

Compare & Conquer™

Can you create a better flood plan?

Compare & Conquer is a museum exhibit that we proposed to the Peggy Notebaert Nature Museum at Chicago and is also the course project for the Multimedia Systems course (CS 523) at the University of Illinois at Chicago in Spring '16.

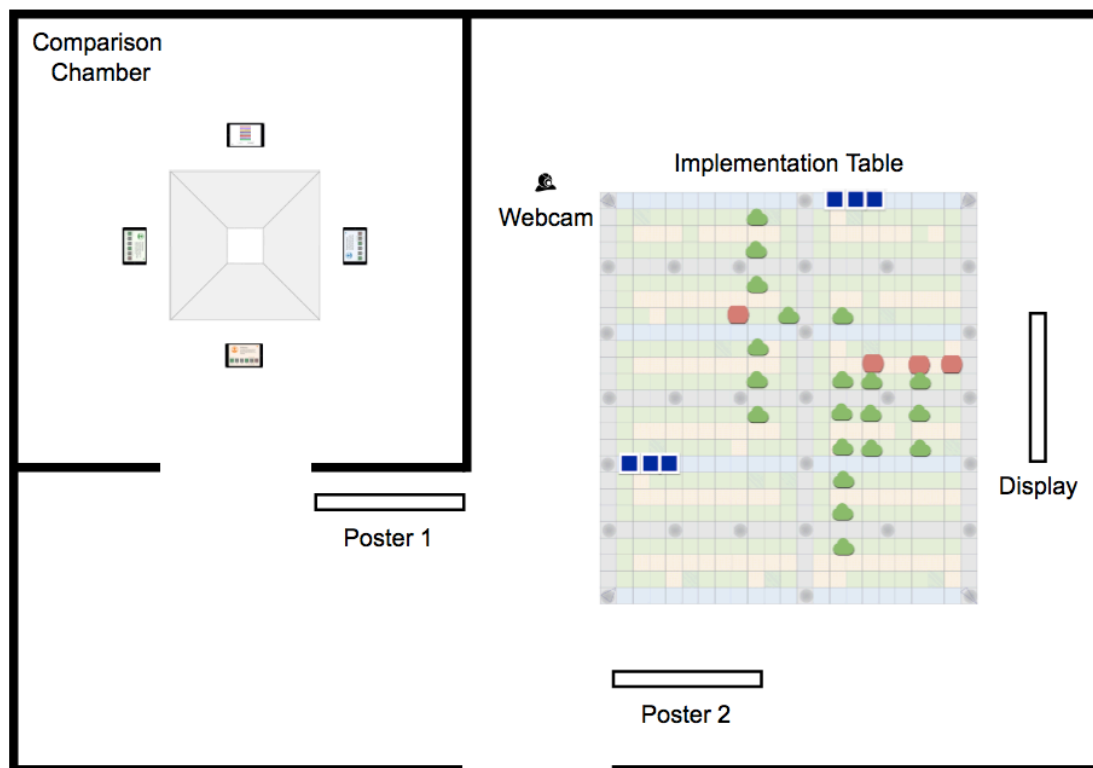
Aim of the exhibit:

Main Idea: Communicating different perspectives (playing with the profiles).

In Detail: This exhibit aims to communicate the impact of surface flooding on people and animal communities in a neighborhood (here, it's Blue Island). It throws light on the work that is being done by urban planners and policy makers in making decisions about planning the infrastructure of the city or neighborhood; it also aims to communicate how different people view the same plan differently.

Contents of the exhibit space:

The exhibit comprises of two parts - the Comparison Chamber (Holographic Chamber) and the Implementation Table. The Implementation Table is actually an entire exhibit by itself (called EcoCollage) and the Comparison Chamber is our addition to it to enhance the user experience. We chose to call this new, combined exhibit as Compare & Conquer. The exhibit space also contains posters with description of the exhibit and ambient displays.



History:

