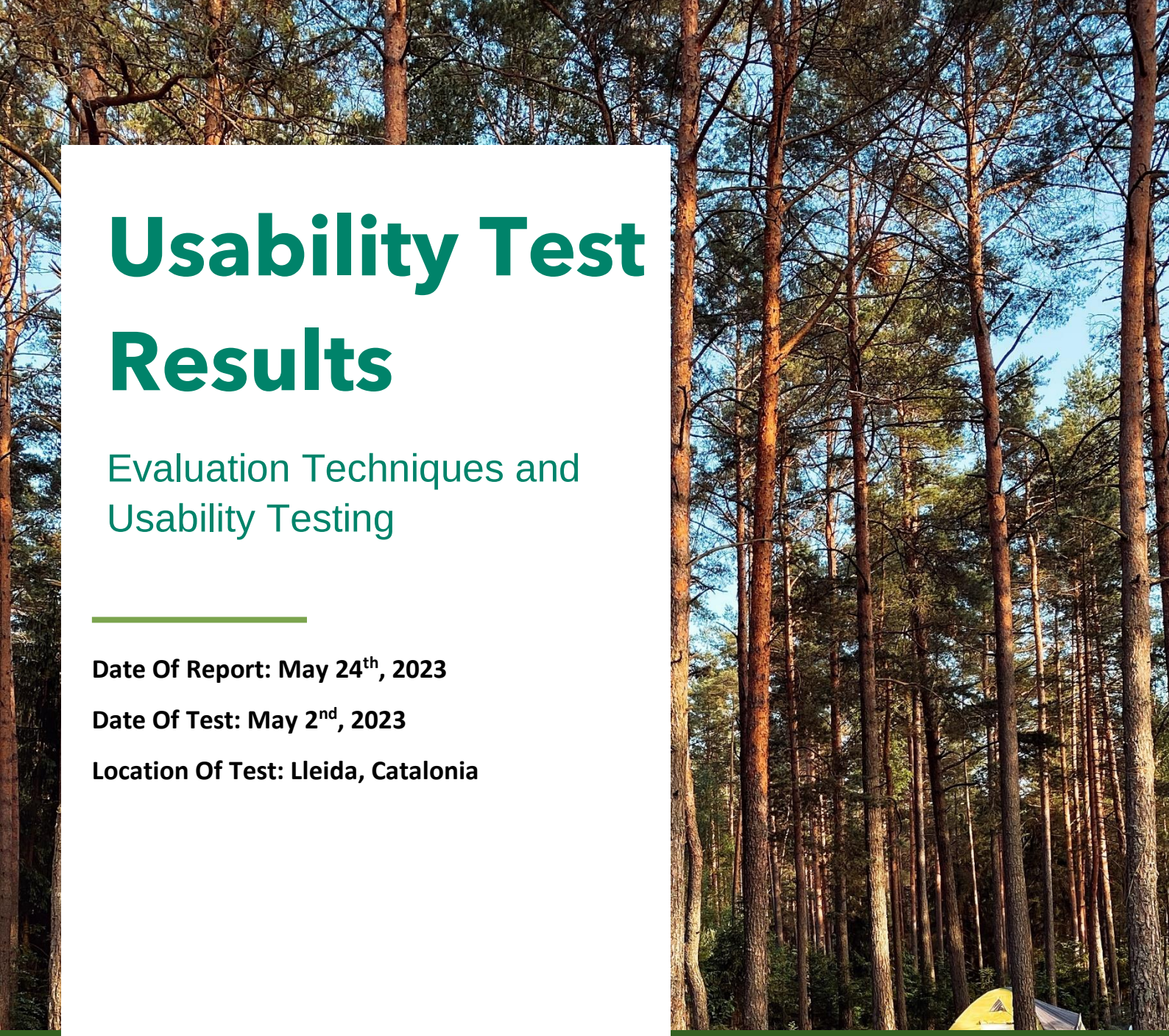

Usability Test Results

Evaluation Techniques and Usability Testing

Date Of Report: May 24th, 2023

Date Of Test: May 2nd, 2023

Location Of Test: Lleida, Catalonia

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1. Executive Summary

This document describes the results obtained of the CampManager Usability Test. The semi-formal test was realized to test the Effectiveness, Efficiency and User Satisfaction when performing 3 tasks that the developers suspected might cause confusion and have a negative impact on the User Experience.

The test consisted in the users performing 3 tasks: Create Campaign Table From Main Organisation Page, Validate If The Table Is Created And Its Status, and Add A New Organisation In Their Space While Being In Some Organisation's Space. During the tasks, the users were recorded using video and audio, and an eye-tracker recorded where in the screen they were looking. After the tasks, the users would review their own performances and comment on them using the retrospective thinking aloud methodology. Finally, they would answer a series of questions to obtain quantitative data about the system.

1.1. Results obtained

The SUS questionnaire provided an average score of 63.75 and a standard deviation of 5.95, ranking the app as above average, but still far from perfect. The 3 tasks were completed by 75%, 100% and 50% of users respectively, and in all tasks the suspicions of the developers were confirmed.

For Task 1, the large number of nested pages that the user has to navigate to reach their objective caused confusion and many errors. Proposed recommendations to fix this problem include renaming some links to pages to make them clearer and adding some buttons with enough information to avoid the user clicking on a wrong button.

For Task 2, it was discovered that the error message provided by the system does not provide enough information, as many users reported that they read the message but were not sure that the task was completed. A proposed recommendation is replacing the generic message with the current status of the table, perhaps as a loading bar.

For Task 3, it was confirmed that the buttons in the footer were too small, and, without an informative text, the users did not know their functions, so when pressing one of those buttons was necessary to complete the task in an efficient manner, most users failed. A solution is making the footer larger, and adding text to each icon that indicates what this icon does.

2. Introduction

2.1. Product Description

The product is an application for summer camp organisations with the aim of managing the members of the organisations, with additional tools such as a social page to publish information to the participants of the organisation's activities, the management of complete summer camps and the activities within them.

Currently the application has implemented the necessary functionalities to create, manage and modify organisations, camps, and counsellors. It also has implemented the creation of new tables to assign the tasks to the counsellors.

The usability of the mobile application is a fundamental aspect in the development since it influences the user experience and the effectiveness and efficiency in carrying out tasks. So, to take it into account, a usability test has been carried out. We want to obtain relevant information about the different actions that are carried out in the app and to know if it meets the user's needs.

One of the issues that we want to discuss is if the user can find how to create an activity table and if performing this task can cause some problems, since it is the most important action to be performed.

Another problem that can be encountered is when the user needs to join a new organisation while being in another organisation's space.

Despite the potential usability issues that are out in the open, we may encounter new ones as usability testing is performed. According to the results of the test, it will be considered to make different modifications in the application, such as the way to show the functionalities or the way to use them.

2.2. Test Plan Objectives

The general purpose of the test is to analyse the development status of the CampManager application, which is at an early stage, with the aim of improving usability issues early.

During the test, it is intended to get a clear view of the challenges and obstacles that users may face when using the application. Also, it seeks to identify the functionalities and improvements necessary to make the system more attractive and satisfying to use. The final goal is to ensure that users can successfully use all or part of the system's functions, thus improving the convenience and ease of use of the application.

