

9 DOTS

Annual Report for 2016-2017



9 DOTS 

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LETTER from the EXECUTIVE DIRECTOR

The 2016-2017 school year marked the beginning of our transition from a small, community-based non-profit to a leader in engineering and computer science education in Los Angeles. It's been an amazing experience, and our team has never felt more inspired and motivated to continue impacting the lives of more and more students each day. You can feel the energy in the office.

After years of running our after-school, weekend, and summer programs, we experienced incredible growth this year in our in-school coding program, getCoding, which trains teachers to provide high quality computer science education in K-12 schools. The elementary school getCoding program grew from six classes at two schools in the 2015-2016 school year to 29 classes at eight schools this past school year. In addition, the high school getCoding program served 31 high school teachers in its inaugural year. To make this growth possible, we've been joined by a team of incredibly talented educators as well as a growing community of partner organizations supporting our efforts. From the work we have done this year, I believe that getCoding and 9 Dots are now well poised to support all of Los Angeles in moving computer science education forward.

This also marks the first year of our research initiative, an endeavor that I believe will take our organization to another level. We've always been committed to finding ways to improve our teaching methods, but truly understanding the learning process requires hours of observations, interviews and analysis. Now, with the combined resources of The National Science Foundation and the education departments at UCLA and UC Berkeley, we are making enormous progress. The research is allowing us to create a much clearer picture of student learning so we can make informed, data-driven decisions as we move forward. We're getting a clearer picture of how to help students gain confidence and learn new, challenging concepts, and it's been spectacular to witness the impact that the initiative has already had. I keep thinking about what Casey, one of our students in the summer and weekend programs, had to say about her experience with learning coding: "I'm not afraid of failing anymore. I can do anything now." And this is only the beginning.



With gratitude,

A handwritten signature in black ink, appearing to read "Josh Taylor".

Josh Taylor
Executive Director

OUR MISSION

9 Dots is a nonprofit organization dedicated to supporting underserved K-12 students in the fields of computer science and engineering. We seek an equitable education system that empowers all students to become dynamic problem solvers and socially conscious leaders in an increasingly technologically-driven world.

OUR STORY

Named for a classic critical thinking puzzle, 9 Dots was founded in 2011 by a passionate group of engineers and educators who believe all kids deserve the chance to imagine a career in engineering. We especially saw a need in communities that lack the types of programming that we had access to growing up - programming that teaches engineering and technology and helps develop students' problem solving, critical thinking, and creativity skills. We set out to create a science, technology, engineering, and math program in Los Angeles (well before "STEM" was a thing). **What started in a small classroom as an after-school project to teach STEM skills in a fun, engaging way, quickly evolved into something far more ambitious.**

In our first few years running as an after-school program, we saw amazing results; students achieved unprecedented improvements in their standardized test scores and their general attitude towards STEM changed for the better. While our after-school program was making an incredible impact on our students, however, we saw the opportunity to do more. In the summer of 2013, we launched devY -



our summer and weekend coding camp. With devY, we were able to take a deeper dive into computer science with our students, a subject that we see as a critical skill in our quickly evolving workforce. In the same year, we also launched our first in-school program, getCoding, to help integrate coding into the curriculum at the public schools many of our students attend. **By providing both out-of-school and in-school opportunities for our students, we truly feel like we are able to give them a leg up in achieving any future they may choose.**

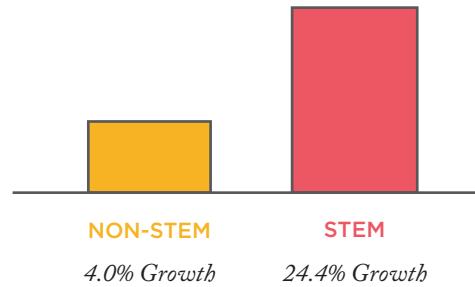
But we haven't stopped there. At 9 Dots, we are constantly striving to learn more about education, especially with regards to technology and engineering. In the Fall of 2016, we embarked upon our first research project in partnership with the National Science Foundation, UCLA, and UC Berkeley. Through our research we are investigating how students and teachers can face obstacles in learning coding fearlessly and resiliently. It is our hope that this research will not only help inform best teaching practices at 9 Dots, but for the teaching community at large.

