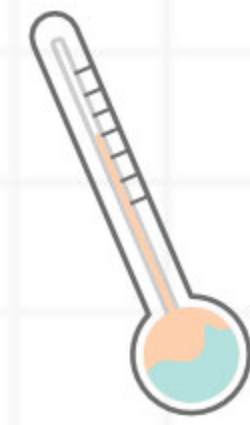


# Indoor Climate Control Data Visualization Tool for Marginalized Individuals



Gabriel Kulp; Victoria Green; Austin J. Hanus; Jacklin Stonewall, M.S.; Michael Dorneich, Ph.D.



## Background

*Marginalized:* low-income and underserved by city officials

Many families in this population live with 2 or 3 generations in one home.

During extreme weather, it can be difficult to move the family out of the house to somewhere with a safer temperature.

Extreme indoor temperatures kill an increasing number of people each year, mostly the elderly.

## Motivation

Provide marginalized individuals with tools to make better-informed climate control decisions

Prevent deaths during extreme conditions, such as heat waves

Create an interactive website to help build intuition for keeping a home cool

Goal: evaluate if interactive visualizations can teach complex relationships between many variables

Provide the help that this population needs

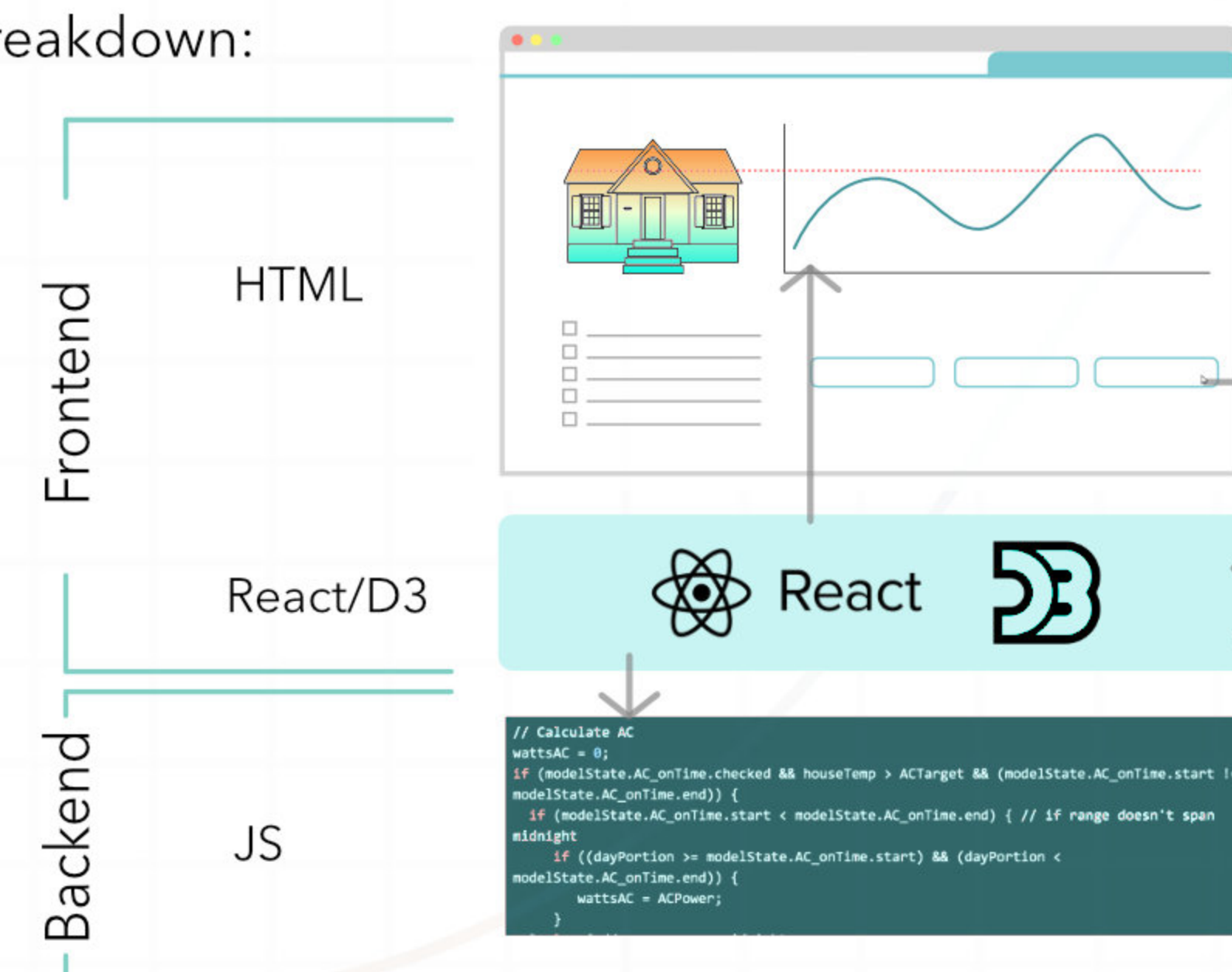


## Methodology

Design Process:

User Stories → Story Boarding/Sketching → Visualizations

Breakdown:



This architecture allows future work to rely on a more complex temperature model with a true separation between a client (providing the visuals) and a server (providing the calculations).

