HCI Report

Introduction:

This paper presents aspects of a heuristic evaluation conducted by adhering to the principles of human-computer interaction[1] for a quiz application prototype. The main objective of this paper is to describe the problems bound up with the system and design. Furthermore, an overview of the feedback will be provided. Additionally, the evaluation of the system and possible improvements will be made in order to ensure a top-quality application.

Our prototype currently presents the graphical interface (GUI), since the project is still ongoing. However, interactions between scenes are provided by using a free online prototyping tool[2]. The quiz will be provided in two variants: one multiplayer, which requires a leaderboard for the current game and one single player, both requiring a global leaderboard. Each group is asked to come up with at least 20 questions that are meant to raise energy awareness among players. Moreover, the game should be interactive and fun to play as a group since it should allow the user to use Jokers, send emojis and see the overall leaderboard, thus increasing competitiveness within the group. Thus, we expect our users to acquire knowledge regarding energy consumption, while also having a good time playing our quiz game.

Additional note: The background image [4] is relevant for the 180th celebration of TUDelft. We chose this image because it is representative for the energy awareness campaign the university is doing and also inspirational for our quiz's topic.

Methods:

- **Experts**

We have recruited a team of 6 experts (group 64) that will conduct a heuristic evaluation on our prototype. They all have the same level of expertise, since they are all students that are also taking the OOPP course, so they have also attended the Human-Computer Interaction lecture. Therefore, we presume that these experts possess prior knowledge required in conducting this type of analysis.

- **Procedure**

The experts need to conduct an evaluation like they were instructed in a Human-Computer Interaction lecture during the second week of the OOPP course. Each expert needs to individually analyze the graphic interface that we provided and also test the interactivity of our prototype[2] , by observing how stages are related to each other. Thus, they will be able to get a grasp of how the application is supposed to work.

[1] – G. Chao, "Human Interaction: Process and Principles of Human-Computer Interface Design," 2009 International Conference on Computer and Automation Engineering, 2009, pp. 230-233, doi: 10.1109/ICCAE.2009.23.

[2] - https://app.moqups.com/cmNXck9bitUSojj11if99BYdvXrEjhW9/view/page/ad64222d5

[3] - Nielsen, J. (1994a). Enhancing the explanatory power of usability heuristics. Proc. ACM CHI'94 Conf. (Boston, MA, April 24-28), 152-158.

[4] - https://www.facebook.com/TUDelft/photos/a.110374005709088/4791613680918407/

After each member of the confronting team tested the prototype, he/she is supposed to address some issues regarding the system, usability, user-friendly design and features that they would improve, change or add. Last but not least, this evaluation must be conducted according to the rules described by Nielsen in his usability heuristics research paper [3]. When the individual part is done, the team meets and discusses each member's results, comparing similar observations and aggregates everything in the final HCI report. The team will recheck everything written in this deliverable document to ensure its reliability and correctness of syntax.

- **Measures (Data collection)**

This paper is written after collecting the data from group 64 in order to come up with some improvements regarding our graphical interface. We are currently measuring the severity and frequency of each issue the experts noted. The experts are instructed to report specific issues that they encounter when testing the GUI in the following format:

1. Problem Description (a brief description of the problem)
2. Likely/actual difficulties (anticipated difficulties that the user will encounter)
3. Specific contexts (the specific context in which a problem can occur)
4. Assumed causes (description of the cause of the problem)

Since the evaluators provided us with a prioritizing severity matrix, it will be easier for us to solve each issue at a time. To be as efficient as possible, we decided to write a priority list based on this specific matrix, so that we make sure to record every important problem and also plan on how to fix it.