THE CHALLENGE

Unequal opportunities and access
leave students from underserved
communities unprepared for careers
in the fastest-growing and most
lucrative occupations of the future.

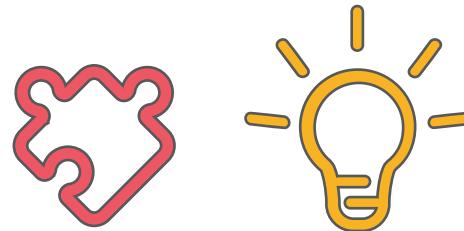
Changing Workforce

According to the US Department of Commerce, over the last decade, STEM jobs have grown significantly faster than non-STEM jobs, and are projected to continue to do so.



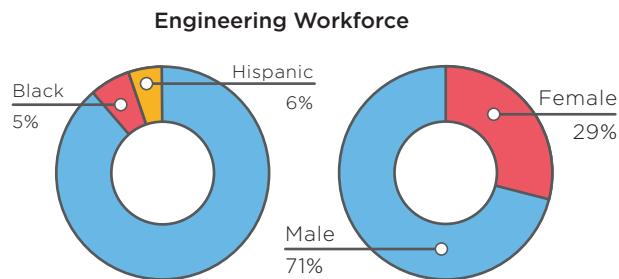
New Skills

It is projected that by 2020, the top skills required for employees will be complex problem solving, critical thinking, and creativity.



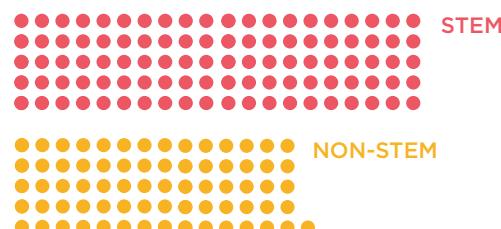
Lack of Diversity

In 2013 blacks and hispanics represented only 5% and 6% of the science and engineering workforce respectively and women only account for 29% of the science and engineering workforce.



Salary Discrepancies

In 2015, STEM workers earned 29 percent more than those in non-STEM occupations.



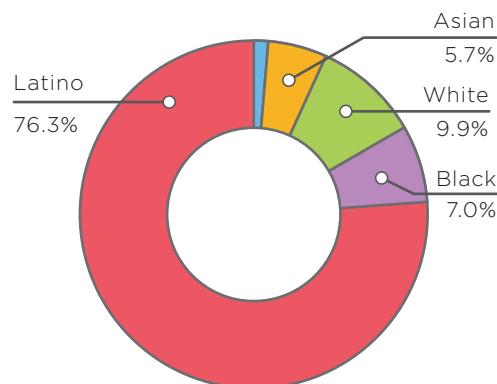
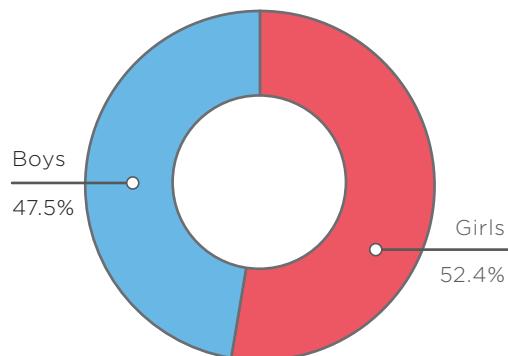
9 DOTS BY THE NUMBERS

OUR REACH

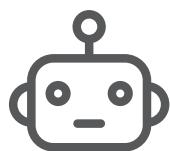
 **2,500 STUDENTS**

 **67 SCHOOLS**

DEMOGRAPHICS



ACCOMPLISHMENTS & ACHIEVEMENTS



150
Robots Built



468,000+
Lines of Code



6,059
Hours Spent Teaching

Our Manifesto

WE ARE ENGINEERS AND EDUCATORS, THINKERS AND

CHANGE- MAKERS.

