

# Usability Testing Report

## Software Engineering

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Table 1: Revision History

<b>Date</b>	<b>Developer(s)</b>	<b>Change</b>
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# 1 Executive Summary

This report summarizes the findings from the usability testing performed for the Alkalytics project. The purpose of this testing was to evaluate the usability of the software and determine areas that required further refinement. This report includes objectives of the testing, the methodologies used, results, conclusions, and a list of proposed changes or modifications to the User Interface (UI) and core features. Implemented changes are indicated where applicable.

## 2 Objectives

The primary goals of the usability testing for the Alkalytics project are outlined below:

- Evaluate the learnability of the application.
- Evaluate the navigation and ease of use of the application.
- Evaluate the design of the application.
- Evaluate the overall user satisfaction and whether it meets the user's expectations.

The following minimum success criteria highlight some of the desired results, taken from the [Software Requirements Specification \(SRS\)](#) and [Verification and Validation \(VnV\) Plan](#) documentation:

- **Learnability:** At least 85% of participants should be able to complete all assigned tasks without external assistance after a brief introduction to the application.
- **Navigation and Ease of Use:** At least 85% of participants should rate the navigation as “Neither easy nor difficult” or better in the usability survey.
- **Design:** At least 90% of participants should agree that the design is visually appealing and consistent across all pages.
- **User Satisfaction:** At least 80% of participants should rate their overall experience a “3” or higher.

The usability testing aims to use a combination of both formative and summative evaluation, meaning that both the qualitative feedback and quantitative metrics will be used to assess the usability of the application.

## 3 Test Methodology

This section outlines the methodologies used to conduct the usability testing sessions.

### 3.1 Test Participants

The usability testing was conducted through two separate sessions with the main project supervisor and client, Dr. Charles de Lannoy, hereafter referred to as **P1**, and one of the lab’s undergraduate research assistants, Meghna Saha, hereafter referred to as **P2**.

Test participants were selected based on the following 3 aspects:

- a. Familiarity with the application’s intended use and the data involved,
- b. Availability to participate in a testing session *in-person*, and
- c. Ability to provide valuable feedback on the usability of the application.

The team determined that asking users outside of the affiliated research team to participate in the usability testing would not be a good reflection of the representative users and may skew the results in a direction that would not be beneficial to the actual end users. Though it is standard practice to have at least 5-10 participants, time constraints, participant availability, and the aforementioned reasoning led to the testing being conducted with only 2 participants.

### 3.2 Test Environment

The usability testing sessions were conducted in a controlled environment, with the software installed and running on the test conductor’s laptop. The test conductor was present to observe the participants, take notes on the elapsed time for each task, and provide assistance only if the participant requested it or if abnormal behaviours in the application occurred.

### 3.3 Test Tasks

Each participant was asked to perform a series of tasks using the application, listed below.

1. Upload a data sheet.
2. Upload another data sheet with the same experiment date.
3. Locate this data sheet in the table view page.
4. Navigate to the experiment table and perform the following operations -
  - (a) Add a new row.
  - (b) Delete an existing row.
  - (c) Add a new column.
  - (d) Delete an existing column.
5. Calculate the average of any couple of values in the experiment table.

6. (*Optional*): Perform additional excel-based functions on the values in the experiment table.
7. Search for a datapoint in the table using the column and value.
8. Generate a graph using all available customization options for the experiment data from **September 26**.

### 3.4 Follow-up Questionnaire

Following a usability testing session, the participant was asked to complete a questionnaire. A sample survey with all of the questions can be found [here](#). The questions were designed to gather feedback on the usability of the software, focusing on the following five aspects:

- a. Navigation and Ease of Use
- b. Visual Appearance
- c. Learning
- d. Responsiveness
- e. Overall Experience

## 4 Summarized Results and Statistics

This section summarizes the results of the usability testing, including feedback from users and resultant metrics.

### 4.1 Survey Responses

Section 3 in the following documents contain the survey responses for each participant:

1. [Survey Results for P1](#)
2. [Survey Results for P2](#)

Responses that were of particular interest are noted below.

#### 4.1.1 Navigation and Ease of Use

- (b) Rate the ease of finding a specific button/feature related to the task you were trying to perform.
  - **P1**: Somewhat difficult

#### 4.1.2 Visual Appearance

- (b) Is the displayed content (text, tables, graphs) clear, legible and easy to understand?
  - **P1**: The text should be larger, especially on the graph axes. The tables are clear and legible and the graphs need to have axes updated with selected parameters.
  - **P2**: Yes, very clear except for the queries page that was too cluttered.
- (d) Did you encounter any unidentifiable symbols or icons? If yes, please describe them.
  - **P1**: Yes, the queries page.