While the app was being developed, the developers found a few spots where a user could get lost due to the large number of actions they performed while navigating nested pages. Therefore, the main objective of this usability test is to certify if this hypothesis is true. That is why it has been decided to use a semi-formal test oriented to the formulation of specific questions.

The aspects under test are based on the user's capability of a certain action, such as assessing the precision with which the users can find their objectives using their system and how good the system is at providing the users with the services to obtain their goals, so the first key property is Effectiveness. For that there will be a series of scenarios based in the previously formulated questions, in which the user will try to realize the chosen answer based on the initial conditions that the developers detected as possible confusion points.

At the same time, on top of validating that the user can complete the actions in a precise way, it is also important to evaluate that the actions can be done in an optimal time, so the key property Efficiency. This refers to the effort spent in reaching the goals while satisfying expectative. For this application, it is important because if it does not speed up and simplify the management, organisations will stick to their original management.

Finally, it is important to consider user experience. For this, evaluating the Engaging property will be useful because it raises user satisfiability, helps with product adaptation, and reduces frustration. For this study case it is vital that user experience is satisfactory, which means, they find the app easy to use and that it satisfies their needs. The app can be used by different profiles, so it needs to have satisfactory experiences for all user profiles, or else the app won't be useful to organisations. If the users don't like the app, it will be a bad investment for organisations.

3. Methodology

3.1. Test Information

The test was carried out on Tuesday 2nd of May 2023 in the UsabiliLAB laboratory, which is located in room 3.03 of the EPS (Jaume II number 69, Lleida).

The participants took a semi-formal test that consisted of three different tasks. Each test lasted about 35 minutes.

3.2. Test Description

The test session was conducted with the participant being guided and supported by the moderator. The moderator followed the established protocol, ensured the participant's comfort, and addressed any doubts or concerns they had. Prior to the test, participants signed an informed consent form, acknowledging their voluntary participation and the option to withdraw at any time. They were informed that the session would be recorded, but their privacy and identification would be protected.

The test session included a welcoming and pre-test phase, followed by three tasks along with their respective post-task questionnaires. Finally, a post-test questionnaire was administered.

The protocol followed is detailed below:

Part 1: First Contact

- Welcome the user into the test environment.
- Introduce the team and the lab to the user.
- Offer the user a refreshment as a gesture of hospitality.
- Express gratitude to the user for participating in the test.
- Show the user the lab, including the location of microphones and cameras.

Important ideas to transmit:

- Emphasize that the user is not being evaluated, but rather the tool or product.
- Clarify that there are no right or wrong answers during the test.
- Ensure that the user does not feel pressured to perform exceptionally.

Part 2: Warming Phase

- Provide a brief explanation of the purpose of the product being tested.
- Explain the specific goals and objectives of the test.
- Describe the methodology of the test, which includes various forms, tasks, post-task questionnaires, and a final post-test questionnaire.
- Detail the procedure to be followed, which is Retrospective Thinking Aloud (RTA). This involves reviewing the task video while discussing the user's thoughts and actions during the task, with minimal communication during the task itself.
- Instruct the user to first complete the consent form (printed version) and then the pre-test questionnaire (printed version).
- Verify that the user has no questions or doubts before commencing the test.

3.3. Tools

For testing, we used Tobii Studio Pro software in the lab. Tobii is a robust program that allows us to design the study, run test sessions using the application, conduct questionnaires, observe the gaze of the participants in real time, view results, and analyse statistics. The software can easily extract meaningful interpretations of eye movements on the application screen, provide utilities to compare different sessions, and offer an intuitive workflow for getting started with eye-tracking technology.

Within the laboratory we can find two differentiated areas:

User space: Space in which the user performs the test together with the facilitator who guides him throughout the process. This space has the following equipment:

- **A computer**: Used to present the app to the participants and record eye movements.
- **Tobii eye-tracker**: This device is placed in front of the user and records the movements of their eyes. It is usually placed at a certain distance from the user so that they can see the screen comfortably and the eye-tracker's camera can accurately record eye movements.
- **Camera Microphone**: Used to capture the user expressions, corporal language, and user comments during the test session (qualitative data). This information is collected with the consent of the user using the Informed consent form.

Observers space: Space where the team monitors the user throughout the test. The equipment of this area is the following:

- **A computer:** Used to monitoring the test.
- **Video recording studio (Tobii Studio software):** Tool to monitor collect user data during the session.

3.4. Participants

In the case of this test, the user sample was centred on counsellors, where the main characteristics of the user sample used by the test are the following:

- Gender:
  - Woman (25%).
  - Men (75%).
- Age
  - Between 18 and 25 years old (50%).
  - Between 40 and 59 years old (50%)
- Summer Camps experience:
  - High (50%).
  - Low (50%).

All the people selected for the test are from Catalonia, Spain.

3.5. Tasks

The team decided to introduce three tasks, which may cause problems for the user during their completion, they contain main functions of the application.

3.5.1. Create Campaign Table From Main Organisation Page

Create may be a not trivial task, the user must be taking a lot of actions after creating a table. The objective of this task is check if the user can find the tables creation panel and create a new table.

3.5.2. Validate If The Table Is Created And Its Status

The automatic generation of the tables takes a while, so when a table is created it cannot be displayed directly, to solve this the application shows an information message. The objective of this tasks validates if the user can see the message, or it is necessary to remodel the format of the message.

3.5.3. Add A New Organisation In Their Space While Being In Some Organisation's Space.

The user can add a new organisation in its space. The app includes a direct button that links to the user organisation space and here the user can enter a new organisation. The main propose of this task is check if the user can see the button and check the user's failures during the tasks.

4. Usability Metrics

As described in the Test Plan document, the team has established the metrics that will be used to analyse the results obtained from the test. Defining these metrics is important to obtain relevant information to achieve final results.

4.1. Effectiveness

One of the main objectives of this evaluation is to verify if the user can complete the tasks classified as problematic, therefore it is important to count the number of tasks in which the user has problems. Thus, the main metrics to use are:

- Percentage of tasks completed correctly. This metric will give us a quantitative measure of the system's usability and if it supports the user in completing their tasks.
- Task success rate. This measures the percentage of users who were able to complete a task successfully. It can also help to identify any obstacles or issues that users may be encountering during task completion

This metrics help to confirm if the usability issues reported by developers are true and detect the tasks that the users have more problems to solve.

4.2. Efficiency

In addition to measuring the effectiveness of a task, it is important to consider the effort taken by the user, in this way cases in which the user luckily manages to complete the task can be ruled out. Furthermore, this type of metric can help to understand the reasons why the user is not able to achieve a task.

- Time for doing each task.
- Number of errors made during the task completion. This can be user errors at entering incorrect data or making mistakes using the app. System errors, that occurs inside the app, like bugs. Design errors, like confusing navigation.

4.3. Engaging

Another important aspect to deal with will be to review the experience that the user has had using our application to detect any type of discomfort or shows a positive attitude with the use of the application:

- Number of positive/negative expressions/comments during the development of a task.
- The System Usability Scale (SUS).

Listening and observing these experiences we can get qualitative data, also with the post-tasks that we going to make after every task. And to get quantitative data, we are making the post-test questionnaires, as they have more precision.

