Evaluation Document Group 7

Persona Description

The goal of this project is to create a webapp with interactive visualizations for the Naturvation Atlas. We decided to choose the Architect/Designer as our persona for this project, thinking that the dataset is suitable for interactions/visualizations that could help an Architect/Designer, for example, understand the types of projects a coastal area has undertaken. Furthermore, some of the goals that can be achieved through this webapp are:

- Information for projects when creating outdoor designs for public spaces, such as parks, green roofs, or street improvements, finding the balance between good-looking and functional.
- Select solutions that fit in the context of spatial area, budget, and environmental/social impacts.
- Use existing NbS implementations as a guide for new potential projects.

The dataset was used to create some interactions and visualizations, such as:

- A recommendation system that could find projects similar to the given filter when the Architect/Designer does not have something in mind and wants to explore the projects for ideas.
- Search projects based on a variety of filters such as scale, type of area before intervention, ecological domain, cost, duration, and place of the project.

- Compare alternative NbS on different metrics such as total cost, nbs area, environmental impacts, governance arrangements and in general all information that the Naturvation Atlas provides.

An overview of what the project could be able to answer questions such as:
- What implementation activities were required for the selected solutions?
- Which interventions had good/bad/neutral environmental impact/outcome?

Data

Data Sources

The main dataset used in this project was from the Nature-Based Solutions (NBS) database, exported as an Excel file that was later transformed into a csv file for better handling. This dataset contains documented NBS interventions across different countries and cities, including information about implementation periods, spatial scale, environmental, social, and economic impacts, governance arrangements, costs, and funding sources.
Because we wanted to create a map in our webapp, we had to find the coordinates of the projects to locate them in the visualization. Since the provided dataset did not have the coordinates, we chose to align the projects to the map based on the city of each project, since it was easier to create a code (which is included in the deliverables) that could find the coordinates of the cities using the Nominatim() which initializes a GeoPy geocoder instance to convert locations to geographical coordinates.

Data Wrangling

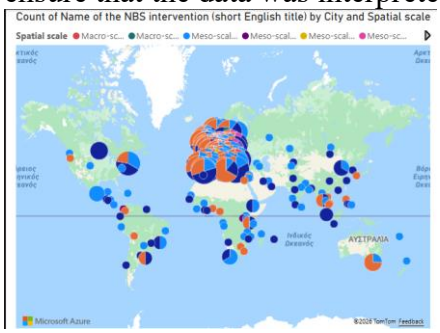
Some Python scripts were used to wrangle the data. At first, we studied the dataset and what each column represents, keeping in mind our persona selection. Based on this persona, the columns that don't fit our selection were removed to narrow the dataset. Then, columns such as *"Duration"* were split into two separate columns to present a cleaner way of the beginning and end of an NbS intervention. Furthermore, to help future handling of the dataset in the coding phase, we changed the names of the columns to be smaller and coding-friendly. And at the end, we had to transform it into a csv file, as mentioned, to be used for our webapp implementation.

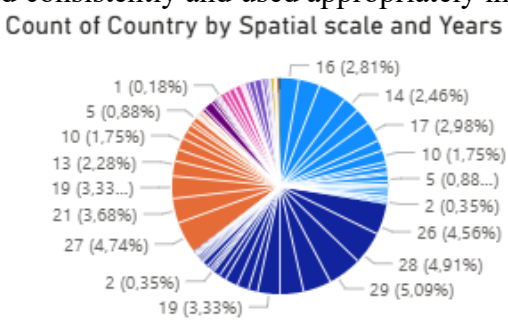
Missing Values

The dataset contained a small number of missing or incomplete values. These were handled differently depending on the type of data to avoid any fault in the visualizations.
For numeric attributes, missing or invalid values were replaced using the median of the corresponding column. This approach was chosen to preserve the typical values while limiting the influence of extreme cases.
For textual attributes, missing entries were replaced with the value "Unknown". This allowed the records to remain in the dataset without introducing assumptions about the missing information.

