

# Design Thinking in Middle School Classroom

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## Introduction

The Next Generation Science Standards emphasizes the importance of science and engineering practices in science learning. Ideally, students are expected to be able to develop and use models as they learn, analyze and interpret data, as well as construct explanations and design solutions. An important skill in science and engineering practices is design thinking. However, it is not an easy skill to acquire.

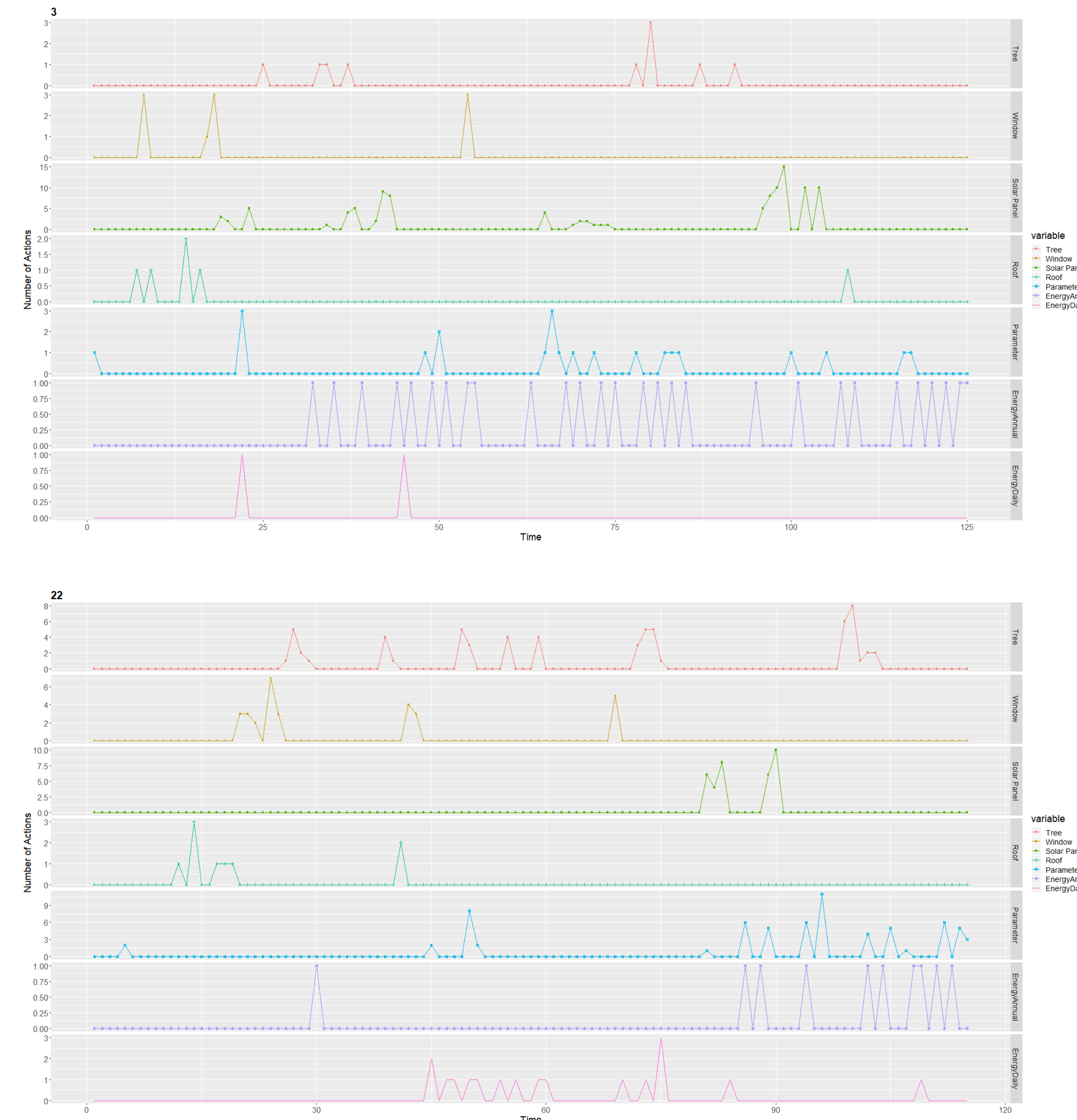
Steve Jobs has famously said “Design is not just what it looks like and feels like. Design is how it works.” A designer solves challenges through creativity, rapid iteration, and empathy.