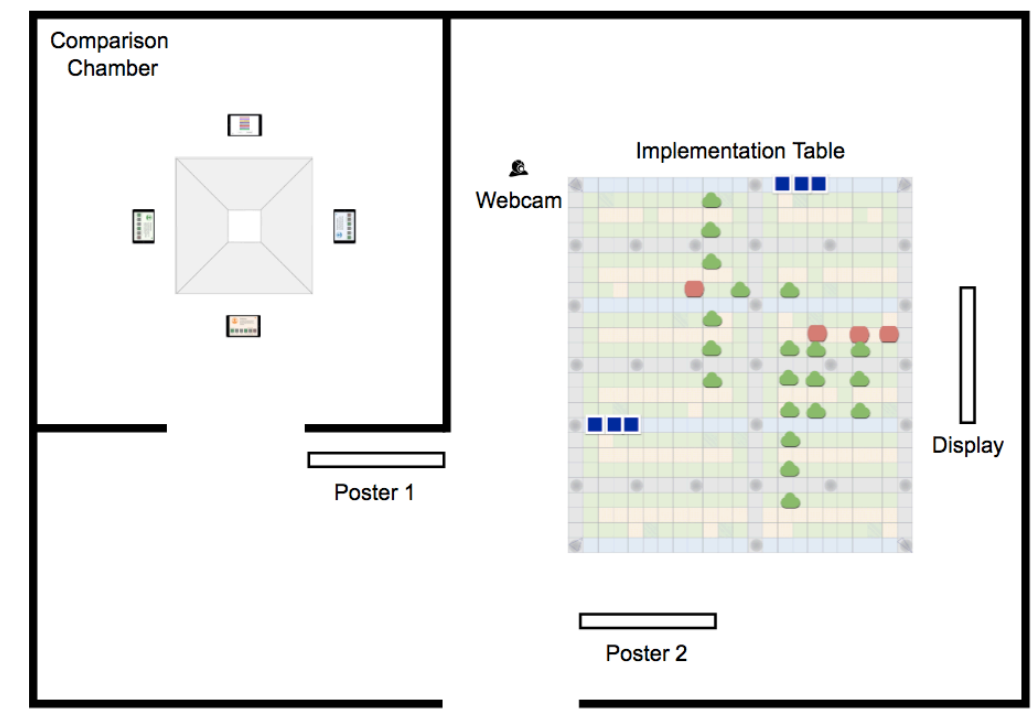
The EcoCollage is paper based Tangible User Interface (TUI) museum exhibit/game that allows visitors to plan the Blue Island neighborhood in Chicago and prevent it from flooding. The exhibit consists of the following:

The visitors are presented with the TUI on a table and a limited number of categorized tokens. The categories of the tokens are as follows:

1. Swales: Slows down the rapid flow of storm water runoff by ponding water between its slopes, often called berms. Once full, it will spill over the berm and slowly run into a local water body. Remaining water will either evaporate or infiltrate into the soil.
2. Rain Barrels: Rain Barrels trap and store large volumes of rainwater. They are containers designed to trap and store rainwater. They can be huge, complex systems that use pumps and linked barrels for storage, or single plastic or wooden drums that catch rainwater swirling along roof gutters and out of downspouts.
3. Green Roofs: A green roof consists of a layer of vegetation that completely covers an otherwise conventional flat or pitched roof. It is effective in reducing the volume and velocity of storm water runoff from roofs. Green roofs can be installed on many types of roofs, from small slanting roofs to large commercial flat roofs.
4. Permeable Pavements: Permeable pavement allows water to flow through tiny, connected holes into the gravel substrata beneath the pavement surface, then into the soil.

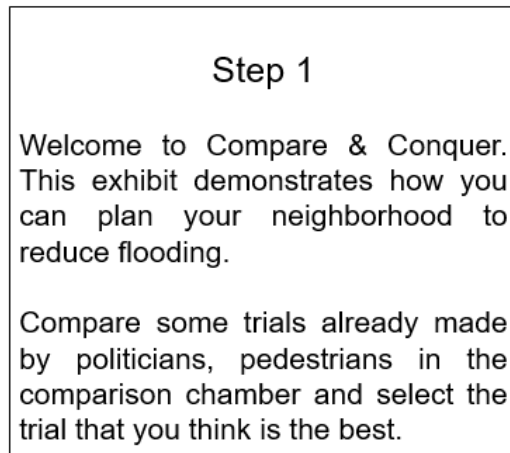
Walkthrough of user experience:

Step 1: A group enters the exhibit space.

