

OOP Heuristic Evaluation Report – Group 10

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1 INTRODUCTION

We have conducted a Heuristic Usability Evaluation by collaborating with another OOP group. The goal of this evaluation is to investigate the usability of our application, by letting students from the other group test a prototype of it. We strive to use the feedback they give us, to improve the GUI of our program, fix potential bugs and make the application more user friendly.

Our prototype consists of software and mock-ups, the software part is not yet fully developed, but already allows for some functionality, which consists of: Adding new to-do lists, adding cards to these lists, removing/renameing these cards and removing the to-do lists. Furthermore, all of these operations are persistent and therefore saved in the database. The basic requirements we have yet to meet and the advanced features are provided as mock-ups.

2 METHODS

2.1 Experts

For this evaluation we have recruited 4 experts that had a deep technical expertise and could understand how our application is structured and how it is implemented. This enabled them to be more aware of what might go wrong and where inconsistencies may appear. Thus, they have managed to find usability details that we have not thought about before.

2.2 Procedure

We have gathered the 4 experts in a room and we had an observer from our team, meant to guide them in case they got stuck, or had any questions. The observer also had to pay attention to how the experts tend to use the app, compared to how the app was designed to be used.

Each expert was provided with the part of the app developed so far, the mock-ups for features that are yet to be implemented, a list of goals and the list of heuristics to use in the evaluation. We have instructed the experts to go through the list of goals from top to bottom and try to complete them. We have also asked them to write every down any usability issue and link it to the corresponding heuristic. In addition, they were told not to communicate with each other and only interact with the observer in case they had a question.

The list of goals was divided into 2 parts and it did not contain any instructions on how the goals should be achieved. The first part contained tasks that could be done with the application functionality implemented so far and the second part was meant to test the design that was not yet present in the application.

2.3 Goals

Here we have listed all the goals we have given the experts. The goals are the bold lines of text at the top of each paragraph. Under each of these goals is a step by step description of how this goal would be achieved in our application/mock-ups. This step by step

procedure has not been shown to the experts, these were simply made by us to have a reference to compare what the experts actually did to what they should have done according to our procedure.

We have also provided a list of mock-ups at the end of the document that we showed the experts during the evaluation. Each of these mock-ups has a number, which we reference in the step-by-step procedure by putting the mock-up number in parentheses after the step it corresponds to. In some cases, there are also arrows indicating that that particular step causes a change in scenery, thus allowing you to see a different mock-up.

Application goals:

Create a new card in the default list

- Click on the ‘plus’ button on the top right of the default list
- Enter a non-empty card name in the text field
- Click ‘enter’ on your keyboard or click the button on the bottom right called ‘create’

Create a new list

- Click on the ‘add list’ button on the top left of the screen
- Enter a name in the text field
- Click ‘enter’ on your keyboard or click the button on the bottom right called ‘create’

Delete the default card

- Double click on the default card
- Click the delete button on the bottom left

Add two cards to a list and change their order

- Create two cards in an empty list by following the first goal
- Click and hold down on one of the cards
- Hover the selected card over the other card
- Release the mouse

Edit a card name

- Double click on a card
- Change the text inside the text field
- Press enter or click on ‘okay’

Edit a list name

- Click on the edit button on top of the list
- Change the text inside the text field
- Press enter or click on ‘okay’

Delete a list

- Click on the edit button on top of the list
- Click on the delete button on the bottom left of the list

Move a card from one list to another

- Click and hold down on a card
- Move the card on top of another list
- Release the mouse

Mock-up goals:

Enter a different board than the one you're currently in

- Click on the ‘back’ button in the board overview on the top right (3) → (1)

- Click on the name of the board u want to enter (1)

Create a new board

- If you are not yet in the board lists scene, first click on the ‘back’ button in the board overview on the top right (3) → (1)
- Click on the plus button on the top left (1)
- Enter a board name in the text field (2)
- Press enter or click on the create button (2) → (1)