With these metrics it is possible to measure if the user experience in the tested tasks is good and to detect possible false success results due to the user's luck after performing a random action.

4.4. Eye-Tracking Metrics

Finally, it will be reviewed how the user interacted with the screen through their view. With this metric you can get information about which interface elements the user is fixing, for how long and in what order.

- Time for first fixation: With this metric we will know the time it takes a user to first focus on a specific element or area of interest. We can evaluate the effectiveness of design elements in attracting the attention of users. The main objective of this metric is to validate that the key points of the application, as well as those that the developers classify as problematic, have been seen and finally measure how long it has taken until a user views them. A considerable value can be an indication that there may be a visual problem with it.
- Total time fixation: With this metric you can see the time that the user fixes his attention. The objective of using this metric is to validate that the key element is effective enough for the user to pay adequate attention. This metric can complete the information that the Time for first fixation metric does not provide (whether the fixation has been punctual or not), in this way a short time may indicate that the user has not really paid attention to that specific point.

- Mouse clicks: With this metric you can see in which places the user clicks and, in this way, it can be used as an auxiliary metric for calculating errors or collecting information that the eye-tracker has not captured.

5. Global Analysis And Problems

5.1. Effectiveness Analysis

Within the analysis of the effectiveness of the application, it can be seen how only one task has been completed by the four users. Of the others, tree users have been able to finish Task 1, and task 3 only two.

Task	Task Success Rate
Task 1	0,75 (3/4)
Task 2	1 (4/4)
Task 3	0,5 (2/4)
Percentage Of Tasks Completed 100%	33%

Table 1 - Tasks Success Rate

A general summary mode shows that only 33% of tasks are complete as indicated by the Percent Tasks Complete metric. It is true that this low percentage might not be very worrying in very isolated cases where the failure could even be due to the very intimidating environment that can be a usability test in a laboratory.

However, in the case of this test, this data is worrying because in some of the tasks, as can be seen in the results of the Task Success Rate metric, more than one user has encountered problems. Therefore, the performance of the users in each task must be deeply analyzed, looking for the reasons why they had problems.

5.2. Efficiency Analysis

Regarding the time that users have needed to complete the task, it can be seen that for Task 1, users in general require a similar time, with an average of 229 seconds and a deviation of 49.5 seconds.

For Task 2, a considerable deviation is distinguished where it seems that the values are grouped into two groups. This grouping can be interesting to study and thus find common patterns that indicate the reasons for the existence of these time differences.

Finally, in the case of Task 3, the users who managed to complete the task took a similar time.

Participant	Task 1 Duration(s)	Task 2 Duration(s)	Task 3 Duration(s)
User 1	**Not completed**	80	**Not completed**
User 2	285	83	85
User 3	213	25	87
User 4	190	36	**Not completed**
mean	229.33	56	86
stdev	49.56	29.81	1.41

Table 2 - Time Required To Complete Tasks

Regarding the Time to First Fixation metric, as a summary, it can be observed that as a general rule, the time it takes for users to fixate is not significant, except for the Areas of Interest (AOIs), "Navbar top" and "Navbar bottom" (which may indicate that these sections are not effective enough to capture the user's attention).

	Task 1		Task 2	Task 3		
	Going to tables list	Add table	Status message	Navbar top	Navbar bottom	Change organisation
mean	2.46	3.90	0.32	42.20	29.87	0.97
stdev	3.34	0.32	0.39	24.55	9.29	0.79

Table 3 - Time To First Fixation Of The Tasks' Main AOI

Finally, regarding the number of errors, it is observed that tasks 1 and 2 do not have a considerable number of errors, while task 3 the number of errors skyrockets. This is an indication that users have not been able to complete the task (and will be analysed in later sections).

Participant	Task 1	Task 2	Task 3
User 1	2	0	10
User 2	0	0	3
User 3	3	0	10
User 4	1	0	20
Total errors	6	0	43

Table 4 - Number Of Errors Per Task

5.3. Engaging Analysis

The main objective of this metric is to evaluate user satisfaction when using the application. It has been analysed from a task-level point of view and a more global one.

This information has been compiled from different sources, which provide a set of interesting qualitative data to analyse. These sources have been:

- Post-task questionaries
- Post-test questionary
- RTA videos

From a global point of view, the System Usability Scale (SUS) score has been calculated. The System Usability Scale is a widely used questionnaire-based tool for evaluating the usability of a system or product. It provides a standardized measure of perceived usability and user satisfaction. The SUS scores range from 0 to 100, with higher scores indicating better usability and user satisfaction. In general, a SUS score above 68 is considered above average, while scores below 51 indicate potential areas for improvement.

Participant	Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10	SUS score
User 1	4	2	5	3	3	3	4	3	3	4	60
User 2	5	5	5	1	5	5	5	1	5	5	70
User 3	4	2	4	1	4	2	3	2	4	5	67.5
User 4	3	3	3	1	3	2	3	3	3	3	57.5
Mean	4	3	4.25	1.5	3.75	3	3.75	2.25	3.75	4.25	63.75
Stdev	0.82	1.41	0.96	1.00	0.96	1.41	0.96	0.96	0.96	0.96	5.95

Table 5 - SUS Results For Each User

Calculating the SUS, an average of 63.75 and a standard deviation of 5.95 are obtained which indicate a positive evaluation of the usability of the application , but a series of improvements must be applied (C- SUS Letter grade).

However, there are also lower scores that indicate that some of the users have had a worse experience than others. This is due to some issues to fix that will be discussed in later sections.

6. Task Analysis And Problems

6.1. Task 1

Task 1 consisted of users creating a campaign table from the organisation's home page. The goal was to check if users could find the table creation panel and create a new table.

6.1.1. Effectiveness

As previously mentioned, the evaluation of the effectiveness of the application is carried out using the Task Success Rate metric.

Task	Task success rate
Task 1	0,75 (3/4)

Table 6 - Task 1 Success Rate

The Task Success Rate was 0,75. This indicates that the task was performed satisfactorily by most of the participants.

Taking this result into account, some users could not complete the tasks, so it is a problem that must be analysed more carefully in order to find a solution. However, the results exceed the expectations of the team, which estimated that this rate would be lower.

6.1.2. Efficiency

When evaluating the efficiency of the task, various factors have been considered, such as the time the user has taken to solve the task, the time it takes to locate the key elements that allow the action to continue and the number of errors.

Participant	Task 1 Duration(s)
User 1	**Not completed**
User 2	285
User 3	213
User 4	190
mean	229.33
stdev	49.56

Table 7 - Time Required To Complete Task 1

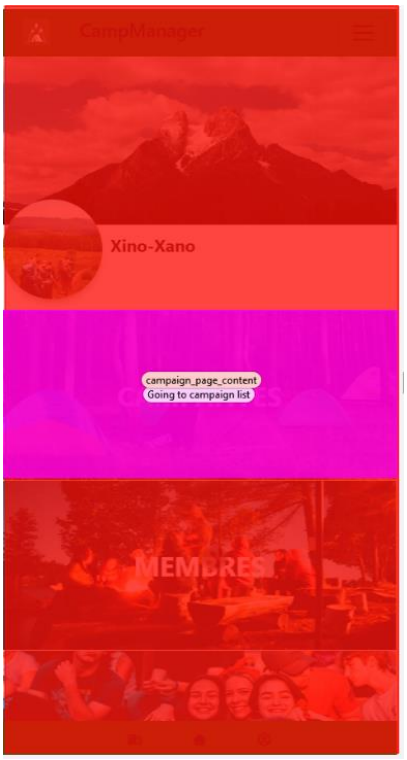
Regarding the time it takes for users to complete the task, they are within the expected ranges (except for the user who failed to complete the task), where the standard deviation does not indicate significant dispersion. This suggests that users, in general, have similar completion times and these differences may be caused by errors or some confusion of concepts (discussed in the Engaging section).

