OOP Project Report – Group 75

Jimmy Zheng, Konrad Gniaz, Robert Mendes,
Arpad Jakab, Matus Leng, Atanaz Semov

1 INTRODUCTION

1.1 Objective

The objective of our evaluation was to identify usability issues in our Talio application through the use of heuristic evaluation. Heuristic evaluation is a usability inspection technique, in which evaluators examine a user interface and identify potential usability issues based on a set of predefined heuristics (principles).

In this essay, we will discuss the results of the heuristic evaluation and the usability issues identified by the evaluators. We will also provide recommendations for addressing these issues to improve the overall usability of the application. Throughout this evaluation, our aim is to gain insights into how users interact with our application and to identify areas where we can make improvements to the over all user experience.

1.2 Prototype

Figures 1-4 show the most important pages of our mockup.[1] In short these are the following. The first is the landing page, where a server can be selected. The second is the join board scene, from where the user can see his visited boards, create and join a board, and go to the admin panel. The third figure shows the most important page of our application, the board overview. And the last shows the admin page, from where admins have access and control over all boards on the server.

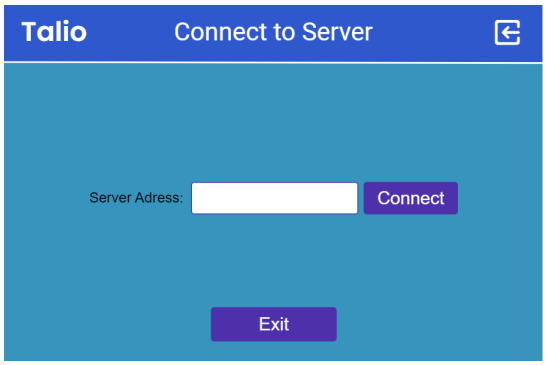

Figure 1: Landing Page

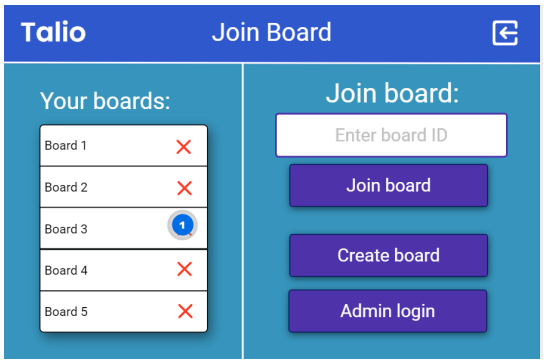

Figure 2: Join Board

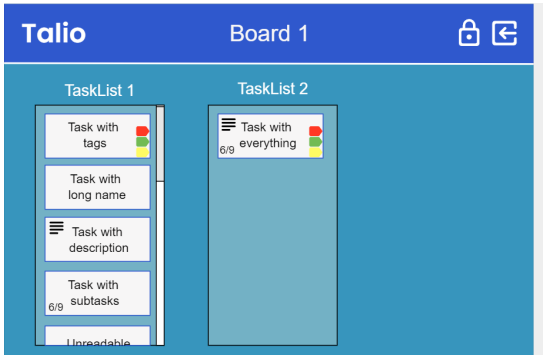

Figure 3: Board Overview

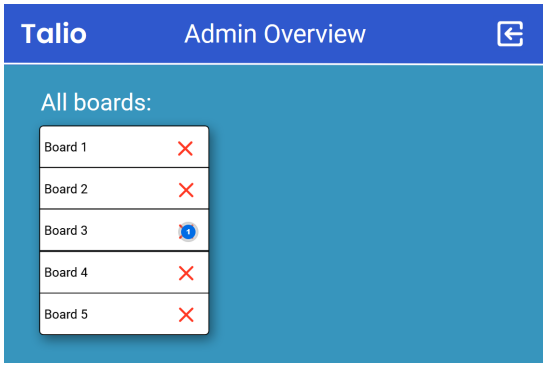

Figure 4: Admin Page

2 METHODOLOGY

Our team has recruited 5 experts to perform the Heuristic Usability Evaluation on the application. We determined this number of experts sufficient based on an average calculated using the results of 6 studies on Heuristic Evaluation. According to this calculation: 5 experts can find around 75% all usability issues in a system.[2]

