TECH TO EMPOWER

SAHAS KUMARAGURU, ANANYA BOMMAREDDY
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APRIL 26TH, 2025

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Why Tech To Empower

Our parent's story has always stayed with us. Growing up, they were fascinated by engineering—the intricate designs, the possibility of creating something new, the sheer magic of turning ideas into reality. But in their schools, nestled in rural India, engineering was reduced to equations and theory. There was no tinkering, no building, and no room for creativity. Slowly, the spark that once drove them to dream of innovation faded, and they shifted to a career in IT instead.

This isn't just something our parents went through—it's the story of countless students across India, trapped in an educational system that prioritizes rote memorization over hands-on learning. When we compare this to our own experiences in the United States, the difference is stark. Here, we've been encouraged to step beyond textbooks, to explore our talents, and to let creativity shape our understanding of the world. Our teachers have empowered me to think outside the box, and that freedom has been transformative.

It was this contrast that inspired the Tech to Empower project. We realized that we wanted to bring that same sense of discovery and creativity to students in India. By equipping rural schools with the resources and training to teach STEM through hands-on experiences, we can unlock the potential of students who have never had the chance to truly explore their talents.
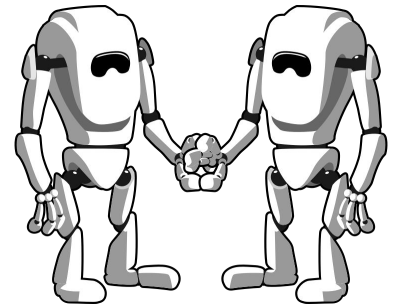
PROJECT GOALS

1. Run fundraising events to raise over $5000
2. Hold awareness camps with for over 1000 students

1. Provide 3D printers to Indian schools

1. Establish 2 robotics teams
2. Expand access to stem education and technology
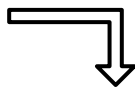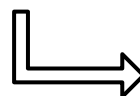
PROBLEMS

- Low event turnout

- Risk of unsuitable partnerships/scams

- Insufficient support from schools

SOLUTIONS

- Partnered with multiple event coordinators
- Set up booths
- Partnered with multiple schools

- Bought from manufacturers
- Shipped straight to schools
- Avoided 3rd parties

- Spoke with officials to get labs set up in offices
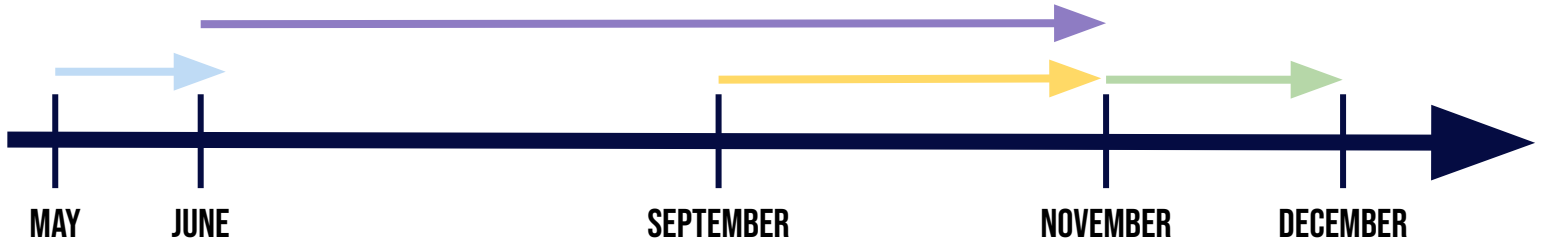- Kept every student engaged

Schedule

CONTACTING PARTNERS

FUNDRAISING

AWARENESS EVENTS

IMPLEMENTING STEM SPACES

MAY   JUNE   SEPTEMBER   NOVEMBER   DECEMBER

Proposed Project Budget

ITEM	PRICE PER (USD)	QUANTITY	TOTAL (USD)
Ender 3 V2 3D printer	223	5	1115
3D printer plastic filament	20	10	200
REV Edukit V2	1,090	2	2180
Team Registration	472	2	944
Total			4439

ITEM	PRICE
Pop Up Tent	50
500W Battery	350
24 Inch TV	74
Total	474

TOTAL: $4913

The Team

PROJECT LEADS

Sahas Kumaraguru

Ananya Bommareddy

Balaji Thiru
VTS CEO

Pro2type
FMHS Robotics
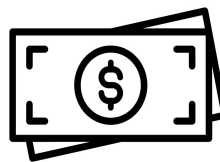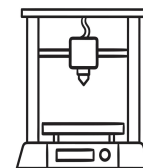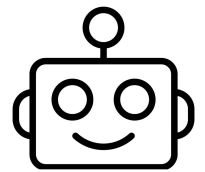
Vijay Moksha
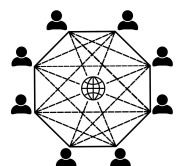Mystic-Mandala CEO

