Empowering Turkish Youth Through STEM Makerspaces

Country of Project Implementation: Türkiye
Sponsoring College: University of Virginia
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Summary
This proposal promoted peace by implementing an innovative engineering education initiative at two high schools in rural Türkiye. The two schools were gifted STEM makerspaces each containing a 3D printer, microprocessors, and more, providing low-income, underserved students access to next-generation skills and hands-on learning.

Project Description
The main issues addressed by this project are income inequality and a lack of opportunity in Türkiye. While I was fortunate to be born to well-educated parents in the United States, I grew up in a very small town with few of the opportunities for advancement afforded by larger cities. I decided on this project because it tackles a more pronounced version of issues I faced in childhood while making use of my unique background in competitive robotics and native Turkish. With this project, educationally underserved students will receive an opportunity to push the bounds of their creativity and learn in-demand technical skills on actual industry-standard hardware.

The final project site, Adana, had opportunities for high impact and fit my connections through friends and family well. Adana has multiple STEM-focused high schools, where the brightest students from across different income brackets are provided a specialized education that nurtures their talents and prepares them to compete for top university programs. One critical connection was Ercan Acımış, who provided close-by storage for project hardware as it arrived and helped us coordinate the project with local school administrators in its early stages.

This project had been planned originally to take place by İzmir on the Western side of Türkiye, but the site was changed after the devastating earthquake of Winter 2023. Adana is near the earthquake’s epicenter along the East Anatolian fault line and was heavily impacted, with many people forced out of work and out of their homes. As a result, I found it more prudent to refocus the project near this area where disruptions to daily life had negatively impacted young students and worsened the effects of existing income inequality. Here, I also had an abundance of local contacts suitable for helping with the project, so shifting to Adana was a natural decision.

No, this project was solely funded through Projects for Peace.
Yes, I have established contact with an interested student at Adana Anadolu Lisesi who is curious about starting up a youth competitive robotics team at the school. I will be remotely mentoring this new rookie team, who will be housed in the STEM makerspace we built and will be using our hardware to make robots and compete this winter. After this season, my hope is to make sure the program has good, sustainable local support and step back to allow it to run autonomously.

Reflection
Peace surely includes physical safety, but a more expansive definition is that peace is what allows people to hope for the future, and it includes the opportunities for education and advancement that underpin a healthy society.

This project helps directly address the economic hopelessness and educational disruption following Türkiye’s earthquake that are challenging Turkish youth today. Short-term benefits are the availability of modern hardware for students to explore programming and engineering skills. Additionally, this project, together with our partnering technology teachers at each school, facilitates the development of hands-on STEM curricula so that our project makes an impact both inside and outside the classroom. In the longer term, our hope in providing these opportunities in STEM to underserved students is to drive them towards careers that are stimulating and economically productive. Ultimately, reducing hopelessness through this initiative and opening more doors for higher-paying careers will help promote peace by economic advancement and improved education.
One significant conflict during the work involved difficulties with international shipping that caused major delays in getting hardware to our storage area and ready for use in the project. Evidently, incoming packages to Türkiye are held under a complex customs policy, Gümrük. Holding periods can range from weeks to months as the necessary paperwork is completed and returned and completed once again unless large fees are paid to expedite the process. This time uncertainty was an issue for the project since the hardware needed to be on site on time, and there was no room in the budget to accommodate the payments that would speed this up. As a result, I switched from the name-brand hardware through international suppliers that I was familiar with and instead focused on sourcing off-brand hardware through domestic platforms to get around the customs issue. This made some of the hardware setup more complicated than originally expected, but it fixed the problem and was the best solution available. One lesson I learned for future projects is the importance of keeping some project funding (~10%) available for discretionary use to address situations like these. I also much appreciated the freedom provided by starting work on this project early: adjusting to these unforeseen issues would have been much more difficult had I begun closer to the deadline.

Engaging with all of the planning and execution from beginning to end for this project has made me much more appreciative of the work that goes into the large, collaborative projects I encounter in my daily life. Ensuring project sustainability and continued impact was much more difficult than I had originally anticipated and required a surprising amount of thought and consideration well after completing my plan and receiving the award. In the research lab, I am used to completing a project and moving on to the next, and this project felt very different in how it continued to demand my attention well after I had thought I had finished.

**Personal Statement**

As a research scientist, stepping into a new domain and leading this project pushed the bounds of my comfort zone. Having this unique opportunity for immediate, real-world impact was exciting and a professional and personal highlight of my year. Interesting learning opportunities included dealing with unexpected challenges of an unfamiliar bureaucracy and communication difficulties across distant timezones. Ultimately, this was a fun and stimulating experience that provided me insight into the challenges of making an impact.

Deniz Olgun