



# Robotics for All: Development and Growth of a Non-Profit

Maximilian Goetz<sup>1</sup> and Jin Zhang<sup>2</sup>  
<sup>1</sup>Henry M. Gunn High School, <sup>2</sup>Amazon



## INTRODUCTION

Robotics for All was founded in April 2017 with one goal: to teach students from disadvantaged communities about robotics. The mission statement of Robotics for All is: "Robotics for All strives to educate students from economically disadvantaged communities in robotics and STEM to help them gain beneficial skills which will be useful throughout the rest of their academic and professional careers." Today, Robotics for All teaches twelve elementary school students at Mariano Castro Elementary School and plans to expand to new locations by the start of the 2018-2019 school year.

## HISTORY

The inspiration to found Robotics for All came from my past volunteering experiences. I initially volunteered at Kidizens, a for-profit organization in which students learn civics skills. Later, I volunteered at Reading Partners, a non-profit organization that helps students with their reading skills. The transition had a profound impact on me, as I felt I made a greater difference while volunteering at Reading Partners. Thus, I gained inspiration to found Robotics for All.

Shortly after, I selected Suvir Bajaj to be my partner for Robotics for All. Throughout the summer, the two of us developed a comprehensive seven-week curriculum that we subsequently named *Programming Fundamentals Curriculum*. The program is based on Lego Mindstorms EV3 software and hardware and teaches students the basics of coding.



The first class officially started November 20, 2017 with eleven students. While plagued with various technical difficulties, the overall class ran very smoothly. Throughout the first session, the students gained a wide breadth of knowledge about robotics. Session one ended February 5, 2018, and each student received a certificate recognizing their new skills.

## Robotics for All Timeline



## EXPANSION AND FUNDING METHODS

As I look forward to expanding my organization to new elementary schools, I must gain funding. Expanding to a new location costs approximately \$1,500 in upfront Lego Mindstorms EV3 set and laptop costs. A number of efforts were done to help achieve the \$1,500 goal.

### 1. Think Fund Grant

March 21, 2018, I was officially granted \$1821.35, which allowed me to purchase equipment to expand to the next elementary school. It also allowed me to publish my website.