2.1 Expertise

The experts have been asked about their previous experience in team projects and programming experience, as it is valuable information during result analysis. From this point onwards the five experts will be called Expert 1, 2, 3, 4 and 5 respectively, as they did not identify themselves by name. Expert 1 and 2 have indicated that they had 1-3 years of programming experience in object-oriented languages, while expert 3, 4 and 5 have said that they did not possess any programming experience prior to enrolling in their Bachelor's Computer Science and Engineering degree. In addition, all 5 experts have indicated that they do not have any experience with working on a team project.

2.2 Procedure

Being given the application prototype, the Evaluators are given limited choice as to how to navigate the application, caused by the time and technical constraints of our team's mockup. The mockup itself[1] consists of a few mockup pages, namely the ones representing the scenes: server connection, board overview, main menu, board creation, and admin panel. The evaluators are to navigate through each of those screens by clicking in the appropriate places and by reading through the developers' comments left on a few features that have not been implemented in the mockup, as we (initially) deemed them not impactful enough to show. When spotting a problem within the currently shown interface, they were to assign it to one of the 10 Usability Heuristics for interface design.[3] The team decided to opt for all 10 of those Heuristics despite the belief that some of them might not be used during the experts' evaluation. From a result analysis standpoint it is far better to have some additional rubrics that none of the encountered problems fell under, than to have problems that could not be classified into any of the given Heuristics, were they to be limited.

2.3 Report Template

After determining the Heuristic from the list, they experts would have to follow a specific problem reporting template , providing:

- A short description of the problem, in which the evaluator states what the issue is about. Only a title and a Heuristic is not enough to determine the problem's identity, which becomes especially problematic when attempting to determine whether the problems that multiple experts found are distinct.
- The location of the problem, specifying on which mockup and where within it the problem was encountered.
- The (assumed) cause of the problem, to help our team out with identifying problem equality among evaluators and possibly make the GUI improvement process a tad faster.
- The impact and frequency rating of a problem on a scale from 1 to 10, in addition to a description that includes the reasoning for the hereinbefore mentioned rating. Impact and frequency ratings are very important to include as they are of tremendous value when prioritizing the problems found by the experts in terms by which ones to work on first.

Each of these subpoints had to be included in each separate problem report, maintaining the order described in points above (description, location, cause, impact, frequency). In addition to sending our team 5 personal report files, we have also asked the experts to send us one team file with all of the problems found by the experts (without any ordering or filtering done, as we consider it to be a part of result analysis that we have to do).

3 RESULTS

3.1 Filtering and grouping

In total, the experts have found 23 problems with the GUI prototype. After careful analysis, our team has concluded that 17 of those problems are distinct issues, meaning that out of all found problems around 26 percent were shared between two or more experts.

The 17 issues were then divided into 2 categories: those who where actual problems with our application design, and those that have occurred due to inaccurate/bad construction of the mockup that we have provided to the experts. The former features 11 issues, while the latter features 6. Only the former will be considered in the "conclusions and improvements" section, as it will be important for the further development of the application. For this reason, we have also decided to not include the latter (6) problems, such that we can focus on what matters.

3.2 Calculations

Furthermore, each problem that has been found by multiple experts has had its "impact" and "frequency" rating changed to an average of all the ratings the experts have assigned to the corresponding problem. This calculated average is then rounded up or down to the nearest whole number.

3.3 Actual problems

The table 1 displays the evaluations we have received from the experts we recruited. The report we received from the evaluators was structured in the format (Problem: Heuristic, Description, Location, Cause, Frequency), therefore we had to delete some duplicate issues from the data and organize it so that we can use it to understand the problems with our design. We just had to construct the table so that it is easily readable.