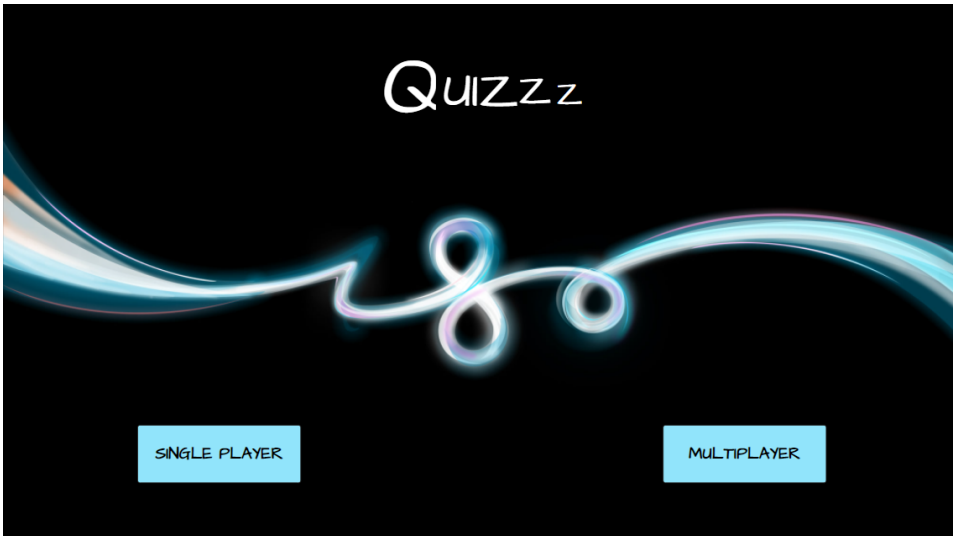
Our results will be visible by comparing our previous version of prototype to the one modified according to the heuristic evaluation conducted by group 64. This will be done by providing comparatory screenshots of type before-and-after.

Results:

These results are presented by writing the problem the evaluators identified, a screenshot of the old version and a screenshot of the new one. The initial version of each scene will have a small description regarding its usability (buttons, text labels, etc), while the updated version will contain the resolved issues with respect to that specific screen.

Splash Screen

The splash screen has a representative background image (described in the *Introduction* part), a label "Quizzz" that informs the user about the type of game that he is going to play. There are initially 2 buttons that allow you to choose the variant of game you want to play: single player or multiplayer.

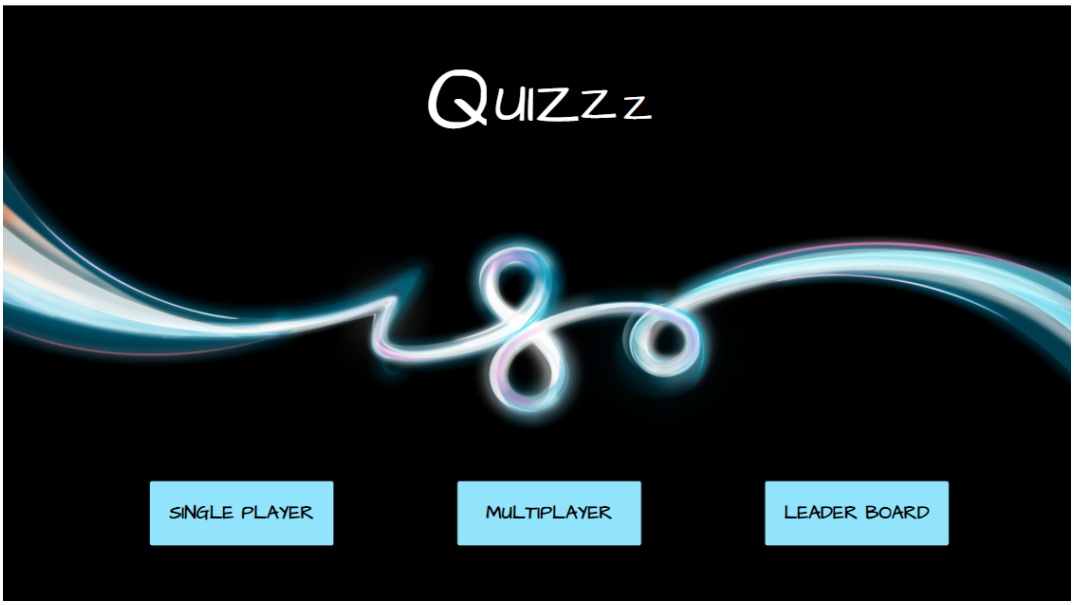


Issues identified:

- There is no option to view the global leaderboard without having to play an entire game first.