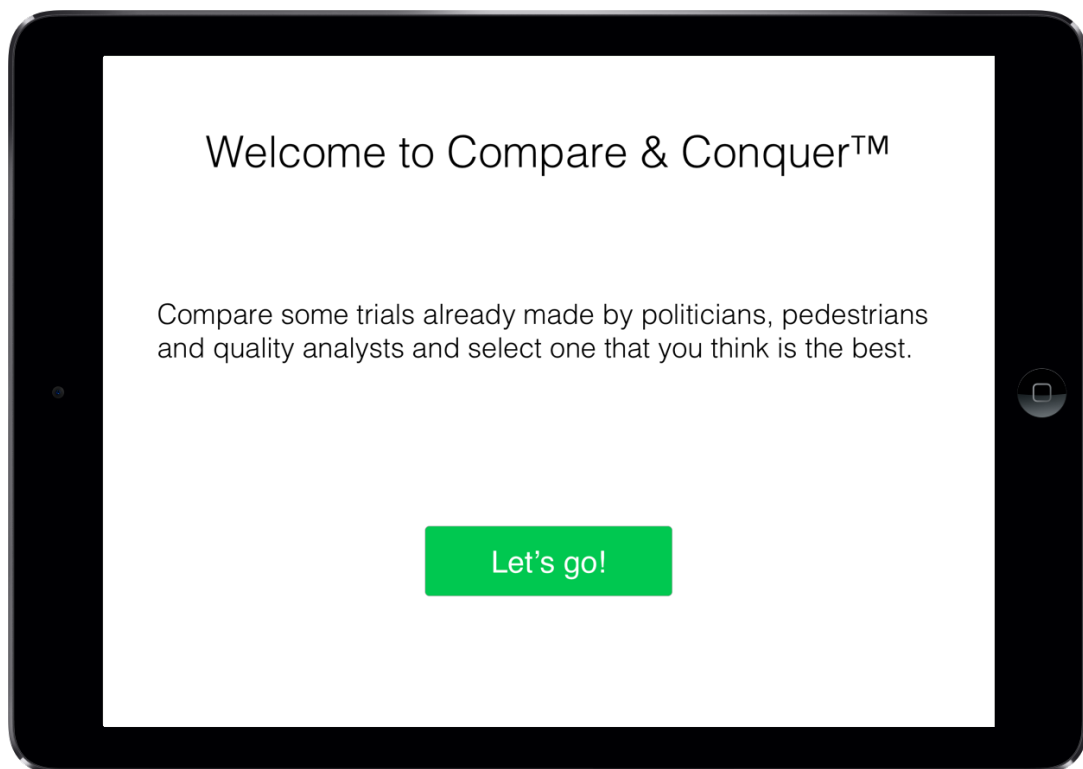


Step 2: They look at the poster that says "Compare some trials already made by politicians, pedestrians in the comparison chamber and select the trial that you think is the best" and head to the comparison chamber.

Poster 1



Step 3: In the comparison chamber, each side of the holographic display has an iPad. Each iPad represents a role, their description and a link to help screen that describes each of the preferences in the graph on the display.

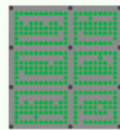




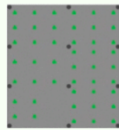
Pedestrian



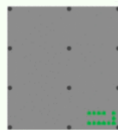
Blue Island residents walk to the nearby CTA stop, school or workplace everyday. They want to decide on a trial that has the least amount of stagnant water.



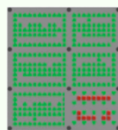
Trial 1



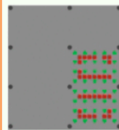
Trial 2



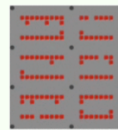
Trial 3



Trial 4



Trial 5



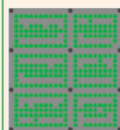
Trial 6



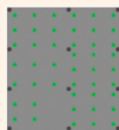
Politician



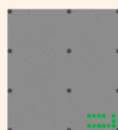
The mayor of Chicago visits the Blue Island neighborhood and wants to decide which trial is the cheapest.



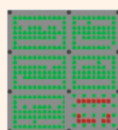
Trial 1



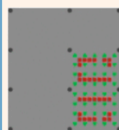
Trial 2



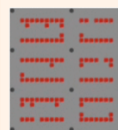
Trial 3



Trial 4



Trial 5



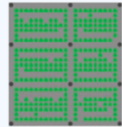
Trial 6



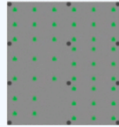
Quality Analyst



A quality analyst who is on the team with the politician wants to decide the best trial in terms of efficiency of the resources used.



Trial 1



Trial 2



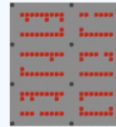
Trial 3



Trial 4



Trial 5



Trial 6

Help! What do the terms mean?



Investment: Cost to install and maintain new green infrastructure on both city and private property. Maintenance costs are in Present Value (PV) over 20 years, at 3% discount rate.

Damage Reduction: The amount of property damages reduced by the investment.

Efficiency of Resources (\$/Gallon): The amount of money spent per gallon of rainwater stored or infiltrated by green infrastructure installations.