Add a new tag to a card

- Double click on a card (3) → (5)
- Press the ‘plus’ button on the bottom right (5) → (6)
- Enter a tag name in the text field (6)
- Select one of the given colors by clicking on said color with the mouse (6)
- Click on the create button on the bottom right (6) → (5)

Delete a tag

- Double click on the card you want to delete the tag from (3) → (5)
- Click on the cross inside the tag (5)

Change a tag color

- Double click on the card that contains the tag (3) → (5)
- Double click on the tag (5) → (7)
- Select another color by clicking on the color (7)
- Press the submit button on the bottom right (5)

Change a tag name

- Double click on the card that contains the tag (3) → (5)
- Double click on the tag (5) → (7)
- Change the text inside the text field (7)
- Press the submit button on the bottom right (5)

Remove a board

- If you are not yet in the board lists scene, first click on the ‘back’ button in the board overview on the top right (3) → (1)
- Click on the cross next to the board name you want to delete (1)

Add a sub task to a card and tick it off

- Double click on a card (3) → (5)
- Click the add sub task button in the top left (5) → (8)
- Enter a name for the sub task in the text field (8)
- Click on the create button or press enter (8) → (5)
- Press on the square next to the name of the newly created sub task (5)

Remove a sub task

- Double click on a card (3) → (5)
- Click on the cross next to the checkbox of the right sub task (5)

Change the background color of the board

- Click on the customize button in the board overview (3) → (4)
- Select one of the given colors by clicking on said color with the mouse (4)
- Click on the submit button (4) → (3)

Change the color of a card

- Double click on the card (3) → (5)
- Select one of the given colors by clicking on said color with the mouse in the bottom left (5)

2.4 Heuristics

The list of heuristics contained 10 principles for user interface design, which were put together by Nielsen Norman Group [1] :

- 1.Visibility of system status
- 2.Match between system and the real world
- 3.User control and freedom
- 4.Consistency and standards
- 5.Error prevention
- 6.Recognition rather than recall
- 7.Flexibility and efficiency of use
- 8.Aesthetic and minimalist design
- 9.Help users recognize, diagnose and recover from errors
- 10.Help and documentation

3 RESULTS

3.1 Raw results

The issues that were collected from the experts were organized in the table that you can see in table 1:

Heuristic	Issues identified by evaluators
Match between system and the real world	<ul style="list-style-type: none"> • The “+” button is not informative enough, I do not get what it really does, should have a separate create and join key. • In the board list, there is no clear explanation of what the “X” button does, which can be to leave the board or delete the board. • There isn’t any mock that represents an overview of all the tags present in a board. • The add subtask button is a bit poorly placed. • I was a bit confused about the difference between a button for adding a card and a tag. I would expect the button for adding the tag to be for the subtasks. • I would expect from delete button in editing the list name to delete the title of the list, not the whole list. • I would expect from button removing the board to be for leaving the board. • I would expect dragging and dropping the card to just put it in another list, but it just duplicated the cards in both lists.

	<ul style="list-style-type: none"> I would expect from delete button in editing the card to edit the title of the card, not the whole card. When I double-click the title of the list sometimes it prompts me with changing the list title and sometimes it just shows the arrows next to the list title, it is confusing. I would expect a plus button in the list of boards to be for joining another board. 		<ul style="list-style-type: none"> The error message can be red to identify user that the card with an empty title can not be created.
User control and freedom	<ul style="list-style-type: none"> Users should be able to choose the IP address they connect to. Clicking on the list name is expected to rename the list. The first click changes the order of the cards which is quite confusing for the users. There is no list of joined boards. The X in the board list is confusing: the user does not know if they leave the board or delete it. Therefore the list of boards is quite confusing. 	Flexibility and efficiency of use	<ul style="list-style-type: none"> Finding the delete for lists and cards (in the edit option after double clicking) was unintuitive for me and took a long time to figure out.
Consistency and standards	<ul style="list-style-type: none"> The window constantly changes size. The app changes window size whenever some interaction with the board is done. The list name can be null. The list sorts when double-clicked as well. Drag and drop cards between lists not consistently working. Drag and drop does not remove the element from the previous list sometimes. I can't create a card with an empty name, the error message could be red. I can however rename the card to an empty name and it disappears. I could also leave a list name blank. Submit button in adding the card is a bit misleading. I manage to edit the default list by double-clicking, however any other list I try to double-click another list nothing happens. In the mockups the text for adding a sub-task is "Add new task", which is confusing. 	Aesthetic and minimalist design	<ul style="list-style-type: none"> The board overview is almost fully black and white, consider making it have more colors.
Error prevention	<ul style="list-style-type: none"> I don't see there is confirmation or retrieval after the user deletes the board. 	Help and documentation	<ul style="list-style-type: none"> It is not really obvious how to edit the list. There should be a way of telling the user how to do it. I don't see where I can ask for some guidance

