OOP Project Report – Group 45

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1 INTRODUCTION

Aiming to improve the user interface (UI) and experience (UX) in a Kanban-board application currently being developed by the authors, we have performed a usability evaluation aided by Nielsen's heuristics [1]. This evaluation highlighted problems with the application's interface early in the development cycle, allowing us to change the application accordingly.

The evaluators had access to a prototype of the application, designed using the Moqup online tool using a mix of screenshots of the current application and additional elements created with the tool. The following is a description of what is shown by this prototype.

When first opening it, the evaluator is shown a screen (the connect screen) with a single text field and button, as shown in Figure 1.

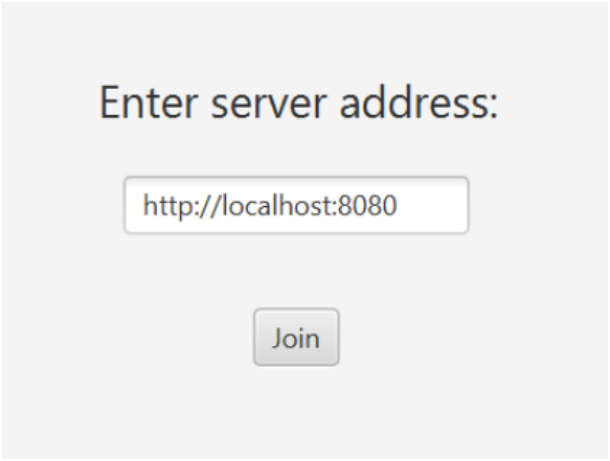

Figure 1: Connect screen

Upon clicking "join", the evaluator is brought to the main application page: A screen titled "Default Board", centralised on its upper portion, several buttons which allow interacting with the application along its left and right sides, and an empty white box in the middle. This is shown in Figure 2.

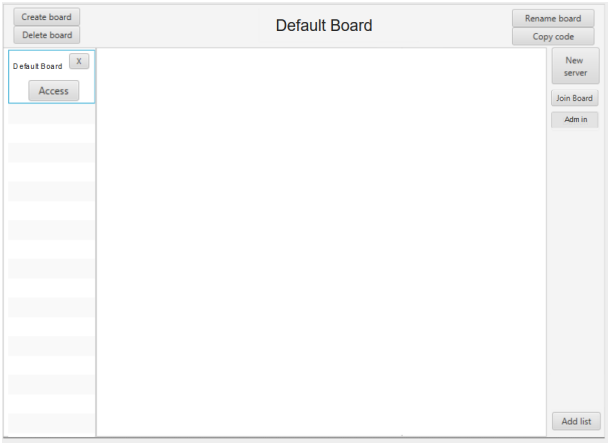

Figure 2: Main page

Pressing the "New server" button brings the evaluator back to the connect screen. An attempt to delete or rename the board shows a simple error message stating the action is impossible in the default board. Either of the buttons "Add list", "Create board" prompts the evaluator to give their new item a title, as seen in Figure 3, with text reflecting the appropriate action.

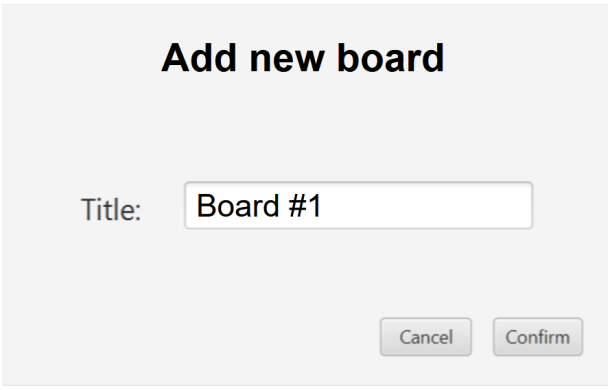

Figure 3: Create board

Creating a new board adds an entry to the left-side list and changes the title to "Board #1" (Figure 4). From here the evaluator can press "Access" on either entry to change the title accordingly. If the evaluator added a list, the middle section of the screen has a blue rectangle added to it; the rectangle contains the text "List 1" on its upper portion as well as buttons labelled "Edit", "X", and "+", as show in Figure 5.

