

Elementary After School Lego Club and Robotics Club, Spring 2017

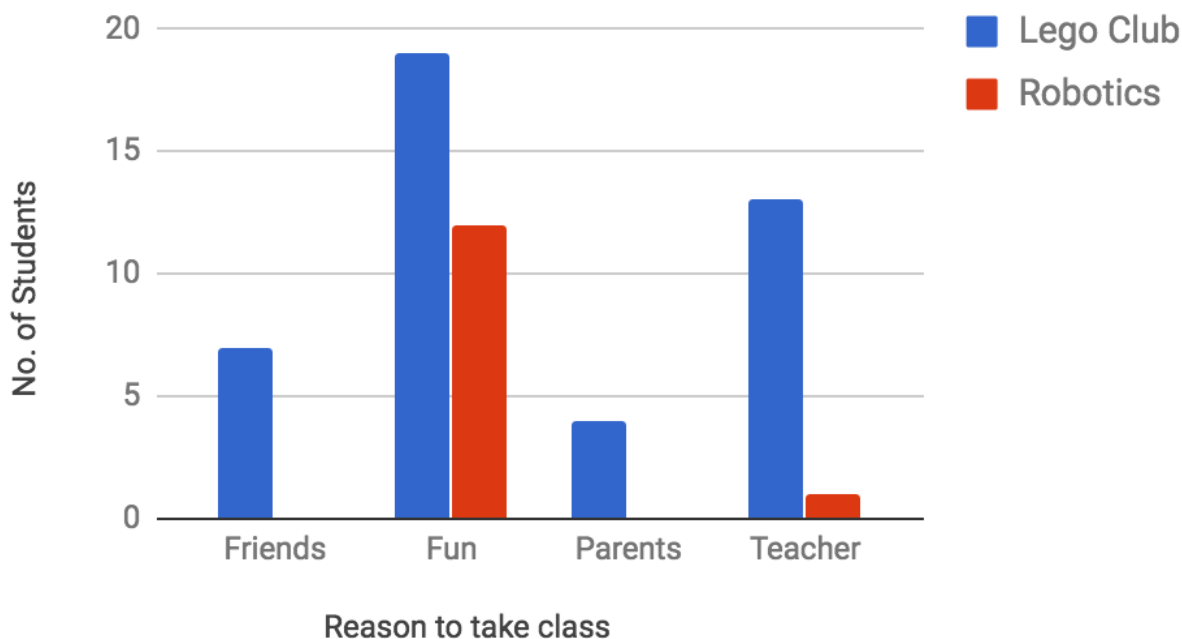
As part of our work focused on after school programming, we partnered with an elementary school in the greater Seattle area to run a Lego building club for early elementary students (kindergarten and first grade) and a Lego Robotics club for intermediate elementary students (grades 4, 5 and 6). The program ran after school, twice a week for an hour each session, for four weeks. Each was led by classroom teachers with an interest in Legos and each developed their own club curricula and projects. All Lego building kits and robotics kits were donated as part of the after school project with foundry10. We also supplied stipends for the teachers to run the clubs. The goal was to provide opportunities, free of charge, for students to build, explore, and be creative in an after-school setting. Bus transportation was also provided by foundry10 so that there were no transportation barriers for interested students who wanted to attend.

Our research focus centered on why students chose to participate in the clubs in the first place (motivational factors), what appealed to them about working with Legos specifically, their attitudes towards the club (at the end of the sessions) and what their favorite aspects of working with Legos turned out to be. It is important for us, in our work at foundry10, to provide opportunities for students to voice their thoughts about programs in which they engage and the pre/post surveys enabled them to do so.

There were 12 participants in the robotics class, and 42 in the Lego club. We knew from previous experience in the robotics class that a small class size is important, so 12 was an appropriate size. Lego club works with traditional Lego block sets, there were three separate groups and 14 students per class.

In the pre-program questionnaires, students were asked to select the biggest reason they wanted to take the class. Their options were, "I like the teacher," "My parents wanted me to," "My friends are taking the class," and "I think this class will be fun." All 12 robotics students chose the "I think this class will be fun" option, and one student selected teacher as well. The 42 Lego club students had a much more diverse set of responses. Of the 42, 19 chose to take the class because they thought it would be fun, 13 chose because they liked the teacher, seven chose because their friends were in the class, and only four kids had parents that wanted them to take the class. This is encouraging. One thing we try to be cautious of in after school settings is that the kids themselves are motivated by the activity and not just there because a parent is making them attend.

