# User Interface evaluation

## Selected evaluation method

In order to effectively evaluate our implemented user interface a number of key evaluation test metrics were implemented in our final usability testing method. The method selected involves a scripted lab based usability test collecting user’s usability opinions alongside quantitative performance statistics. Users undertake a series of ‘typical’ tasks on the system, these tasks (seen on appendix 2, a blank evaluation document) involve the user interacting with different aspects of the system covering all user interface screens. Throughout the testing users will be invited to talk us through their thought process allowing insight into the difficulties and errors occurring in the completion of their task. Further to their own feedback we will be recording data relating to their interaction with the system such as comments and screen captures. Recording their activity on screen gives allows us to correspond their comments to specific tasks and see how their movements on screen were affected by the UI design choices. Particularly we can calculate the amount of time taken for them to complete each individual task. When all data is collated, a longer than average time to complete each task can suggest difficulty with navigation particularly when correlated to the comments given throughout.

The reason a task based testing method was selected was it allowed us to see the users understanding of the UI and how the UI can be used in order to complete their task. Our system involved key functionality that would be performed by typical users. A task based approach allowed us to ensure the UI eased access to these areas of functionality and not confuse or restrict. In order to reduce the amount of time required of the user we have limited the amount of tasks to 5, this was short enough to keep users engaged throughout the testing.

## Evaluation plan

Appendix 2 shows our evaluation plan giving room for recording user feedback and completion times. For this study 5 participants were used, with at least one Tester recording their progress. These participants were scheduled in 30 minute intervals with 20 minutes for each task and a final 10 minutes for further feedback about their experience on each task and for resetting the system. After agreeing to undertake the study each participant was given a brief overview of the study and what was required. During the test the user was first presented with the starting login screen of the system. From here they were told to work through each task communicating their current thought process as well as any difficulties encountered. The Testers were to write down all user comments separating them by current Task. Upon completion the Users end time was recorded along with the user’s final rating for their experience in completing that specific task. However in order for the test to maintain some validity the Testers role will be to record and not to advice. Any advice in how to use the system will alter the results as users will no longer rely only on their understanding of the UI.

## Ethical considerations

Appendix 1 shows the consent form presented to potential participants before the study begins. As this study involves recording of their information, through screen capture and comments, effort has been made to communicate the use of this information to participants. We have decided to anonymise each participant’s comments and results in order to welcome more honest comments from users. This anonymity reduces the ‘human factor’ from the data for the Testers putting more focus on the results instead of who may have given them. All of this is communicated to the user in the consent forms, equally however before each test participants are informed again of their ethical rights and reminded that they can withdraw from the study at any time.

## Evaluation results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Task 1 | Task 2 | Task 3 | Task 4 | Task 5 |
| Top comment | Users had no feedback as to login or registering. | Users had little idea on how or where to navigate | Users unsure what information is needed | Navigation was not clear | Users had lack of understanding of switch |
| Avg Speed | 30 Seconds | 46 seconds | 39 seconds | 37 Seconds | 24 Seconds |
| Avg Score | 1.7 | 1.7 | 3.5 | 2.7 | 2 |

The evaluation ran successfully, however potentially further tasks may have been required as all users completed the study relatively quickly. Figure 1 shows the evaluation data for each user. Through making users complete task it highlighted key flaws in the navigation and intuitiveness of the user interface design. As visible on Figure 1; the most repeated comment on task one involving the register and login screen was the amount of grey space and lack of feedback. This lack of feedback was mainly due to incorrect logins, the users were unsure what was wrong. Task two involved users created a field station, initially there was difficulty amongst all users. However once it was understood that the ‘manager’ button navigated to a separate page it was clear the ‘Add FieldStation’ button was needed. All users found it straight forward to use the add FieldStation screen, potentially due to the lack of onscreen items. However in task 3, adding a sensor, all users commented on the lack of understanding to what is needed. All used noted that they did not understand what each element did and whether it was mandatory to fill in. User 3 for example directly commented on the lack of labelling for the interval and how that directly related to the reading of the Sensor data.