Evaluation of Key Metrics

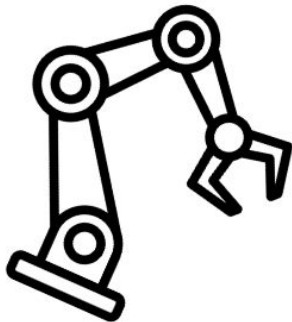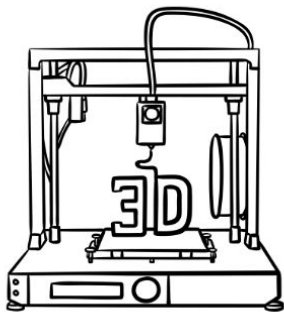$9249 Raised

9 Printers Delivered

2 Robot Teams Formed

Lessons Learned

- Adaptability
- Effective communication
- Leveraging local expertise
- Building trust

A. Statement of Problem

As second-generation immigrants, the stories passed down from our parents about the lack of resources in their schools serve as a stark reminder of the reality that many children still face in public schools located within underprivileged areas in India. Currently, over 29 million students across different regions have inadequate access to technology further diminishing their educational opportunities beyond in-classroom learning. Further, the Central Square Foundation has found that more than 40% of children across over 6000 households have never used technology within their learning environments. According to the India STEM foundation, many rural schools lack science labs, computers, and trained educators, leaving students without exposure to foundational concepts essential for pursuing advanced STEM fields. As we noticed a recurring issue across generations, we've come across various solutions to ease hands-on engagement beyond just the classroom.

Looking for ways to mitigate inequalities to the greatest extent, we've created Tech to Empower- a nonprofit whose mission is to distribute technological resources such as 3D printers, robotics parts, and more to children within grade school to enhance learning opportunities and bolster extracurricular activity irrespective of a child's background or financial limitations. On a deeper level, our mission begins with awareness metrics to gain traction for the stories pertaining to our future changemakers. With sufficient support, livelihoods are destined to be altered. Addressing this disparity is crucial to breaking the cycle of poverty by giving students the tools to build career skills that will empower their ability to contribute back to their economy/community.

B. Project Scope

Tech To Empower aims to alleviate the lack of STEM resources in schools. Our three main issues we identified in students were:

- **lack of awareness** of STEM opportunities
- **lack of education** on how to use technology
- **lack of supplies** for them to tinker with

We structured our project scope to **hit all three** of these problems. The project will need to spread awareness of robotics opportunities, **educate** students on how to compete in robotics, **fundraise** for materials, and **supply** communities with the necessary machines and parts.

Purpose and Benefits

The primary purpose of this project is to empower rural students with the knowledge and tools needed to explore STEM fields, particularly robotics and technology. By introducing them to advanced concepts and fostering a **hands-on approach** to learning, we aim to equip them with the skills necessary to thrive in STEM careers.

Promoting STEM education not only benefits individual students but also has a **transformative impact on their communities**. By providing these students with the foundation to pursue careers as engineers, scientists, or other STEM professionals, we pave the way for them to secure higher-paying jobs. This, in turn, contributes to the **economic development** of their communities as these students grow to become **role models** and reinvest in their local economies. In time, this initiative can create a **cycle of empowerment**, where education drives sustainable community progress.

Rationale

Our parents' stories of pursuing engineering in school but losing interest due to a lack of hands-on opportunities resonated with us. This is a **common narrative** among many **immigrants** from India, where theoretical education often **overshadows** practical application. Hearing these experiences, we realized the potential of so many students whose curiosity and talent go unfulfilled because they **lack access** to tools and opportunities. We wanted to channel these feelings into a movement that inspires the indian-american community here to make a **difference** for students in India.