Table 1: Problems

	Problem	Description	Location	Cause
1	Accidental deletion	If users are not attentive enough, then they can accidentally delete their board, since the delete option is between the colour view and tags. The user could also accidentally click the delete button of a task list whilst changing the name, or the 'x' in the corner of a card when clicking on it.	The whole application.	If users delete their board by accident, then it's because the delete button is between the colour view and tags buttons.
2	Only deleting board for the user	The fact that red cross next to a board name on the main page only deletes board for one user is intuitive and potentially needs some explanation. It is somehow similar to delete only for you vs delete for everyone functionality on various message chats	Join board	More user freedom leads to possibility of user getting confused in all those customization settings, thus some options might not lead to desired output
3	Unclear how to change password of the board	How can admins change the passwords of the boards?	Admin page	There is not one
4	Previous page button not working	Clicking on the "go to previous page button" from the locked Board 1 does not let you go to the previous page. Why does the go back button sometimes redirect the user to unlocked board?	The location is in the top right corner with the square and the left-pointing arrow in the locked board page.	When you click on board 1 or join board and then on the "go to previous page", then it will not let you go to the previous page, but to the unlocked board 1.
5	No confirmation screen	In all instances in which a user (or admin) can delete a board, or a board that they have joined, there is no confirmation screen, which could cause major problems in the event of an error like a mouse slip or an unintended deletion.	In the "Your Boards" section and the admin section.	Not having a confirmation pop-up when deleting or leaving boards.
6	Layout of tags and delete button on the card	If the tags are on the same side as the delete button, the button with the red cross, then if users add more than 3 tags, then tags won't be able to fit inside the card.	Any card with the tags, though this problem was found in the unlocked board.	Adding more than 3 tags will probably not fit inside the card.
7	No undo or redo options	There is no undo or redo buttons in the application. In the event that a user makes a mistake, they should have an "emergency exit" option to quickly leave whatever unwanted situation that they are in.	The whole application.	Lack of an undo or redo button.
8	Locking the board after creating it	When creating a new board without password, there is no way to add a password after the creation of the board. It seems like the lock button is making the board password-protected, but the user has to click the lock icon again to get a pop-up telling them to enter a password.	unlocked board page	After clicking the create board without a password, there is no way to add a password to the board.
9	'Colour view' option on the dropdown menu	I think there is an issue with the clarity of options in the dropdown menu on the right. It is not totally clear what 'colour view' means.	Board 1 in the dropdown box on the right.	It just seems like a vague label and it is not really clear what 'colour view' means in this context (i.e., is it for changing the colour of the board? Is it for setting the colours of components of the board?).
10	'Tags' option on the dropdown menu	It is not totally clear what the function of the option 'tags' is. Is it a key for the different colours of tags? Is it a way for the user to create their own custom tags?	Board 1 in the dropdown box on the right.	It's not really a descriptive label considering that it could be referring to multiple tag related actions. You wanted to keep all settings for a board organized in one popup, but simplified tag customization to just Tags, so the user doesn't know what it does.
11	Redundancy of exit buttons	In the "Connect to a Server" screen, there is both an exit button and a "go back" button on the top-right. Assuming that both have the same function of disconnecting the client, having both is redundant, and in other words, not minimalist.	In the "Connect to a Server" screen, the exit button is in the bottom-middle, and the "go back" button is on the top-right.	Layout of the screen.

Table 2: Heuristics

#	**Heuristic**
1	Error prevention
2	Match between system and the real world
3	Help and Documentations
4	Error prevention / Visibility of system status
5	Error prevention
6	Aesthetic and minimalist design
7	User control and freedom
8	User control and freedom / Match between system and real world
9	Match between system and real world / help and documentation
10	Match between system and real world / help and documentation
11	Aesthetic and minimalist design

3.4 Common Heuristics

The problems have been mapped to Nielsen's Heuristics by the experts in table 2. The table shows the number of the problem in the left column and the corresponding heuristic(s) in the right.

As shown in the table the majority of heuristics are from types "Match between system and the real world" , "Error prevention" and "Help and documentation".

3.5 Prioritization

From these problems we prioritized problem #1 because mistakes by users happen frequently and having no way to restore the deleted item can be really annoying for the user. Another critical issue is #2 which is likely to lead to confusion. Aside from those, problem number 5, 7 and 8 are also the ones we consider worthy to prioritize.