#### 4.1.3 Learning

- (a) How easy or difficult was it to learn how to use the different features of the application?
  - **P1**: Somewhat difficult as the labels need to better reflect their purpose.
- (b) Were there any features or functions you found challenging to understand or figure out? If yes, please describe.
  - **P1**: Performing calculations on the rows and columns was not intuitive. This needed better layout design. Also, building the graph needs improvement to better select parameters, make edits after a selection was made and identify the proper data to use.

#### 4.1.4 Overall Experience

- (b) Do you have any suggestions for improvements to enhance your experience with the application?
  - **P1**: It's on the right track, just a few improvements to organization, label clarifications, and graphical outputs needed.
  - **P2**: The dashboard should display a list of previous insights each graph gave along with previous analyses instead. Additionally, there could be a welcome thing added to the very top of the dashboard. Also, just to maintain contextual consistency, all column names should be replaced with their full forms and units should be added for all of them.

## 4.2 Conclusions Drawn from Results

Overall, the survey results indicated that the application is generally user-friendly and visually appealing, with an average rating of 3/5 across both participants for overall satisfaction. However, some issues were identified, particularly with the Queries page. Both participants reported confusion regarding the terminology used, specifically the distinction between “data sheet” and “experiment sheet”. Additionally, the visual appearance of the Queries page was not intuitive, with both participants noting difficulties in locating it within the navigation bar, as well as finding and using key features on the page itself.

## 5 Summary of Proposed Changes

This section summarizes the proposed changes to the user interface and functionality of the application based on the results of the usability testing. These points are taken and paraphrased from Section 5 of P1’s Survey Results and Section 4 of P2’s Survey Results.

Changes marked with a check mark (✓) are considered high priority and should be implemented as soon as possible. Due to time constraints, not all of these may be implemented. If it has been implemented in the final product, the exact commit implementing the change is hyperlinked in parentheses. Changes marked with an × have been determined as low priority and should be implemented if time allows, else it would be deferred to a future developing team.

### 5.1 Changes to the User Interface

- ✓ Rename ‘data sheet’ to ‘raw data’ and ‘experiment sheet’ to ‘processed data’ or ‘summarized data/results’ in the Upload page and any other subsequent appearances of the two terms. (see [commit](#))
- × Add a pop-up or a help button to explain that a file ID must be entered in the format `yyyy-mm-dd`.
- ✓ Rename the Queries page and replace its icon in the navigation bar to something more relevant and intuitive. (see [commit](#))
- ✓ Re-arrange the different button elements in the Queries page, keeping the calculation bar separate from unrelated buttons. (see [commit](#))
- ✓ All column names should be displayed in their full form with units. (see [commit](#))
- ✓ The font for the graph should be bigger and units and title should be added for each graph.
- ✓ The dashboard should display a list of previous insights or analyses and it could have a welcome message at the top as well. (see [commit](#))



## 5.2 Changes to the Functionality

- ✓ Add date and timestamp for when a data sheet was uploaded. (see [commit](#))
- × Allow for more comprehensive search functionality in the Queries page. For example, searching 1.5\* should display all values that start with 1.5.
- ✓ The Excel function bar should have a more detailed usage guide.
- ✓ Implement an edit button for graph generation so users can modify parameters for a graph without having to go through the entire form every single time.
- × The functionality to add a new row should mimic the one that adds a new column.
- × The past 3 graphs in the dashboard could be turned into interactive widgets.

## 6 Reassessment of Usability After Changes

The usability of the application must be re-evaluated after the proposed changes have been implemented. This will help to determine if the changes have improved the issues raised during the initial usability testing sessions. However, due to time constraints and deadlines, the documentation of this reassessment is not included in this report. The team will aim to conduct this reassessment for a proper evaluation of the final product, but a comprehensive summary of the results will not be available.

## 7 Conclusions

The usability testing sessions conducted with the two test participants provided valuable insights into the usability of the Alkalytics application, highlighting several areas for improvement. Although the overall design and functionality mostly met the user's expectations, specific aspects of these needed refinement, particularly in the navigation and visual appearance of the Queries page. The proposed changes to the UI and key features will be taken into account for future development.