USABILITY TESTING REPORT

SOIL INFILTRATION

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Introduction:

User Interface Description:

Soil Infiltration is a web application is designed to be accessed from desktop or mobile. This app will be used by field soil scientist and Burned Area Emergency Response (BAER) Teams collecting soil infiltration data.

The primary focus of this project is to help field soil scientist and Burned Area Emergency Response (BAER) Teams to enter accurate values. This app will initially allow the user to set the time intervals they want to, then gets notified after the selected time interval . When the user gets notified, it will prompt them to enter the volumetric information that the soil infiltrometer device shows. The app will show a table below, that dynamically auto-populates the information. Also this app allows users to store the entered researched data with the location of the researched field. The app will also allow the users to review, edit and delete the saved data.

Test goals:

Scenario1: Non Student (road engineer)

To determine if the participant can use the app easily or is it difficult or confusing to navigate.

Scenario2 : Research student

To determine if participant is able to enter data and save it. Scenario3 : Research student

To determine if user is able to edit and review from previous test data.

Test Plans:

Test setup:

There are six sessions scheduled, at least one undergraduate students will be present at each testing session to observe and assist in the testing process.
The graduate student will act as the test administrator.
The zoom link is scheduled and share it to the participants and undergraduates.
Everyone participating (graduate, undergraduate, and testers) are expected to have access to a mic, camera, and Zoom. The Zoom meeting will be recorded for future reference. During the test the participants will be given the link to the application via the chat, then asked to share their screen as they complete the scenarios in the test. Pre-test and Post-test questionnaires will be distributed through the chat using a link to a Google form.

Test procedure:

Before test:

1. Greetings and introduction.
2. Google form Consent from the participant
3. Explain the purpose of the app
4. Pre-Test Questionnaire in google form

During Test:

5. Read the testing scenario to participants
6. Share the link of Soil Infiltration app
7. The participants have to share their screen and implement the given tasks

After Test:

8. Performed the post-scenario interview
9. Post-Test Questionnaire in google form
10. Thank participant for their time

Consent:

The participant should sign the consent form that acknowledges that participants can cease from the experiment at any time if they feel uncomfortable with the test or for any other reason the privacy of their identity will be safeguarded. The participant can participate in the experiment only if they signed the consent form.

This link for the google consent form is shared with the participants to sign electronically. https://forms.gle/RjLRJLvuWXDEBYB77

Pre-Test Questionnaire :

The participant requires to complete this Pre-Test questionnaire before the usability test, he/she will be given enough time to fill this form before proceeding further. Link for the Pre-Test questions https://forms.gle/N7o66c6TXtYA4eV37 Here are the questions:

Pre-Test Questions
1. Name
2. Email id
A. Yes
B. No
3. How old are you
A. Yes
B. No
4. do you prefer mobile app / web app , mention your reason
A. Mobile app
B. Web app
5. Are you research student/professor/professional
(if none-mention below)
A. research student
B. Professor
C. Profession D. Other….
6. Are you familiar with soil infiltration?
A. Yes
B. No

Test scenario:

Scenario1: Non Student (road engineer)

You are a road engineer who want to test soil before constructing a road to check if that place is compatible for construction. So you wanted an app to record the data

and need to analyze it by your team after research. Hence you decided to use Soil Infiltration app for this, so you are checking what is this app and how to use.

Task goals:

- ★ Check if the user can use the app easily or is it difficult / confusing to navigate
- ★ Check if user is able to understand what's the instructions are?

Task List:

1. Open the app from the given link
2. read popup
3. go to the instruction page to learn about app
4. and go to instruction page to learn how to use the app

Quantitative Measurement List:

- ★ The amount of time participant spent completing the first scenario.
  - ★ Number of question asked by participant.
- ★ Number of events when participant didn't receive any feedback for entering invalid data.

Qualitative Measurement List:

- ★ Time taken
- ★ Facial expression
- ★ Verbal comments

Potential Observations of Participant:

- ★ Status of the participant on successful/unsuccessful completion of test-happy/exited/confused/sad
- ★ Level of confusion
- ★ Overall feedback from participant Post test interview question:

What is your overall experience for fist scenario?

1. Overall experience is satisfied
2. The instructions are clear and easy to understand
3. Navigation is simple and easy

Scenario2: Soil research student

Your a soil research student who wants an app to enter the researched data and to store it. Also you want to analyze the data at the end of the day. So you decided to use soil infiltration app for the test. Now will be testing how do you going use the app.