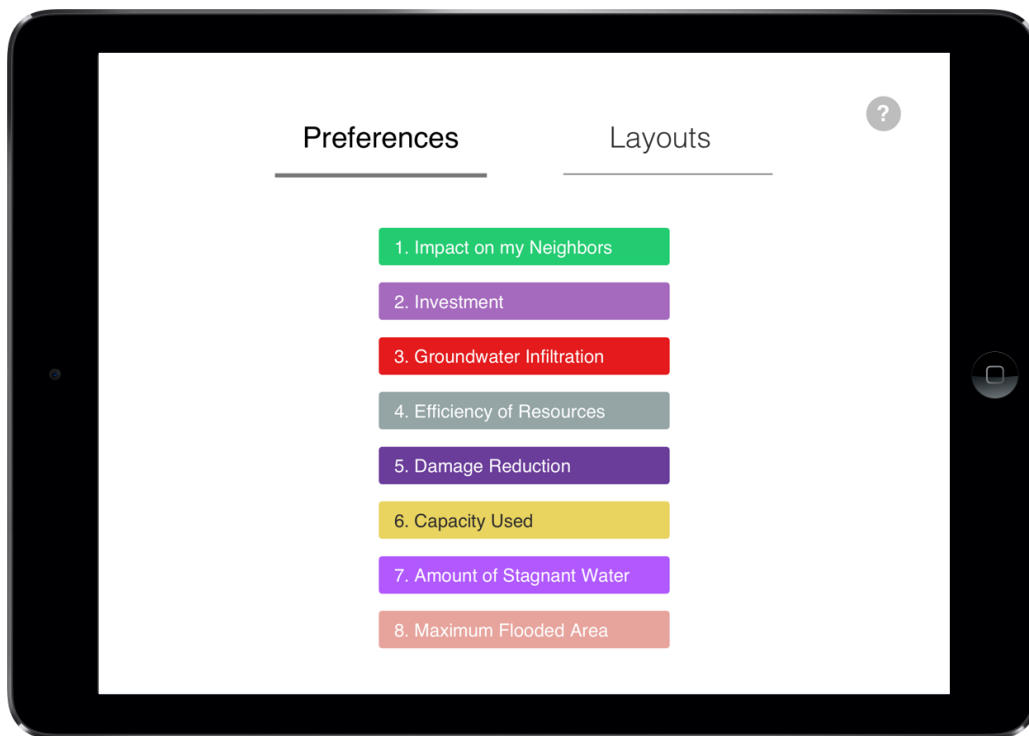
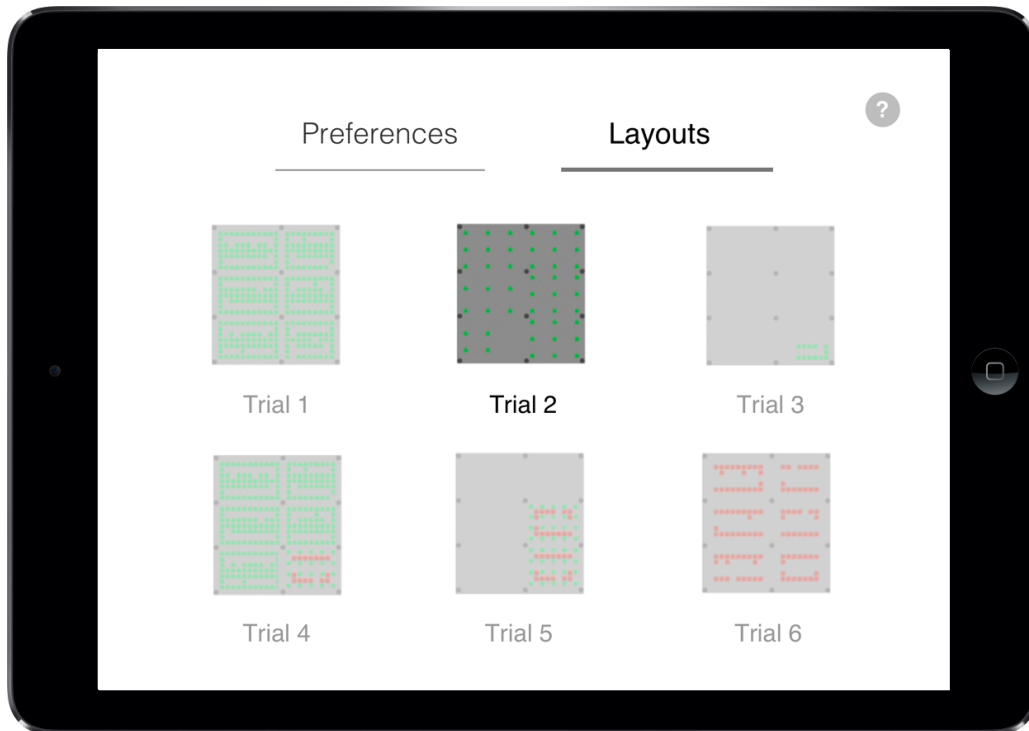
Capacity Used: The percentage of capacity used by interventions over their total available capacity.