On the other hand, before analysing the number of errors and the time of the first fixations to the key points of the application, Areas of Interest (AOI) used will be defined.

- Going to campaign list: This area represents a section in the app's main page that enables the user to navigate to a list of campaigns. It serves as a gateway to access and manage the various campaigns available within the app.
- Going to campaign: This area represents a page within the app where users can access specific campaign.
- Going to tables list: Similar to the "Going to campaign list," this area represents a section in the app that allows users to navigate to a page displaying all the tables they have access to.
- Add table button: This area represents a specific button located on the table list page. When clicked, it triggers the functionality to add a new table to the app. Users can utilize this button to create and set up new tables for their campaigns.

It should be noted that in the images where the AOIs are specified there are several areas that have been marked to detect possible errors that users have produced when trying to access areas totally different from those mentioned above. This is reflected in the table where the errors produced by the user are shown.

The areas of interest selected on the screens of Task 1 are shown below:



Going to campaign list

Going to campaign

Going to tables list

Add table button

Figure 1 - Areas Of Interest Of Task 1

It can be seen that there is a high deviation of the Time To First Fixation metric in some of the points.

	AOIs (Areas Of Interest)			
	Going to campaign list	Going to campaign	Going to tables list	Add table button
User 1	0.34	0.65	-	-
User 2	1.66	0.56	6.31	4.13
User 3	1.07	0.24	0.41	3.67
User 4	1.52	4.61	0.65	3.90
mean	1.15	1.51	2.46	3.90
stdev	0.59	2.07	3.34	0.32

Table 8 - Time To First Fixation Of Task 1

These deviations are notable in the cases of the “Going to campaign” and “Going to tables list” AOIs. Some users have required a longer time to locate the element, which may be indicating some type of problem.

After analysing the material collected during the session a second time, it has been possible to see that this is because they asked to remember what should be done in the task. Note that for the second case, it was due to a case of confusion. The nomenclature used in the application is not common within the field (as indicated by one expert user in the RTA), which has led the user to a situation of confusion.

Also, the task is not free of errors. That can help to find the reasons why some users have failed to complete the task. As can be seen in the following table, many of the users make a series of errors.

Participant	Task 1
User 1	2
User 2	0
User 3	3
User 4	1
Total errors	6

Table 9 - Task 1 Errors

As it can be seen, users have made a series of errors that in some cases lead to them not being able to complete the task.

The main error that has been detected is that users tend to use the "Edit Campaign" button when they are trying to select a campaign. This is reflected in the following table, which shows the number of clicks made by the user in the area of interest related to the "Edit Campaign" button.

Participant	Edit campaign	Going to campaign
User 1	2	-
User 2	-	1
User 3	2	1
User 4	-	1
Total clicks	4.00	3.00

Table 10 - Mouse Clicks Of Task 1

This may indicate that users do not recognize that the elements displayed in the campaign list can be clicked, and instead, they assume that they need to use the "Edit Campaign" (a clarity problem), button to add a table.

6.1.3. Engaging

From the answers of users in the post task questionnaire, it has been possible to validate that for them it was not an easy task to complete. However, those users who have been able to finish the task are satisfied and have provided a series of comments on their feelings.

Thanks to these comments, it has been possible to detect the main problems that the task has. First, expert users on the subject have reported that some concepts used are not common within the field, which has led to confusion.

Also, other users reported that when selecting the campaign name, the white box in which the name of the campaign is located does not make it clear that it can be clicked or not, so they interpret that to add a table they must press the button to edit a campaign. This point confirms the hypothesis formulated previously.

6.2. Task 2

Task 2 consisted of a user that wants to check a table's status. The goal of this task in the test is to check if the message provides enough information to indicate that the table is not yet available, because it is being generated.

6.2.1. Effectiveness

In Task 2 all participants completed the task, obtaining a task success rate of 1.

Task	Task success rate
Task 2	1 (4/4)

Table 11 - Task 2 Success Rate

Even though all the users have completed the task, the observers detected that many of them were not satisfied at all, therefore it cannot be classified as an effective task (the reason is discussed in the following points).

6.2.2. Efficiency

Given the false positive results obtained in the effectiveness, it is necessary to look for the indications that can help answer why the users are not convinced that they have carried out the task correctly.

Analysing the time to complete the task, it can be observed how there is a considerable dispersion.

Participant	Task 2 Duration(s)
User 1	80
User 2	83
User 3	25
User 4	36
mean	56
stdev	29.81

Table 12 - Time Required To Complete Task 2

This dispersion of values is divided into two groups, one with users whose times are around 30 seconds and another group with users who are around 80 seconds. These groups can be identified based on the age range (specifically ranges 18-25 and 40-59).

Based on these two groups, the remaining metrics will be analysed with the aim of comparing them and determining whether these differences hold any significance or have occurred due to randomness.

In the same way as in Task 1, an area of interest has been defined which covers the area of the table status text message.

Figure 2 - Area Of Interest Of Task 2

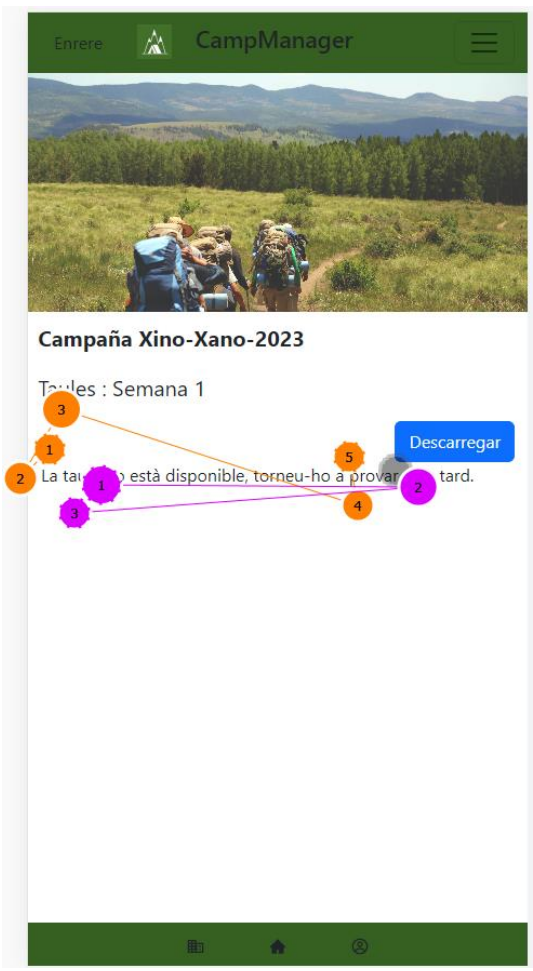
Once the area of interest has been defined, the *Time to first fixation* metric has been evaluated, obtained the following results.