To bring this vision to life, we partnered with organizations like the **Mystic Mandala Events Foundation,** using their Indian cultural events to raise **funds** for the cause. These events helped us connect with a community that are very familiar with the problem we are combatting. Simultaneously, we collaborated with V**illage Tech School (VTS)** in Chennai, forming a team on the ground to **implement** our initiatives. By bridging resources here with needs in India, we aim to create transformative opportunities for students to explore STEM in **meaningful**, hands-on ways.
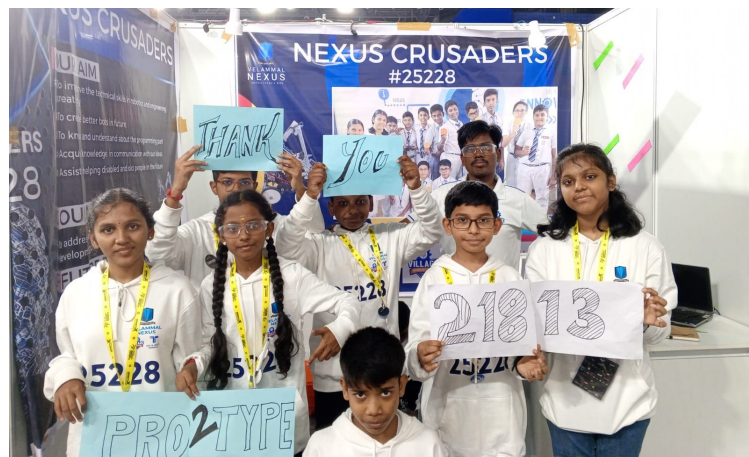
ONE OF THE TEAMS WE CREATED

III. PLANNING & ORGANIZING

A. Project Goals

The primary goal of the Tech to Empower initiative was to expand access to STEM education and robotics for students in underserved rural areas of India. To achieve this, we set the following specific objectives:

Awareness Camps: Conduct **three** STEM awareness camps at various schools, introducing at least **1,000** students to foundational STEM concepts and the FIRST Robotics program. These camps were designed to ignite curiosity and inspire students to explore STEM fields.

3D Printers: Deliver **five Ender 3 V2 3D printers** to schools in rural India. These printers would provide students with hands-on experience in engineering and prototyping, fostering innovation and technical skills.

Robotics Teams: Establish two robotics teams to compete in the India National FIRST Championship. Each team would receive robotics parts and money for competition registration, ensuring they had the resources to design, build, and compete successfully.
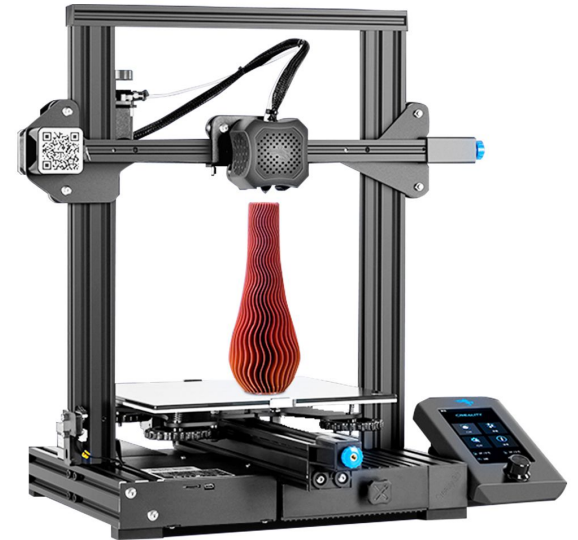
Fundraising

As a **501(c)(3)** nonprofit, we utilized our tax-deductible status to secure donations from individuals and organizations. We planned to set up tents with tvs at Indian cultural events because we needed to resonate with the right audience. We knew that the estimated cost of all the materials we were sending would be around $4500, so we wanted to raise enough money to have some wiggle room. Thus, we set our **fundraising goal as $5000.**

B. Human Management Plan

SAHAS KUMARAGURU - PROJECT LEAD AND ROBOTICS LEAD

Responsibilities: Executing the project, contacting partners in India, working with robotics teams
Strengths/skills: Tech Skills, Strategic Planning, Communication.
Sahas reached out Village Tech Schools to plan awareness events with them. Connected robotics teams with the students in India. Determined cost effective ways to purchase tech.

ANANYA BOMMAREDDY - PROJECT LEAD AND FUNDRAISING COORDINATOR

Responsibilities: Prepping for fundraising events, contacting sponsors
Strengths/skills: Fundraising, Marketing, Communication
Ananya reached out to Mystic Mandala to get free booths at Indian cultural events in order to fundraise. Set up the fundraising material like the presentations and TV.

BALAJI THIRU - VILLAGE TECH SCHOOL CEO

Responsibilities: Advertise awareness events in India, work with schools to create labs with our donations
**Strengths/skills:** Networking, Advertising
Mr. Thiru, in Villupuram helped us with connecting with schools to give 3d printers to. He worked on the field to teach the students and set up meetings.