Amount of Stagnant Water: Water accumulation, defined as the depth of water accumulated in the streets on the property at any point in the storm.

Groundwater Infiltration: The proportion of rainwater infiltrated over the maximum possible infiltration that returns to groundwater (if bioswales everywhere).

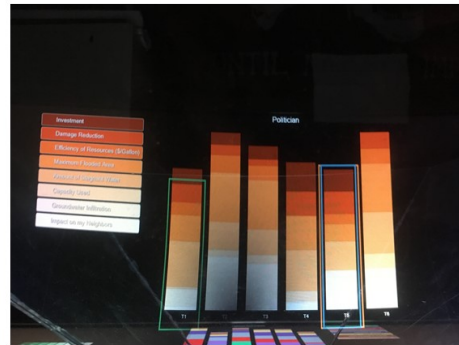
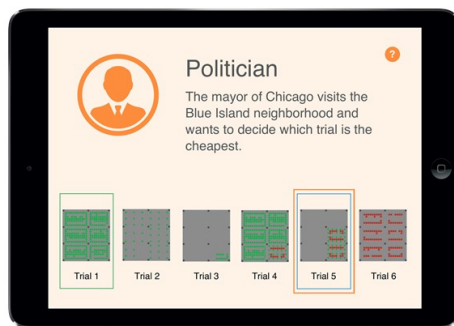
Impact on my Neighbors: The amount of rainwater that passes from my neighborhood to the next neighborhood.

Step 4: But one side of the holographic display is different from the characters and this side allows for deep exploration and changeable priorities for the preferences. This interface has two screens one to change the priorities of the preferences and the other to select a particular trial highlight it on all other sides of the display. Each screen also has the link to help.

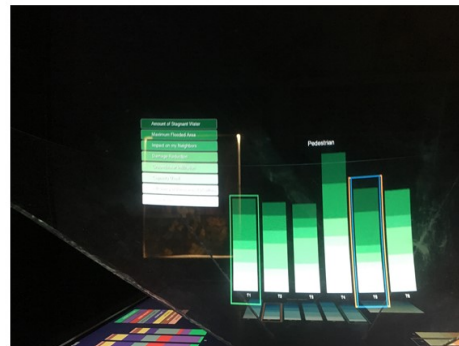
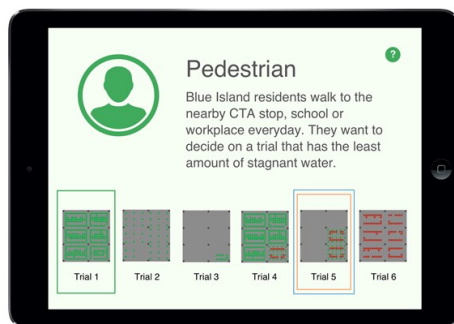


Step 5: Politician selects trial 5, Quality Analyst also selects trial 5 and Pedestrian selects trial 1, respective selections are indicated through the height and color of the rectangle around the bar of selected trial on every side of the display.

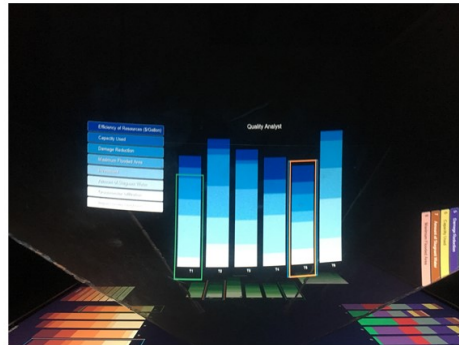
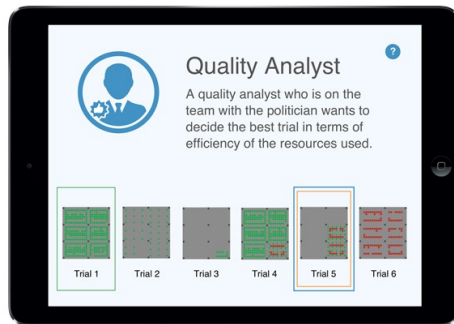
Role - Politician