	Table status message AOI
Age 40-59	
User 1	0.46
User 2	0.81
Age 18-25	
User 3	0.00
User 4	0.00

Table 13 - Time To First Fixation Of Task 2 Based In Age Groups

As can be seen, in the case of the 18-25 age group, it seems that the action of displaying the message is instantaneous, while the older age group takes a slightly longer time.

The main reason for this is because the younger users have kept their eyes on the same point where they had stayed on the previous page, with the luck that the area of interest is at the same point, while the users of the other group move the view to other points on the screen.



Gaze Plot of age range 40-59 (first fixations) *Gaze Plot of age range 18-25 (first fixations)*

Figure 3 - Gaze Plots' Start Of Task 2

However, if the start of the glaze plot is analysed, it can be seen that this difference between the two groups does not provide any information, following the route described by the users, it can be seen how they follow the message reading route. Therefore, this minimal time difference only indicates a possible precision error of the eye-tracker.

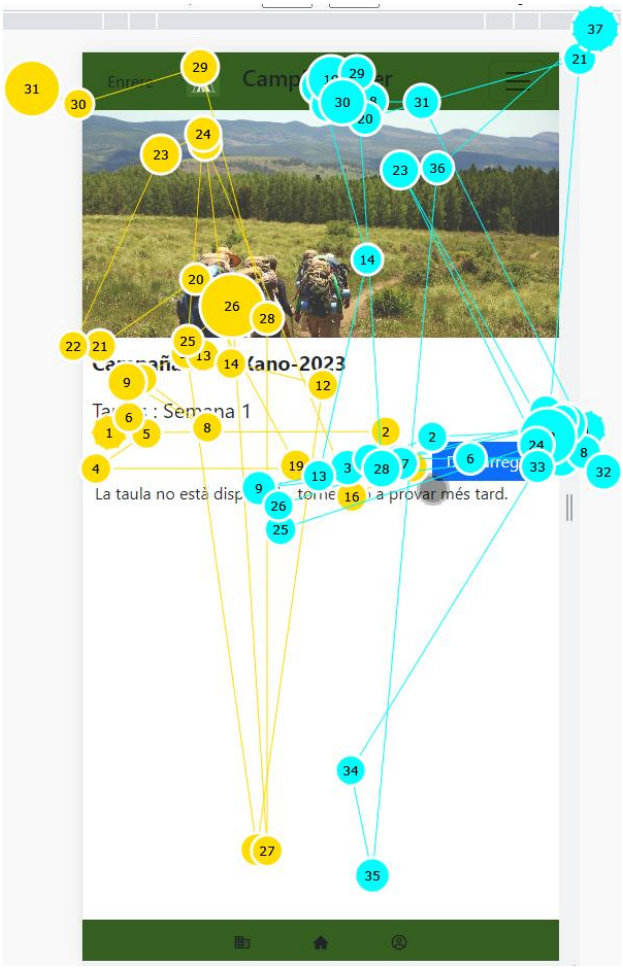
Once this small-time discrepancy has been clarified, it is necessary to analyse whether the message is effective or not. The "total visit duration" metric has been used, with the aim of knowing the effective time in which the user fixes his attention on the message and to detect if he has really paid attention and has read the message or not.

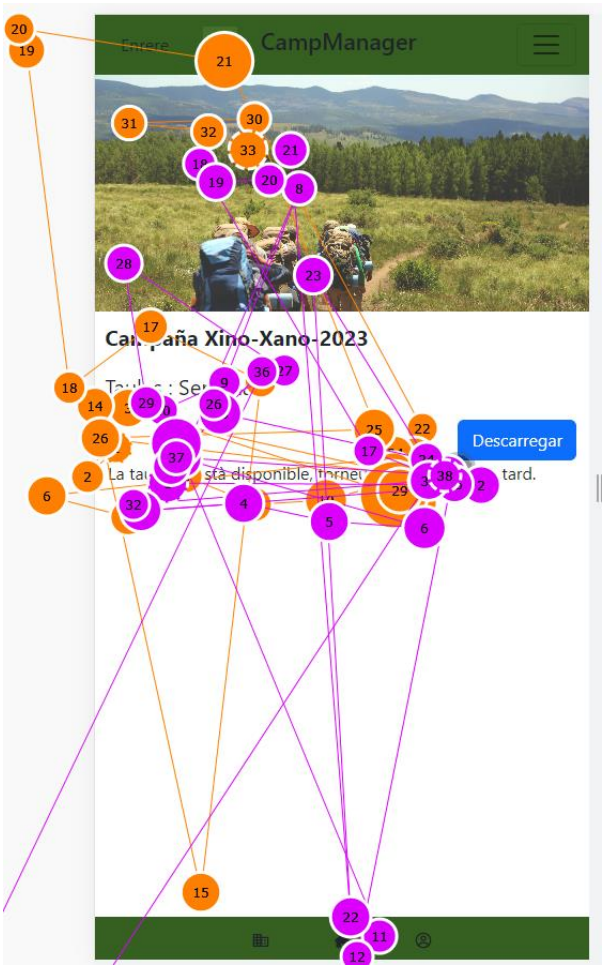
Participant	Total Visit Duration(s)
User 1	2.42
User 2	1.89
User 3	5.60
User 4	6.36
mean	4.06
stdev	2.24

Table 14 - Task 2 Total Visit Duration

The metrics indicate that all users fix their attention long enough to affirm that they have read the message, however, the time of the group made up of people between 40 and 59 years spends less time, possibly due to the precision error of the eye-tracker.

Despite the fact that users read the message, based on the visual route that users take after reading the message, it seems to indicate that they are not convinced (a lack of feedback problem, the users don't receive enough feedback to directly understand that the message shows the state of the table), and they sweep the screen in search of other elements that give them more information, being the users of the youngest age range the first to consider the task completed.





Gaze Plot of age range 40-59 (all fixations) *Gaze Plot of age range 18-25 (all fixations)*

Figure 4 - Gaze Plots Of Task 2

Based on these data, it can be concluded that the message is not effective enough for users to quickly know the status of the table.

6.2.3. Engaging

Based on the user responses in the post-task questionnaire, it has been observed that users report finding the task to be difficult. This point has come as a surprise since it was believed this was the task that would be easier for the user to solve.

On the other hand, after reviewing the post-task responses, the responses of the users have been analysed and the results show that they are satisfied with their performance. This may initially seem to contradict the hypothesis formulated above. However, if it is analysed deeply, the user initially distrusts it because the message is not clear, and they search the rest of the page to find the solution. Because there is no other element that provides more information, they come to the conclusion that the table is not available and with this they consider the task as good.

This last point is confirmed by one of the users after analysing the RTA (Retrospective Think-Aloud), which indicates that he saw the message, but at first it confused him because he did not know if the table was unavailable due to an error or because it was being generated.

Thanks to this information, we can say that despite the fact that the task has been completed by all the users, the fact that the message of the status of a table is not effective, makes users mistrust at the initial moment.

