

FIRST Impact Award - Team 6431

2023 - Team 6431
Team Number
6431
Team Nickname
NoktaParantez
Team Location
Istanbul, 34 - Turkey
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.
Through the FIRST programs, #6431 has developed diverse real-world skills such as leadership, critical thinking, and applied engineering. This helped our alumni set their long-term goals, with a growing passion towards pursuing a career in STEM, with 87% going into STEM in higher education and 67% in occupations. FIRST allowed us to form bonds that overcome the barriers of post-graduation separation and become a family, reunited each winter break and over online mentorship sessions weekly.
Describe your community along with how your team addresses its unique opportunities and circumstances.
ideaLab is the heart of our family, where failure and learning through peer-to-peer interaction is encouraged. As the only K12 FabLab in Turkey, our access to an international network of makers, close-knit alumni, and machinery enables us to grow and utilize these resources on R&D projects that have been presented at international conferences and Fab events organized by MIT, alongside our community service projects to uplift our society and the FIRST community towards aligning with the UN SDGs.
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?
#6431 focused on spreading the FIRST message and inspiring the youth to join the FIRST community via outreach programs to under-resourced communities and providing them with access to STEM education/mentorship through annual global organizations. We have created courses on Udemy (@HisarCS) for our audience of over 41,000 enrolled students, tracking our growth and impact through the feedback we continuously received while also gathering the data of the participants pursuing STEM-related careers.
Please provide specific examples of how your team members act as role models within the FIRST community with emphasis on the past 3 years.
#6431 members are all unique ready-resources for the FIRST community. They became the ambassadors of global organizations and youth venture programs such as GençBizz and InspiritAI while

advising rookie teams, helping students integrate FIRST's Core Values, and guiding them to become leaders in STEM. Through over 30 events and keynote speeches from specialists in FIRST-specific fields that we have organized, we became role models for other FRC teams to further educational efforts.

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

We started and mentored an FLL team in our school, guiding them and over 2000 children in our community on their journeys of FIRST and STEM. We leveraged our connections to global organizations, putting together diverse and inclusive educational content on Udemy and with the annual events we organize. We created and guided the proceedings of the Incubator in Athens, a laboratory for students of American Community Schools to have a dynamic learning environment and start FIRST programs in Greece.

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?

Carrying FIRST's Romi Robot Kit to a new level, we developed two research proposals, Lemon (a biomimetic educational robotics kit) and Pomelo (an interactive educational programming robot), to introduce STEM to children, which provided users with tangible learning and prototyping experiences. After being utilized in our curriculums and presented or published in numerous conferences, various FabLabs from around the globe requested our models to implement them into their own curriculums.

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

We collaborated with institutions who were generous with all their resources, allowing us to develop, not only as a research lab but as a team. We provided Raspberry Pi's to underprivileged youth with our organizations like PiWars, enabling hundreds of children's access to expensive electronics and mentorship. We partnered with schools for cultural and educational events in metaverse and international summits where we delivered STEM and FIRST related courses to over 300 students in Greece.

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

To alter the male-dominated demographics in STEM fields, we established Technovation (a global nonprofit that empowers girls to address real-world problems) in Turkey and have been working as their ambassadors ever since, recruiting girls to pursue their passions in STEM and entrepreneurship and introducing them to the FIRST Community. Within the last three years, we increased our outreach in Turkey by over 300%, providing one-to-one mentorship opportunities to girls with our global partners.

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

Most of our projects are aimed at raising a STEM-oriented curious generation, inviting our younger peers to join us and create a family-like structure within our lab. Even when #6431 members graduate, over 80% of our alumni keep in touch and continue mentoring the team. As our younger peers gain more experience in the lab, they get thrilled to take over these projects in their high school years, ensuring the sustainable continuity of our initiatives that have become traditions over the years.

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

While financial support is crucial, we also believe in prioritizing forming long-lasting relationships with sponsors while receiving advice and know-how. We recruit our sponsors based on our aligned values and strengthen this relationship by continuously involving them in our team's activities. Leveraging our R&D background, we provide an interactive experience for our sponsors by arranging test drives of our robot and trials of our projects to engage our sponsors and grow through their insight.

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

The post-pandemic season presented many challenges to our team, especially in maintaining effective communication within sub-teams under the roof of #6431. Addressing this issue, we established FabBizz, a new organ responsible for creating common channels for communication within the team and ensuring all members feel valued. FabBizz has organized many thoughtful events for our special occasions that provided an informal space for team bonding, adding depth to our connection.