Task goals:

- ★ Check whether user is able to enter data quickly and easily
- ★ Check if the entered data is visible in the below table
- ★ Check if the user is able to access saved data

Task List:

1. Open the app from the given link
2. there will be a pop up, take your time and read it
3. In welcome to soil infiltration page enter the given input time interval in seconds -----15 soil infiltrometer radius ----mini disk soil type ----------sandy clay suction ---------- -3
4. Enter the 5 volumetric data after the time interval. quickly enter volumetric data enter volumetric data : 50 quickly enter volumetric data enter volumetric data : 40 quickly enter volumetric data enter volumetric data

:

30 quickly enter volumetric
data enter volumetric data

:

20

quickly enter volumetric data$_{11}$ enter
volumetric data

:

0
5. Submit volume and check entered data in the below table 6.
once the data gathering is completed,
enter title as Test, enter Gps
location : longitude : -83
latitude : 42 save and return
to main page.

Quantitative Measurement List:

- ★ The amount of time participant spent completing the scenario.
- ★ Number of questions asked by participant.
- ★ The number of attempts taken before completing the first scenario
- ★ No. of text fields in which participant can input arbitrary data ★ Number of events when participant didn't receive any feedback for entering invalid data.
- ★ The time spent by participants for looking around the website before completing the task
- ★ Number of events when the app crashed for invalid input.

Qualitative Measurement List:

- ★ Time taken
- ★ Facial expression
- ★ Verbal comments

Potential Observations of Participant:

- ★ Status of the participant on successful/unsuccessful completion of test-happy/exited/confused/sad
- ★ Level of confusion
- ★ Overall feedback from participant

Post test interview question:

What is your overall experience for fist scenario?

1. Over all experience is satisfied
2. Confused at preset values and timer
3. Volume input fields has 0 after every reset which is not efficient for users

Scenario3: Soil Research Student

Your a soil research student who wants an app to enter the researched data and to store it. Also you want to analyze the data at the end of the day. So you decided to use soil infiltration app for the test. Now will be testing how do you are going use the application.

Task goals:

- ★ Check whether user is able to enter data quickly and easily
  - ★ Check if the edited Previous Test data is able to access
- ★ Check if the exported data is has graphs to analyze the data

Task List:

1. open previous test data
2. edit test name as 'Tested', save and return.
3. review it.

Quantitative Measurement List:

- ★ The amount of time participant spent completing the scenario.
- ★ Number of questions asked by participant.
- ★ The number of attempts taken before completing the first scenario
- ★ No. of text fields in which participant can input arbitrary data
- ★ Number of events when participant didn’t receive any feedback for entering invalid data.
- ★ The time spent by participants for looking around the website before completing the task
- ★ Number of events when the app crashed for invalid input.

Qualitative Measurement List:

- ★ Time taken
- ★ Facial expression
- ★ Verbal comments

Potential Observations of Participant:

- ★ Status of the participant on successful/unsuccessful completion of test- happy/exited/confused/sad
- ★ Level of confusion
- ★ Overall feedback from participant

Post test interview question:

What is your overall experience for fist scenario?

1. Over all experience is satisfied
2. Confused while saving, wondering if it will auto save or have save manually since the save button is not on the same page.

Post- Test Questionnaire:

After Usability Testing, another link is given to the participant as a Post-Test questionnaire. Here is the link for the questionnaire.
https://forms.gle/kEtoqEKUZE48seAm8

Here are the questions:

1. Name
2. Email id

2. Is the application easy to navigate
strongly agree
Agree
Neutral
Disagree
Strongly Disagree
Other…

3.Is this app userfriendly
1.Yes
2.No
3.Maybe
4. what is your first impression and did it changed after using app
5. How is your over all experience
1.satisfies
2. Somewhat satisfied
3. Neither satisfied or dissatisfied
4. Somewhat dissatisfied
5. Dissatisfied

BUGREPORT:

Bugs are errors in the program. Every time a user encounters a bug, unique bug number is given and the bug name. For multiple occurrences of the same bug, no description is written except the bug name and number. Here is link for bug reporting form https://docs.google.com/spreadsheets/d/11XXkn30CnmZsvHr0UrtGb6vGrIyf7FS54IV_R5z8e9s/edit?usp=sharing

Bug Number: A bug number is an identifier provided by the usability test administrator when a user encounter a bug Bug Names: the name of an encounter bug