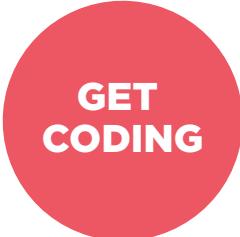
LET'S MAKE **EXCEPTIONAL** LEARNING EXPERIENCES AVAILABLE TO ALL STUDENTS. NOT MOST. ALL. LET'S SUPPORT THE EDUCATION SYSTEM IN TEACHING COMPLEX PROBLEM SOLVING, CRITICAL THINKING, AND CREATIVITY. OUR **FUTURE LEADERS** WILL NEED THESE SKILLS MORE THAN ANY OTHERS — LET'S MAKE SURE THEY'RE

WELL-EQUIPPED. LET'S LEAN ON **COMPUTER SCIENCE** AND **ENGINEERING** TO DEVELOP COMPLEX PROBLEM SOLVING SKILLS. LET'S HONE THE CRAFT OF CRITICAL THINKING THROUGH DISCOURSE AND ARGUMENTATION. LET'S DIVE INTO ART, FOR THERE IS NO TOOL MORE POWERFUL FOR DEVELOPING CREATIVITY AND REFLECTING ON LEARNING. LET'S FOSTER FUTURE LEADERS WHO ARE SOCIALLY CONSCIOUS AND THINK DEEPLY. AND WHILE WE'RE AT IT, LET'S MAKE IT FUN. WE ARE 9 DOTS. **LET'S ENGINEER BRIGHTER FUTURES.**



OUR PROGRAMS

We believe that for our students to have a real chance at success, we need to approach their education from many angles.



**GET
CODING**

Supporting schools to provide computer science education



DEVY

Weekend and summer computer science courses



**TECH
& TAPE**

Training out-of school instructors in robotics and coding



**AFTER
SCHOOL**

Academic enrichment and STEM programming



RESEARCH

Partnerships with universities to study best practices in education

GET CODING



GET CODING helps low income schools incorporate K-12 computer science education by providing curriculum, training, and on-site support to teachers.

We strategically partner with schools in areas with the greatest need to build their capacity to offer computer science courses. With our elementary school partners, we provide professional development and co-teaching support on our custom CS curriculum. With our high school partners, we work with Code.org to provide professional development for a high school course called AP Computer Science Principles.

“Both the coding classes for students and the professional development for teachers was superb. ... The lessons were well facilitated and the students loved it.”

- Principal O'Brien, New Los Angeles Elementary School

900

Kindergarten–6 students

8

Kindergarten–6 schools

31

High schools reaching approximately 1,120 students

79%

Elementary school student proficiency in coding skills at the end of the year

100%

Of elementary school teachers feel confident teaching code after 1 year

88%

Of teachers who enrolled in the program for upper middle and high school went on to offer the course at their school

A photograph of two young boys looking at a white LEGO robot on a table. The boy on the left is wearing a blue shirt and has his hand on his chin. The boy on the right is wearing a yellow shirt and has red face paint. A blue circle with the word "DEVY" is overlaid in the bottom right corner.

DEVY

DEVY provides free computer science and robotics courses on the weekends and throughout the summer for underserved 5th-8th grade students.

149

Students

24

Weekends

2

Summer camps

6

Project showcases

350+

Robot battles

6,583

Hours of coding

62%

Increase in students' enjoyment of coding

98%

Of students now believe failure can help them learn

In devY, students create digital art, program robots, and build computer games using JavaScript. devY's instructors, most of whom are CS and Math majors from local universities, help students develop the identity and skillset of a computer scientist. These computer science mindsets and skills are not only critical to becoming a successful programmer,

but will become enormously helpful to our students' success in all of their future pursuits. The devY program is also heavily involved with 9 Dots' research efforts; our research with the National Science Foundation takes place during the weekend and summer instruction.

“I’m not afraid of failing anymore. I can do anything now. [devY] made me a more confident person!”

- Casey Ramirez, 6th grade devY student



TECH & TAPE

TECH & TAPE empowers out-of-school educators to teach high-quality lessons in coding and robotics.

Through professional development workshops, ongoing online support, and on-site observations and feedback, Tech & Tape enables educators to develop the skills they need to bring coding and robotics curriculum to their communities. Our Tech & Tape staff are experts in out-of-school STEM education, and design the Tech & Tape curriculum to be accessible and clear to educators new to coding and robotics.

“At one point, I heard a student say ‘Aw man, we only have an hour!’ It was nice to see that the girls enjoyed class and wished to stay longer.”