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

#6431 aims to prompt students to get involved in STEM by providing under-resourced communities with opportunities to discover STEM through FIRST programs. To spread FIRST's mission, starting from a small bubble, our school, and expanding to the global sphere, we cooperated with the Association for the Support of Contemporary Life to introduce FIRST to local underprivileged students, mentored over 5,000 students in STEM subjects, and tutored over 41,000 students via online courses.

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.

In the post-pandemic era, #6431 lacked veteran members and urgently needed restructuring. Despite all obstacles, we managed to do so by accumulating the necessary knowledge/background through involvement in scientific research. This allowed us to have a unique perspective that not only focused on building a robot but also practiced scientific principles in an attempt to explore the frontiers of our every line of work. We make it our mission to spread this approach through all our endeavors.

Essay

Let me take you back in time to the year 2013 to a room that's now so fondly known as the ideaLab. A knock on the door interrupts a routine meeting amongst our now-mentors, and a handful of curious students enter, looking for ways to explore beyond the standardized curriculum. This simple interruption creates the foundations of our ideaLab, and for years, students add beam after beam by embracing such unforeseen but welcome interruptions to fortify this legacy.

An interruption to the life a person is accustomed to creates friction. This friction may come in the form of a teacher suddenly daring a group of students with a STEM challenge or a group of students who confidently believe traditional education to be insufficient, cutting in on a meeting to demand more. But what's more important is that this friction, sourced by these interruptions, begins to generate abounding sparks of inspiration and curiosity, which forces that group of students to explore new frontiers of STEM, and that group of teachers to challenge the traditional student-teacher hierarchy, surrendering their office to students as an experimental educational facility: the ideaLab.

The ideaLab focuses entirely on self-differentiated learning and peer-to-peer education. We follow every interruption, almost carelessly going where these tides take us, but always guided by our curiosity and our maxim: "Make, Fail, Learn, Repeat." As a result, the past three years transcribed here will tell of many obstacles, interruptions, and the countless sparks that generate under the heat of challenge. From humble beginnings as just a room with a few computers and ideas, ideaLab has now become a home for our team: a safe, dynamic, and constructive maker space for all curious minds.

As we grew, we became mentors to students around us, guiding them on their journeys of ideation, design thinking, entrepreneurship, and engineering. Our team is diverse and inclusive, consisting of 24 students with different computational skills, organized into 4 sub-teams responsible for CAD, mechanics, electronics & programming, and business; and 4 teachers, countless alumni, and external mentors. We operate democratically, with the team captain and the leaders of each sub-team responsible for everyday decision-making and long-term planning, allowing us to efficiently manage the entire workload while promoting learning and growth amongst the team.

NoktaParantez participated in 6 seasons and 12 FIRST events, receiving recognition for 8 awards. The most critical component of this legacy is the family-like structure within our lab and our connection to our close-knit alumni. Inspired by their contributions to our success, we started and began to actively mentor our school's FLL team, "HisarCS," whose members come to join us as they matriculate to high school, and our alumni from almost a decade ago still reach out to us, guiding us as we face obstacles daily.

One such obstacle that we have tackled is the fact that the ideaLab, reflective of STEM fields in general, was overcrowded with a male population. Recognizing this issue, #6431 took a step towards overcoming this imbalance and established Technovation (a non-profit organization aiming to increase girls' participation in STEM and entrepreneurship) in Turkey, becoming the first Student Ambassadors from our homeland who in 2018, launched a program in our middle school engaging our younger peers. Our mentees were elected to be one of the 8 finalists of Technovation from over 2000 teams worldwide and pitched their idea at Silicon Valley. In 2020, we organized the first-ever Technovation Launch Event to expand our outreach to under-resourced girls in Turkey. Our ambassadors mentored tens of girls each year, helping them pursue their interests while solving real-world problems through developing mobile applications or AI models. This season, we have more than doubled our outreach, connecting with more girls than ever who wanted to participate and introducing 55% of them to the FIRST community.