6.3. Task 3

Task 3 of the usability test consisted of providing the user with a new organisation code and the user had to add a new organisation to their account. To do this, the user started from the home page of their current organisation (different from what they had to add).

The app includes a direct button that links to the user organisation space and there the user can enter a new organisation. The main propose of this task is to check if the user can see the button and check the user's failures during the tasks.

6.3.1. Effectiveness

In the Effectiveness of the last task, the success rate indicates that half of the users have not been able to complete it, suggesting that there is a usability problem that needs to be solved.

Task	Task success rate
Task 3	0.5 (2/4)

Table 15 - Task 3 Success Rate

6.3.2. Efficiency

Participant	Task 3 Duration(s)
User 1	Not completed
User 2	85
User 3	87
User 4	Not completed
mean	86
stdev	1.41

Table 16 - Time Required To Complete Task 3

Within the participants who managed to complete the task, the average duration is 86 seconds and a deviation of 1.41, indicating that there is not much variability in duration.

This may be suggesting that those users who completed the task managed to jump the barrier that allowed them to find the option to change organisation that the rest of the users could not jump. Once they managed to overcome this conflicting point, the rest of the task was easy to complete.

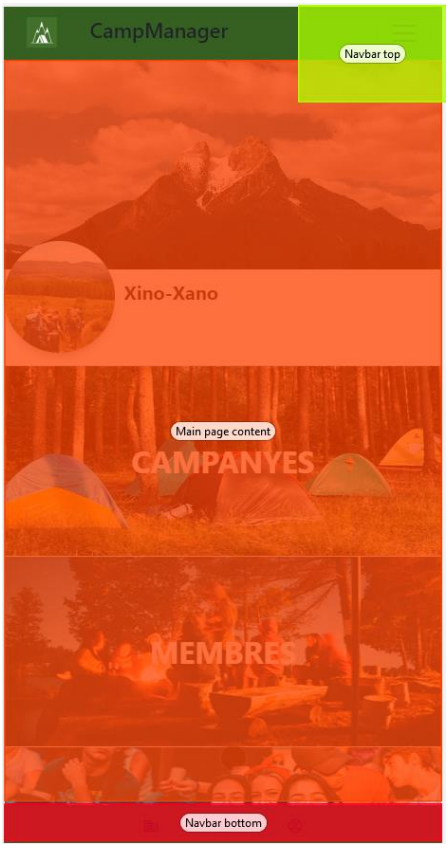
In order to validate this hypothesis, the rest of the metrics will be analysed in search of these indications.

Before of the analysis of the rest of metrics, the Areas of Interest (AOI) used will be defined.

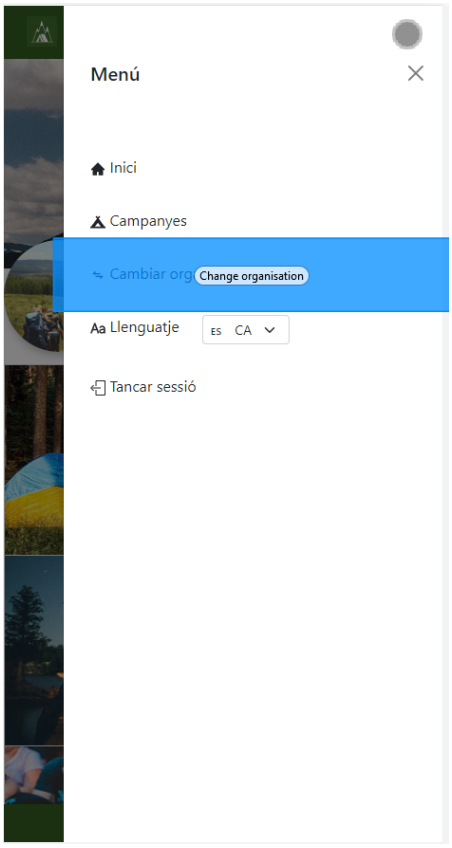
- Navbar top: This is a navigation bar located at the top right of the application interface. Once is pressed it contains icons that allow users to access different sections or key features of the application.
- Navbar bottom: The navbar bottom is a navigation bar, located at the bottom of the application interface. It contains three icons to access different sections of the application that focus on more specific navigation options or quick actions.
- Change organisation: This feature allows users to change the organisation they are interacting with in the app. By selecting "Change organisation", users access a list of available organisations and can select the one they want.
- Organisation title: This area shows the title of the section in which the user is. It provides visual and contextual information to help users understand what context they are in.
- Add organisation: By pressing the "Add organisation" button, users will be redirected to a new page where they can access a search engine where they are asked to provide a code to add a new organisation to their account.

It should be noted that in the images where the AOIs are specified there are several areas that have been marked to detect possible errors that users have produced when trying to access areas totally different from those mentioned above. This is reflected in the table where the errors produced by the user are shown.

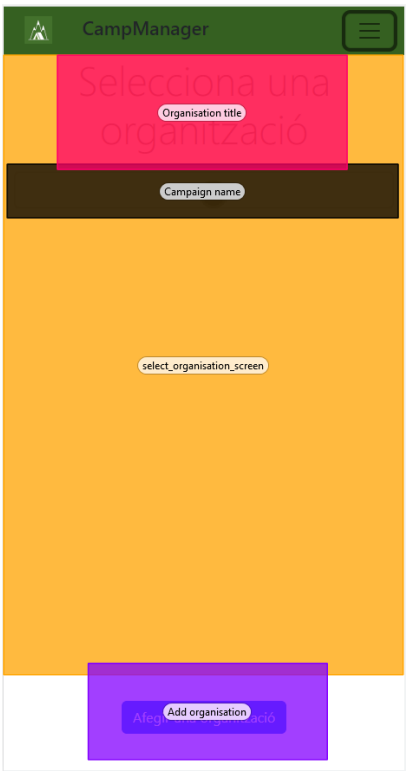
The areas of interest selected on the screens of task 3 are shown below:



Campaign page



Change organisation



Add organisation

Figure 5 - Areas Of Interest Of Task 3

To begin with, it can be seen that a high number of errors made by users is observed. These errors indicate that users experienced difficulties trying to find new functionality that they had not seen in previous tasks. These findings suggest that users were confused and lost while performing the task.

Participant	Task 3
User 1	10
User 2	3
User 3	10
User 4	20
Total errors	43

Table 17 - Task 3 Errors

When considering user clicks, it becomes evident that their attention is primarily drawn to elements located in the central part of the screen. This area contains the main information and lacks the necessary buttons for changing the organization.

Participant	Main page content	Campaign name
User 1	10	-
User 2	2	1
User 3	10	-
User 4	19	1
Total clicks	41	2

Table 18 - Task 3 Users' Clicks On The Areas Of Interest

The fact that users focus their attention especially on the main content is an indication that there is a possibility that users have difficulties seeing the buttons that allow them to access the pages necessary to complete the task.

	AOIs (Areas Of Interest)				
	Navbar top	Navbar bottom	Change organisation	Organisation title	Add organisation
User 1	-	-	-	-	-
User 2	34.18	-	1.83	1.84	11.63
User 3	22.66	36.44	0.29	0.88	0.02
User 4	69.76	23.31	0.79	14.15	6.81
mean	42.20	29.87	0.97	5.63	6.15
stdev	24.55	9.29	0.79	7.40	5.84

Table 19 - Time To First Fixation In Each Area Of Interest Of Task 3

As shown in the table above, users take considerable time to locate the access to the change of organisation page, either through the top menu (Navbar top), or the shortcut at the bottom of the screen (Navbar button).

