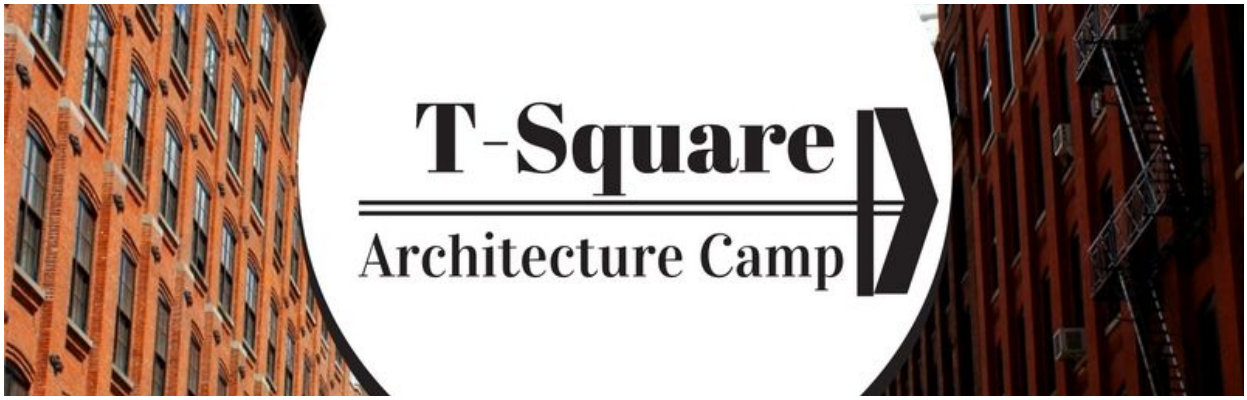
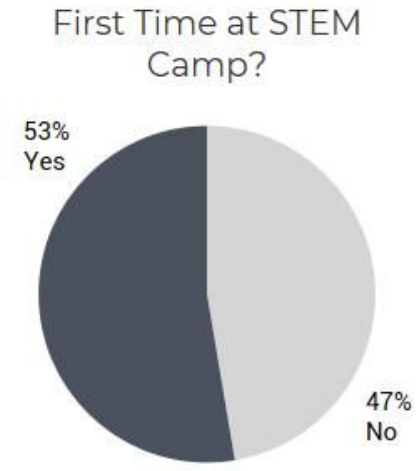


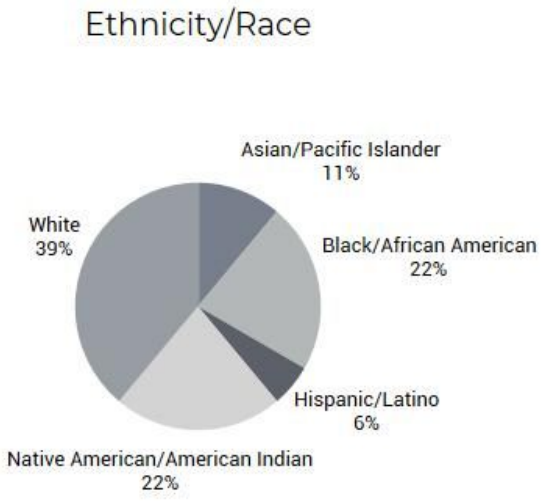

From June 11th through 15th, twenty middle school students participated in the T-Square Architecture Camp.

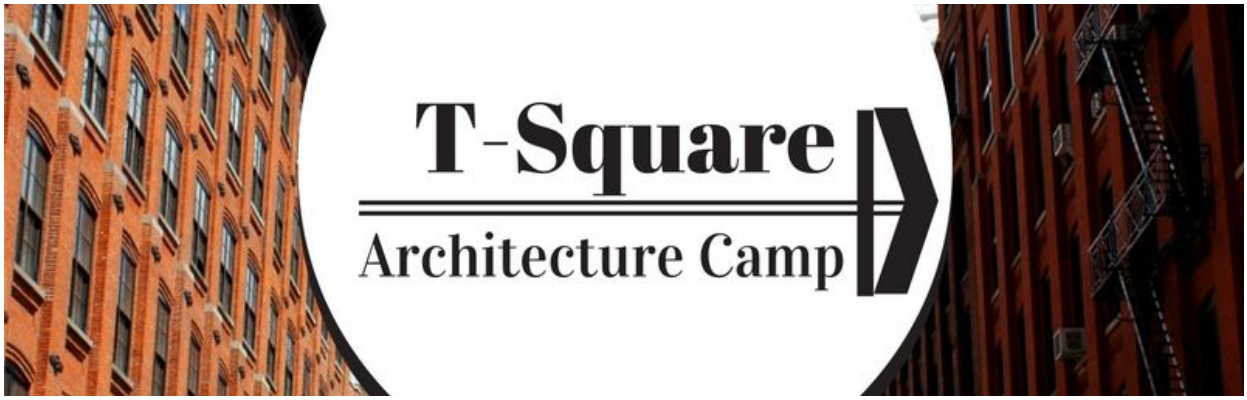
Students explored the city of Tulsa, touring popular architecture attractions, and even meeting the Tulsa City Planner. They were tasked daily with various challenges, such as building a bridge or build a shelter to combat water balloons. In the afternoons, students were tasked with planning and building their own city. Each participant built a particular building or section of the city.

## Participation

20 students participated, 10 female and 10 male. The grades ranged from 6th to 10th grade, with a non-statistical majority in ethnicity or race. 12 separate schools were represented from 5 districts in NE Oklahoma.