Purpose of this project is to explore design thinking in middle school students. It specifically tries to answer – How do students think while solving a design challenge? Is there a pattern or existence of specific correlations?

## Methodology

- Literature Review with current research
- Data Collection using Energy3D Software
- R Scripting to analyze log data (JSON)
- Generate graphs from the scripts
- Analyze the graphs and draw patterns
- Produce Results from the analysis

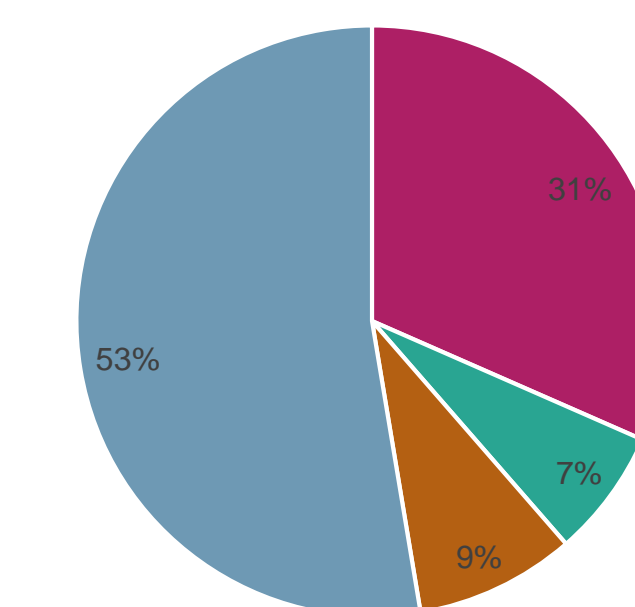
## Sample Graphs



The graphs plots the number of action performed on each item (trees, solar panels, windows, roofs) which can include addition, removal or modification in a specific time frame of the project design simulation. It also plots the number of times a student checks estimated annual energy consumption and daily energy consumption of the designed house in that time frame. These are identified as important parameters to track and predict student behavior.

## Results

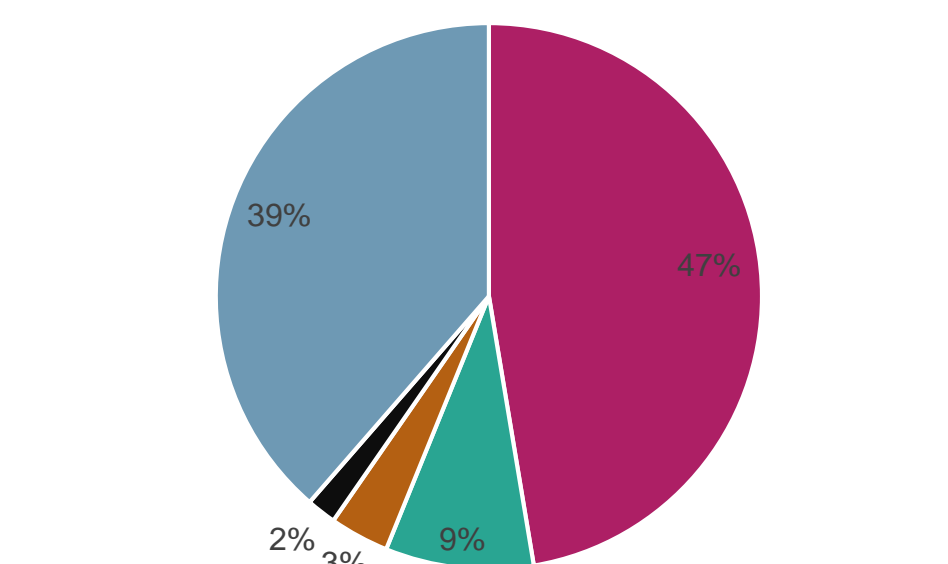
Students



- 53% students feel the importance of trees in making energy efficient homes
- 31% students do not think about trees at all while thinking about energy efficiency

- 47% students do not think about solar panels at all while thinking about energy efficiency

Students



- 39% students feel the importance of trees in making energy efficient homes

Those students who felt the importance of trees, felt same for solar panels and vice versa. There are extremities in thoughts as there are very less students who used solar panels and trees in moderate amount. They either use them a lot or not at all.

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