Bug Description: a formal description of the bug that has been encountered

Bug number	Bug name	Bug description

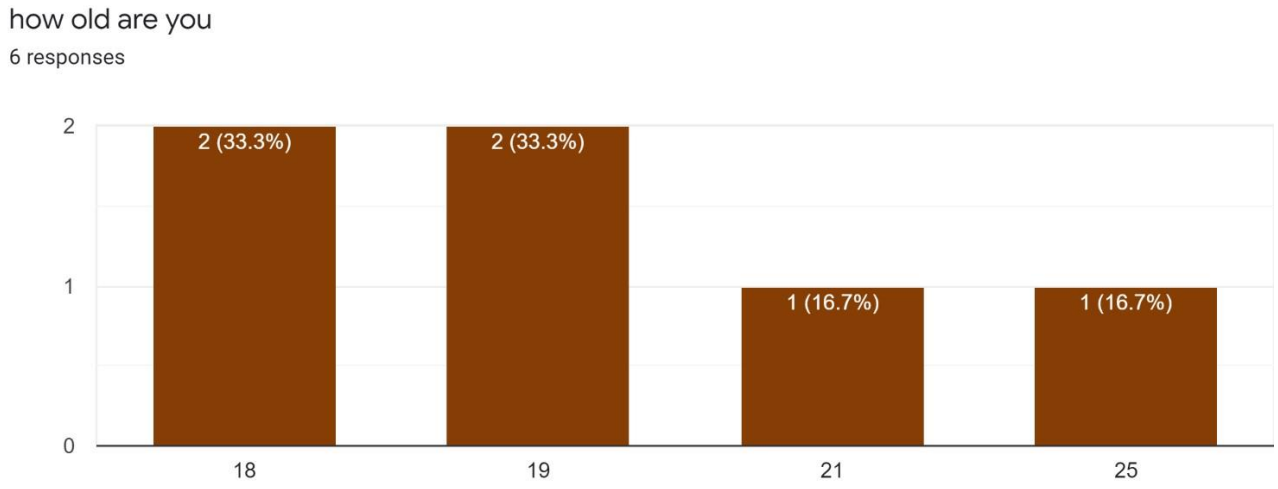
Test Results :

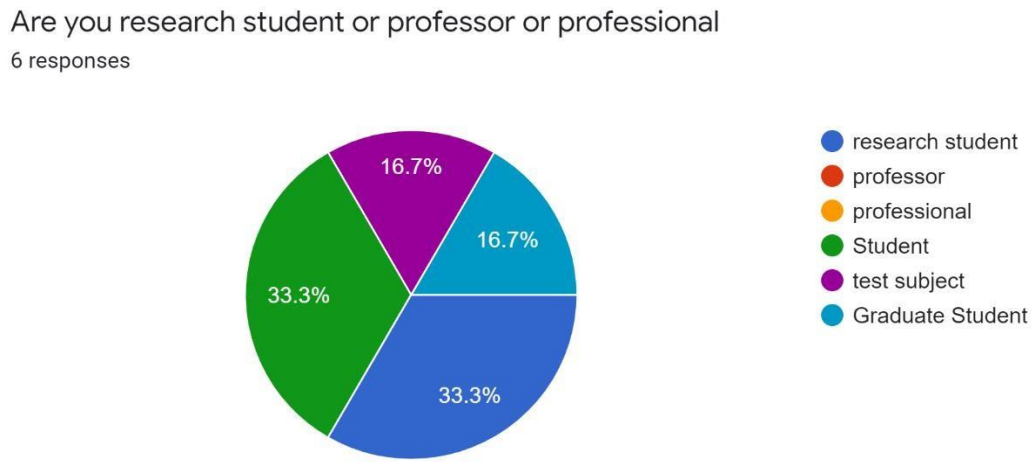
We collected information via a pre-test survey before starting the usability test. We used Google Doc online form for all of our questionnaire forms. Quantitative and

qualitative data were collected during all of the scenarios for detecting the level of confusion and frustration. After each scenario, we send post-test questionnaires to collect answers to our questions about our usability test elements. Also, as a quick interview, we asked general questions about participants feeling about the application