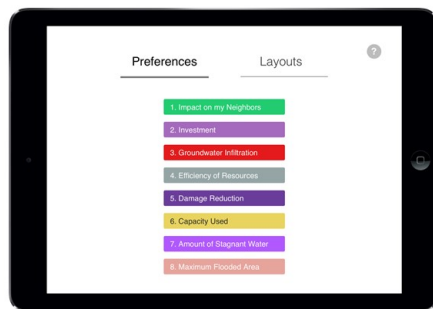
Role - Pedestrian



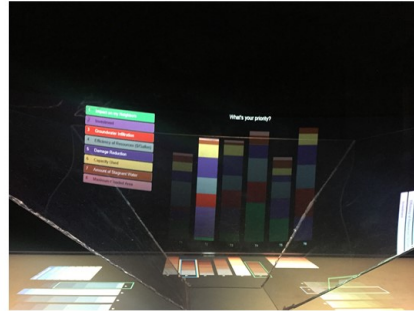
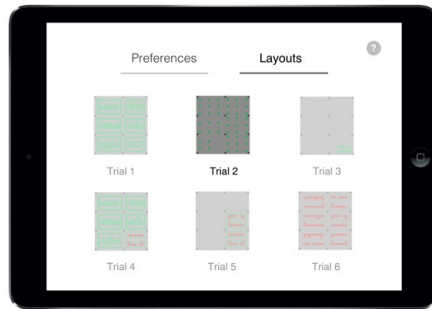
Role - Quality Analyst