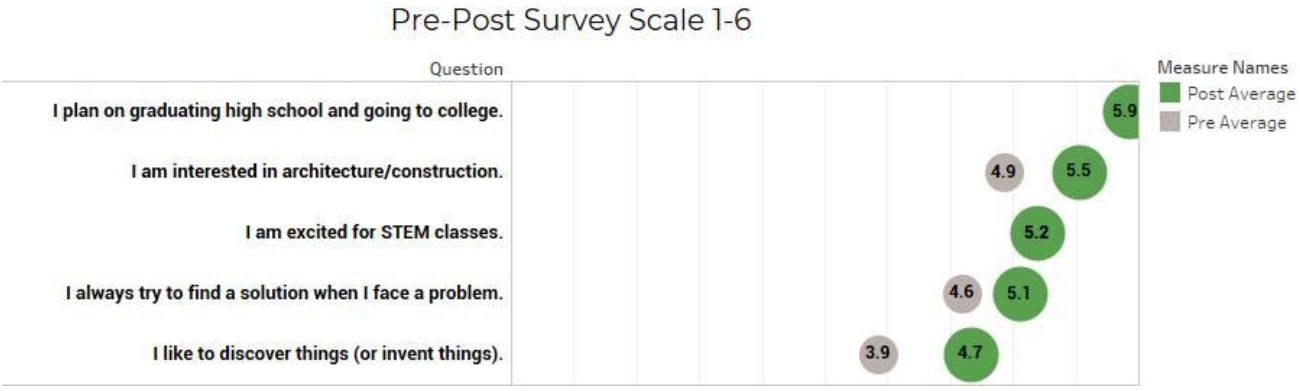



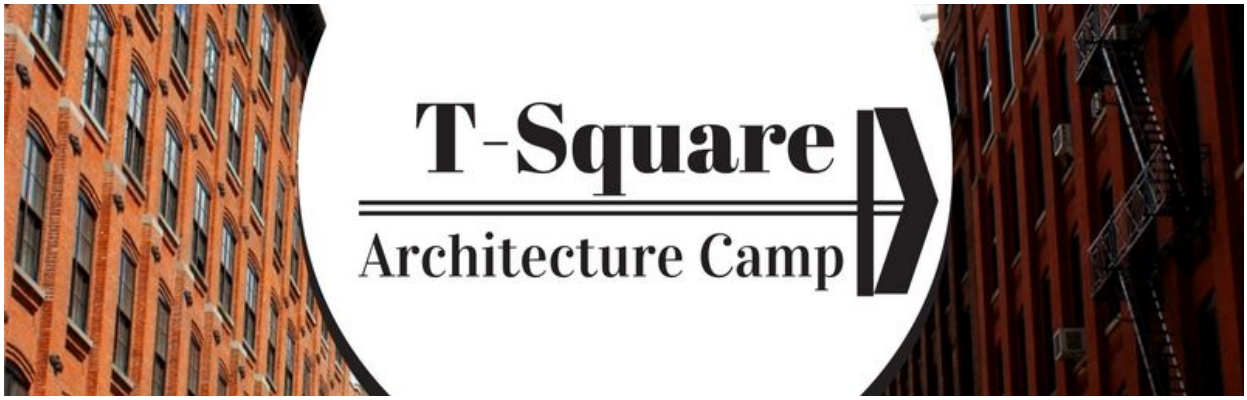



## Measurements & Results

Students were given surveys on the first and last days of camp to report any changes. The surveys were broken into two parts: retroactive and pre-post analysis. In retroactive analysis, students were asked to think about their time at the camp and determine if they feel more, the same, or less with each statement. In pre-post analysis, students were given the same statements on both surveys, thus reporting any significant changes.

In pre-post analysis, students reported increases in architecture interest, problem solving, and a significant increase in innovation ($p<.001$). Retroactively, 80% of the students reported an increased interest in STEM subjects. Moreover, 83% of students reported an increased interest in a job/career in STEM.






## Discussion

Statistically speaking, participant demographics show no majority, illustrating the diversity efforts of T-Square Architecture Camp. Moreover, half of participants were female. STEM self-efficacy in women reaches a critical point in middle school as it has shown to exponentially decrease compared to their male counterparts.[1] Thus, it is important to sustain STEM efforts throughout the middle school years as T-Square has done.

One key experience students reported was the opportunity to meet STEM professionals. In the pre-survey, 50% of participants stated they have never seen or met a STEM professional. STEM identity is an important facet for later achievement and meeting an engineer is one of the first steps for this development.[2]

## Quotes

**What was your favorite part about T-Square?**

“My favorite part about camp was all of the challenges we had to do, like building towers and stuff.”

“My favorite part was when we got to build our own town.”

**How did T-Square make you feel about yourself and STEM classes?**

“I am more confident in STEM classes now and I am more likely to enjoy them.”

“It made me more excited to do architecture and STEM building projects.”

“I want to come again and want to go to more STEM classes.”

[1] MacPhee, D., Farro, S., & Canetto, S. S. (2013). Academic Self-efficacy and performance of underrepresented STEM majors: Gender, ethnic, and social class patterns. Analyses of Social Issues and Public Policy, 13(1), 347-369.

[2] Callahan, J., Pyke, P., Shadle, S., Landrum, E. (2014). Creating a STEM Identity: Investment with Return, American Society for Engineering Education Annual Conference & Expo.