Table 1: Issues collected from experts.

3.2 Adjustments

To transform the raw results that were taken the following process was done. The aim is to present data highlighting the main issues and organising the priority of these issues through how frequent it was encountered by the experts.

Taking an example of one of the issues experienced by the expert from the raw Results:

Consistency and Standards	<ul style="list-style-type: none"> Adding a name to the List doesn't account for a null name. Card renaming field can be set to empty.
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It is seen that one of the issues highlighted is that text field names can be empty and the application doesn't have any mechanism to handle this issue. This is also occurring when we rename the card, where the application is not handling an empty text field in this occurrence.

To be able to transform this data into a processed result we merge the main issues together and count the frequency of these issues occurring. Merging both the list null file and card renaming null field the general issue leading to this can be classified as:

Usability Issue	Frequency
Empty TextField	2

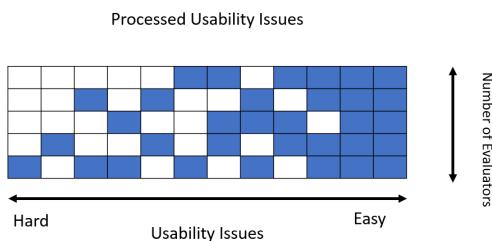
From this table we end up with two variables the independent variable the Merged Issue and the dependent variable the Frequency, this is the value which depends on the occurrences of

the independent variable. Through this procedure merging all the main issues and counting the frequency of each issue we end up with the processed table:

Usability Issues	Frequency
Empty TextField	2
Plus sign is not informative	3
Guide Section	2
X button is misleading	2
Missing tags overview	3
List renaming misleading	4
Issue with drag/drop cards	3
Window size changing	1
User server	1
Application color	3
Button functions	5

Table 4: Processed table showcasing the Merged issues as well as the frequency of each issue occurring.

Transforming this table to a processed matrix emphasizing recurring issues experts found in the evaluation. This is explained in the Matrix below:



Graph 1: Processed matrix graph showcasing frequency of Usability problems by the 5 experts

In the matrix above it is explained that 5 experts were used to find the 12 merged usability issues. The blue squares above in Graph 1, shows a single Usability Issue found by a single expert. Each row is representing a single expert and the columns represent the 12 Usability issues. Through the square it is possible to see whether the expert has found that particular usability issue. The processed graph has also been sorted to match the most successful experts which are at the bottom to the least successful evaluator at the top of the graph. The priority of usability has been organised with the most frequent issues represented on the right to the least frequent or least prioritized usability issue presented at the left of the graph. The prioritisation is done in this way to emphasize the issues that should be tackled straight away as these are the issues causing the

most disturbance for a user. By having a distribution from left to right respectively a negatively skewed distribution it is easier to visualise the priority of each usability issue.

4 CONCLUSIONS AND IMPROVEMENTS

graphicx

- What are your main conclusions from these results?
- This section should lead from the Results into the Improvements.
- Describe how you will improve our application based on your results. What changes will you make, and why? What would it look like before and after? Why is the improved version better? Motivate your choices using the heuristics and your results.
- The conclusion of this section should show your final GUI design.
- Note that this report is only about the design, so it is not necessary to already show the finished improved implementation.