VIJAY MOKSHA - MYSTIC MANDALA FOUNDER

Responsibilities: Setting up Indian cultural events
Strengths/skills: Fundraising, Marketing
Mr Moksha sets up many cultural events for Indians yearly like Diwali and Holi festivals. He was kind enough to give us free booths at every event he hosted, so we could maximize our donations.
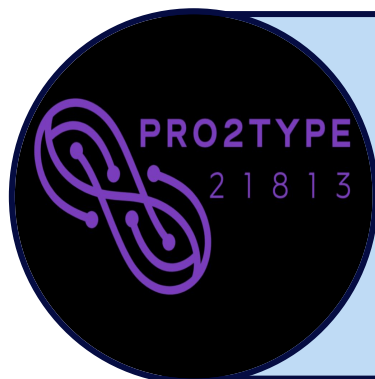
PRO2TYPE - ROBOTICS PARTNERS

Responsibilities: Use robots to help fundraise, mentor the Indian students
Strengths/skills: Robotics knowledge
Pro2type is a 10 member robotics team at FMHS High School who lended us their robot for our outreach events and fundraising to draw in crowds of people.

C. Schedule

MILESTONE 1: CONNECTING WITH PARTNERS

Description: The first milestone of our project focuses on building partnerships. We need to establish an **on-the-ground team** to man the events in India, **an events team** to help run fundraisers**, and a technical team** to support the robotics teams we create. These collaborations lay the foundation for implementing our initiative and ensures we had the resources and networks needed to bring STEM opportunities to rural Indian students.

MILESTONE 2: FUNDRAISING

Description: Through our partnership with organizations, we plan to **raise funds** at cultural events, using our **501(c)(3)** status to **attract** donations. These efforts will provide the resources needed for awareness events, 3D printers, and robotics teams, driving our mission to **empower** rural Indian students.


MILESTONE 3: SETTING UP AWARENESS EVENTS

Description: The third milestone of our project focused on organizing awareness events to introduce STEM concepts and robotics to at least **1,000 schoolchildren in rural India**. These interactive sessions, held in partnership with **local schools** and the on-the-ground team, features hands-on activities and demonstrations designed to spark curiosity and enthusiasm for STEM education. By providing this foundational **exposure**, we aim to inspire students to explore STEM fields and engage in programs like **FIRST Robotics.**

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Description: The fourth milestone involves **sending** 3D printers and robotics parts to India, equipping schools with the tools needed for hands-on STEM learning. We also will connect a robotics team to the rural team to mentor **two teams** to compete in the India National FIRST Championship through virtual workshops.


MILESTONE 1   MILESTONE 2   MILESTONE 3   MILESTONE 4

MAY   JUNE   SEPTEMBER   NOVEMBER   DECEMBER
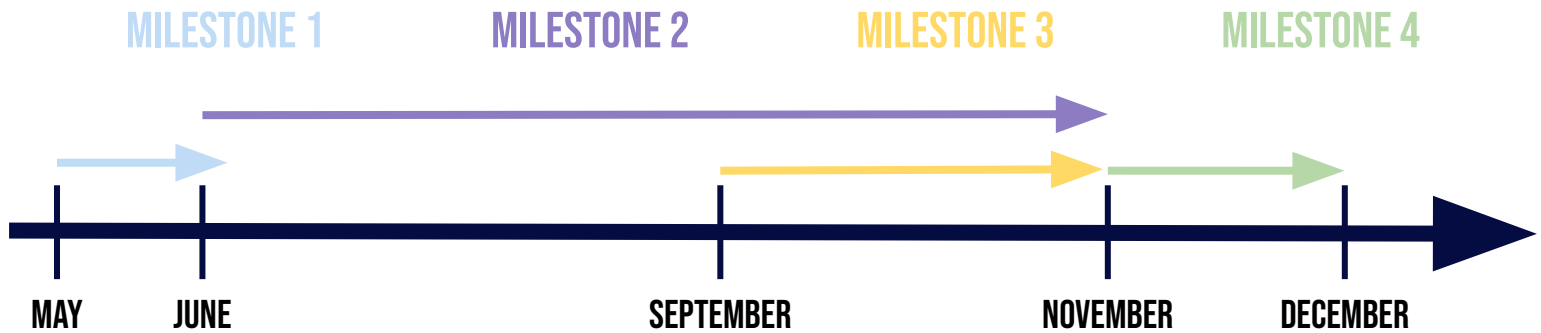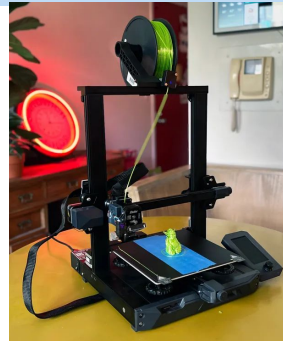
D. Quality Management

The success of Tech to Empower relied on a robust quality management plan to maintain high standards throughout the project. We set clear benchmarks, such as engaging at least **1,000 students** in STEM awareness events, delivering fully functional 3D printers and robotics kits, and preparing **two robotics teams** for the India National FIRST Championship.