Adjusting priorities

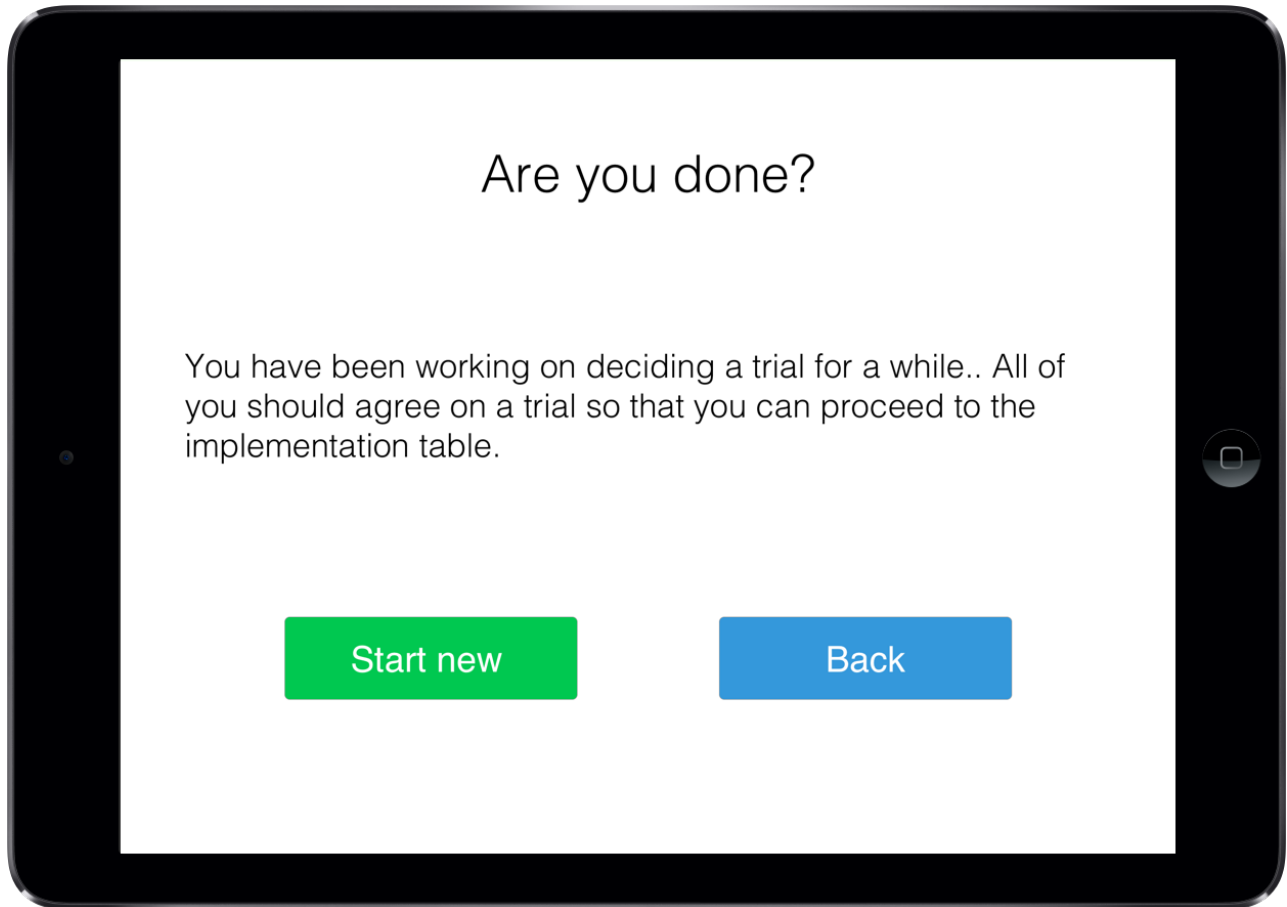


Preset trials

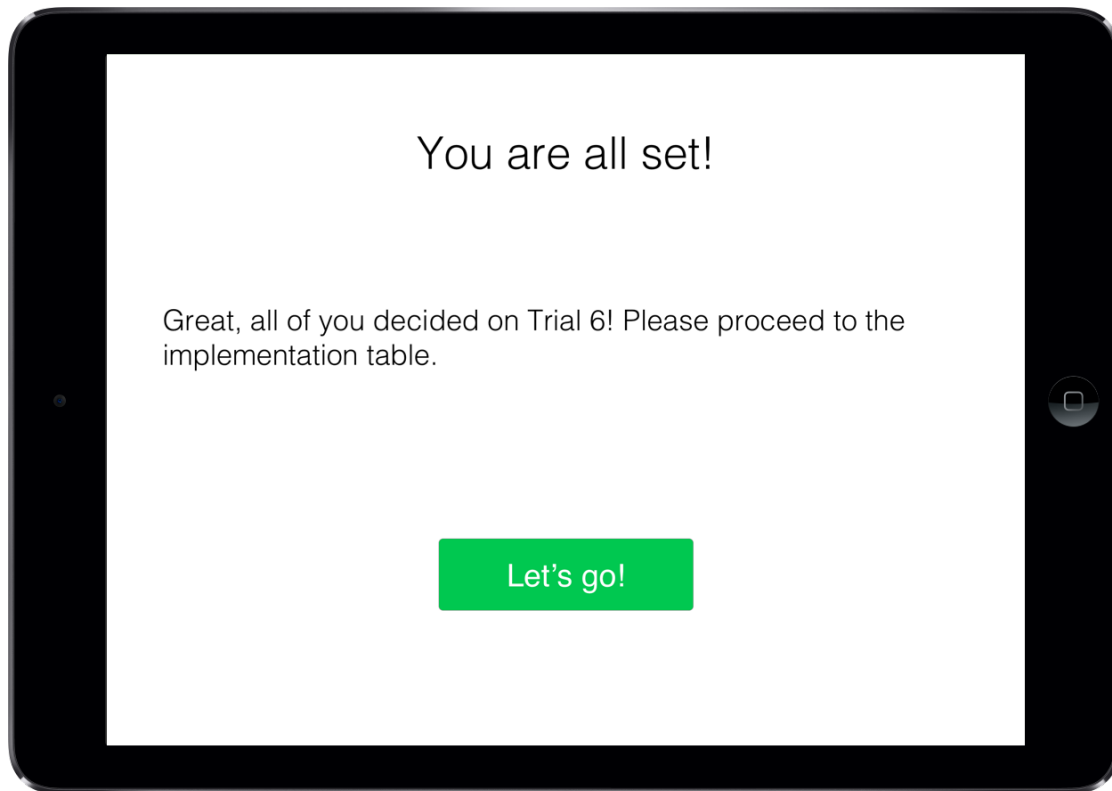


Step 6: They compare different trials.

Step 7: After a timer for 2-3 minutes, a timeout/continue screen pops up on every iPad that reminds them that they need to select a particular trial to implement.

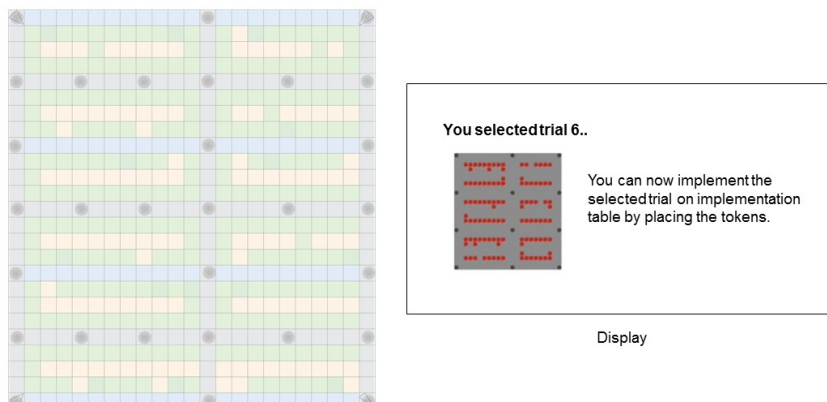


Step 8: They decide on a trial to implement say trial 6, a message pops up saying, "Great, all of you decided on Trial 6! Please proceed to the implementation table".



