FIRST Impact Award - Team 6431

2025 - Team 6431

Team Number

6431

Team Nickname

NoktaParantez

Team Location

Istanbul, 34 - Türkiye

Describe the impact of the *FIRST* program on team participants within the last 3 years. Think about percentages of those graduating high school, attending college, in STEM careers, leadership skills, and serving as mentors/sponsors in *FIRST* programs.

FIRST empowered our members with leadership, problem-solving, and engineering skills, leading 87% of our alumni to pursue STEM in higher education and 67% to STEM careers. The bonds we build in ideaLab are lasting: with many alumni returning as mentors, like Zeynep'17, who founded a successful STEM startup, and Iremsu'23, the first girl from Turkiye admitted to CMU for CS, continue to inspire us, ensuring that the cycle of peer-mentoring and innovation thrives.

Describe your community along with its unique opportunities and circumstances. Think about your geographic region, diversity of town/school, language barriers, socioeconomic barriers, and cultural expectations.

Situated in Turkiye, where access to STEM education is limited; especially for minorities and girls, 6431 works to overcome the cultural stigma and encourages everyone without regard to age or gender to partake in technical and non-technical fields. Our team is composed of more than 50% girls participating in all projects, serving as role models for future technology leaders. We translate and upload free courses in Udemy, breaking language barriers and advancing STEM education.

Describe the team's methods, with emphasis on the past 3 years, for spreading the *FIRST* Mission in ways that are effective, scalable, sustainable, and creative.

With 20+ active projects, we encourage young minds from 15+ countries to join FIRST to become the change-makers and STEM leaders of tomorrow. We bring hands-on STEM education with our sustainably produced Automata Kits in Turkiye's first K12 FabLab, shipped by our sponsors to all 81 provinces of Turkiye. Through our 14 online courses, like the only Turkish Swift Udemy course, we continue to inspire 50K+ students in the light of FIRST, creating a stronger generation.

Describe your team's goals and the progress you have made towards them to fulfill *FIRST's* Vision.

6431 is not only about influencing the highest number of people but about simply firing a spark of interest in a child's perception of STEM. Our R&D kits continue to empower underserved communities&our workshops introduce students to all areas of STEM, creating a lasting culture of curiosity&passion. Reaching thousands through our initiatives annually, we embody FIRST's vision&instill an appreciation for FIRST's endless opportunities of engineering&collaboration in every mind we touch.

What impact has your team seen from your efforts described in the above question? How does your team measure impact?

For 6431, impact is more than just numbers, but a combination of quantitative results and qualitative transformation. While we've reached 35K+ students on our Udemy account, we measure our impact not only through numerical data, but by the team members we raise. This year 7 rookies joined the team through Technovation & are improving their design-thinking skills through FIRST opportunities. We see our impact in the growth of ourselves and the ones we touch.

Please provide specific examples of how your team and team members act as role models within the *FIRST* community with emphasis on the past 3 years. How do you share these best practices with other teams?

By donating our lab's CNC Machine to FYF & supporting FRC teams through our open-sourced robot CAD's, we work to create equity amongst underserved teams. Our members guide teams in fabrication & in-house manufacture with the expertise they gain through FabLab in digital manufacture. Through Technovation, we promote leadership roles for girls in STEM. By mentoring #8795, we invited them to join our mission as Chapter Ambassadors of their region, inspiring the next generation of female innovators.

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

Providing peer mentoring, fostering gracious professionalism and exposing hundreds of younger peers to FIRST, we formed FLL#554&FTC#25163 teams in our school. We encourage educational institutions in Greece to launch their own teams by developing open-source FIRST-targeted documentations and with creative ways to spread the FIRST message through annual competitions like our Game Jams. Our member Sadık joined FRC#10246 to accompany them through their FIRST season as an experienced participant.

What other initiatives have you created, grown, sustained, or participated in (*FIRST* or otherwise) to help inspire young people to be science and technology leaders and innovators? What outcomes have you seen from your efforts in the past 3 years?

In our 11th annual Coding Summit, innovative courses focusing from mechanics to entrepreneurship were taught by eager instructors to curious minds, with guest speakers like Brianna Chrisman&Barış Özcan. We introduced FIRST core values through bonds made with STEM to learners from all walks of life. We founded ISCI and run annual Innovation Summits in ACS Athens, expanding to thousands across continents. This inspired Greek students to give back what they learned through online workshops.

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

Through Fab, ACM, AIED, and Constructivism Conferences hosted by labs associated with MIT and Columbia, we exchange ideas with global innovators and bring invaluable insight back to our lab and FIRST. Partnering with ACS Athens, our annual Innovation Summits introduce STEM to 800+ students from Greece, Lithuania, etc. Our outreach extends 200+ students via ÇYDD and another 2,000+ through Technovation in collaboration Meta, empowering future science leaders worldwide.