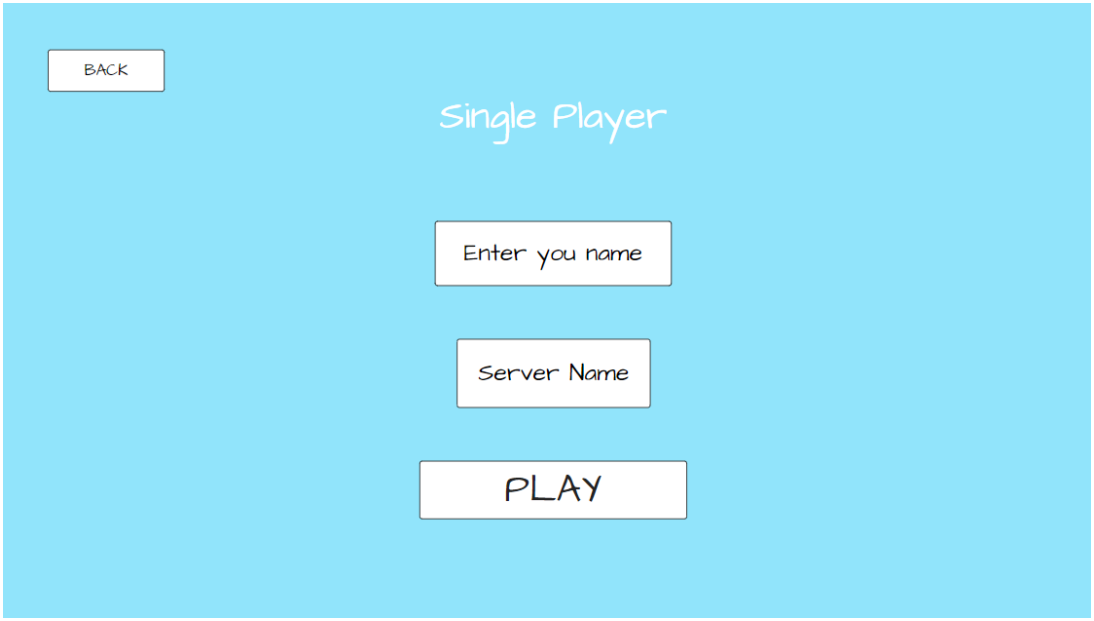
Solution:

- Add a new button on the splash screen that goes directly to the global leaderboard which records every score that every player ever got.
- Upon pressing the leaderboard button on the splash screen, the “global leaderboard“ scene will pop-up on the user’s screen as shown below.



Single player screen

The single player screen provides the user with 2 buttons: “back” and “play”, that allows him/her to go back to the splash screen or to start a single-player game, respectively. There is also a “Single Player” label that lets the player know information about the variant of the game he chose.



Issues identified:

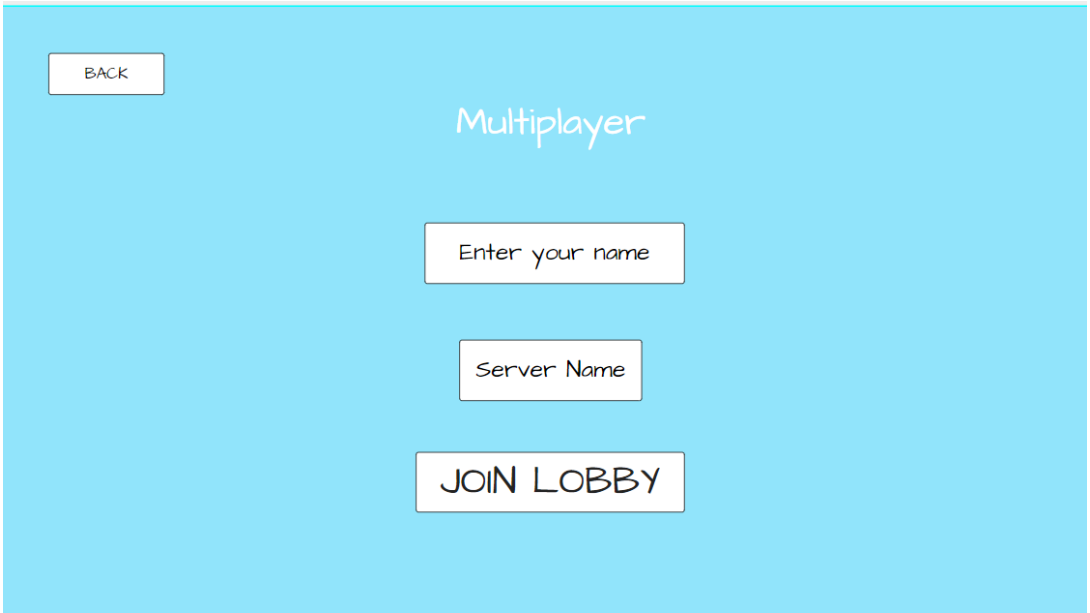
- There exists a field to input the server name on the single player selection menu page, a redundant option which might lead to errors and slows down the implementation process.

Solution:

- We removed the “server name” input field as shown below.

Multiplayer screen

This scene was not modified at all. There is a “back” button that allows the user to go back to the splash screen, an input field “server name” that requires the user to input his name, a “server name” text field that shows the IP address that identifies the device on which the game is running, a “Multiplayer” label that lets you know you are currently in the multiplayer scene and the “JOIN LOBBY” button gets you to a waiting room with all the other players that are currently enqued to start a game.



Multiplayer lobby

The multiplayer lobby will have a “Lobby” label that tells the user he’s currently enqued for a multiplayer game that is going to start. There is also a text field below the lobby label that informs the user about how many players are already enrolled out of 50 (maximum capacity). Furthermore, a table providing information about each player that is currently waiting in your lobby is available in the left-bottom part of the screen. Last but not least, the “START GAME” button kicks off the game when one awaiting user presses it.

Issue

- There is no back or leave lobby button on the lobby page.