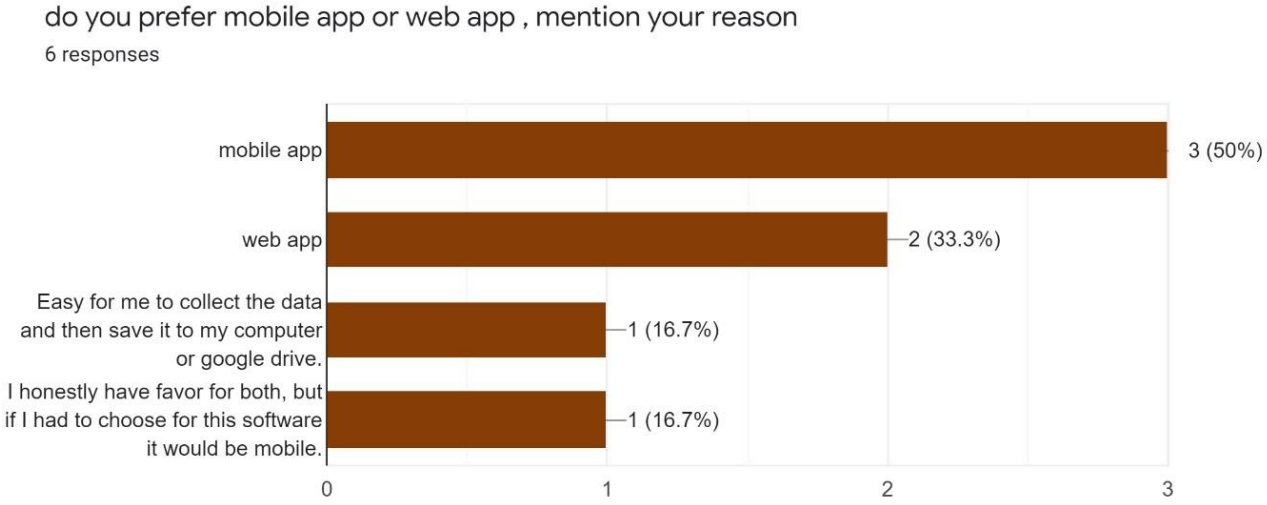
Pre-Test Questionnaire:

In this section, we asked general questions. Here the first question is asked to participants to know the age and profession of different people who are going to use the application. Next question is about their preference between web application and mobile application. Last question is to know if they are familiar with soil infiltration.

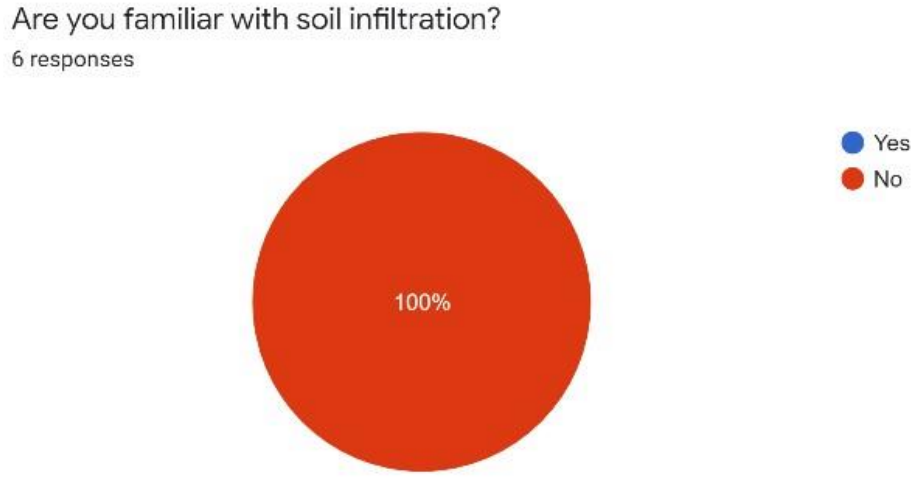




The participants are between 18-25 years and most of them are research students like about 66%. Remaining are also education related profession not from an road or fire engineer department.



Next question is about preference between web or mobile application. Most of them are fine with either web or mobile application. But a participant opted for web as computer is easy to access data and store however another participant preferred mobile for this software.



All the participants attended for the usability testing mentioned that they don't have any knowledge in soil infiltration, but the more time they spent on the app they became very comfortable with it.

Results of Measurements :

Scenario1 : Road engineer

The application did not crash during testing and all the functionalities worked great. Also, the amount of time that each navigation took was less than 3 seconds. All the participants were able to carry out their tasks without any question and also they are comfortable while doing tasks in scenario1. Satisfied is the overall feedback given by the participants.