Data Understanding

To better understand the meaning of the dataset attributes, we reviewed the available documentation provided with the dataset. This was particularly important for columns describing the characteristics and impacts of nature-based solutions, such as environmental, social, and economic outcomes, as well as governance and implementation aspects. Furthermore, we used Power BI to do some initial visualizations, such as maps, pie charts, and histograms, to understand in depth the data and explore patterns, differentiations, and get some ideas for our future visualizations. Understanding how these attributes were defined helped ensure that the data was interpreted consistently and used appropriately in later analysis.





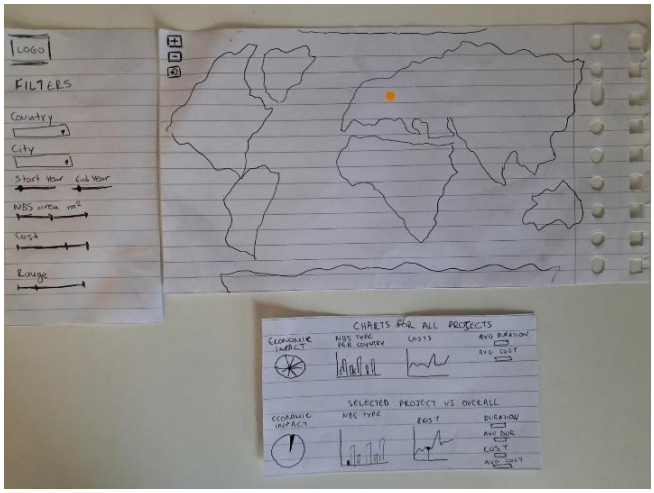
For example, these two visualizations were created with Power BI as an initial try to understand the data. The left map indicates the number of project per city and spatial scale, while the right pie counts the number of projects per country and spatial scale but per they duration of the project.

Sketches

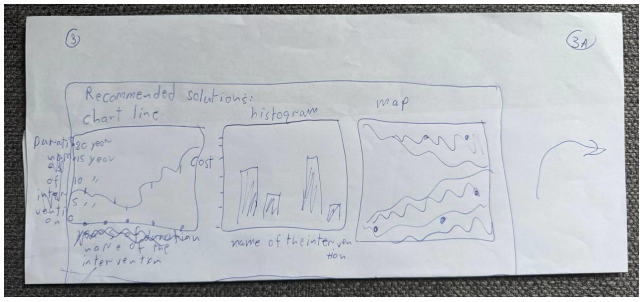
As a team, we had some similar sketches in our first meeting, so for the final setup of our project view, we decided to combine our sketches (as you can see from the different pieces of paper).

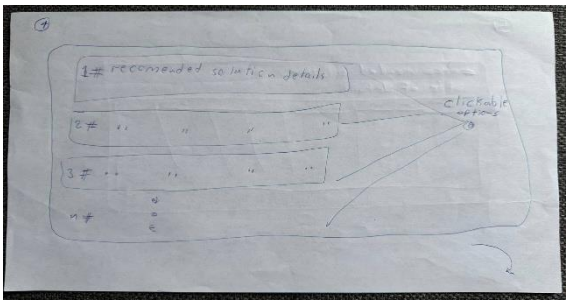
Initial Sketches

Konstantinos Zavantias:

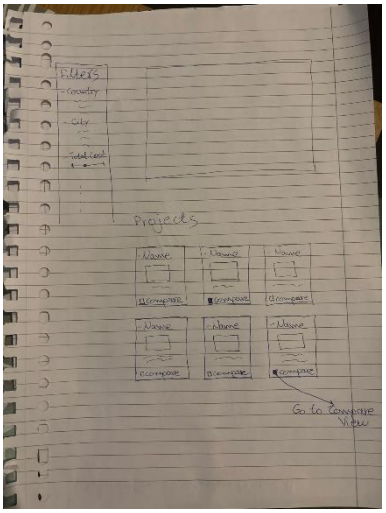


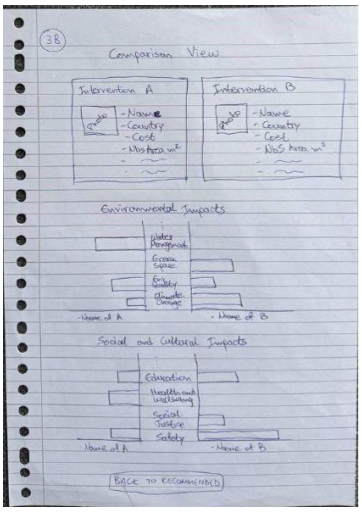
Mohammed Bashabeeb:

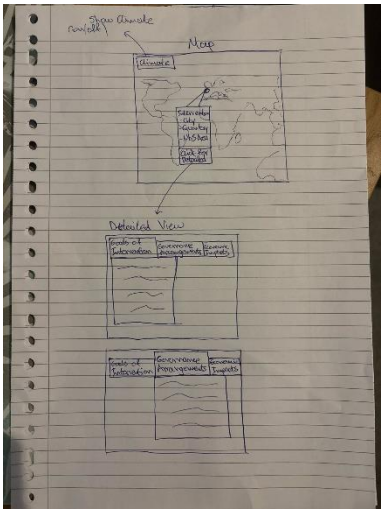


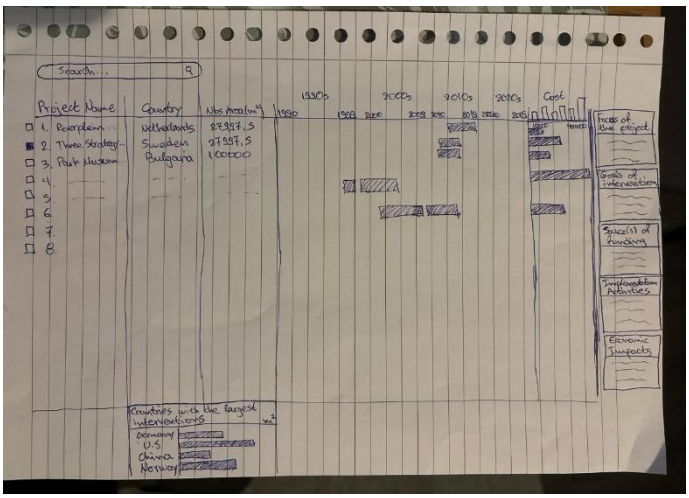


Alexandros Xanthopoulos:

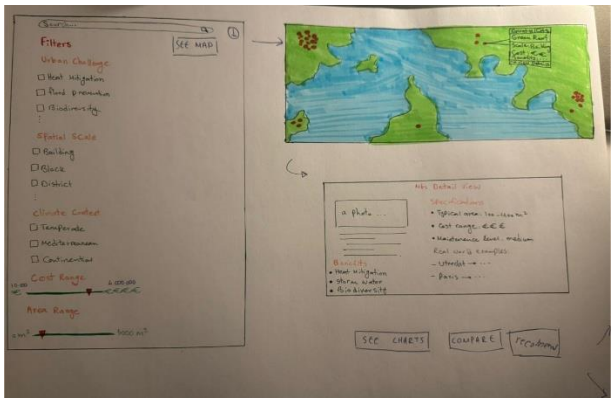




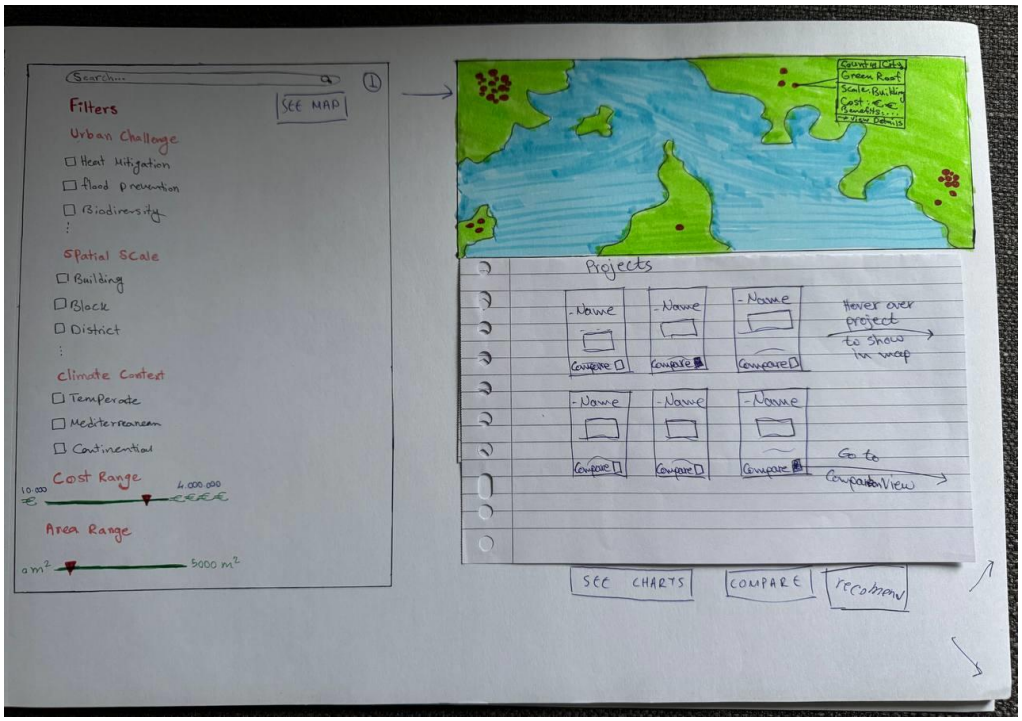


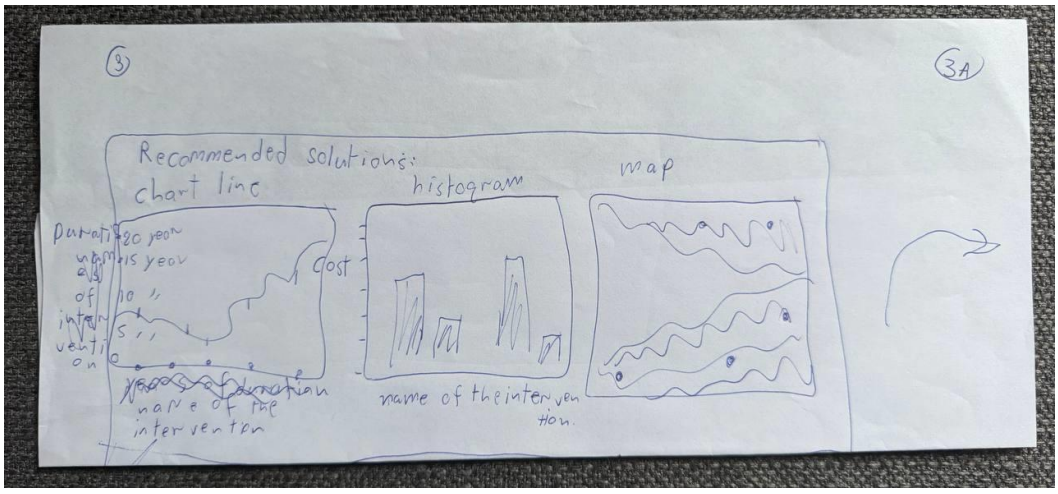


Mahshid Jafar Tajrishi:



Final Sketches





RC

1 ——— 10

Move to the recommendation →

3B

Comparison View

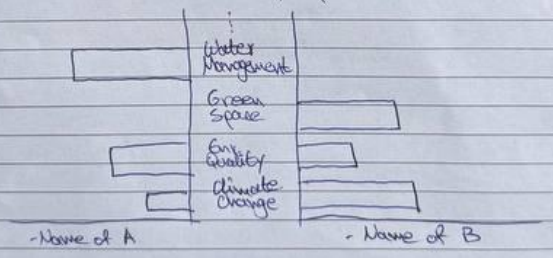
Intervention A

Photo
- Name
- Country
- Cost
- NbS Area m^2
- ~
- ~

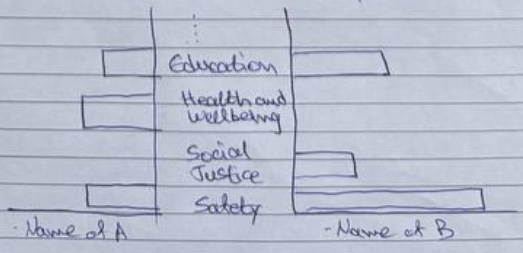
Intervention B

Photo
- Name
- Country
- Cost
- NbS Area m^2
- ~
- ~

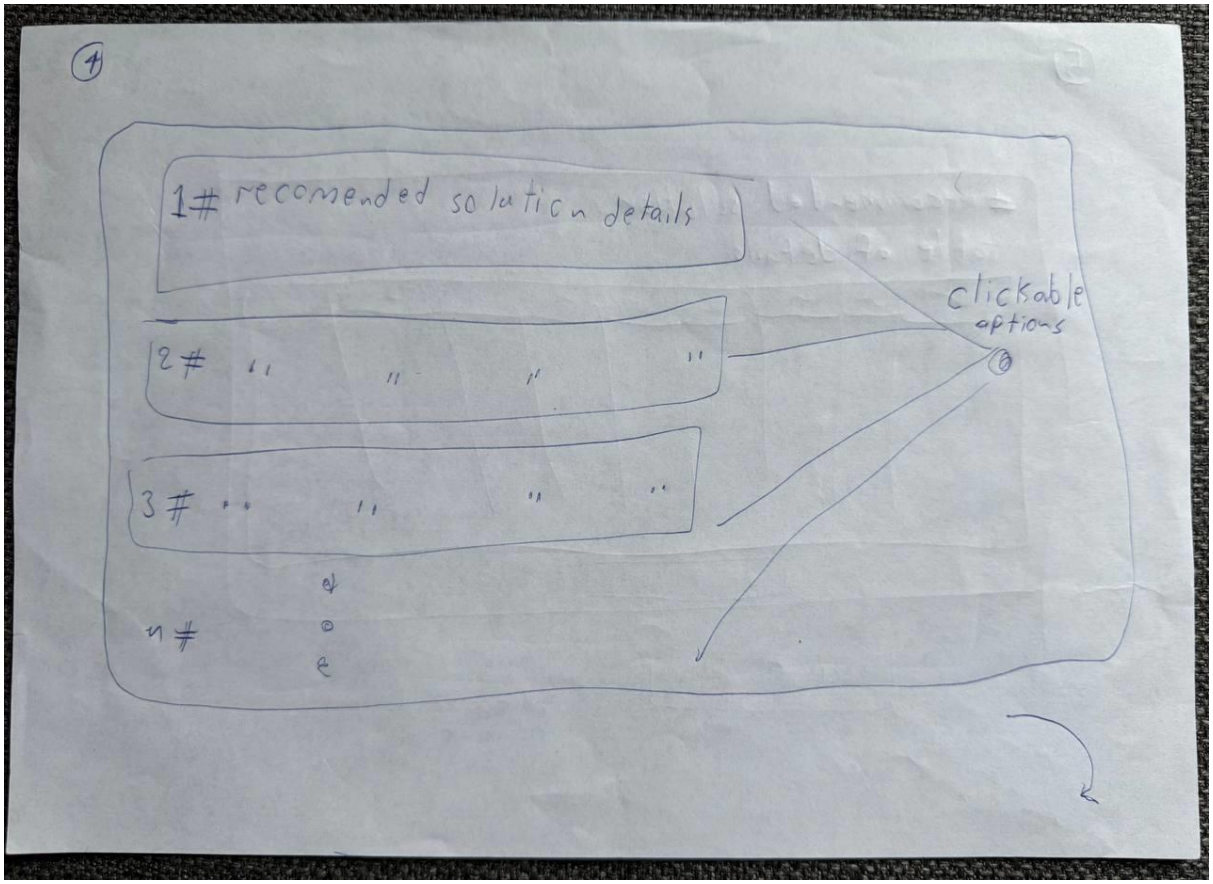
Environmental Impacts



Social and Cultural Impacts



BACK TO RECOMMENDED



MoSCoW prioritization

MUST HAVE:

- Map visualization that includes all projects aligned correctly.
- Interactive filters to help the Architect/Designer select wanted preferences.
- Information Page containing the project's information.
- Result table containing all projects each time, basic information, and a comparison button.
- Interaction between visualizations: changing the filters to change the map projects, the results table, and the charts' values.
- Search Bar to find desired projects if user knows what wants.
- Recommendation System to help users who do not have a specific project or idea in mind.
- Comparison table between projects.

SHOULD HAVE:

- A button or triggering when pressing the name of a project in result list to see more information about the project.
- Pop-up window with projects and information.
- Map controller (zoom in, zoom out, reset).
- Chart zooming in.

COULD HAVE:

- Pie charts instead of circles in the map indicating different filters.
- Pie chart's legend in each pop-up window.
- Buttons in pop-up for comparison and information.

- Colorblind button to change the colors of the page to be colorblind-friendly.
- Connection of the dataset with the web to find images, for example, of the projects or other info to display them within our page and not with Atlas' link

Evaluation

Tasks

1. Filter the NbS and show the interventions whose type of area before intervention was "Industrial".
2. Choose any of the filtered interventions and find it in the map. Zoom into it and identify what country and city is in, and the NbS Area in m2.
3. Select the detail view of the selected intervention and tell the goals of the interventions, the type of NbS and ecological domain, and the governance arrangements.
4. Select two different interventions and compare them based on total cost and environmental impacts. Also, do the same comparison but now based on social and cultural impacts.
5. Find an intervention and focus on participatory methods/community involvement. Note who the key actors-initiating organizations are, what types of community involvement were used. Maybe try to think if you choose to make a project like this, would it work good for the city?

Design Questions

1. When selecting an intervention on the map, do you feel that the country, city, and NbS area are enough information?
2. Was it obvious how to open the detailed view of an intervention on the map?
3. For governance arrangements and community involvement, did the layout help you understand who was responsible for what?
4. Did you experience any confusion during navigation/ did you think of any suggestion throughout using the system?

Evaluation samples

Round 1

Group 6

The participant from group 6 was able to complete tasks without difficulty. Basic interactions, such as identifying key elements of the charts and understanding overall trends, were clear and

intuitive. However, when interacting with more detailed chart elements, the participant noted that the amount of information presented could feel overwhelming. While the data was informative, the amount of information shown at once sometimes made the charts harder to read. They suggested that probably reducing the number of displayed variables could improve clarity. Overall, the interface works well for simple tasks, but simplifying the visualizations would make it easier to explore more detailed information.

Round 2

Group 4
The participant was unsure about what they were supposed to do during the tasks. While they could use the system, the goal of each task was not always clear to them. They also found the overall purpose of the system somewhat difficult to understand. In particular, it was not clear what question the visualization was trying to answer or why some views are important. They mentioned that providing short explanations or an introduction could help users to understand better the purpose of the system and how to use the visualization.

Round 3

Group 5
The participant from group 5 liked the search bar in the filters and found it helpful for finding items quickly. However, they felt that the layout could be improved. They suggested showing the map and other visualizations on the same screen is a good idea to make the data easier to understand. The navigation was also a bit confusing to them and required too many steps. Making the layout clearer and simplifying the navigation could improve the overall user experience.

Round 4

Group 2
The participant found it too difficult to immediately understand what information the visualization was intended to present. Even though there were interactive elements, the main idea was not always clear. They also mentioned that it was hard to see which filters were available and active. Making active filters more visible could help users understand how the data changes. Clarifying the main focus of the visualization would make it easier to understand.

Round 5

Group 1
The participant from group 1 was focused on the comparison view. They suggested adding numbers to make the differences between solutions easier to see. They also suggested separating the recommended solutions from the detailed information. Showing recommendations first and details later could make the view easier to understand.