- **Anonymous**, robotics facilitator trained through Tech & Tape

7

Instructors trained across 6 schools throughout the country

100

100 students participated in the 20-session Tech & Tape Coding and Robotics curriculum

22

Remote PD's

8

Schools site observations

40

Hours of remote support

18%

Increase in instructors' confidence teaching robotics

46%

Increase in instructors' robotics content knowledge

A photograph of two young girls. In the foreground, a girl with dark hair and a yellow jacket is smiling broadly at the camera. Behind her, another girl with long dark hair and a blue jacket is looking towards the camera with a more neutral expression. They appear to be outdoors on a brick-paved area.

9DOTS
AFTER
SCHOOL

The 9 Dots After School Program provides free homework tutoring and innovative STEM projects to underserved elementary and middle school students.

80

Students served

17

Schools

100%

Students financially disadvantaged

99%

Students of color

15

STEM units, from stop motion animation to robotics to coding digital art

10,000+

Homework assignments tutored

91%

of students said they are more interested in STEM because of 9 Dots

100%

of parents say their child did better in school because of 9 Dots

The 9 Dots After School Program is led by 9 Dots staff with the help of a team of volunteer tutors. With a 1-5 tutor to student ratio, students receive individualized academic support in order to help them succeed in school. In addition, students are introduced to STEM with fun hands-on projects. From learning about food justice through growing a vegetable garden to learning about graphic design by designing their own business cards, the unique and engaging lessons created by 9 Dots staff make students excited to become involved with the world of STEM.

“When it comes to 9 Dots they allow you to do so much, they allow the student to learn not just basic things that they'd teach you in school... It really makes me feel like I can do so much more which... is what I want to achieve.”

- Lendy Gramajo, Grade 8

“9 Dots is a one of a kind program, and the students are able to be both creative and collaborative in an environment where learning is cool. None of the kids take for granted being able to attend 9 Dots, and they truly enjoy being there”

- Anonymous, 9 Dots' After School Program Volunteer



RESEARCH

Our current research initiative investigates how students approach and bounce back from challenges in coding.

45

Days of collected data at student coding workshops and instructor PD sessions

131

Students Studied

234

Hours of classroom lessons observed

10

Professional development sessions

150

Instructor reflections on their teaching practices

1,572

Student journal reflections about debugging

In Fall 2016, we launched our research initiative with the kickoff of a three-year National Science Foundation funded project called “Debugging Failure: Fostering Youth Academic Resilience in Computer Science.” In collaboration with the graduate schools of education at UCLA and UC Berkeley, our research focuses on how students can respond productively to errors in code and how instructors can facilitate this process. Through analyzing student reflections on failure and classroom discourse, we are developing a well-rounded understanding of how students and teachers create a classroom culture where students are comfortable with fearlessly taking on challenges.

“In this first year of our debugging failure research project, we have learned so much from our students. In turn, we are challenging ourselves to better understand how to develop a supportive culture around failure, what resources to offer students, how to foster class-wide discussion about struggle and success, and how to infuse creativity and empathy into the debugging process. I couldn’t imagine working with a more motivated, thoughtful, and insightful group of students and instructors as collaborators on this research.”

- David DeLiema, Research Advisor

“It’s my last week! I made it so far! Theres no going back! When coding gets tough I’m going to remind myself how far I’ve come. #IbelieveIcancode.”

- **Anonymous**, devY weekend program student



OUR FINANCIALS

Statement of Assets, Liabilities and Net Assets

Modified Cash Basis – December 31, 2016

ASSETS

Cash and Cash Equivalents	\$124,868
Property and Equipment	
Property and Equipment	67,078
Less Accumulated Depreciation	(37,592)
<i>Net Property and Equipment</i>	29,486
TOTAL ASSETS	154,354

LIABILITIES AND NET ASSETS

Liabilities	
Other Current Liabilities	\$340
<i>Total Liabilities (All Current)</i>	340
Net Assets (Page 4)	
Unrestricted	104,014
Temporarily Restricted	50,000
<i>Total Net Assets</i>	154,014
TOTAL LIABILITIES AND ASSETS	154,354