3.6 Impact and Frequency results

A third table (table 3) has been made to show the impact and frequency ratings for each problem. After reading through the issue list, our team has considered issues number 8, 7, 5, 2 and 1 the most crucial ones to work on. The table that sorts the problems by their impact and frequency ratings does not reflect that opinion at all however. Only problems 1, 2 and 5 are among the most impactful and problem 8 among the most frequent.

However, we consider the gaps in rating among most problems not high enough to change our priority based on problem description, with the exception of problems 9 and 10 which are both related to the dropdown menu and are neither significant nor frequent. Based on the aforementioned analyses of evaluation data we have decided to change our UI to fix the found problems in a manner that we will discuss in the following section.

4 CONCLUSIONS & IMPROVEMENTS

Expert evaluations have pinpointed 11 relevant problems with the GUI prototype that suggest that the present design might not satisfy our users' requirements and expectations. Our team's objective is to resolve these problems and develop a more accessible and user-friendly GUI prototype, improving the overall user experience.

Table 3: Heuristic evaluation results

Freq.\Imp.	1	2	3	4	5	6	7	8	9	10
1										
2			#9	#10						
3										
4								#4, #5		#2
5					#7					#1
6					#8				#3	
7		#11								
8					#6					
9										
10										

Following the heuristics, the modifications will enhance the system's alignment with real-world expectations, improve error prevention and user autonomy, and guarantee that everything is easily understandable. The improvements should make the app more intuitive and user-friendly, resulting in a more engaging and enjoyable user experience.

4.1 Main Conclusion

Our team will prioritize resolving the most critical issues, such as the inability to backtrack after accidental deletions. We will also work on enhancing the system's alignment with real-world expectations, error prevention and user autonomy. Furthermore, we will involve a broader range of users in the evaluation process to guarantee the system's accessibility and usability across various user groups.

4.2 Improvements

Out of the 11 listed problems, problems 3, 8 and 9 are concerning features that have not been implemented in the final application. Therefore, no solution has been made for these problems.

4.2.1 Problems 1 and 5: Accidental deletion. Both issues 1 and 5 are quite similar, as they both describe the possibility of accidentally clicking a delete button where this should not be done. The changes that have been made to the final application concerning this problem are as follows. For both the deletion of tasklists and boards a pop-up is added to make sure the user needs to confirm the deletion (figures 5 and 6). A confirmation popup for the task deletion was not added, as the benefits for Error prevention did not outweigh the downsides for Flexibility and Efficiency of use.

4.2.2 Problem 2: Unclear visited board deletion. Our solution for the second problem was to simply change the name of the list from "your boards" to "visited boards" (see figure 2 and 7). This makes it clear to the user that the list describes the boards that have been visited. This implies that deleting a board from the list will be similar to deleting something from your browsing history. This ties into the Consistency and Standards heuristic.

4.2.3 Problem 4: Exit button. This problem was fixed internally, the exit button was already in the corner of each page but just not working in the described scenario. This has been fixed in the final application.