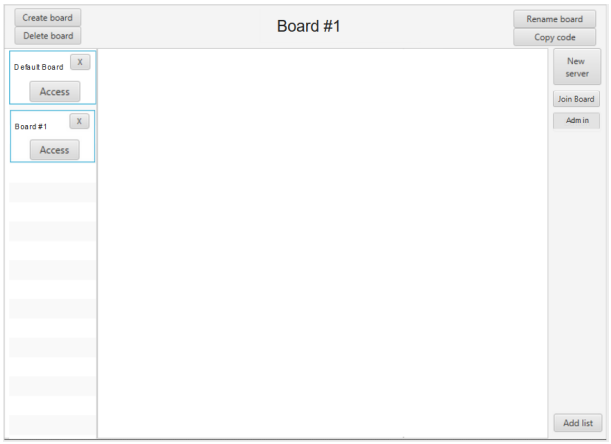

Figure 4: In Board #1

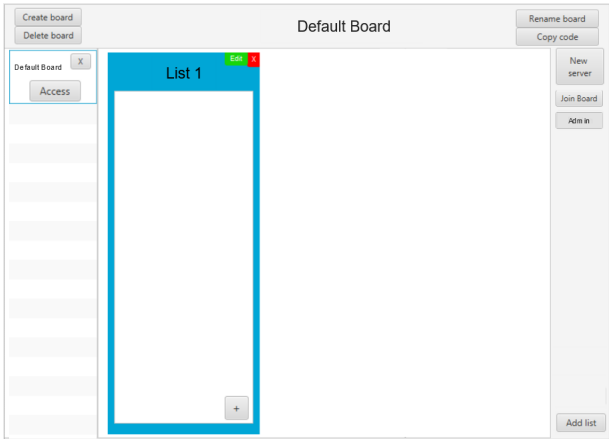

Figure 5: Board with list

Finally, pressing "+" will show a screen prompting the user to "Add a new task" (Figure 6). The user must input a title and description for this task and either cancel or confirm the action. After confirmation, a smaller light blue rectangle titled "Task title 1" appears inside the list rectangle. The screen showing both list and task is shown in Figure 7.

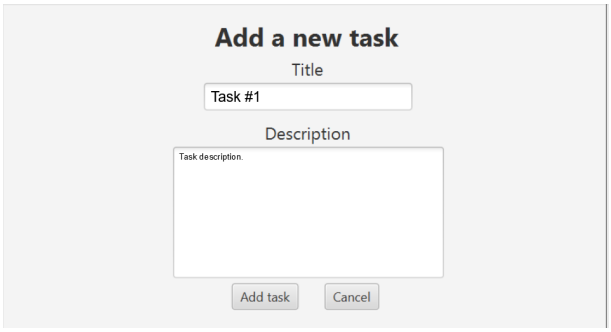

Figure 6: Add new task

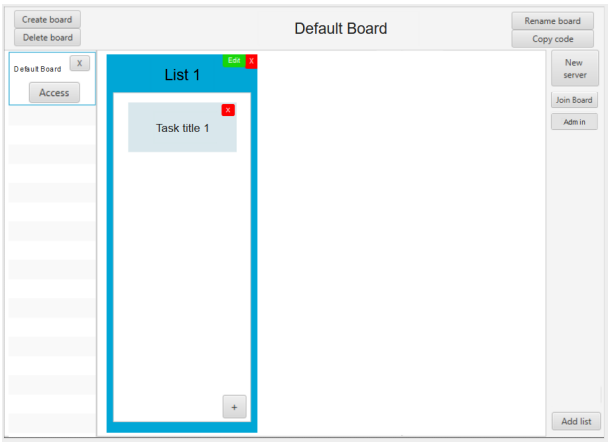

Figure 7: List with task

The remainder of this report details the methodology used in the evaluation (Section 2), explains the results obtained (Section 3) and considers the improvements that will be made to the application in light of the evaluation (Section 4).

2 METHODS

To accurately analyse the compliance to the heuristic principles of our task-organising application "Talio", we based this heuristic evaluation on the results of a form containing a number of significant questions, which has been sent to a number of evaluators in order to receive the feedback given on our UI by a potential user of the application. The results collected by this form have been used to identify flaws in the design of our application's interface and improve UX.