Evaluation

Pilot study participants (undergraduate students at Iowa State University) were presented with a pre-survey, scenarios to work through with the interactive website, then a post-survey.

This evaluation style allowed us to gain insight into how our website changed perceptions, confidence, etc. on indoor climate control.

## Results

User Reports

Best Application Features

- Home heat visualization
- Visualization options
- Interactivity

Areas of Improvement

- Simplicity of graph
- Better instructions
- Information about features

The case study also showed that participants' solution confidence decreased after using the application.

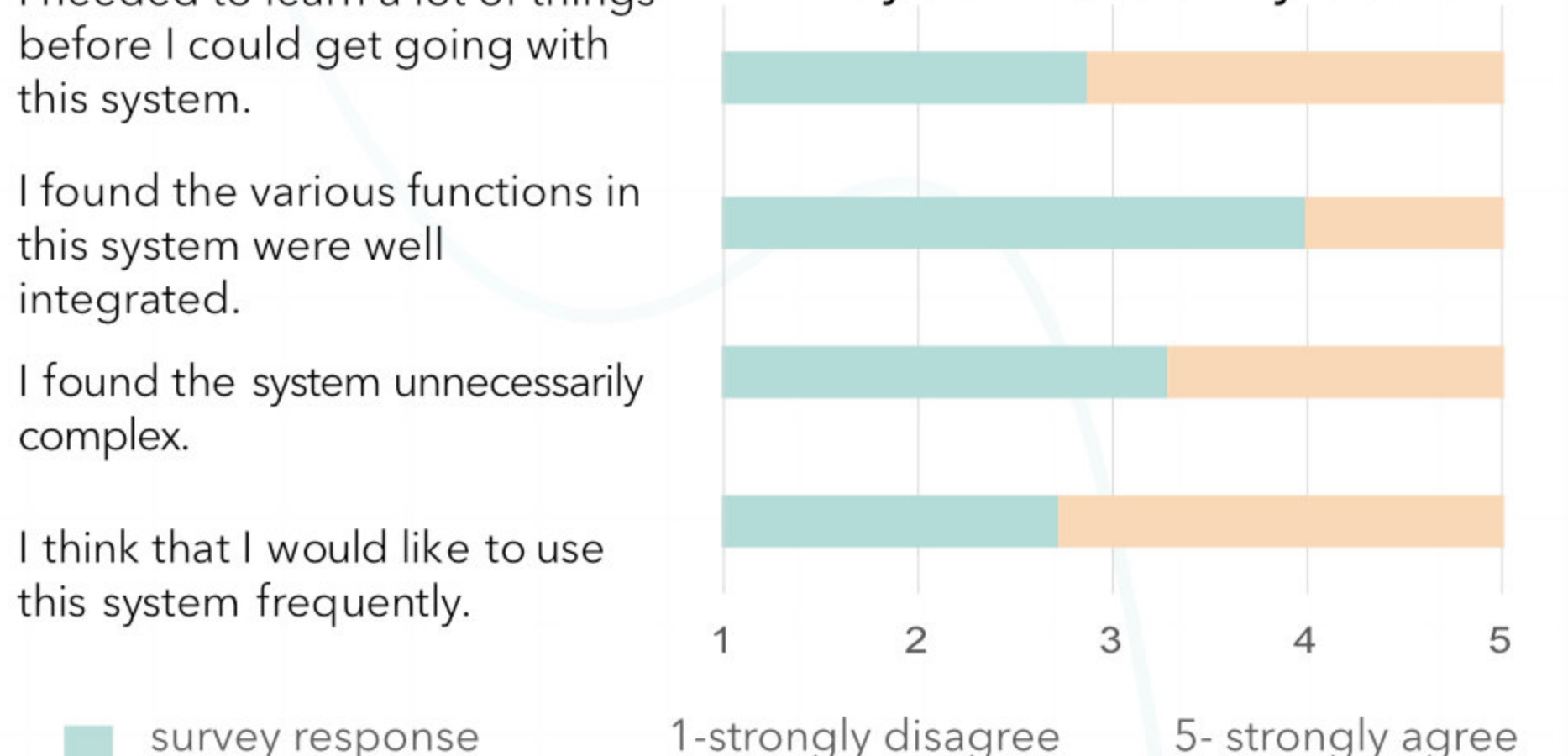
I needed to learn a lot of things before I could get going with this system.

I found the various functions in this system were well integrated.

I found the system unnecessarily complex.

I think that I would like to use this system frequently.

System Usability Scale



## Future Work

Conduct a case study with the actual target population

Implement more cooling options with detailed descriptions

Implement more customizable residence options

Improve the user interface to be more intuitive

Test a variety of visualizations to find the most intuitive version