We ran **weekly progress reviews** with Village Tech School and robotics teams ensured milestones were on track, from event organization to team training.

We **tracked** and **verified** the timely delivery and **functionality** of 3D printers and robotics kits, addressing any logistical or technical issues promptly. Before students used the equipment, rigorous inspections were conducted to ensure readiness.
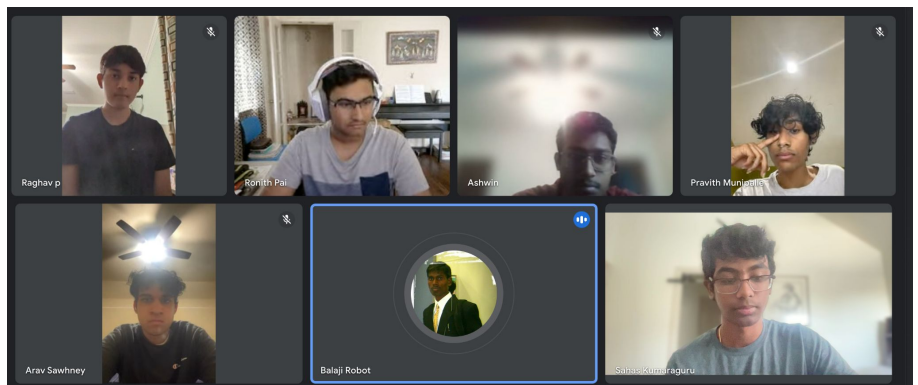
E. Risk Management Plan

POTENTIAL ISSUES	POTENTIAL IMPACT	RESPONSE STRATEGY
Finding the right people to partner within India	Corruption	For robotics parts we went straight to the suppliers and delivered the parts directly to the schools to avoid third party meddling with the funds we raised
Low attendance to events	Decreased funds	Set up booths at multiple events and partnered with multiple event coordinators
Low school support	Hard to set up labs if schools didn't support the mission	Worked with Village Tech Schools who set up some labs in their own offices

F. Proposed Project Budget

ITEM	PRICE
Pop Up Tent	50
500W Battery	350
24 Inch TV	74
Total	474

The project budget included expenses for both **fundraising efforts** and **delivering resources** to India. For fundraising, we minimized costs by securing **free booth spaces** through partnerships with event coordinators. Additional expenses included a portable battery, a tent, and a TV to enhance our booth setup. The TV, **powered by the portable battery**, showcased our project plans and goals to potential donors, helping us attract support. For resource delivery, costs included purchasing 3D printers, robotics parts, and the registration fees for the India National FIRST Championship. These investments were essential to providing students with the tools and opportunities needed to explore STEM and robotics meaningfully.

ITEM	PRICE PER (INR)	PRICE PER (USD)	QUANTITY	TOTAL (USD)
Ender 3 V2 3D printer	18,999.00	223	5	1115
3D printer plastic filament	1,693.47	20	10	200
REV Edukit V2	92,294.12	1,090	2	2180
Team Registration	40000.00	472	2	944
Total				4439

IV. EXECUTION

Connecting With Partners

The first step in executing the Tech to Empower project was establishing **partnerships** with organizations who could provide the expertise, resources, and on-ground support essential for our mission. We began by reaching out to the following organizations and groups to create a **support network:**

1. **Village Tech School (VTS)**: Our partner based in Chennai. VTS was instrumental in connecting us with rural schools and facilitating the **distribution** of 3D printers and robotics kits. Their team helped organize **awareness events** and provided local expertise for implementation.
2. **Mystic Mandala Events Foundation**: This organization allowed us to utilize cultural events to **raise funds**. We secured free booth spaces at their annual Diwali and Holi festivals to maximize community engagement.
3. **Pro2Type Robotics Team**: Their technical knowledge and resources, including the **loan of their robot** for demonstrations, helped us **draw interest** from donors and **inspire** students during awareness events.

Fundraising

The second milestone of the **Tech to Empower** initiative focused on fundraising to achieve our **financial goal of $5,000**. These funds were critical for procuring 3D printers, robotics kits, and materials to establish hands-on STEM learning opportunities for students in rural India.

To captivate potential donors, we borrowed the robot and competition mats from the **Pro2Type Robotics Team** and set up interactive booths at various cultural events hosted by **Mystic Mandala**. Ananya negotiated an **agreement** where we could set up our booths for free at their cultural festivals allowing us to **establish** a presence at their high-traffic events. In return, our team volunteered at their events, assisting with setup, coordination, and cleanup.

Robot Obstacle Course: We had an area where children could drive the robot through an engaging obstacle course. This activity was a major draw, attracting families and creating excitement around our booth.