The most difficulty found by users was completing task 4. The lack of clear navigation lead users to guessing on how to get to the correct screen in order to display the GPS map data. User 2 guessed from the task that it involved the report screen, the screen he remembered initially starting on. Other users however instead clicked between different pages until a GPS label could be found. User 4 took the longest to complete task 4 instead found the correct page through exhausting all other navigation options. This lack of clear navigation was highlighted by User 4 and all other previous users. Finally task 5 was completed quickly only due to it residing on the same screen. Potentially further tasks would have been required in order to navigate users away from this page. Users still commented however on the lack of clear understanding given by the user interface.

## Re-design suggestions

It’s clear from the evaluation there are a number of different re-designs that could be made. The top comments made on figure 1 show the main focus of user frustration was the lack of clear navigation. To solve this far more labels and tool-tips should be added to the UI. Were users able to quickly read and understand the meaning behind each button potentially their ability, and thus completion time, to complete each task would be increase and lowered respectfully. The navigation between pages is the clear place these descriptions should lie. Users should be able to know their current page as well as future pages available to them with clearer navigation buttons.

On both the add Sensor and add Field Station screens lack of labelling was also an issue. All users commented on the confusion around what each element did and whether it was required. In order to improve this clearer mandatory field markers should be introduced. This as well as too tips explaining to the user what is required in each box would drastically reduce user confusion. Equally User 4 found difficulty knowing when an entered value was incorrect, easily solved by introducing an alert to the user informing them of the incorrect values.

The majority of users misunderstood the switch to change from GPS to Table view on the report screen. Although once used this misunderstanding reduced it was clear they did not understand it was an intractable object. Along with labelling explaining that this switched changed the data view it potentially a good idea to change the switch entirely. In software design it’s uncommon for a large toggle switch to be used for such a big UI change, instead a button or settings marker could instead be used. User 3 noted that the table and GPS data could be better suited as separate screens, potentially allowing for both to be open at the same time. This would allow for greater understanding of the data presented and how it mapped between GPS and the table.

Appendix 1

# The Study

The aim of this study is to evaluate your usability of the ADMMEU system user interface and experience completing a series of tasks. The study will involve you undertaking a series of tasks involving different aspects of the system. During each of these tasks you will be able to feedback your current thought process along with any difficulties you are finding with completing the task required. Throughout the completion of the tasks your movement on screen will be recorded along with any comments made relating to your activity.

## Anonymity

Your results may be individually referenced and discussed however your participation within this study will not be personally identifiable to you. You may request for any recorded information, such as written notes and screen recording, relating to you to be sent to you upon completion. If any recorded information contains personally identifiable this will be removed from the study.

# Please answer the questions below and then sign the form.

|  |  |  |  |
| --- | --- | --- | --- |
| I agree to participating in this study:(Please circle) | | | Yes/No |
| I agree to text quotations from me being included in publications:(please circle) | | | Yes/No |
|  | | |  |
| I agree to screen recording of my activity being used in publications: (please circle) | | | Yes/No |
| **Name:** |  | **Contact number/email:** |  |
| **Signature:** |  | **Date:** |  |
| Development team signature: |  | Date: |  |

Appendix 2

|  |  |
| --- | --- |
| Participant Number |  |
| Date |  |
| Task 1 |  |
| Time taken: | Notes: |
| Difficulty Rating (1-5) |
| Task 2 | Add a new FieldStation |
| Time taken: | Notes: |
| Difficulty Rating (1-5) |
| Task 3 | Add a new sensor to that fieldstation |
| Time taken: | Notes: |
| Difficulty Rating (1-5) |
| Task 4 | Display the sensor report GPS data and view individual sensor data. |
| Time taken: | Notes: |
| Difficulty Rating (1-5) |
| Task 5 | View yesterday’s report table data for a selected sensor |
| Time taken: | Notes: |
| Difficulty Rating (1-5) |