Why Students Took the Class

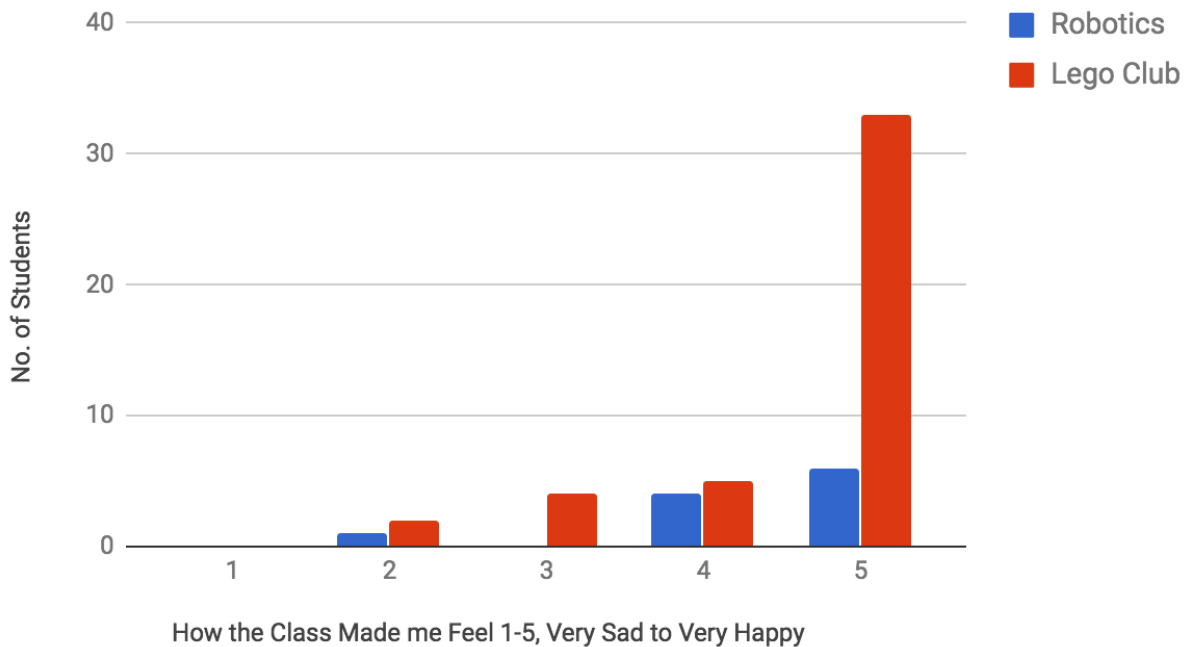


Both Lego Club and Robotics students were also asked to write the thing they liked best about Legos. Twenty-eight of the forty-two Lego Club students (67%) wrote about the building capabilities and creative aspects of legos, six drew pictures, and the rest were mostly glowing reviews about Legos themselves. Some Robotics students used words like “Imagination” and “Creative” in their responses. It seemed as if all the students appreciated Legos for what they are: a fun way to build creatively.

The post-program questionnaire prompted participants to circle one of five robots that best represented the way the class made them feel. The robots had expressions that ranged from very sad to very happy. These data were converted to numbers 1-5, with 1 being very sad and 5 being very happy. The average response from the robotics class was 4.32, indicating a high level of satisfaction. The only participant to circle below a 4 was also the only person that did not want to do the program again; 10 other students said yes, and one said maybe with regard to whether or not they would want to do the club again.

The Lego Club satisfaction index was 4.63, with four 3s and one 2 as the lowest numbers. Out of the 42 students, 35 of them expressed interest in participating in the club again. However, satisfaction numbers were not always indicative of interest levels. The student who circled the 2 robot actually wanted to do the club again, while three 5s and one 4 did not. It is important to keep in mind the age range of the students as we have seen that kindergarteners at times get confused with the rating scale (even though it uses visual cues to help rank order).

