1. Total time to submit a picture
2. In case of failure, measure the percentage of task completed
3. Number of failed/error clicks
4. Time and steps to recover from an error
5. Number of buttons/pages not used
6. Number of times the user needed assistance
7. Check for the confirmation messages to ensure successful task completion

Scenario description:

“For this task imagine yourself as a student who is involved in a high school hydrology project. Your teacher took you to read hydrology data from a specific location and upload those using the ‘StaffGauge App’. Your task is to upload a picture of the water gauge to the app. Open the app from your mobile browser and take a picture or choose from the phone’s gallery. Once you have chosen a picture, try to retake another picture and then upload it. After completing the task go back to the app’s home page.”

3. Task-1 list:

- a. Browse the StaffGauge App’s Home page
- b. Tap on the ‘Use picture’ button
- c. Take/choose a picture using the mobile’s camera
- d. Tap the ‘Retake’ button
- e. Repeat step b and c again
- f. Tap the ‘Use picture button
- g. Click ok to the confirmation page

4. Qualitative measurement list:

- a. User's Facial expression
- b. Spontaneous verbal expression
- c. Level of attention towards the task
- d. Activities showing reluctance (looking elsewhere, doing nothing etc...)

5. Potential observations of participant

- a. User might take few moments thinking of which button to click to take the picture because the manual 'submit' button is positioned before the 'take picture' button.
- b. User might expect for a picture in the picture preview page which is not yet implemented.
- c. Instead of taping the Retake button to retry taking another picture, user might tap the back button which does not work.

6. Bug Report Form

Attached in Appendix D.

Test Results:

Pre-test query results:

The figure 1 shows our user's smart phone experience ranging from 3-6 years for the amateurs and 8-9 years for the expert users. Considering that our actual amateur users will have less experience and the scientist (expert) might have more, the test results were evaluated taking the average experience of all the users.

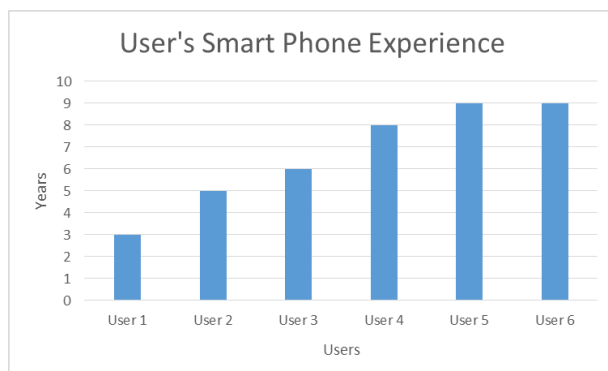


Figure- 1

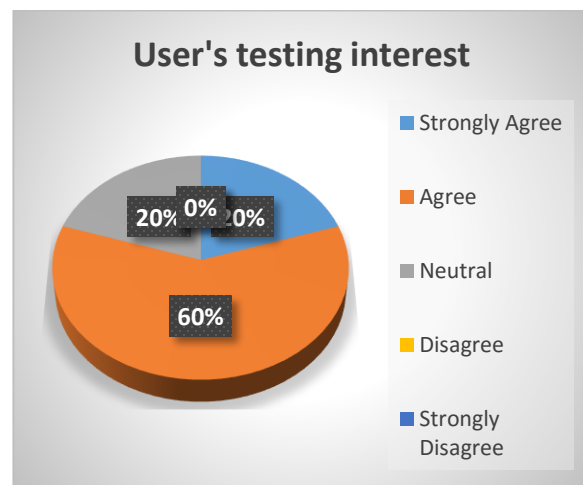


Figure- 2

After the brief introduction about the StaffGauge app and tests, all of the users were interested in testing the app.

Four out of six users had experience in similar type of app. So, their expectations were mostly specified. They expected to see a good data entry UI with fast interaction and understand the water level based on the input they will be providing. Others did not expect anything at all and went by the flow of the task.

Quantitative Measurement result:

Figure 3 shows the quantitative measurement results after performing usability test for each of the scenarios. The result is an approximate average of all the user’s performance. Since the backend was not implemented, so the email validation in the sign up couldn’t be tested. Some of the assistance required were due to Android’s older version issue. Most of the users were more familiar to iOS. That is why they had problems understanding Android phone’s basic design, e.g locating the back button, and hence needed assistance. They had more problems using an older version of android than understanding the app design.

Scenario	Tasks	Avg. total time (minutes)	Assistance	Avg. % of task completed	Unused Button/ fields	Recovery time
Sign Up and Login	Task-1: Successfully create an account Task-2: Login with username and password	<8	2	50%	None	Quick
Upload text data manually	Task-1: Submit gauge reading and # Task-2: Only see graphical view	4-5	1	80%	None	Little slow
Upload picture	Take picture Retake picture and upload	2-3	1	100%	None	Quick

Figure- 3

Post-test query results:

After the users performed all the tasks they answered the post-test queries. The figures below show the post-test results of the 6 users. Most of the users found the app easy to use and more or less enjoyed using it. The most important outcome of the test was that the majority of the users agreed that they were able to perform the tasks in the shortest possible steps.