Fundraising Cont.
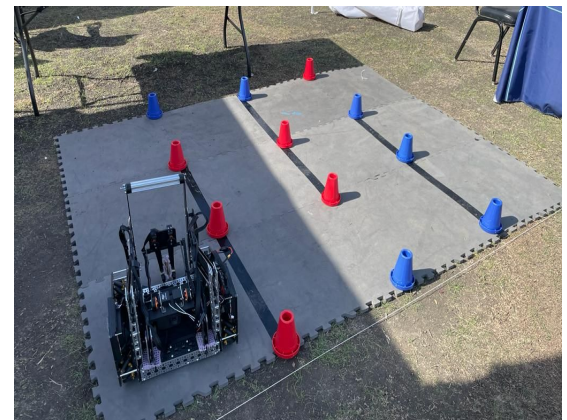

MYSTIC MANDALA DIWALI EVENT

At our first event we struggled to get donations but we met a JP Morgan employee who was moved by our story. He gave us the idea of fundraising through the **Giving Tuesday** program where JP Morgan would match triple our donations. For example if someone donated $5, JP Morgan would add $10 to it making it $15.
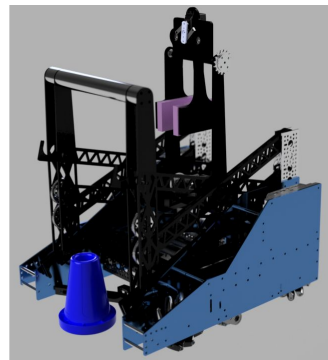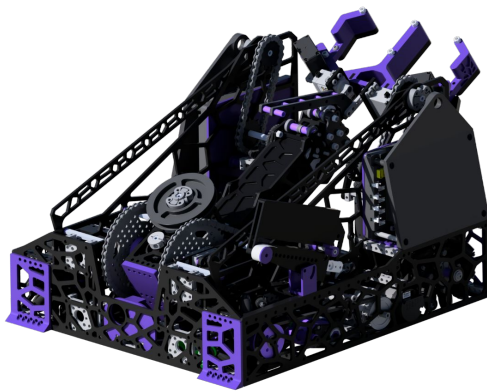
Our fundraising was very effective:

- **Funds Raised**: We exceeded expectations, raising over **$3,000**, and with the JP Morgan program we raised over **$9,000.**
- **Inspiration for Future Events**: The success of the obstacle course activity demonstrated the power of interactive, family-friendly fundraising strategies.

DRONE FOOTAGE OF DIWALI EVENT

ROBOTICS OBSTACLE COURSE

THE TWO PRO2TYPE ROBOTS

FLOWER MOUND DIWALI EVENT

SOURCE	REVENUE ($)
Diwali Event Flower Mound	334
Diwali Mela Mystic Mandala Saturday	1039
Diwali Mela Mystic Mandala Sunday	542
Flower Mound DCICA Garba	650
Wellington Diwali event	518
JP Morgan Chase Giving Tuesday	3083 ⟶ 9249

TOTAL REVENUE: $9249

Awareness Events

The awareness event's main purpose was to build excitement around the STEM labs we were going make. Working closely with our on-ground partner, **Village Tech School (VTS)**, we planned and executed 3 interactive sessions at local schools in the month of November. Two were in person (November 9th and 16th) and one online (November 23rd). While we ourselves couldn't be there in person, VTS was able to conduct the camps and set up projectors so we could still be present.

To capture students' attention, we shared recorded demonstrations of a robot from the **Pro2Type Robotics Team** navigating challenges and completing tasks. These videos provided a glimpse into the exciting possibilities of robotics. VTS built on this by teaching students how to create simple mechanisms using the **DIY robotics kits** that VTS sells. These hands-on activities allowed students to experience the joy of building and problem-solving

Additionally, we introduced students to robotics competitions, such as the **India National FIRST Championship**. By explaining the structure of these competitions and showcasing how other students had successfully participated, we encouraged students to **dream big** and explore their potential in STEM fields. VTS provided guidance on the skills needed for such contests and began training a few promising students to form robotics teams in the future.

These events also involved local teachers, who were given resources and training to continue the work in classrooms.

INTRODUCED OVER 2.5 THOUSAND STUDENTS FROM 5 SCHOOLS TO ROBOTICS PROGRAMS

PICTURES SHOW VARIOUS ONLINE/IN PERSON CAMPS WE CONDUCTED

TTE LOGO

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Implementation

The implementation phase of the **Tech to Empower** initiative marked the realization of our goals, as we successfully delivered critical resources to support STEM education in rural India. Thanks to the success of our fundraising efforts, which concluded on **November 20, 2024**, we exceeded our initial expectations and were able to provide more comprehensive support than originally planned.

