

FIRST Impact Award - Team 649

2024 - Team 649
Team Number
649
Team Nickname
MSET Fish
Team Location
Saratoga, CA - USA
Describe the impact of the <i>FIRST</i> program on team participants within the last 3 years. This can include but is not limited to percentages of those graduating high school, attending college, in STEM careers, and in <i>FIRST</i> programs as mentors/sponsors.
MSET Fish offers students chances to develop technical, interpersonal, and leadership skills, paving the way for STEM careers and internships in high school. Over the past 3 years, our team's retention rate rose by 16.7%, with 100% of members graduating high school and pursuing higher education, 90% of whom go into STEM majors. 3 MSET alumni have returned to mentor us, bringing their experience on the team and in FIRST to nurture us into future innovators and leaders.
Describe your community along with how your team addresses its unique opportunities and circumstances.
In our county, the disparity in per capita income ranges from 27k to 150k within mere miles of each other. We teach an Arduino curriculum at Title I schools where 40% of the families are classified as low-income, to introduce middle schoolers to electronics and software. Spreading our experiences with STEM, we host Library Science workshops at eight local libraries, improving our Home Science Curriculum from COVID and introducing 300+ children to science through interactive experiments.
Describe the team's methods, with emphasis on the past 3 years, for spreading the FIRST message in ways that are effective, scalable, sustainable, and creative. How does your team measure results?
We commit to using our experience in FIRST to spread equity to all in need. In our GoBabyGo initiative, we assemble toy cars and ATV's to mobilize paraplegic toddlers. We quantitatively measure our results (25 cars total), but primarily focus on the depth of our impact (helping toddlers reclaim their mobility). We document our process for sustainability, helping FRC teams like 840 contribute, and to facilitate future improvements to our designs (e.g., adding oxygen tanks to our cars).
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.
We cofounded the California Association for STEM Advocacy (CASA) to spread advocacy efforts in California to demonstrate and host the California Advocacy Leadership Conference twice. During our conferences, we taught FIRST teams how to advocate for STEM education and robotics, using our

methods as a model. Our instruction empowered our fellow teams to represent their communities. We also presented at the Western Region Robotics Forum to teach teams initiative management and presentation tips.

Describe your team's initiatives to Assist, Mentor, and/or Start other *FIRST* teams with emphasis on activities within the past 3 years.

Over the last 3 years, we have expanded our FLL Program to include all 3 of our districts' elementary schools, 1 Girl Scout troop, and a private team, increasing our number of started and mentored teams from 3 to 17. We assisted 9692 FRC rookie Team Sigma from India in starting a competitive robot. Our demonstrations at local elementary schools inspired some schools to host 4+ teams. We have shared our practice field with teams 972 and 2813 and led tours for 846 and a rookie Taiwan team 7709.

Beyond starting teams, what initiatives have you done to help inspire young people to be science and technology leaders and innovators? What results have you seen from your efforts in the past 3 years?

We created videos about computer-skills and English for Shadhika, an organization devoted to empowering young girls in India. They were added to their toolkit and reached 80 girls, giving them a path towards independent success. With our school's art program, we donated artwork for scholars in India, which raised money for girls in Shadhika's Program. We also shared a story of Shaista, a girl from impoverished India studying for her masters and leading the next generation of girls into STEM.

Describe the partnerships you've created with other organizations (teams, sponsors, educational institutions, philanthropic entities, etc.) and what you have accomplished together with emphasis on the past 3 years

From our partnership with Vikalp Sansthan, an organization trying to end child marriage, we learned of similar groups such as WeEducate and One Billion Literates. WeEducate rehabilitates girls affected by sex trafficking. We made videos viewed by 25 girls across 2 shelters. With OBL, we helped English literacy in rural Bangalore reaching 4500 students through 79 schools, allowing students to get higher education. We partnered with 6652 Tigre to repurpose these videos for students in Mexico.

Describe your team's efforts in the past 3 years to promote equity, diversity, and inclusion within your team, *FIRST*, and your communities.

Our advocacy efforts, combined with the efforts of FIRST teams, have resulted in a total increase of \$175 million towards Title 4A Grants under the Every Student Succeeds Act, subsidizing afterschool activities like FIRST for low income communities. We are in talks with Country Lane Elementary School to set up a Makerspace to further learning opportunities for low income communities. FirstForAll inspired us to be more internally inclusive (ex. offering male and female T-shirt sizing options).

Explain how you ensure your team and the initiatives you have created will continue to run effectively for the foreseeable future

This year we implemented multiple policies: we created an application system for all of our subleads ensuring continued interest and picked multiple underclassmen managerial and technical subsystem leads to improve sustainability. We also made an understudy program for our drive team to improve underclassmen involvement. For our outreach initiatives, in addition to documentation, we encouraged newcomers to contribute ideas, creating a continuity of experience and direction.

Describe your team's innovative strategies to recruit, retain, and engage your sponsors within the past 3 years

At sponsor events like Intuitive Surgical's Robonanza and Saratoga Rotary Club's Art Show, we exhibited our robot, program, and outreach. GoBabyGo impressed Intuitive, prompting them to expose the initiative to their other teams. Rotary Club connected us to Latimer Middle School, a Title I School, helping us spread our outreach to more students. We featured sponsor speakers, such as an alum at Intuitive Surgical, and recognized sponsors on our robot, outreach book, t-shirts, flyers, and banner.