Statement of Support, Revenue, Release and Expenses, and Changes in Net Assets

Modified Cash Basis – December 31, 2016

SUPPORT, REVENUE AND RELEASES	Unrestricted	Temporarily Restricted	Total
Contributions	\$420,961	\$50,000	\$470,961
Grants	39,500	68,495	107,995
Program Income	153,963	-	153,963
Other Revenue	22,273	-	22,273
Net Assets Released from Restrictions	97,599	(97,599)	-
TOTAL SUPPORT, REVENUE AND RELEASES	734,296	20,896	755,192
EXPENSES			
Program Services	\$573,950	-	\$573,950
Fundraising	30,094	-	30,094
Management and General	102,838	-	102,838
TOTAL EXPENSES	706,882	-	706,882
INCREASE IN NET ASSETS	27,414	20,896	48,310
NET ASSETS, BEGINNING OF YEAR	76,600	29,104	105,704
NET ASSETS, END OF YEAR	104,014	50,000	154,014

A photograph of three students sitting together, looking at a laptop screen. The student on the left is wearing a blue hoodie with a white graphic on the sleeve. The student in the center has long, curly brown hair and is wearing a purple tie-dye shirt. The student on the right is wearing a grey sweatshirt. They are all looking down at a silver laptop. The background is blurred.

MOVING FORWARD



In the next year, we are looking forward to growth in our getCoding, Tech & Tape, and Research programs, as well as some exciting new changes in our 9 Dots After-School program.

Next year, getCoding's elementary school program will grow from serving 900 K-6 students in eight schools to serving roughly 3000 K-6 students in 21 schools. The getCoding high school program will continue to provide AP CS Principles training in the 2017-18 school year to a new cohort of 35 high school teachers. In addition, we will train 24 middle school teachers on a new middle school computer science course developed by Code.org called CS Discoveries. Our middle school teachers will be among the first in the nation to provide this new curriculum designed specifically for middle school students.

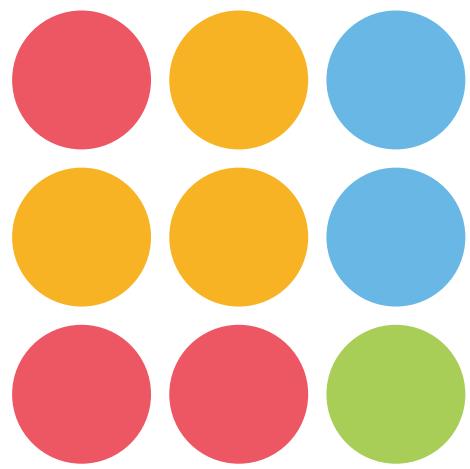
Our Tech & Tape program will also see an impressive amount of growth next school year. After piloting our Tech & Tape program with seven out-of school instructors in the 2016-2017 school year, we are excited to ramp up the dissemination of our Tech & Tape curriculum next year. Beginning in Summer 2017, we are confirmed to train 62 new STEM instructors in our coding curriculum, reaching an estimated 520 students.

Our work on the National Science Foundation research grant in 2016-2017 has opened the door to many new research opportunities for 9 Dots. Working with partners such as the Los Angeles Unified School District and UCLA School of Education, we have applied to more research grants from the National Science Foundation, and look forward to new opportunities to promote learning in the field of computer science education in the coming years.

Finally, next year, 9 Dots' After School Program will evolve into Lead LA, a program designed to foster leadership development in underrepresented elementary and middle school students. As of 2015, 90% of elected officials in the United States are White (non-people of color), 72% are male, and 65% are white males. Fortune 500 CEOs also suffer from a lack of diversity: 1% are Black, 9% are Hispanic, and less than 5% are women of any ethnicity. Paired with the problem of a non-diverse STEM workforce, the lack of diversity in these top fields is worrisome. While research has demonstrated that leadership skills can be taught, and ideally should be taught at a young age, leadership programming is not readily available for elementary and young middle school students in Los Angeles.

We aim to fix this. Lead LA will continue to teach the STEM topics students enjoyed in the 9 Dots' After School Program while also adding three new classes: leadership, art, and communications. These classes will teach students how to critically think about the world around them and use their unique voices to enact change in their communities. The Lead LA program will work with the same groups of students for three years, with students joining the program in 3rd or 6th grade. The first classes of students will begin in September 2017, which additional cohorts added each school year.

Since founding 9 Dots over six years ago, we've been so grateful to work with incredible students, families, schools, and partner organizations. In the next year, we look forward growing the 9 Dots family even more, and can't wait to see what these new changes bring!



9 DOTS

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