We recruited a team of five reviewers with student-level expertise of the domain. The reviewers were required to open a link, which led to the functional mock of the UI design for our application. They were also promted with four specific scenarios which they had to follow, in order to test the application thorougly. The scenarios were:

(1) Creating a new board and adding two lists with a single task each - then the reviewers were asked to copy the board's code so they can share it;
(2) Joining another board using a given code, and removing tasks and lists from the joined board;
(3) Joining a different server that is run on a given address.
(4) Deleting all existing boards, except the default board, by using the given admin password

After following the scenarios, the reviewers had the chance to investigate our application by freely testing different features that it provides in a trial-and-error fashion or by navigating through the scenes in a slide show.

The reviewers were also asked a question regarding their familiarity with applications that have similar functionality before the evaluation, in order to measure how our application appeals intuitively to users of different prior experiences. Finally, the reviewers were asked to reflect their experience of using the application: the reviewers were asked to answer ten questions regarding Nielsen's

ten usability principles. The reviewers were supposed to grade, on a scale of one to five, how accurately our design complies to the given principle. Then they were asked to give a detailed account of the encountered issues including, but not limited to, a description of the issue, the context or scenario in which it has occurred or may occur, the effect it would have on a potential user, and how it could be avoided. This question served to identify and fix flaws in our design which may have been overlooked while designing the UI.

3 RESULTS

The main feedback that we received from the reviewers was that there were too many buttons on the screen. This problem was addressed deeply and repeatedly, with reviewers reporting that “The amount of buttons can be distracting”, “New users will probably have issues with the amount of buttons”, “it could be even more self-explanatory if the amount of buttons were reduced” and “The buttons feel really crowded and they also have a lot of text”. We noted that the users feel overwhelmed by the amoung of buttons, and this has negative impacts for consistency and the aesthetics. As a solution, we decided to group similar buttons, in order to reduce clutter and improve both consistency and the application’s minimalist design.

The most specific feedback was on the button “copy code”, which copies the code of the current board to the user’s clipboard. The reviewers mentioned that “It isn’t clear what copy code does by just reading it” and “the "copy code" could use more context in my opinion”. Upon evaluating our application with this feedback, we have realised that the code of the current board is never shown on the main scene of the application. This can be a problem because the code is what the users have to remember in order to access the board. We identified showing the actual code of the board as a potential fix.

We had also received some positive feedback on our use of colours for certain buttons: that they clearly indicate what functionalities they serve and help the users to recognise them. The reviewers wished to see them throghout the application, stating “you can make it look a bit nicer by using more colors” and “it could be even more self-explanatory if [...] icons and colours were used”. So to improve the consistency of our application further, we decided to utilise colours more extensively. In addition, we also decided to replace some texts with icons in order to improve further on the recognisability of the buttons, as some reviewers expressed feelings such as “using icons could make an improvement”.

The last improvement that we made on our application was regarding the error prevention. The reviewers appreciated the error messages we had, saying “The message that you can’t delete the default board is a good example of putting error prevention in place”, but there was feedback on how easy it is to delete entities accidentally: “it’s pretty easy to delete things without giving confirmation”. As a solution, we agreed to add the functionality to display an alert box asking for confirmation of deletion.

After reviewing the feedback, we composed a list of all the changes we agreed on based on their observations, these were: grouping similar buttons, showing the active board’s code, adding icons and colors to buttons and confirmation when deleting items. To prioritize these issues, we used the Prioritizing Severity matrix[2].

	Impact Score	**Frequency Level**
Grouping similar buttons	3	2
Show board code	2	2
Colors and icons in buttons	4	4
Confirmation of deletion	5	4

As such, we analyzed the frequency of occurence and the impact of each issue on the overall UX, on a scale from one to five.

The confirmation of deletion was considered very impactful, as accidental deletion can result in a great loss of data, and very frequent as it is part of a basic operation. Therefore, this improvement was our top priority. The next priority was adding icons to buttons. It is impactful as it guides the user through our interface and frequent as the buttons come up often while using the application. Grouping buttons was considered medium impact - we thought it was important to not overwhelm the user - and low frequency - as it refers to a small number of buttons. It ended as our third priority. Finally, our least prioritized issue was displaying the board code, which was considered low impact and frequency as it only clarifies a minor function. By these results, we agreed on the order in which these issues should be tackled.

4 CONCLUSION & IMPROVEMENTS

These results lead us to believe that, while most aspects of our application are appreciated by our potential users, there is still room for improvement in certain categories.