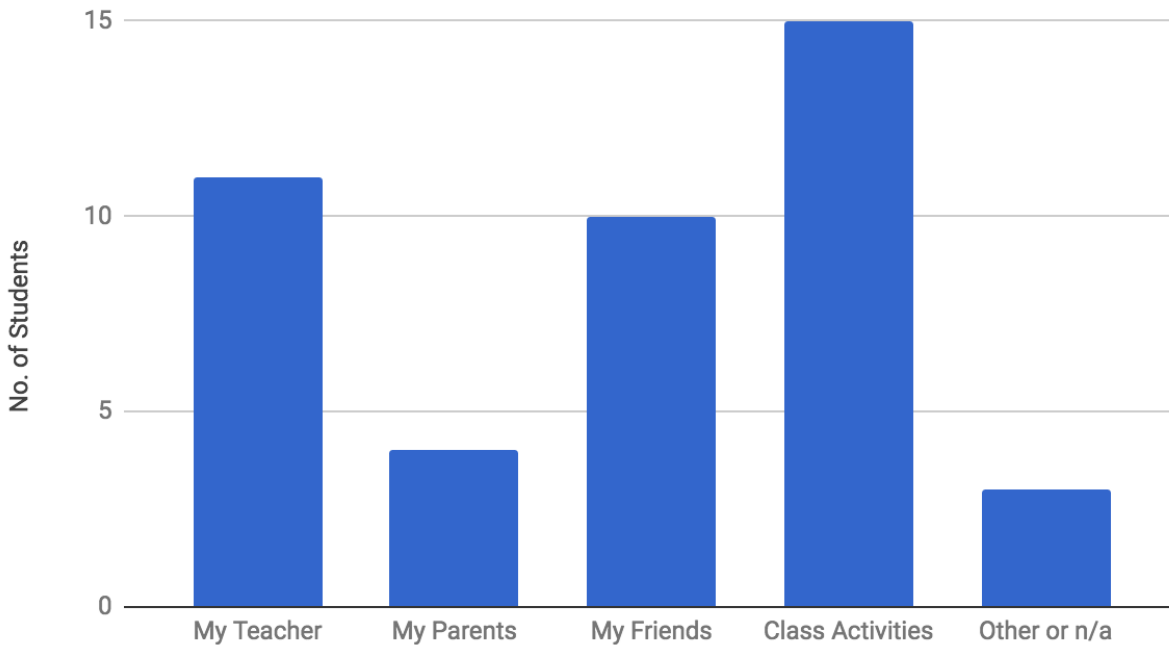
Emotional Reaction to Program



After circling the robots, students were asked to reflect on what made them circle the robots in the way they did. In other words, what was most impactful to them. The options, in parallel to the pre-program questionnaire, were “My Teacher,” “My Parents,” “My Friends,” and “Class Activities.” Eight out of twelve robotics students chose “Class Activities,” indicating satisfaction in the classroom. This was reflected later on when students were asked to share their favorite part about the class, and every student mentioned something they had done in the classroom. Two students chose “My Friends,” one chose “My Teacher,” and one circled all four options.

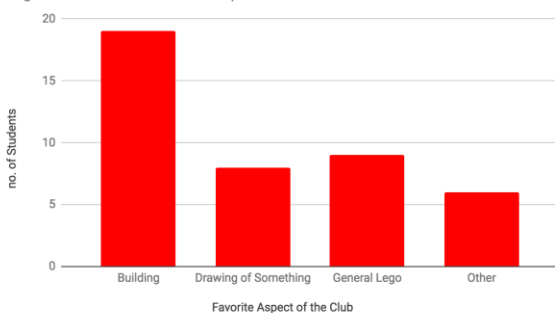
Students in the Lego Club found Class Activities and the teacher to be most impactful, with 15 selections and 11 selections, respectively. Ten students chose friends, four chose parents, and three had other ideas.

Lego Club-What was Most Impactful

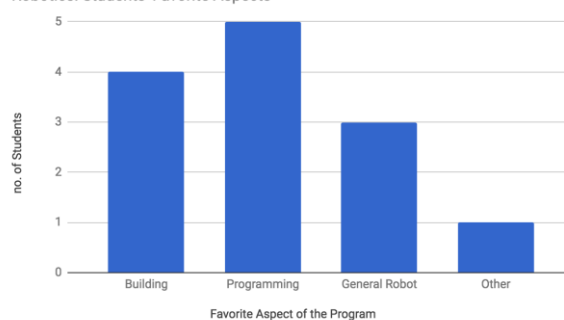


Overall, the lego club students seemed to enjoy playing with and building things with Legos. Nineteen students wrote that their favorite thing was building-related, nine enjoyed the Lego aspect of it, and six wrote other things. Eight students drew pictures to describe their favorite part. While the unrefined creativity in these kids was undoubtedly great in class, it often translated to uninterpretable responses in the questionnaires. These picture responses were difficult to sort, especially as some drawings were almost completely uninterpretable. Even some of the better drawings that clearly represented something were hard to categorize due to their random nature. Therefore, the drawings were grouped together instead of being placed into a “Building” or “Lego” category.

Lego Club: Students' Favorite Aspects



Robotics: Students' Favorite Aspects



We are pleased with the development of the Lego Robotics club and the Lego club. The robotics work at the school has been developing over time into an independently-run club and has consistently received positive feedback from students. The Lego building club is newer to the school and seems to draw, retain and engage students in creative activities. Student

responses were extremely positive and it appears that the teachers who run these clubs provide additional reinforcement and appeal for the students.

For future programs, it would make sense for us to ask specific questions about the projects students found most appealing, particularly in the Lego Robotics club so that we can share those ideas with other educators who might be interested in running similar programs.