4.1 Conclusion

To summarize, we mostly got feedback about the User Interface of our application. The reviewers noticed that the UI was not intuitive. During testing, they encountered many buttons which they thought were misleading. For example in our current design, shown below:

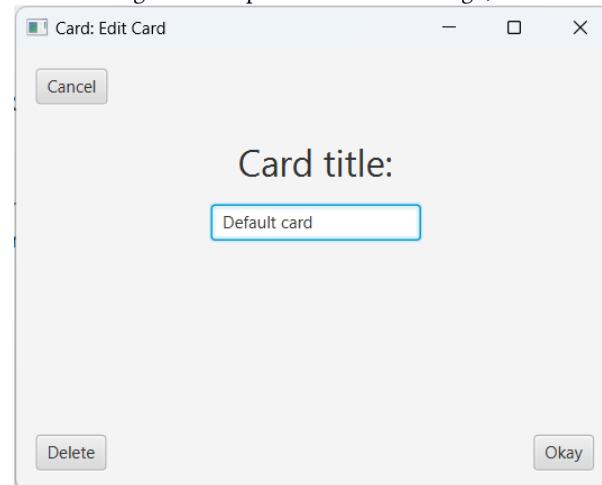


Figure 5: Window that enables users to edit card information

Whenever a user edits the card information there is a button called “delete” which can be used to delete the card that is currently being viewed. This button was however misinterpreted by our reviewers. The button seems to suggest that the card’s name will be deleted which is not its intended use case. The same issue

was also found with the plus, as can be seen in the figure below:

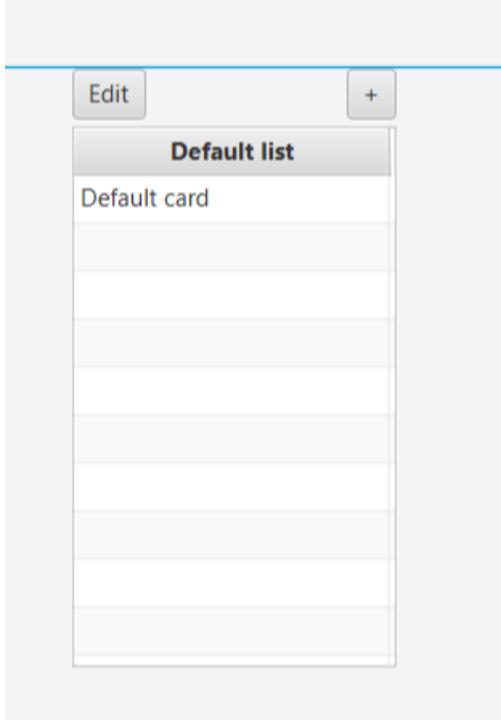


Figure 6: Window where the user can view the list

The user can be used to add a card to a list, however the experts thought it would create a new list, instead of adding a card. We will improve upon these (and other related issues) by changing the positions of the buttons in our UI and by replacing some of the logos that we currently use in our buttons by more descriptive texts.

Another point we noticed was that users had trouble clicking on the title of the list to enter their menu to edit the details of the list. This happened because we also gave users the ability to sort the list of cards by clicking on the box next to the list title. This caused many issues, we will improve upon this by not enabling users to sort their list alphabetically and by creating a separate button for changing the list details. Considering all the

feedback we received. We redesigned figure 6 to now look like this:

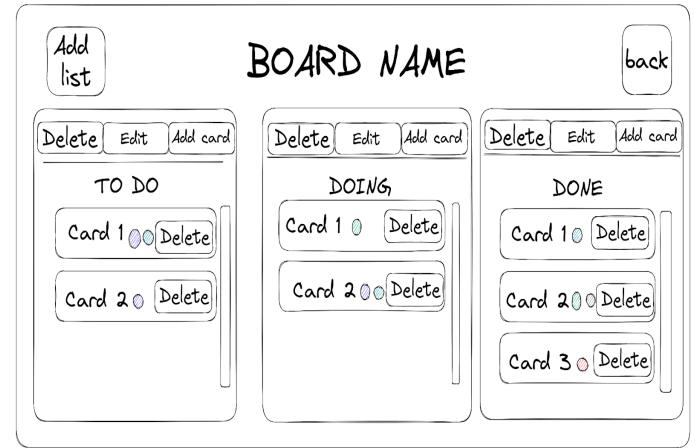


Figure 7: Redesigned list overview

As shown in the mockup we made, the buttons now have more descriptive names, and we moved the delete button from inside the card edit menu (figure 5) to the list in the overview (figure 7). We also gave the overview a more organized look.

Another frequently mentioned bug in our application is the absence of a check for an empty name. In our current implementation, users are able to submit an empty name field which will cause errors during the conversion to JSON. To resolve this issue, we will check for this. And inform users that an empty name is not allowed, as can be seen in the following mockup we made:



Figure 8: Label informing the user that an empty list-name field is not allowed

Experts also had problems with drag and drop and it seemed not to work and in some cases even deleted existing cards and lists. Unfortunately for us we didn't manage to implement this feature before the assessment and the issue with the drag and drop was known. When it is finished the user would be able to drag any card of his choice to another list without any cards or lists disappearing which would drastically improve user interaction with the UI.

So overall we want to improve the user experience. We will do so by making the text of the buttons more indicative and less vague. We will also reposition some of our buttons so that the buttons will be located in less awkward places. Needless to say, we will

continue developing our application and finish some of the features that had not yet been finished at the time of the review. By making all of these changes we hope to increase the intuitive usage of our application

5 CITATIONS

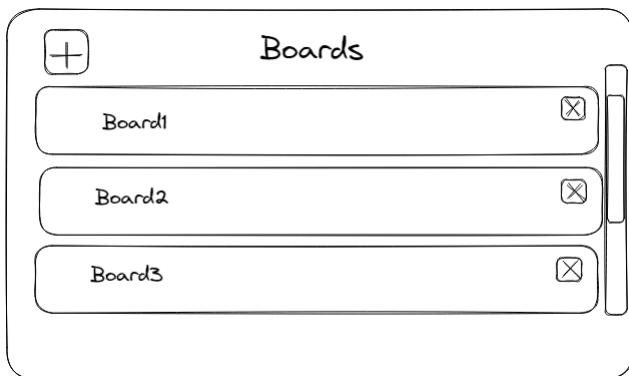
You can cite papers, e.g., [1]. To make the references appear, make sure to compile the latex sources, then bibtex, and then latex twice.

REFERENCES

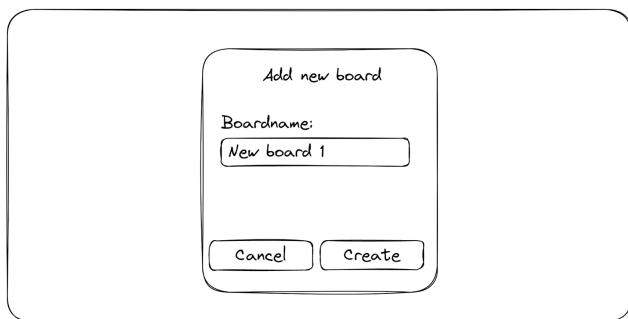
- [1] Jakob Nielsen. 1994. 10 Usability Heuristics for User Interface Design. In *Nielsen Norman Group*.