To finish confirming this hypothesis, if the total time that the user spends in each area of interest is evaluated, it is observed that the time is higher in the main area of the screen (Main page content), with respect to the rest of the areas of interest.

Participant	Main page content	Navbar bottom	Navbar top
User 1	15.94	-	-
User 2	13.61	-	1.53
User 3	25.22	0.16	0.86
User 4	25.63	0.09	0.59
Mean	20.10	0.13	0.99
Stdev	6.22	0.05	0.48

Table 20 - Total Fixation Time In Each Area Of Interest Of Task 3

This can also be seen graphically, using the Gaze-plot, which shows how users tend to focus their visual attention on the central part of the screen, ignoring the key buttons. A key point that indicates the existence of a visibility problem.

Figure 6 - Gaze Plot Of Users Attempting Task 3

6.3.3. Engaging

Based on the user responses in the post-task questionnaire, it has been observed that users report finding the task to be difficult. This point confirms the suspicions that the developers themselves had.

Furthermore, those users who have not been able to complete the task report that the application's structure does not help in completing the task. This helps to affirm that the elements that allow the task to be completed are not visible and effective enough for all users.

7. Recommendations

In this section, a list of changes to the CampManager application will be proposed, with the aim of solving the problems detected after carrying out this usability test.

The list of proposals will be classified according to the following priority levels:

- High priority
- Medium priority
- Low priority

7.1. High Priority

7.1.1. Change Of Organisation Button Visibility

7.1.1.1. Usability Problem

The organisation change button is not easily seen by users despite the fact that it is found as a shortcut in the lower menu of the application.

7.1.1.2. Problem Illustration

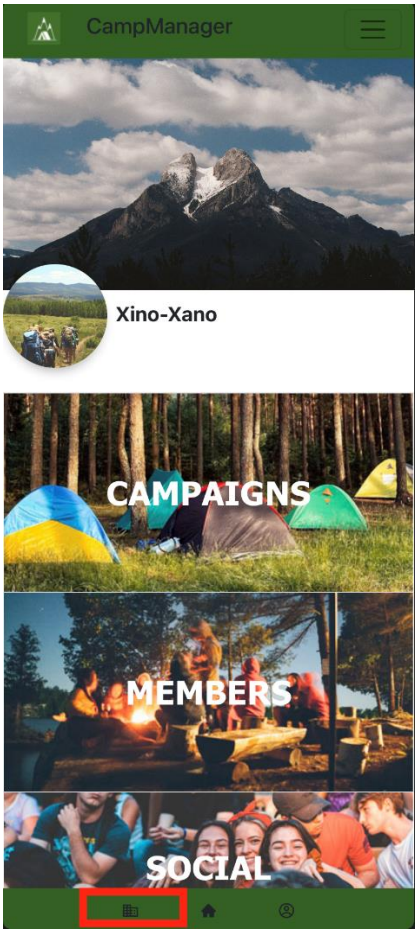


Figure 7 - Location Of The Organisation Change Button

7.1.1.3. Possible Solution

The button only includes an icon that may not be representative, so a good solution is for the button to also be accompanied by a representative text.

7.1.1.4. Impact Of The Change

Low: It only implies adding a representative text in the button.

7.1.2. Enter A Campaign Page Action

7.1.2.1. Usability Problem

Within the page of the list of campaigns the user can click on the title of the campaign to be able to enter the corresponding page and see its information. However, not all users are capable of interpreting that they can interact with the title and instead they end up performing the wrong action of clicking on the button to edit the campaign.

7.1.2.2. Problem Illustration

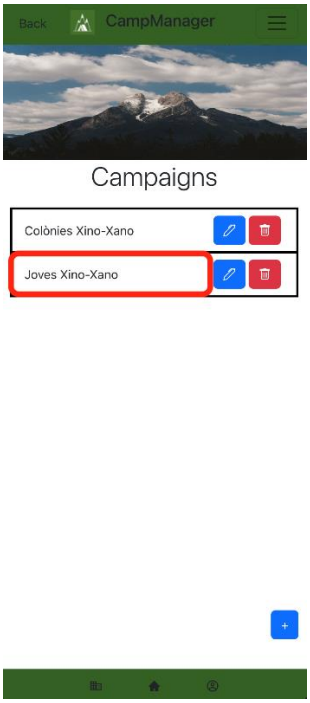


Figure 8 - Campaigns Selection Screen

7.1.2.3. Possible Solution

A possible solution is to include a new button to the existing ones (edit and delete), which indicates to the user that if he interacts with it, he will be able to see the pertinent information of the campaign.

7.1.2.4. Impact Of The Change

High: It can affect users who are already familiar with the application, who interact directly with the title, and it does not perform the action.

7.2. Medium Priority

7.2.1. No Table Available Status Message

7.2.1.1. Usability Problem

Tables are not generated instantly and take time. In this way, the application reports that it is not available. The problem is that the message is not clear, and users do not know the status of the real table (they do not know if it is in the generation phase or if the generation process has failed).

7.2.1.2. Problem Illustration

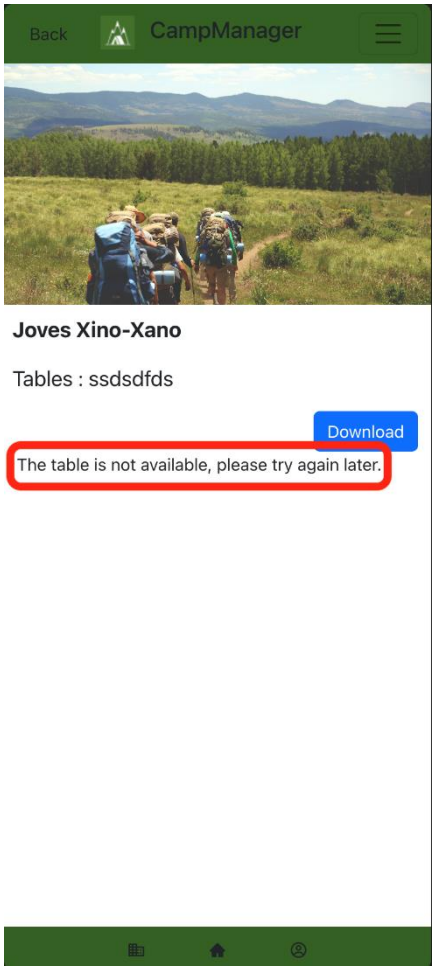


Figure 9 - Table Generation Loading Screen

7.2.1.3. Possible Solution

The main solution would be for the message to report the real and current situation of the table instead of the generic message that it currently exists.

7.2.1.4. Impact Of The Change

Medium: Users may think that table generation is temporarily not working.

7.3. Low Priority

7.3.1.1. Usability Problem

The name "campaign" on the main page of the application has confused some users because in their professional environment they use another word. This means that the first time they access the app they do not understand the content of this section well.