On **December 1, 2024**, we purchased and shipped nine **Ender 3 V2 3D printers** and 20 kilograms of filament from Amazon. These printers, chosen for their reliability and affordability, were delivered directly to **Village Tech School (VTS)**. By **December 4, 2024**, VTS had distributed the printers to five rural schools, where teachers and students received training to begin using them. These 3D printers provided **hands-on experience** in engineering and prototyping, allowing students to design and create functional models, enhancing their **understanding** of STEM concepts.

In addition to the 3D printers, we shipped over 1,000 robotics components, including motors, sensors, chassis parts, and controllers, that arrived on **December 5, 2024**. These materials were used to establish **two fully equipped robotics teams** in rural India. The VTS mentors led the students through the process of assembling their robots, teaching vital skills in coding, mechanics, and **teamwork**.

The two teams are officially registered for the **India National FIRST Championship**, scheduled to take place on **January 31, 2025**. This competition represents an extraordinary opportunity for the students to showcase their skills and creativity on a national platform. Participating in such a **prestigious** event will not only challenge their abilities but also inspire them to pursue further education and careers in STEM fields.

STUDENTS USING THE 3D PRINTER
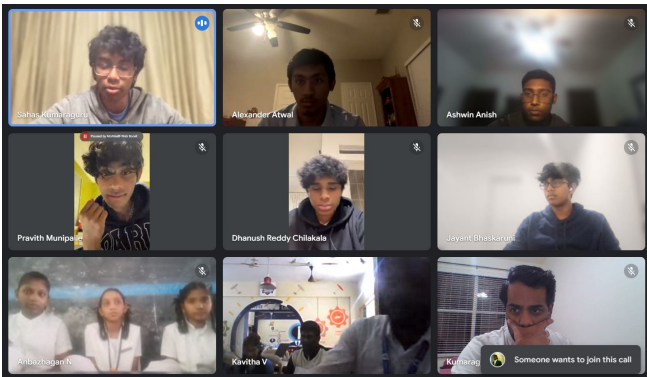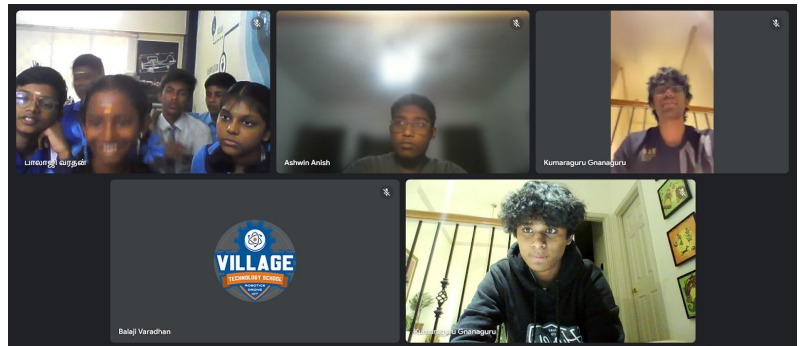

STUDENTS OPENING THE ROBOTICS KITS

V. MONITORING & CONTROLLING

A. Monitoring

Throughout the project, we **monitored** all our partners to ensure the success of each milestone and maintain **accountability** across all activities. We conducted **weekly check-ins** with Village Tech School (VTS) to track progress on the deployment of resources, including the distribution of 3D printers and robotics parts. VTS provided detailed updates on training sessions and student engagement. Additionally, we kept track of all tasks through a **shared google sheets file.**
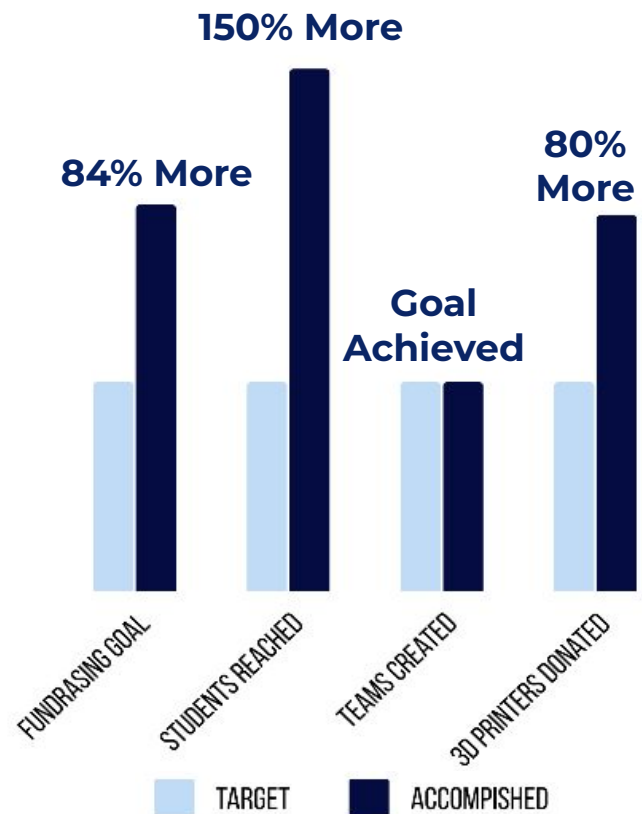