First of all, the placement of the buttons on our main page seems to generate some confusion, as seen in the feedback recieved regarding heuristic "Consistency and standards". In response to this, we have grouped the buttons in drop-down menus in order to reduce the amount of clutter in the overview. There is now a single button (Figure 8) on the top left part of the screen that shows a list of all operations the user is able to perform: create board, delete board, rename board, join board and join server. In addition, we also have moved the “Admin” button next to this menu button and replaced it with the Admin icon (Figure 9). We have also added the text “Admin” below the icon, in order to address any uncertainties that might arise from what the icon means.

Figure 8: Menu icon

Figure 9: Admin icon

In addition, some comments regarding heuristic "Flexibility and efficiency of use" state that the “Add list” button is placed outside the centre of visual focus, which could become a problem for inexperienced users. To address this, we moved the button towards the

middle of the page, and placed it on the right side of the lists. This brings it to eye level and makes it much more easily accessible.

Reviewers believed that other buttons should be more clear about the action they perform, especially the “Copy Code” one (according to responses recieved for heuristic "Match between system and real world"). To deal with that feedback, we replaced the button with the actual code of the board, and next to it placed a button which shows the copy icon from Figure 10.

Figure 10: Copy icon

Another issue we were made aware of by observations regarding heuristic "Consistency and standards" was the lack of layout consistency, which we improved by associating certain colours to actions the user is able to perform. To be more exact, we coloured the ‘delete’ buttons to red, the ‘edit’ ones to blue and the ‘add’ buttons to green. We chose the colours in such a way that the purpose of each button becomes intuitive, eliminating the need of text to describe each action. Also, we have added edit buttons on the cards as well, for a more consistent design, and replaced the text “edit” with an edit icon shown in Figure 11.

Figure 11: Edit icon

Moreover, as comments from heuristic "Visibility of system status" show, the server address is never displayed on our main screen, which depreciates the recognition of our application - of the “New Server” button in particular. One way the application could be improved would be if the address of the current server would be permanently displayed on the screen, so the user has easy access to this information.

Taking into consideration the feedback recieved regarding heuristic "Help the user recognize, diagnose and recover from errors", we improved the error prevention when deleting entities by introducing pop-up alerts that ask users to confirm their choice.

To conclude, this report described the usability method of Heuristic Evaluation, as well as the findings from a Heuristic Evaluation conducted by a team of five reviewers, with student-level expertise of the domain, on a Kanban-board application currently being developed by the authors. Ultimately, there were six individual usability problems identified. Of the six, one was deemed a “major issue”, two “minor issues” and three “cosmetic problems”. This resulted in seven redesign recommendations:

(1) Group the “Create/Delete/Rename/Join Board” and “Join Server” buttons on the overview page into a drop-down menu. This should make it easier for the user to navigate through the application, and the new change should also improve the layout of our application, making it more minimalistic. The comparison pictures are shown in Figure 12 and Figure 13.

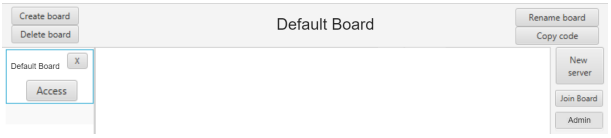

Figure 12: Before

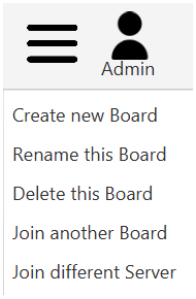

Figure 13: After

(2) Position the “Add List” button towards the middle of the page, placed next to the lists. With the button being more visible, we can expect users to recognise this button and its functionality more easily, improving the user control on our application. The comparison pictures are shown in Figure 14 and Figure 15.