7.3.1.2. Problem Illustration

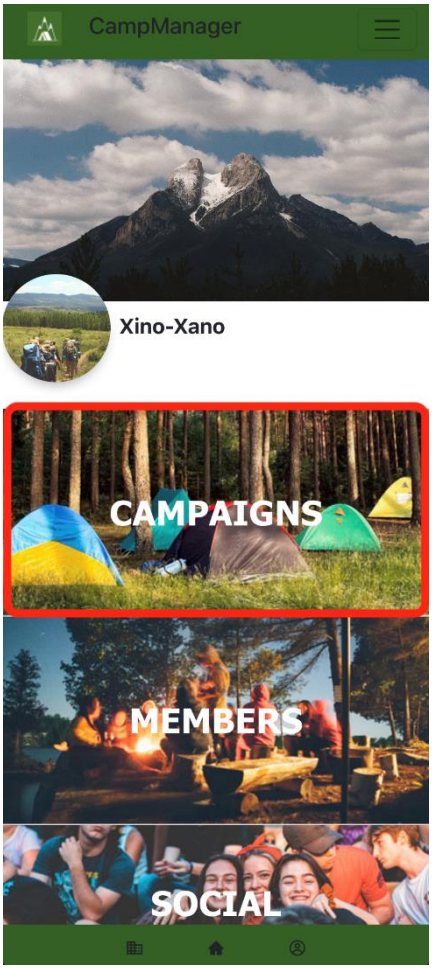


Figure 10 - An Organisation's Main Screen

7.3.1.3. Possible Solution

The solution would be to change the title of "Campaigns", specifically to "Camps" which is the term commonly used in the environment in which the application is immersed.

7.3.1.4. Impact Of The Change

Low: It only implies changing the text of the button.

8. Conclusions

With this usability test, it has been possible to evaluate how users interact with the application and what problems they face. Based on the results obtained, a series of changes can be applied to improve the usability of the application.

From the tested users, which were rigorously selected from the target user group of the test. An analysis has been carried out using the metrics

- Effectiveness
- Efficiency
- Engaging

With these metrics, the answers of the users to the pertinent questionnaires, the recordings of the session and finally the RTA (Retrospective think aloud), qualitative and quantitative information has been made available, which makes it possible to find the problems that the users have as well as the reasons why they have them.

Once the analysis has been completed, it has been possible to conclude that the application has not passed the test, and therefore the suspicions of the developers have been corroborated, who had detected points in which users could possibly have problems.

However, even though the application has not passed the usability test, it should be noted that, except for the conflicting points, the application is intuitive and easy to use both for users who are experts in the subject and for others who are. Point that affirm some users in their comments when they answered the questionnaires

9. Annexes

9.1. Pre-Test Questionnaire

First of all, thank you for joining to the usability test of CampManager. We are thankful for your interest about the application and your participation. Before starting the test, we want you to answer the following questions.

1. How old are you?

- ❑ 18-25.
- ❑ 26-39.
- ❑ 40-59.
- ❑ 60-74.

- ❑ 75 and older.

2. Could you define your gender?

- ❑ Male.
- ❑ Female.
- ❑ Other.

3. Have you ever worked as a camp counsellor?

- ❑ Yes.
- ❑ No.
- ❑ No, but I would like to.

4. About how many hours per week do you spend on your phone?

- ❑ 0h-10h per week.
- ❑ 11h-25h per week.
- ❑ +26h per week.

5. Have you ever used a management and planning app?

- ❑ Yes.
- ❑ No.

In case of Yes, give your opinion on applying this type of application in the camp environment.

9.2. Post-Task Questionnaire

Complete these few questions about your feelings for this task.

Instructions: For each of the following statements, mark one box that best describes your reactions to the application today using the following scale:

I was able to complete the task.

Yes (continue)	No (please, explain the reasons)

	Strongly disagree				Strongly agree
The task was easy	1	2	3	4	5
I think I did the task correctly	1	2	3	4	5
The structure of the interface has helped me to solve the task.	1	2	3	4	5
I needed little effort to solve the task	1	2	3	4	5
The task was well defined, and I understood exactly what I had to do	1	2	3	4	5
I felt satisfaction after completing the task	1	2	3	4	5

9.3. Post-Test Questionnaire

Thank you for doing the test!

Here we attached some final questions you to answer:

	Strongly disagree				Strongly agree
I think that I would like to use this system frequently	1	2	3	4	5
I found the system unnecessarily complex	1	2	3	4	5
I thought the system was easy to use	1	2	3	4	5
I think that I would need the support of a technical person to be able to use this system	1	2	3	4	5
The interface has a clear and easy to understand terminology	1	2	3	4	5
I thought there was too much inconsistency in this system	1	2	3	4	5
The elements with which you have interacted have been easily accessible	1	2	3	4	5
I found the system very cumbersome to use	1	2	3	4	5
I felt very confident using the system	1	2	3	4	5
I could get going with this system	1	2	3	4	5

9.4. RTA Results

9.4.1. SUS Questions

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. The interface has a clear and easy to understand terminology.
6. I thought there was too much inconsistency in this system.
7. The elements with which you have interacted have been easily accessible.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I could get going with this system.

Participant	Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10	SUS score
User 1	4	2	5	3	3	3	4	3	3	4	60
User 2	5	5	5	1	5	5	5	1	5	5	70
User 3	4	2	4	1	4	2	3	2	4	5	67.5
User 4	3	3	3	1	3	2	3	3	3	3	57.5
Mean	4	3	4.25	1.5	3.75	3	3.75	2.25	3.75	4.25	63.75
Stdev	0.82	1.41	0.96	1.00	0.96	1.41	0.96	0.96	0.96	0.96	5.95

	Participants' comments		
User	**Task 1**	**Task 2**	**Task 3**
User 1	I hadn't realized I was creating a campaign when I thought I was creating a table and so was trying to add participants to the table/campaign	At first, I didn't know where the campaign "tables" section was, and I tried to enter through a user (it was incorrect). Then I was able to see the result of the table without problems, but I did not know why it was displayed.	I didn't really know how to change organisation; I thought I had to choose my user.
User 2	The name "campaign" on the main page of the application has confused me, since in my professional experience I have never named them that.	I have confused the "campaign" section with "advertising campaign". Other than that, completing the task was easy.	After ruling out on the main page that none of the 3 options (social page, campaigns, and members) were used to change the organisation, I decided to investigate the other buttons available in the application until I found the button to change organisation
User 3	It was clear to me that the "edit" and "delete" buttons did things in the app, but it wasn't clear to me that the campaign name title was clickable to access the campaign	Having done the previous task, it has been very easy to solve this task, since I already knew where the tables were.	It took me a long time to find the button to "add the organisation" and I accessed it through the button at the bottom despite having displayed the menu on the right. Once I accessed the page to change my organisation, it was easy for me to add a new organisation
User 4	I did not see the "tables" section correctly in the app and I thought that I had to add the participants of the table in the participants section. After realizing this error, I was able to finish the task without any problems.	There is nothing in the app to indicate if the table is complete or not. There is simply a message that the table is not available, and I don't know if it's a problem with the app or because it wasn't created	At first, I didn't see the "add new organisation" button well. I thought I would find it in the list of organisations. Finally, instead of adding the code, I tried to search by organisation name but that was not how the search engine worked.