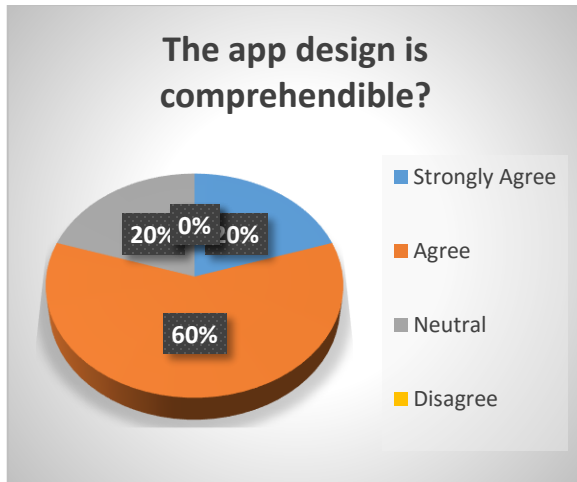


Figure- 4

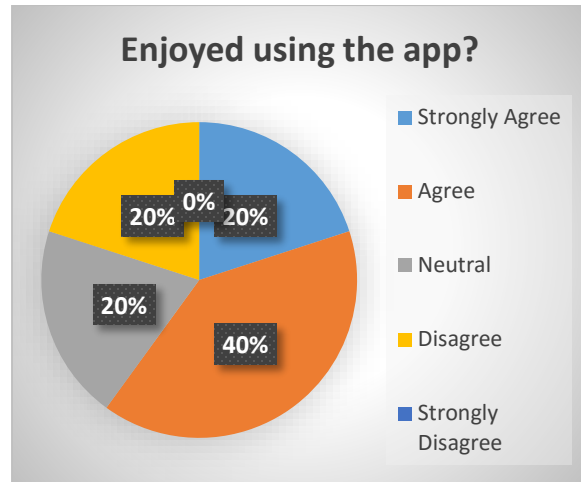


Figure- 5

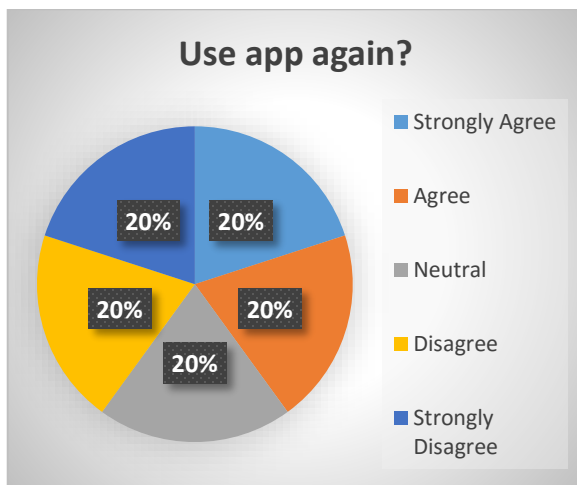


Figure- 6



Figure- 7

Usability problem analysis and Suggestions:

- The Sign up/Login button at the top of the home page does not directed to Sign-up page instead it takes to the login page. From the login page the user has to again tap a sign up button to reach the sign up page for account registration. There is no direct link to sign up even though the button label has sign up written on it. Locating the sign up page was both confusing and time consuming for the users.
 - Suggestion: *Make separate Login and Sign up buttons in the home page instead of cramming them in one button. The Login button will direct to Login page and the sign up button will direct to the sign up page.*
- In the sign up page's the password field has a specific format for creating a password, like the password should be like a regular expression with both small and big alphabets and also digits. But there is no direction for that format for the user when he/she creates the password. Password format can only be known if a mistake is made and the user attempts submission. The user has the read the pop up error message and create password all over again. This is time consuming and also annoying for the user to remember the format.
 - Suggestion: *Mention the password format right above the password field*
- Though the users were attentive in performing the tasks but reluctant to read the pop up messages. As a result they often missed some useful information and did the same error again and received the same message again.
 - Suggestion: *Avoid some pop up messages by mentioning useful information about some rules and formats before the user taps the submit button.*
- The home page has a submit button for the text entry of the manual input method. After the user taps on the submit button, the app takes the user to the graphical view page, which also includes a submit button. Upon tapping on this submit button a successful submission/upload is confirmed with a confirmation message is shown. Users get confused by the submit buttons. They have an idea that they have already submitted their data in the home page and so ignores the graphical view page's submit button. This is very dangerous because doing so will not upload the data successfully.
 - Suggestion: *Rename one of these buttons as upload and another as submit. Also insert a short text in graphical view page that says "For a successful submission please click the submit button below."*
- To directly only view the graph of a particular gauge a 5 digit gauge number should be inserted. There is no indication of that in the app unless someone directly taps the View graph button without inserting the gauge number
 - Suggestion: *Mention it above the View graph button*
- For the View graph option, after the user inserts the gauge number, instead of tapping the View graph button some of the users tapped on the submit button .

- Suggestion: *Ask the user to insert the gauge number inside the pop up message they receive after tapping the View graph button.*
- Some of the issues faced due to older version of android:
 - Button overlapped and covered the text fields.
 - Some of the fonts were too small and was not consistent
 - Graph size becomes small
 - Submit button needed double tap

Conclusion:

The testing was performed beside the window in a sunny day to mimic the outer environment of a water stream. The colors chosen for the app was good enough for the users to easily understand and differentiate between buttons and fields, action performed etc. The app had some bugs but can be easily fixed. Developers are recommended to follow the suggestion to fix the bugs and hopefully it will make a robust and efficient app for both the researchers and other users.

Appendix A:

Day	Team member 's attendance	No. of test participants
Day-1	Kyle Petermann & Jacob Timmer	2
Day-2	Jacob Timmer & Nikita Koshcheyev	3

Appendix B:

Bug #	Bug Name	Location	Frequency	Bug Description
1.2	Login without entering credentials	Login Page	2	Pressing Login button shows successful login even without entering Username & password
2.1	Submit without gauge reading	Home Page	2	For manual input, can submit without entering gauge reading
2.2	Accept gauge # without verifying	Home Page	6	For manual input, can submit gauge # of any digit -> No Checking
3.1	Retake picture direction	Picture Preview	6	Retake picture button directs to Home page instead of camera option