Highlight one area in which your team needs to improve and describe the steps actively being taken to make those improvements.

This year we aimed to bridge the gap between upperclassmen and newcomers. We created "Schools of Fish", mixing everyone into groups of 5, familiarizing our new members to returning teammates. Weekly, the groups competed in games to improve team interconnectivity. In hardware, we paired freshmen with upperclassmen to work on offseason projects, such as the robot cart ("Big Fish Little Fish Program"). In software, taught newcomers to code a scouting app, giving them more direct mentorship.

Describe your team's goals to fulfill the mission of *FIRST* and the progress you have made towards those goals.

Our mission statement is to foster a generation of leaders and innovators with an emphasis on equal opportunity for all. We applied our technical skills to equitize mobility through GoBabyGo. With our India Literacy Programs, we taught underprivileged girls English, computer-skills, and math, supplementing education and chipping away at child marriage. Our advocacy combined with other Californian robotics teams protected the Expanded Learning Opportunities Program's funding through a recession.

Briefly describe other matters of interest to the *FIRST* Judges, including items that may not fit into the above topics. The judges are interested in learning about aspects of your team that may be unique or particularly noteworthy.

We pride ourselves on our organizational structure, which is entirely student-driven. MSET's student voted president holds leads together with student-lead retrospectives. Leads oversee student subsystem leads, who coordinate the work done on each component of the robot. Though our mentors guide us through the season, they give us the space to develop our own ideas and to grow from our failures. Our adaptive and flexible style grown through student initiative is what leads us to success.

Judge Feedback

Who/When

Feedback

Mar 30,
2024
11:06:13
AM EST

What has FIRST identified as the largest gaps as it pertains to equity, diversity, and inclusion, and how do we as a larger community help FIRST narrow this disparity?

An area the team has an opportunity to improve.

Something that really impressed the judges.

Essay

In FIRST's Ocean, Team 649 MSET Fish inspires the next generation of STEM leaders and innovators to turn ripples of impact into waves of change.

Team Intro:

Team 649 began in 2001 as the Saratoga Robotics Team and rebranded in 2010 as the Mechanical Science and Engineering Team (MSET). We have expanded from 10 members to 94, with 49 in FRC and 45 across 3 FTC teams.

From student-led retrospectives to technical progress meetings, our team's student-led nature allows us to pursue endeavors that maximize impact, growth, and leadership opportunities. To improve our sustainability, we appointed sophomore subleads, we created "Schools of Fish" familiarizing our new members to returning teammates, paired freshmen with upperclassmen to work on offseason projects, and held workshops to improve our teams' eFISHency.

Our Mission: To foster the next generation of leaders and innovators with an emphasis on equal opportunity for all.

We evaluate our outreach initiatives by their impact, ease of implementation, and alignment with our mission statement.

FIRST Involvement:

Since 2016, we have been mentoring FLL teams. When 3 of our teams couldn't attend a competition due to a logistical error in 2022, we hosted a student-led Saratoga Invitational Scrimmage. In 2023, we grew our FLL Program to Saratoga Elementary School starting 3 new teams, and grew our other school locations to a total of 17 teams. We hosted our Saratoga Invitational for a second year, and we are working on an FLL curriculum. In 2023, we spent 300+ hours mentoring teams, totaling over 1000 hours for the past 3 years. Two of our teams qualified for the Northern California Innovation Expo in 2022, and two teams qualified for regionals in 2023. We invited our older teams to volunteer at our Saratoga Invitational and mentoring sessions, to expand our program's ripple effect.

We also shared our FRC field with teams 972 and 2813 and supported the FTC qualifier, which has over 400 annual participants, for the last 10 years. We also assisted rookie FRC 9692, Team Sigma, in hardware design, strategy, and software before the season started this past year. With our growing connections to local stem programs, we were invited to EmpowerHer ShowDown. In 2024 we plan to partner with FRC team 840, Argon Robotics to complete the IncluSTEM workshops at Pine Hill School.

For the past 2 years, we have presented at the WRRF Conference, teaching many FIRST teams how to expand their own outreach initiatives and develop presentation styles.

Local Outreach:

With our county's disparity in per capita income ranging from \$27k to \$150k within mere miles of each other, students nearby have vastly different experiences than us. Aiming to reduce this disparity, we developed our Robotics Merit Badge curriculum which uses Arduino as a cost-effective introduction to robotics. We taught this curriculum at Latimer Middle School, a Title I school, where at least 40% of the students identify as low-income, and with Breakthrough Silicon Valley, an organization dedicated to supporting eventual first-generation college students. Through intensive projects like a robotic arm, we

inspired 65 middle schoolers to believe a STEM career was achievable.

Realizing that many children were unable to perform hands-on learning at school due to COVID, we taught Home Science Experiments to spread the joy of learning through science experiments. In 2023, we expanded our program to local libraries to make the science experiments available to more families and children, now reaching 8 libraries and 300+ kids in underserved areas. We leveraged our Library Science Curriculum by partnering with the Special Education Needs program at our school to allow students to experience new experiments.