B. Controlling

Throughout the project, we encountered several challenges that required timely solutions. Below are the key problems and the steps we took to address them:

- **Low Booth Traffic at Fundraising Events**
  - **Problem:** Initially, not many people visited our booth at cultural festivals, putting our fundraising goal at risk.
  - **Solution:** We introduced a robot obstacle course, featuring a robot borrowed from the Pro2Type Robotics Team. This interactive activity attracted families and increased engagement. While children drove the robot, we spoke to their parents about our mission, leading to a significant increase in donations.
- **Delayed Shipment of Robotics Parts**
  - **Problem:** Customs delays threatened the timely delivery of over 1,000 robotics parts to India, which could have disrupted the formation of robotics teams.
  - **Solution:** We coordinated closely with Village Tech School (VTS) to expedite local logistics and ensure all materials were delivered by **December 5, 2024**, preserving the timeline for team preparation.
- **Limited Awareness of STEM Opportunities Among Students**
  - **Problem:** Some students in rural areas lacked familiarity with STEM concepts, posing a challenge for participation in robotics activities.
  - **Solution:** We partnered with VTS to conduct hands-on awareness events, using videos, DIY kits, and teacher-led sessions to introduce students to robotics. These efforts ensured students were engaged and prepared for the next steps.

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VI. CLOSING THE PROJECT

A. Evaluation of Key Metrics

METRIC	TARGET	OUTCOME	STATUS
Funds Raised	$5000	$9249	Exceeded
Students Introduced to STEM	1,000	2,500	Exceeded
3D Printers Donated	5	9	Exceeded
Teams Formed	2	2	Met

150% More

84% More

80% More

Goal Achieved

FUNDRAISING GOAL · STUDENTS REACHED · TEAMS CREATED · 3D PRINTERS DONATED

TARGET   ACCOMPLISHED

B. Lessons Learned

One of the biggest takeaways was the importance of **adaptability**. When we realized that our booth wasn't attracting enough attention at the fundraising events, we quickly pivoted by adding the robot obstacle course. This change not only brought people to our booth but also **reinforced** how creativity and responsiveness can **turn** challenges into opportunities.

We also learned the significance of strong partnerships. Collaborating with organizations like **Village Tech School** and **Mystic Mandala Events Foundation** showed us how leveraging local expertise and businesses can aid our efforts. Trusting our partners to execute on the ground allowed us to expand the reach of our project despite being geographically distant.

Another key insight was the value of **clear communication** and **proactive monitoring.** Regular updates with our partners ensured that everyone stayed aligned and allowed us to address issues, such as customs delays, before they escalated.

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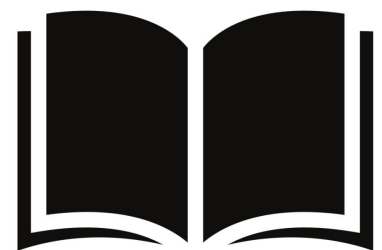
C. Recommendations for Future Projects

Diversify Fundraising Methods:
Future projects could run new ways to attract donors, such as conducting **raffles**, hosting **silent auctions**, or organizing **virtual events**.

Leverage Corporate Matching Programs:
Partnering with corporate initiatives like **JP Morgan's Giving Tuesday event** or other matching gift programs can significantly amplify donations. Researching and securing these opportunities early in the project could maximize financial support.
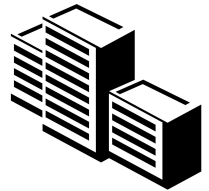
Host Workshops at Fundraising Events:
Offering short, engaging workshops on robotics or STEM basics during fundraising events could attract more attendees and demonstrate the value of the project firsthand, hopefully pushing additional contributions while giving attendees something to discover.
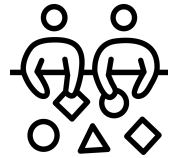
Collaborate with Local Businesses:
By partnering with small businesses for event **sponsorships** or in-kind donations (ex: equipment or venue spaces) we can **offset costs** and help build community awareness for our projects.

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4. https://www.getontop.com/blog/10-key-points-to-prevent-issues-with-international-money-transfers#:~:text=Taxation%20and%20Fees%3A%20Be%20aware,accurately%20budget%20for%20your%20transfers.