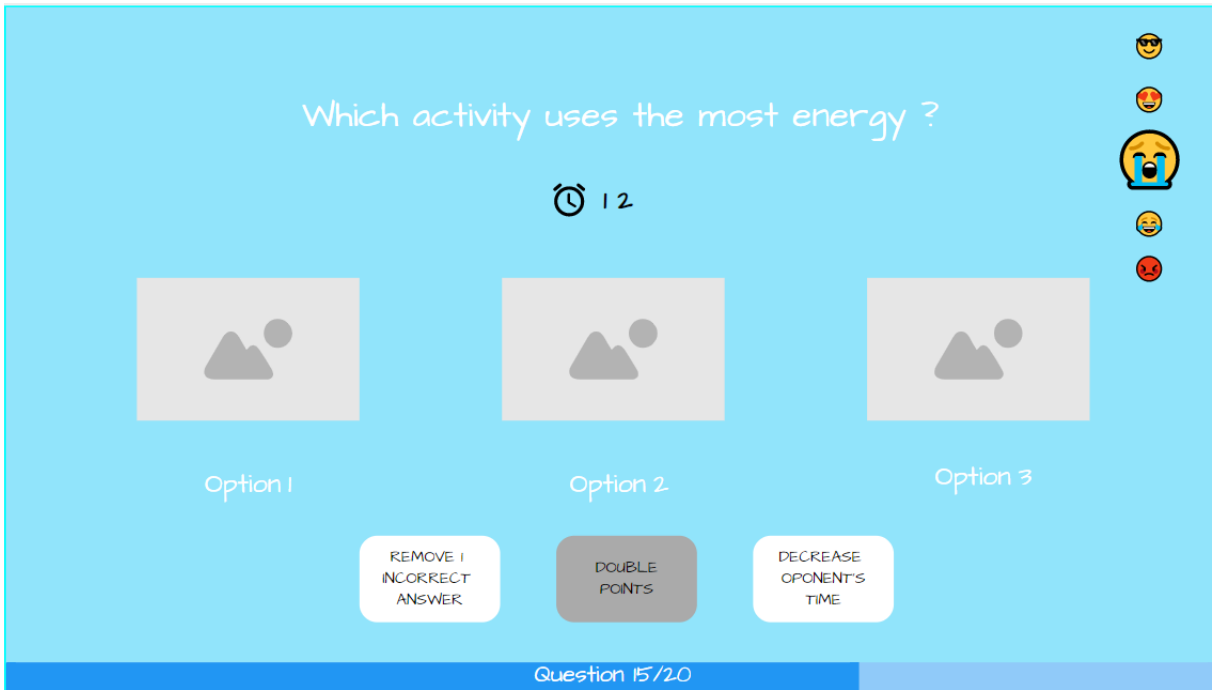
Solution

- Added a leave lobby button on the multiplayer lobby screen, that when pressed takes the user back to the splashscreen

Question screen

The question screen has a label that represents the task, a text area below it that shows how many seconds are left to answer that specific question, 3 options for the multiple-choice questions (below the time-remaining text field). On the bottom of the page, there are the 3 jokers buttons (The client required the following specific jokers: remove 1 incorrect answer, double points and decrease opponent's time). Each of these jokers will have a white background if they are usable (which means that it applies to that specific task and you have not used it before in the game, since each joker can be used at most once during a game), or a grey background otherwise. There is also a progress bar below the jokers that indicates the question number you are currently at. After each question, the bar “fills” with dark-blue, informing the user about how many questions he had answered since that specific moment (i.: For 15/20 questions as shown below, ¾ of our bar is dark blue, while the rest is pale blue). Last but not least, there are 5 emoji that we chose (in the up-right corner), so that users can react to a specific question. When one emoji is pressed (i.e: the crying emoji, as shown below), it becomes larger (scaled by a factor > 1) and all the other users see it this way. In other words, all the users see the emojis in the

same state during the game.



Issues:

- There is no leave game button.
- The description on the button “Decrease opponent’s time” is vague, not stating the amount of time that is being removed.
- The user cannot see their own score at all times during the game.
- The user is not notified when someone disconnects.

Solution:

- Created a leave game button
- The description on the decrease opponent’s time joker was modified to be more clear
- The user can now see their own score at all times
- The user gets notified when someone disconnects

Answer screen

In addition to the '*Question screen*" usability (see the previous screen description), after a question has timed-out, the correct option greens out. In case you answered incorrectly to this specific question, your response will be displayed as red.

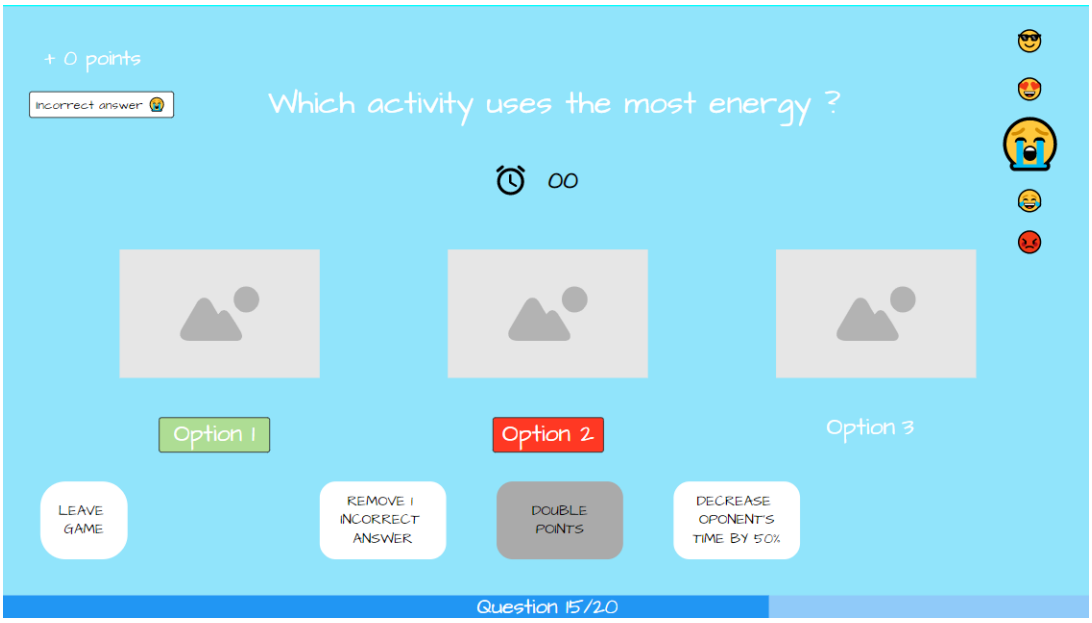
Issues:

- There is no leave game button.

- The description on the button “Decrease opponent’s time” is vague, not stating the amount of time that is being removed.

Solution:

- Created a leave game button
- The description on the decrease opponent’s time joker was modified to be more clear



Leader board for current multiplayer game

The leader board for the current multiplayer game is displayed after the game is over (being self-explanatory due to the central “GAME OVER!” label). There is also a label below it “Leader board” that informs the user he is currently seeing the ranking of all the players from his/her game. The table representing the leaderboard relates each position of a player to the given name (i.e: 17 Ada Lovelace). For this table, a scrollbar option is provided so that the user can go through the ranking and see other players’ performances.

Issues:

- There are no scores on the leaderboard after a game has ended.

Solution:

- Added the players' scores on the leader board.

Global leader board

The global leader board screen shows the names of all players that have ever participated in at least one game. There is a label “GAME OVER !” which is self-explanatory. Below this label, there is another one that annotates the screen’s utility “Global leader board”. The table representing the leaderboard relates each global position of a player to his/her name (i.e: 17 Ada Lovelace). For this table, a scrollbar option is provided so that the user can go through the ranking and see other players' performances. Last but not least, a “PLAY AGAIN” button is displayed in the top-right corner that will guide the user to the splash screen.

Issues:

- There are no scores on the leaderboard after a game has ended.

Solution:

- Added the players’ scores on the leader board.

Conclusion & Improvements

Our **main conclusions** drawn from the heuristic evaluation are the following:

- We lacked a way to display the global leaderboard even before playing a game, because the players need to be able to see at any time how their knowledge ranks in comparison with anyone who played before or after them.
- We were prompting a user using the single player variant of the game to type in a server name, when it was not the case. We resolved this issue in order to maintain a redundancy free design.
- We decided to create a “LEAVE LOBBY” button, since there was no way to go back to the splash screen besides leaving the entire game or waiting for the game to start and then leave.
- We encountered the same problem of not having a “LEAVE GAME” button as before, so we decided to add it to our GUI in order to allow users to go back to the splash screen directly, instead of restarting the client.
- We changed the description of “Decrease opponent time” button because it was not clear enough, so we wanted to make sure that there are no confusions among users.
- We made the personal score of the players available to them at any time, so they can keep track of their progress.
- We added a pop-up that notifies all players when another player disconnects, so that the remaining users are aware of how many opponents they are still facing.

- We attached each person his own score on the leader boards, so that players are able to directly compare their performances throughout a game not only to other players, but also to their past scores (in case of global leaderboard).

The improved version of our GUI is better than the previous one because it solves some issues that could have come up in certain situations (i.e: leaving before a game has started). This current version also offers more flexibility due to a variety of features. It also complies better with the clients' wishes, since there were some details that we did not manage to take into consideration before receiving the HCI evaluation of our peers.

Note: For all the other main points regarding the "*Conclusion & Improvements"* section, we have answered in the "*Results" topic.*