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

We have been creating an inclusive culture in STEM for 12 years by involving people of diverse demographics; from those who have not been introduced to possibilities, to the experts themselves. We brought Technovation to Turkiye, ran annual Launch events, and expanded the competition to the FIRST community. We continue breaking barriers through initiatives like our workshop at Columbia University, making sure that everyone has access to STEM-from ages 7 to 70-years-old across the globe.

Explain how you ensure your team and the initiatives you have created will be sustainable.

Defying a conventional student-teacher hierarchy, the IdeaLab thrives on peer mentorship, hands-on STEM involvement, and knowledge sharing through detailed documentation. Embracing the philosophy of 'make, fail, learn, repeat,' we foster growth, ensuring every member carries FIRST's mission forward. With access to an accredited FabLab, we prioritize in-house manufacturing, reducing reliance on external production while equipping students with essential technical skills.

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

This year the percentage of rookies in our team was at an all time high. New members felt foreign to the IdeaLab. This made it harder for our projects to run smoothly at the start of the season. To overcome this obstacle, our veteran members held new members' hands on their "FIRST" steps and mentored them throughout a 2 week training period & two Off-Season competitions. This way, our rookies were able to take part in crucial roles, gain insight about the FRC environment and adapt to our family.

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, particularly noteworthy, or had a large impact.

Carrying FIRST's Romi Robot to a new level, we developed Lemon kits, bridging theoretical and applied mechanics by integration of augmented reality, providing an intro to STEM. By completing these kits, beginners are able to build their own biomimetic robots & grasp basic assembly and programming skills. We introduced this robotics kit at FabLearn conferences in Bali&NYC and provided hands-on workshops in schools in Ordu & İstanbul in collaboration with ÇYDD, expanding our impact to thousands.

Judge Feedback

What approach should we take when integrating other FIRST teams into our initiatives so that it is beneficial and long-lasting on both ends?

An area the team has an opportunity to improve.

Something that really impressed the judges.

Essay

A glitch; unexpected, unpredictable, unavoidable. A break in the pattern.

Glitches disrupt, but more importantly, they expose. They reveal the cracks in a system, forcing change, creating space for something new. A glitch occurs when a group of students steps into a space not originally meant for them, questioning the boundaries of education. The system registers an error, a crack. The structure, designed to function a certain way, faces an input it wasn't built to process. What if glitches were opportunities to create something revolutionary?

Let's go back to 2013, to a room that's now known as the "ideaLab," where the glitch emerged. The only K12 FabLab in Turkey where 24 curious and passionate minds intersected, where abounding sparks of inspiration were generated. A workspace that forced tens of students to explore new frontiers of STEM and to introduce FIRST&STEM to thousands. This room is a place where a group of teachers challenge the traditional student-teacher hierarchy, surrendering their office to students as an experimental educational facility. Thus, a glitch occurs, opposing the expected.

By encouraging peer-to-peer learning when working on R&D projects, we create a knowledge flow through the

ideaLab eco-system. At the heart of our team lies a full-circle process that constantly moves us forward. The projects created in the ideaLab are never passive; they fuel a loop of exploration and innovation, sparking questions & new ideas to continue the research. This cycle is what pushes us to continuously evolve in technology, and also within our team dynamics. Our problems today ignite solutions for tomorrow, and the accumulated knowledge becomes a foundation step for the next breakthrough. By fostering this ecosystem, we create a bubble of discovery in which learning, teaching, and alteration are inevitably linked.

We also apply this mindset of long-term thinking to the real world by functioning as a sustainable team that manufactures their own equipment with their own machines. We have CNC routers, laser cutters, and 3D printers that help us construct the needed materials for our projects. Producing our own products in our lab without relying on outside resources sets us apart from any standard FRC team. We see our ideaLab as a self-sustaining hub; a unique, dynamic, and constructive maker space for all interested minds.

Glitches interrupt, but their real value is in what they reveal. Tackling the cracks along the way is a collective effort: we have a group of 24+ students with different computational skills and interests. We are split up into 5 sub-teams responsible for design, mechanics, electronics, programming, and business, guided by 4 teachers, assisted by countless alumni, and external mentors. Despite these divisions, our members possess a wide skill set, making sure that everyone is flexible when it comes to participating in different areas. We see ourselves as a family where anybody has a say, considers every idea and nobody judges each other. Although we are different, we embrace those dissimilarities and ensure a secure environment.