Technovation functioned as the interruption in the lives of girls with no prior experience in STEM, which released sparks of inspiration, that they, in turn, shared with our community and nurtured into flames through our annual Coding Summit, becoming educators themselves. Aiming to become a place where people could ask for help, reach out and connect to like-minded others, #6431 organized the first Coding Summit in 2014, with a room full of middle schoolers passionate about learning and a handful of high schoolers eager to help them out. With the community we garnered, our team expanded the Summit's educational content and outreach into a global event that introduced unfamiliar topics to students, engendering the necessary friction to inspire individuals and jumpstart their journey in individual learning, as self-learning is one of our team's core values.

We kept dreaming big. Over 8 years, the annual participation in the Summit has increased from 20 students in 2014 to over 500 in 2022. The variety of courses we offered went up from 2 in Turkish to 17 available, ranging from quantum computing to AI in Turkish and English, allowing us to invite guests from around the world as the pandemic hit. In 2022, we hosted guests from over 16 countries on 4 continents and 10 keynote speakers from 5 countries. The Coding Summit became a universal event that accommodates hackathons or ideathons like the GameJam and the HisarCTF (cybersecurity contest) as well as student-led workshops to meet curious people and develop their potential within the scope of digital transformation.

Our team took the Summit to a new level, introducing the Innovation Summit in Athens. We created the Incubator of Students' Creative Ideas (ISCI) in the American Community Schools (ACS) in Greece, a student-run, project-based learning initiative using the design process to promote, support, and guide students' creative ideas in all STEM disciplines facilitating and organizing STEM oriented events. With this partnership, we designed a platform on the metaverse and hosted students from Greece to celebrate Cultural Diversity Day, where over 320 international students presented their projects and organized another Summit with the American Farm School, tutoring over 300 Greek students.

Covid hugely impacted us, interrupting the traditional learning environments we had structured in our lab as we heavily depended upon our physical working space. But inspired by this interruption, we went online and global, maximizing our outreach. In 2020, we started delivering online courses on Udemy and have gathered an audience of tens of thousands. But our ability to work as an FRC team was heavily hindered. Instead of disbanding, we took the time to work on ourselves. We created the first FIRST-based podcast series, FRCast, aiming to increase the interactions between the Turkish FRC community, connecting with over 26 FIRST teams around Turkey. On top of this, due to the pandemic and recurring lockdowns, #6431 lacked experienced members and lost its accumulated know-how. Aiming to rebuild the team's solid foundations, we began focusing on R&D to continue gaining experience throughout the pandemic.

This also allowed us to earn the accreditation of becoming the only K12 Fablab in Turkey and acquire machineries such as CNC routers, laser cutters, and 3D printers that we used for both R&D projects and FRC. While continuing our research, we had publications of our work in numerous ACM and IEEE conferences and magazines like the MagPi, earning valuable recognitions with the Judges Award in the HRI Student Design Competition in Korea and the privilege to present our work to experienced researchers as the only high school team. The ideaLab has since developed into a hub for innovation and creativity through substantial modifications, motivated to provide learners of all ages and backgrounds a tangible learning experience with accessible and credible resources that draw in curious people from all walks of life. Building our foundations upon research, we created a stronger scientific

background in encouraging youth participation in STEM, spreading FIRST to our now-global community, and providing related education through a different and valuable perspective.

With this approach in mind, we initiated our newest R&D project, The Lemon Robotics Kit, to ensure that all of our rookies acquire the necessary hands-on skills for quick prototyping. The Lemon Robotics Kit is a bio-inspired educational tool for K12 students wishing to gain hands-on experience in manufacturing that has three models focusing on different aspects of quick prototyping. With this year's FRC theme, "Charged Up," in mind, after initiating efforts to transform our laboratory into a Sustainable FabLab and align ourselves with this season's FRC theme, we also modified Lemon to use affordable and accessible electronic components. With environmental concerns in mind, we significantly improved our kits by eliminating adhesive glues, making Lemon reusable and recyclable.

But more importantly, after contributing to a conference in Indonesia and witnessing the excitement with which Lemon was received, we saw how knowledge shared builds incredible bonds, concretized by the sorrows of our colleagues in Indonesia in light of our departure, reminding us of what was truly special about FRC and becoming an inspiration for us all.

Through this experience, we have become a family of researchers, developers, designers, entrepreneurs, and manufacturers; a team strengthened by its alumni, collaborative partners, network, and technical expertise; a team of students who can't sleep out of excitement the night of the kick-off, drafting the first design of the robot. Because we all know no matter how many challenges or interruptions we face, this is and will continue to be our most meaningful journey .) ;