6 APPENDIX

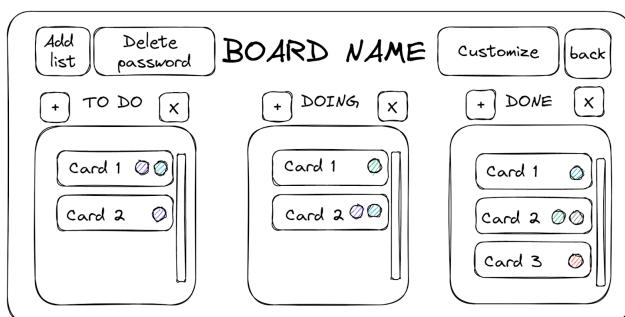
6.1 Used Mockups



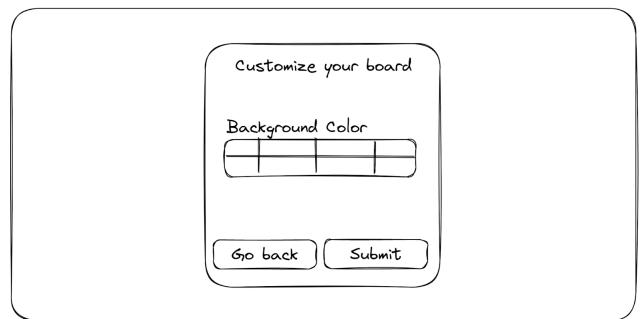
Mock-up 1



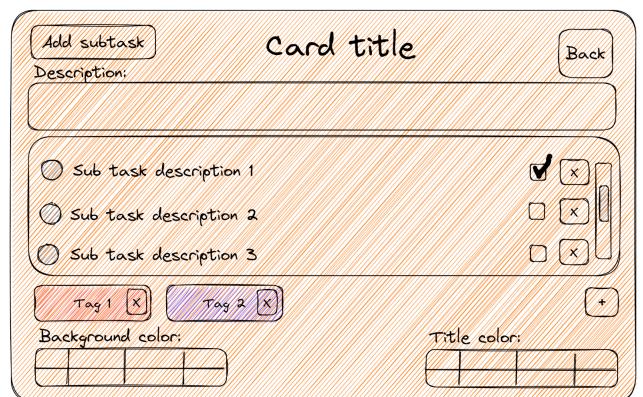
Mock-up 2



Mock-up 3



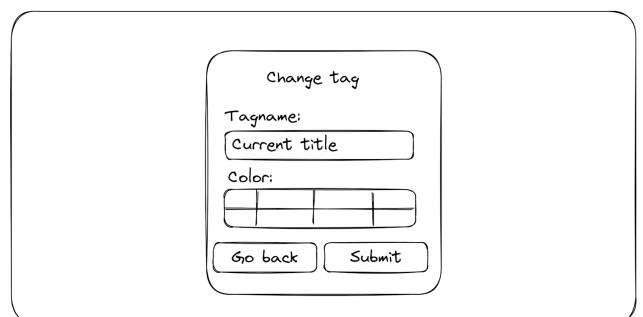
Mock-up 4



Mock-up 5



Mock-up 6



Mock-up 7

Add new Task

Description:
New task 1

Mock-up 8

List Name:

6.2 New Mockups

Add list

BOARD NAME

	<input type="button" value="Delete"/>	<input type="button" value="Edit"/>	<input type="button" value="Add card"/>
TO DO			
Card 1	<input type="button" value="Delete"/>		
Card 2	<input type="button" value="Delete"/>		
DOING			
Card 1	<input type="button" value="Delete"/>		
Card 2	<input type="button" value="Delete"/>		
DONE			
Card 1	<input type="button" value="Delete"/>		
Card 2	<input type="button" value="Delete"/>		
Card 3	<input type="button" value="Delete"/>		

List Name:

Name can not be empty!

Card title

Description:

Add subtask

Sub task description 1
 Sub task description 2
 Sub task description 3

Tag 1 Tag 2

Background color:

Title color:

Card Name:

Type the server:

Card Name:

Name can not be empty!

Create a List!

List name:

Cancel

Create

Create a Card!

Card name:

Cancel

Create

Create a List!

List name:

List name can not be empty!

Cancel

Create

Create a Card!

Card name:

List name can not be empty!

Cancel

Create