Scenatio2: Soil Research student

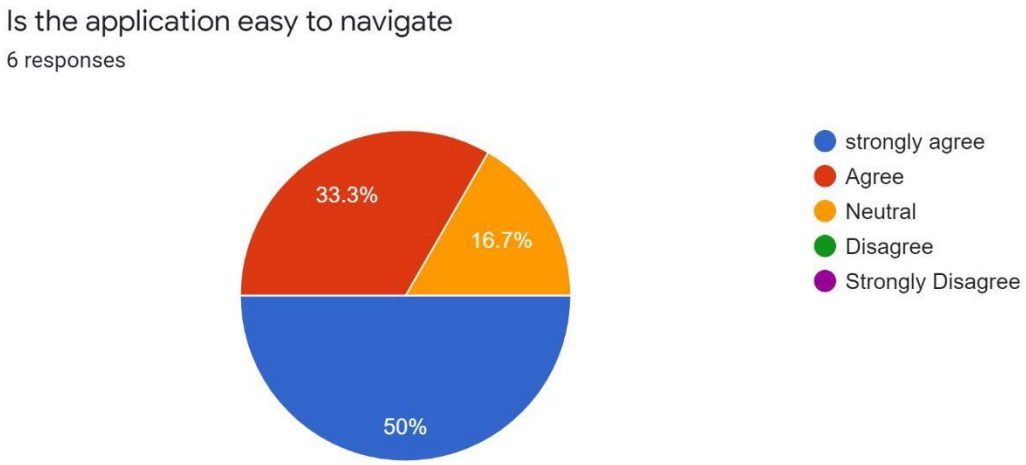
The application did not crash during testing and all the functionalities worked great. The amount of time that each navigation took was less than 3 seconds. The participants were confused with input fields and took few seconds in this scenario especially at the preset values and after entering volumetric data, but they figure it out very quickly. I observed that though they were confused at some point but they were happy at the end of the tasks. Satisfied is the overall feedback given by the participants.

Scenario 3: Soil Research student

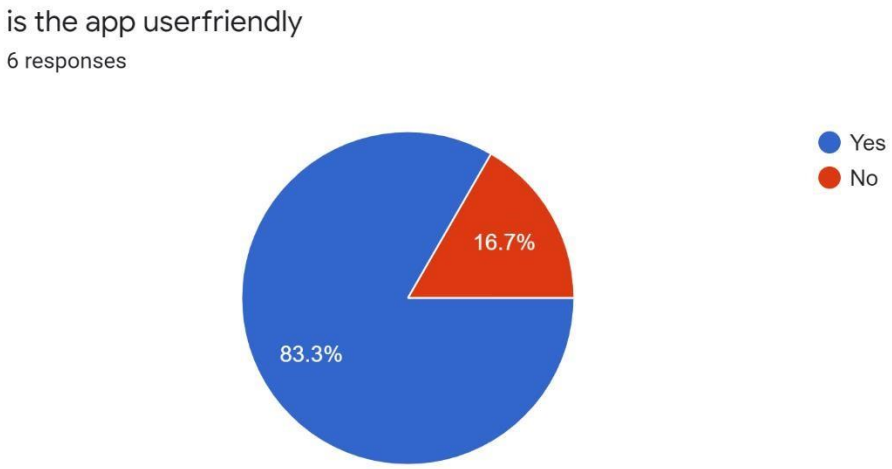
The application did not crash during testing and all the functionalities worked great. The amount of time that each navigation took was less than 3 seconds. They took some time to look around the page but they figured out what to do in no time. They seemed very confusing while doing tasks especially when saving the edited previous test data. Over all feedback given by the participants is satisfied.

Post-Test Questionnaire:

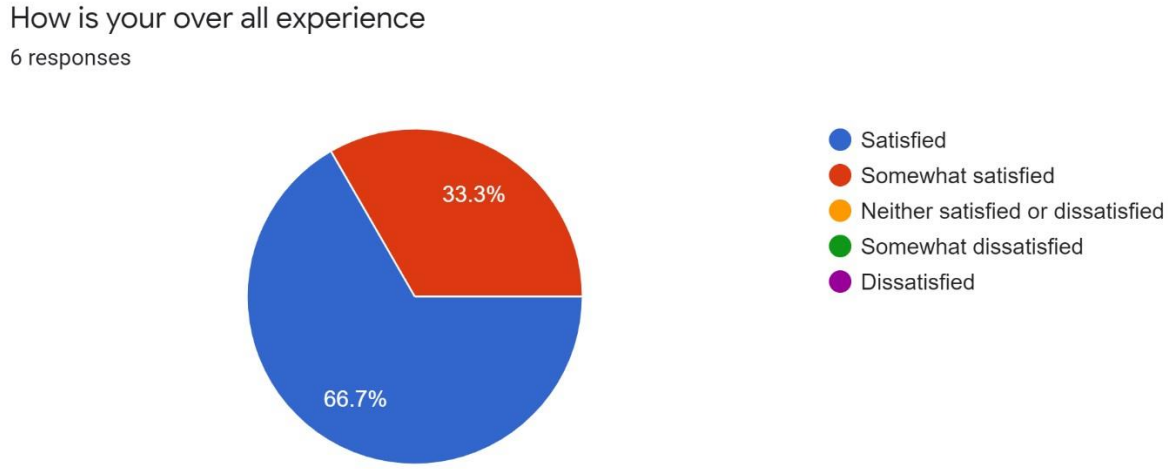
The results from Post – Test questionnaire are summarized below in pie charts. 73% people agreed that navigation is easy. As mentioned earlier, after entering volumetric data, participants looked around to find which button must be clicked in-order to save and return to main page. Also after changing the previous test data location or name or picture , they were highly confused and lost at that moment because there was no save and return to main page option in the same page.



83% of the people suggested that app is user friendly. I agree too, the interface is smooth and easily understandable by the people who even does not know the purpose and usage of the app.



The over experience is the happy one here. Even though participants were little lost at some point they are satisfied overall.



what is your first impression and did it changed after using app?

First impression is that it is a little claustrophobic, and it seemed to stay that way.

I don't know what soil infiltration is but the more time I spent using the application the purpose and functions of it became more clear

My impression throughout the entire experience was that the app was simple and effective in its purpose.

Lots of words in the pop up, not a lot of words in the guide.

My first impression was that it was clean and was easy to use and understand, even for someone who has had no experience with soil infiltration. My impression did not change after using the app

Good overall, the 0 bug was kind of annoying. and I'd like to see a save button added to the edit screen

The above opinions from the participants are very positive. One interesting thing here is none of the participants are aware of the soil infiltration and the purpose of app. The information given by our team regarding the app and soil infiltration as an introduction helped them a bit but the more the time they spent with the app, the better they understood the purpose of it.

Suggestions :

1. Even without giving any input, it prompts to next page. Need validation
2. Save button be need to in the same page after editing the title and location
3. Fixing reset to zero in the volumetric data entry field
4. Moving preset values above the manual entry field
5. Even after volume is given 0, the pop up to enter volume shows up
6. Give another pop up or note near location about the “allow” and “don’t allow”

Conclusion:

Ios and android phones are used to test this application, as it is mainly designed for mobile application. All the functionalities were working good and there is just minor bugs/errors to be taken into consideration. Overall all the participants are happy to test the application, also they felt application is user friend and easy to navigate.

Appendix A –Undergraduate Attendance:

Usability expert	Test location	Test date and time	Development Team	Attendence
pooja Mothukuri	Zoom	4/13/2021 4:00 PM	Franklin Van Hove(Logger), Bryan Wandrych	Yes
pooja Mothukuri	Zoom	4/14/2021 3:00 PM	Nathan Kenwabikise	yes
pooja Mothukuri	Zoom	4/14/2021 4:00 PM	John Bland	yes
Pooja Mothukuri	Zoom	4/14/2021 5:00 PM	Franklin Van Hove(Logger), Bryan Wandrych	yes
pooja Mothukuri	Zoom	4/15/2021 4:00 PM	Nathan Kenwabikise, Paul Rayment	yes
pooja Mothukuri	Zoom	4/15/2021 5:00 PM	John Bland, Paul Rayment	yes

Appendix B - Bug report

Bug no.	Bug name	Bug description	Severity
1	Sustained zero on field reset	When the user is entering the current volume level in volumetric data field, after they enter it the field resets to the value 0	High
2	save button	The user is confused when trying to save the edited previous test data and was looking for a save button on the page rather than looking in the menu	High
3	GPS request	It just occurred with one participant, it might be error from user side. Since it was very fast response we could not notice what user did.	Minor

Appendix B – Testing challenges:

1. Conducting Zoom meetings was bit challenging as few users had problem in understanding the share screen.
2. Also, camera was off even though mentioned it should be on throughout the testing process, so facial expressions when testing the application could not be evaluated properly.