We are not only proud of celebrating our differences, but also defying the anticipated. In a world where girls are underrepresented in STEM fields, our team consists of more than %50 of girls. As 6431, we recognized that most engineering majors and STEM topics are male-dominated. Therefore we 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. At this breakpoint, female individuals out of the ordinary come together; we aspire to make everyone feel welcome because we aim to be extraordinary.

In 2020, we organized the first-ever Technovation Launch Event to expand our outreach to under-resourced girls in Turkey. Since 2020, our ambassadors have mentored hundreds of girls each year, helping the youth pursue their interests while solving real-world problems through developing mobile applications or AI models and getting feedback from experts. During the 5th Launch event last year, sponsored by Meta, we reached over 300 girls, including members from other FRC teams, exposing 100% of them to the FIRST community resulting in 55% of them currently participating in our team. Through the years, empowering and guiding young girls to pursue their passion has become an indispensable part of NoktaParantez’s goals.

The second glitch we identified is the absence of hands-on skills in current science education. In response, we developed our Lemon and Automata kits.

Lemon is an educational robotics kit that allows beginners to practice entry level mechanics, electronics, and programming while building biomimetic robots. We manufacture and cut Lemon pieces from recycled wood plates with our CNC laser machine. In 2024, we showcased Lemon at the FabLearn Constructionism Event which took place at Columbia University, New York. We had 24+ learners from all ages, backgrounds and genders participate in our workshop. Recently in January 2025, we organized a two-day instructional practice in Ordu and introduced our kit to children to spark their curiosity for STEM and FIRST. What makes Lemon unique is that it’s an open-sourced, accessible kit that is simple enough for everyone to engage with , yet intricate enough to facilitate vast knowledge on a wide range of topics.

Similarly, our Automata project aims to address the challenge of students' understanding of basic mechanical principles by contributing a tangible learning experience. We designed six versions of this kit, each utilizing a different cam, gear and crank systems, which are further enhanced by customized AR. We are working with the

School Support Foundation (Okul Destek Derneği) who are helping us to reach students in all 81 provinces of Türkiye, and provide workshops to students through online sessions. By integrating augmented reality with hands-on mechanical assembly, Automata Kits bridge the gap between theoretical knowledge and practical application, offering an interactive approach to STEM education. Our goal is to help students to dive into mechanics with ease, by creating an amusing and engaging learning experience that surpasses traditional static models. A defining trait of 6431 is our commitment to providing essential guidance with these kits, ensuring that students feel confident and supported as they navigate a new and challenging curriculum. This leads us to our third crack in the system: the insufficiency of open-sourced education. Our Udemy account (@HisarCS), where we reach over 40K eager students, creates a pioneering and informational STEM hub. With courses spanning from Python to Fusion360, Swift to Raspberry Pi and Lemon, our team members prepare and film educational videos both in Turkish and English. We guide all curious minds around the world with our free STEM content. Our Udemy channel is our way of repairing the cracks within STEM education. We are currently filming 16 new courses of our annual Coding Summit to upload on Udemy. Coding Summit cherishes our “peer-to-peer” learning philosophy. Our team members prepare and direct easy-to-understand STEM courses to an audience aged from 5 to 70. In our most recent Coding Summit, we reached over 400 participants and 35 student instructors, and focused on the theme, “Artificial Intelligence”. We finalized our event with a speech from a guest speaker as usual; this year our alumni İremsu gave a talk on her major, Human Computer Interaction.

Further carrying out our mission, we founded the Incubator of Students Creative Ideas in Athens. By sharing our tradition of Coding Summit, we organize annual Innovation Summits in Greece in collaboration with the American Farm School in Thessaloniki, American Community Schools in Athens, The Queen Morta School in Lithuania, American High School in Florida and Robert College. With this international event and 800+ participants annually, we connect communities across geopolitical landscapes. Reaching 2400+ attendees, our organizations in Athens build connections internationally, creating new STEM guidance networks for research, and in FIRST.

The fourth crack we bridged was the lack of FIRST awareness within the business world. As a team with nearly a decade of experience, 6431 is firm in its belief in building solid, long-term connections. By establishing a professional presence on social media, organizing strategic sponsor meetings, and initiating outreach efforts, we have successfully developed partnerships with international companies such as Fibabanka, Netaş, and Sarmakina. In our journey to reach potential future parents of FRC students, we extend our guidance, inviting them to become integral members of our journey as well.

Glitches, often seen as problems within a system, errors that interrupt the expected flow, assume an entirely different meaning in our understanding; we consider them as opportunities that we create for change, sparks of inspiration, and the gaps to fill. By rejecting the conventional point of view that sees glitches as issues, we embrace them as fresh ground for reinvention and discovery. Because sometimes, all it takes is one unexpected turn to break barriers, challenge expectations, and remodel the future. ;