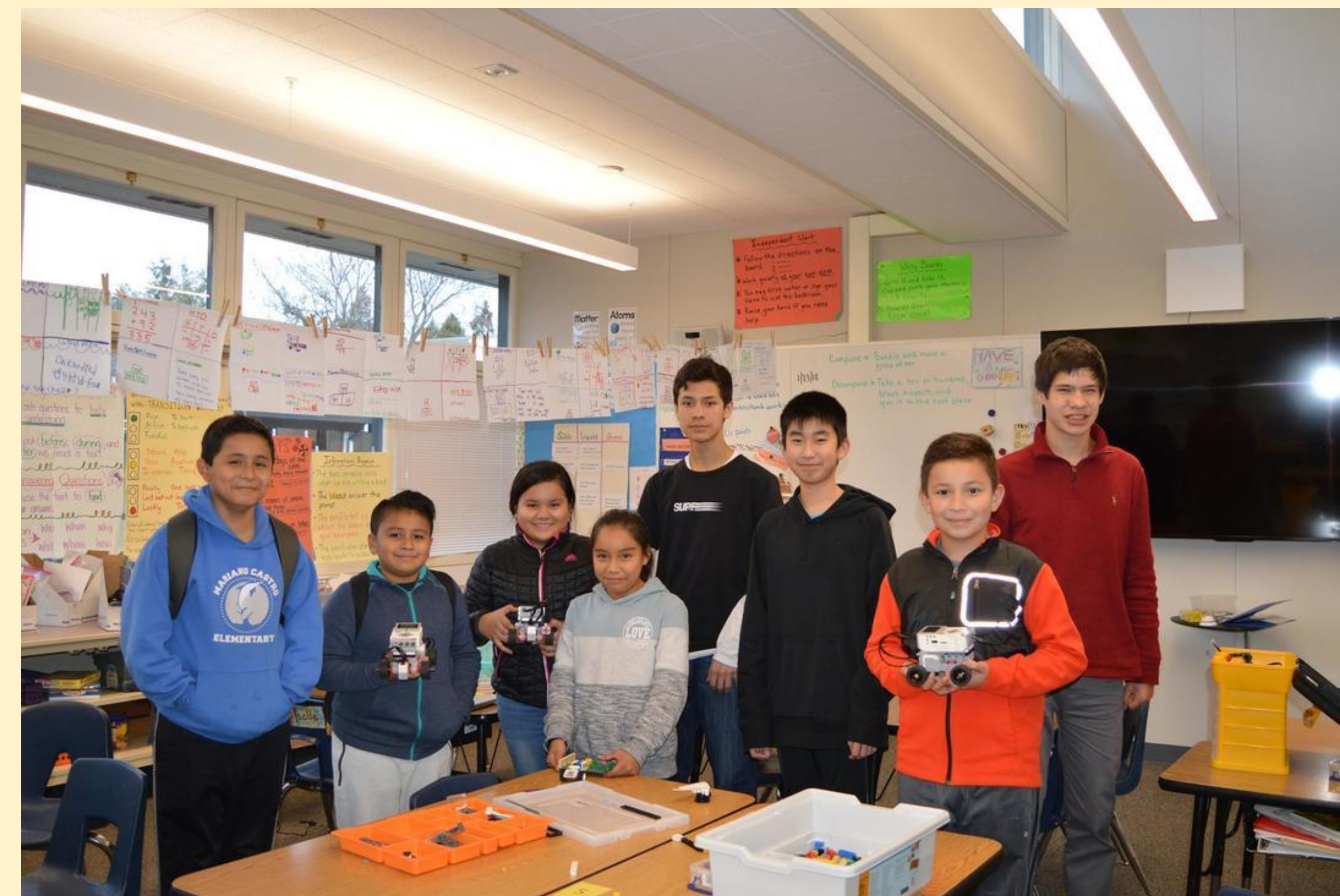
### 2. Website Development

I created a Facebook page in November 2017 to attract publicity. The Facebook Page includes our mission statement and is aimed at attracting potential high school teachers. To visit the official Facebook page of Robotics for All, go to: [www.facebook.com/roboticsforall01](http://www.facebook.com/roboticsforall01).

I developed a website that will help increase publicity for my organization to attract potential student teachers and donors. The website was officially published April 25, 2018, using funds granted by Think Fund. The website can be viewed at [www.roboticsforalleducation.com](http://www.roboticsforalleducation.com).

### 3. Curriculum Diversification

In order to appeal to a wider range of students, I developed the *Creative Automation Curriculum*, which focuses on analytical thinking skills. The curriculum is catered toward students with previous robotics experience and those who have taken the *Programming Fundamentals Curriculum*. Over the summer, I plan to develop the *Experimental Building Curriculum*, to allow my organization to teach second and third graders.



### 4. 501(c)(3) Non-Profit Organization

A 501(c)(3) organization is certified by the United States Internal Revenue Service (IRS) as a non-profit. The main benefit of being certified is that all donations to the organization are tax-deductible. A lot of grants for non-profit organizations require 501(c)(3) certification. However, the application process is extensive and requires a lot of time and effort. For that reason, I have decided to wait until summer to certify Robotics for All as a non-profit organization.

## CONCLUSIONS, IMPLICATIONS, AND NEXT STEPS

### Lessons learned from session one that were implemented during session two:

Note: There were three groups of four students for both sessions.

1. Four teachers were assigned to teach the class instead of three.
  - a. Originally, with three teachers teaching three groups, I found that if one teacher got sick, it would be hard for the other two teachers to manage teaching three groups.
2. We brought a box of free building Legos to session two.
  - a. This gives the students something to do while the teachers and I set up the class.
3. We now print out all curriculum.
  - a. Before, teachers had to reference the curriculum on the computer, while simultaneously teaching coding on the computer. Now, when the curriculum is printed out, teachers can make more efficient usage of class-time.
4. A five minute break is now given halfway through the two hour class.
  - a. Elementary students usually cannot focus for two hours straight. Giving them a five minute break part-way through class enables the students to be more productive throughout class.
5. Parts of the the curriculum have been modified.
  - a. I found that some parts of the curriculum was redundant and did not give further learning value. As a part of session two, I optimized the curriculum to reduce repetition.

### Future Expansion

Over spring break, I reached out to Gabriela Mistral Elementary School and Monta Loma Elementary School and am currently in the process of scheduling classes at these schools. In addition, I am working with Mariano Castro Elementary School to fit in three sessions during the 2018-2019 school year, instead of two, to enable more enrollment.

Once Robotics for All is a certified non-profit organization and has the funding necessary for expansion, I plan to expand my organization to even more schools.

Are you interested in contributing? Any donation is appreciated. Make a difference by donating at: <https://www.gofundme.com/robotics-for-all>.



## ACKNOWLEDGEMENTS / REFERENCES

Special thanks to my mentor, Jin Zhang, Ms. Tarn Wilson and Ms. Angela Merchant for all of their help during this process.

### Grant Applications and Curriculum:

Please feel free to view my grant application at: <https://tinyurl.com/thinkfundgrant>

I invite you to check out my Programming Fundamentals Curriculum at: <https://tinyurl.com/programmingfundamental> and my Creative Automation Curriculum at <https://tinyurl.com/creativeautomation>.