Step 9: The implementation table has no tangibles placed on the map so a message is displayed on the display next to it as shown.

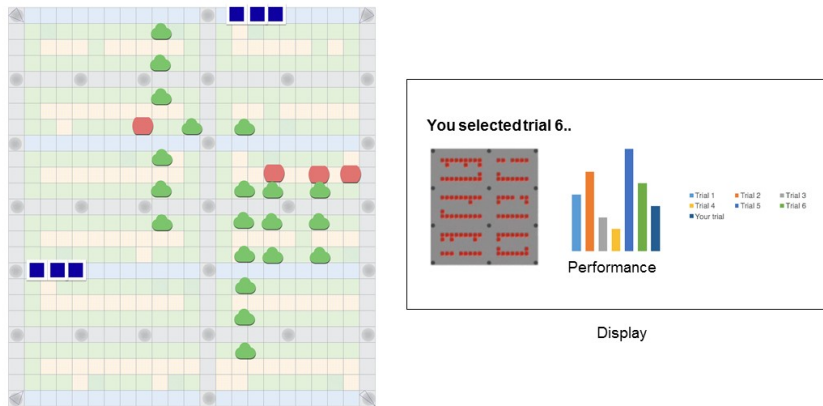
Implementation Table



Step 10: Users start to place the tokens on the table with reference to the large image of selected trial on the display.

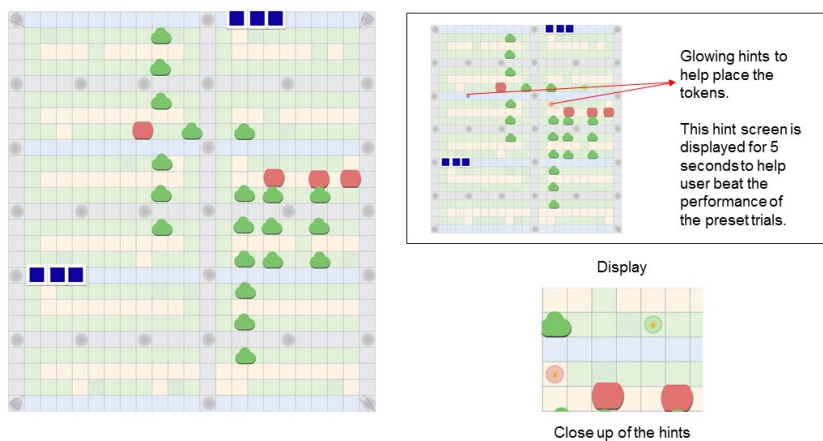
Step 11: This activity is tracked by the webcam mounted on the top and the display gives results in real time about the performance of the trial being implemented as a graph along with the other trials with normalized scores.

Implementation Table



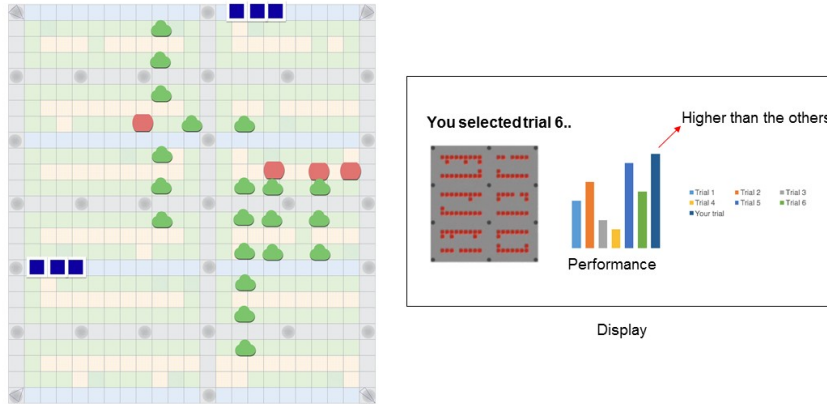
Step 12: If the users do not beat the performance of the selected trial, they get a hint on the display next to them for 5-10 seconds, that shows the possible block with a bulb icon that glows in the color of the token that can be placed in the block, if they place it the performance of their trial increases, this is a kind of bootstrap in the end to make the user feel a sense of accomplishment.

Hint Screen



Step 13: Once the performance of the trial they implemented exceeds the other trials, a message shows appears that the particular goal was achieved.

Implementation Table



Display



Congratulations! Your trial performed better than all the other trials!!

Step 14: They move to the next exhibit in the museum space.