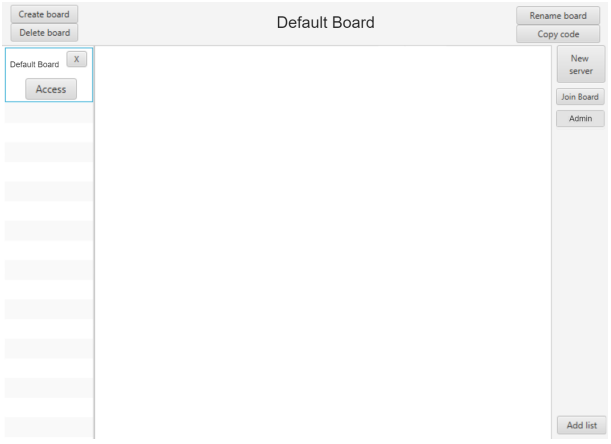

Figure 14: Before

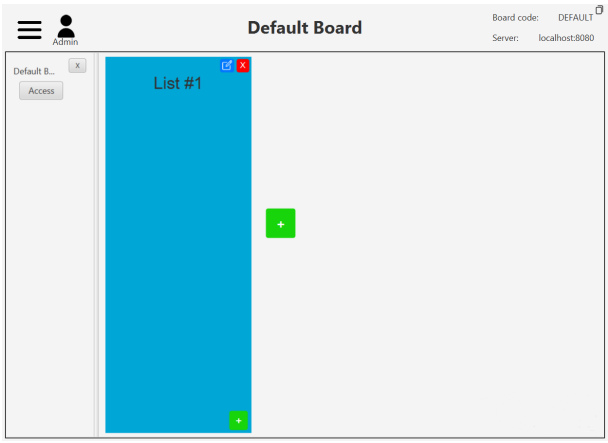

Figure 15: After

(3) Replace the "Copy Code" button with the current board's code, along with a small button on the side with the copy icon. This way, the user is informed about the code of the current board and can also easily copy it. The comparison pictures are shown in Figure 16 and Figure 17.

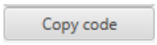

Figure 16: Before

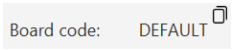

Figure 17: After

(4) Recolor all the delete, edit, and add buttons to red, blue and green respectively. After this change, interacting with this application should become a more pleasant process for the user. The comparison pictures are shown in Figure 18 and Figure 19.

Figure 18: Before

Figure 19: After

(5) Add edit buttons on each card and replace the "Edit" text with an icon. After this change, the user can start editing a task easier and the button's purpose should become more intuitive. The comparison pictures are shown in Figure 20 and Figure 21.

Figure 20: Before

Figure 21: After

(6) Place the address of the current server in the overview of the application. After this change, the user can easily recognise which server they're connected to. The comparison pictures are shown in Figure 12 and Figure 22.

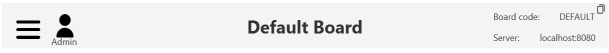

Figure 22: After

(7) Add pop-up alerts that ask users to confirm their choice when trying to delete an entity. This way, they are much less likely to accidentally perform an action that's hard to recover from. The after pictures are shown in Figure 23.

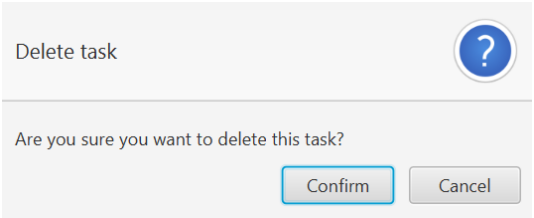

Figure 23: After

After implementing those changes, we perceived a major improvement in the user experience. For each of Nielsen's heuristics, we observed the following improvements:

- Visibility of system status
  - Board code is now clear to the user.
  - Current server's address is now clear to the user.
- Match between system and real world
  - There are no ambiguities on what actions the buttons perform.
- User control and freedom
  - No improvements were needed.
- Consistency and standards
  - Buttons are consistently coloured according to their functionality.
- Error prevention
  - Destructive actions require user confirmation before being performed.
- Recognition rather than recall
  - Reduced number of buttons shown to the user at once, making the scene more recognisable.
  - Colours for certain buttons reinforce their functionalities.
  - More extensive use of icons improves the minimalistic design and coherence of the whole system.
- Flexibility and efficiency of use
  - No improvements were needed.
- Aesthetic and minimalist design
  - Several buttons were replaced by icons.
  - Buttons were grouped and hidden into drop-down menus.
  - Colours were added to buttons.
- Help users recognize, diagnose, and recover from errors
  - Destructive actions require user confirmation before being performed.
- Help and documentation
  - No improvements were needed.

Given its significant influence in the final design, and the quality improvement it brought, the authors believe the evaluation was successful.

REFERENCES

[1] Jakob Nielsen. 1994. How to Conduct a Heuristic Evaluation. (1994).
[2] TUDelft. 2023. Heuristic Evaluation Lectures. (2023).