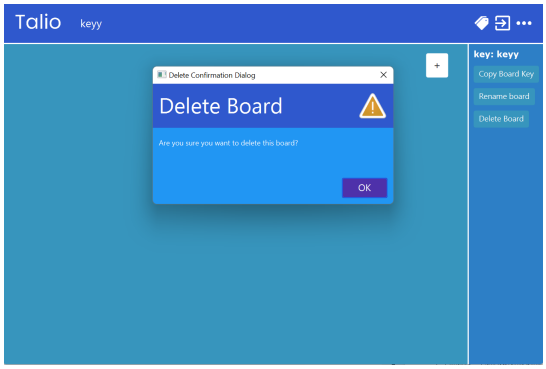

Figure 5: Board deletion confirmation

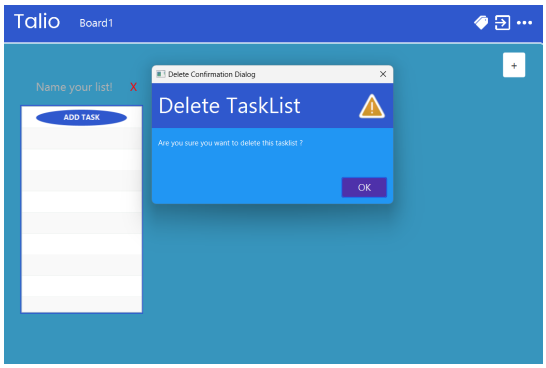

Figure 6: List deletion confirmation

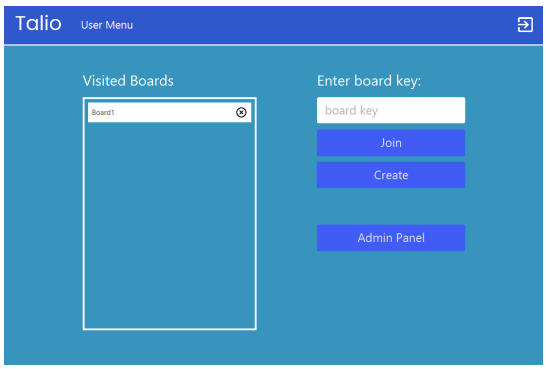

Figure 7: Unclarity of removing board

4.2.4 Problem 6: Tag display. The sixth problem has not been solved. This is because there was no aesthetic and minimalist solution for this problem. Therefore the final application still looks similar to figure 3. The three tags that are shown are chosen to be some arbitrary three.

4.2.5 Problem 7: Undo or Redo options. The seventh problem also hasn't been solved. Users already get pop-ups to confirm they delete/create boards and lists and anything without a confirmation popup, such as list/task creations and renames can easily be undone through deletions and another rename.

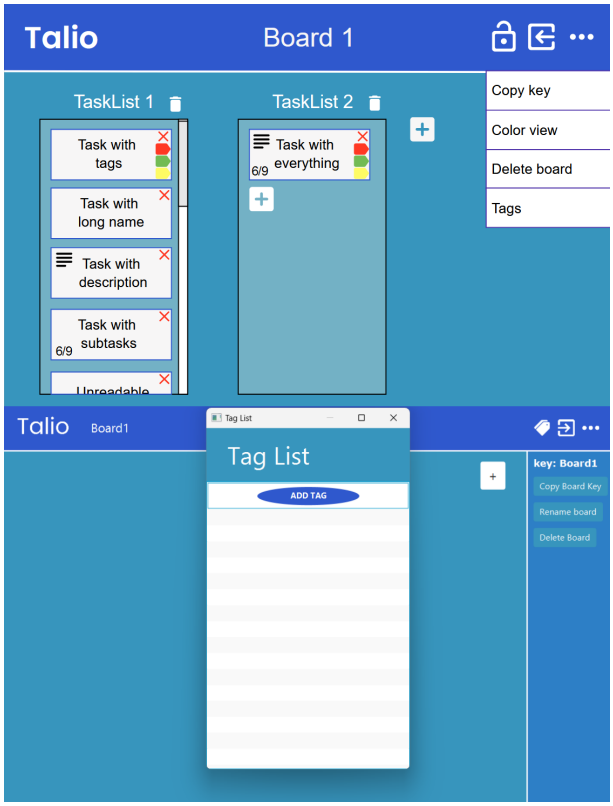

Figure 8: Old tags button (top) and new tags button and popup (bottom)

4.2.6 Problem 10: Unclear "tags" option. Issue 10 describes that the purpose of the tag button in the drop-down menu is unclear. We have moved the tags button to the header (see figure 8) and changed the "Tags" text to a tag symbol. This should indicate the importance of the feature, and for the user to figure out what it does, clicking it should be sufficient.

4.2.7 Problem 11: Exit button redundancy. Problem 11 identifies an important redundancy of having 2 exit buttons on the landing page. For this, the solution was simple, we removed the one on the bottom, and left the one in the top right corner (see figure 9). This single exit button is then consistent with all the other pages.

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[1] Our group. 2023. prototype of Talio application. https://app.moqups.com/ERBWy1VMVrbIzkza1b7MVkdHuJPppSru/view/. [Online; accessed 24-March-2023].
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