This March, we are planning a SWE Day for our local middle school girls with the UC Berkeley SWE organization, to exhibit real experiences of women in STEM.

Sponsor Interaction:

We strive to retain and engage our sponsors by attending their robotics events and visiting their sites. At Intuitive Surgical's RoboNanza this year, our robot competed against other teams at the company site, showing them the impact of their support on our team. Last year, we were invited to the FIRST Inspire Gala and the Semiconductor Industry Association Awards Dinner. We have presented to KLA and the Saratoga and Los Gatos Rotary, discussing the value of FIRST in our education, while expressing our gratitude for their support of our team.

Moreover, we have sponsors speak at our school, including a 649 alum at Intuitive Surgical who discussed the medical robotics field. Our sponsors also connect us to new outreach opportunities, such as how Saratoga Rotary introduced us to Latimer. Thanks to our sponsors, we can foster opportunities for others through our outreach programs.

Equity through Mobility:

Children with mobility disabilities face difficulties physically interacting with their peers, leading to isolation and low self-esteem. In 2019, we partnered with AbilityPath, a local physical therapy organization, to found GoBabyGo! North California chapter. We have modified 25 of these cars for children in our community. Cars were customized for kids with poor limb and core strength who have trouble holding themselves up, allowing them to drive without standing up. ATVs were modified for toddlers who are learning to stand, by moving while they stand and stopping when they sit. We enabled these toddlers to move independently and socialize with their peers, bringing equity through mobility.

In October 2022, we reached out to the Children's Hospital of Northern California to help hospitalized children on mechanical ventilators and feeding tubes. In 2023, we finished designing cars to carry such equipment, further enhancing their mobility. In December, we also finished documentation to instruct other teams on how to spread this equity.

In September 2023, we began developing a pose detection app to aid physically impaired children during their physical therapy. Our real-world application of technical skills helped toddlers reclaim their agency.

Equity through Literacy:

Lack of literacy in India forces young girls into arranged child marriages and stops them from receiving

higher education. In 2020, we partnered with Vikalp Sansthan, who wants to eradicate child marriage and in rural India through education. To date, we have produced 49 conversational English and math videos, reaching 600 Vikalp students across 18 learning centers.

Afterward, we partnered with the WeEducate Foundation, which helps girls affected by sex trafficking. Our videos empowered 25 girls across 2 shelters, giving them the vocational skills necessary for independence.

Partnering with Shadhika, an organization affiliated with Michelle Obama's Girls' Opportunity Alliance, we created five computer skill videos featured in Shadhika's toolkit for 80 girls, as part of Unicef's International Day of the Girl. In 2023, we partnered with the Saratoga High School Art program to create artwork presented at Shadhika's fundraiser for international girl scholars. We voiced over the story of Shaista, a girl from impoverished India, who found a new life in education through Shadhika's program and hoped to help girls do the same.

Working with One Billion Literates, who aim to increase literacy in rural Bangalore, we've modified our videos and made quizzes to help 60 teachers better teach over 4500 students in 79 schools. By helping teachers improve their English proficiency, they can apply this lifelong skill beyond the scope of this initiative, creating a larger ripple effect. Equity through Advocacy:

With STEM education rising in prominence in politics, student perspectives are vital to ensure consistent support on the federal level.

Since 2021, as a part of the Student Association for STEM Advocacy (SASA), we have met with the offices of multiple federal elected officials to advocate for increased funding for the Student Support and Academic Enrichment (SSAE) program, which subsidizes afterschool extracurriculars like FIRST, under the Every Student Succeeds Act. The offices we have met with are Representatives Anna Eshoo, Tom McClintock, Jim Costa, and Mike Garcia; Senators Dianne Feinstein and Alex Padilla; and former Speaker Kevin McCarthy. Our efforts over the last 3 years combined with other SASA robotics teams have resulted in a total increase of \$175 million in appropriated funds towards SSAE, helping to expand STEM access for underserved students.

Despite having the most important voices in education, students are often barred from representing themselves due to a lack of experience. Additionally, state legislatures have more direct control over funding, allowing them to provide more specific support to education.

To address both factors, we cofounded the California Association for STEM Advocacy, later becoming the Californian branch of SASA, in July 2022 to teach robotics students how to advocate for STEM education and access. Initially working with FRC teams 1138 and 1622 and FTC teams 6165 and 12675, we expanded the organization to include FRC teams 1671, 2584 and FTC teams 13356, 14473, and 20163 to host the California Advocacy Leadership Conference. We virtually hosted our 1st conference in January of 2023, corresponding with the final days to introduce a bill. We held our 2nd conference in Sacramento, walking our attendees through their meetings with the offices of their respective legislators. As well as teaching, we met with Assemblymember Marc Berman's office to bolster our attendees' efforts, expanding our collective voices. Our combined efforts have protected the funding of the Expanded Learning Opportunities Program through a recession.

Extending opportunities to all, our mission pushes us to reach every student, leaving them inspired, empowered, and ready to spread their fins.;

