Taipei, Taiwan

Taipei American School

RAID ZERO R

4253R “Revengineers”

Angelina, Ben, Eric, Ethan H., Ethan C., Isabella, William, Tinsley

Our Philosophy

With the help from members from team 4253R, we were able to bring the joy of robotics to all people across Taiwan.

TEAM 4253R RAID ZERO

We are from Taipei American School, an international school located in Taiwan. Our school places a heavy emphasis on STEM education. We are grateful for the opportunity to benefit from these resources at our school, and are committed to giving back by supporting underserved students, who lack access to STEM, all across Taiwan. At Raid Zero, we have one objective: Objective Zero.

Objective Zero: Spreading the joy of robotics to all people.

What We Saw

As we talked with other teams and peers in Taiwan, we realized that there was a lack of STEM opportunity, engineering in particular, in the public school system.

Furthermore, living in Taiwan, we've witnessed firsthand the disparities of educational opportunities in aboriginal communities. After speaking with students and teachers who have worked with these communities, we decided to get involved.

So we did some research...

Taiwan's Current Situation

Here's what we found:

- Taiwanese Aboriginal Students have relatively fewer academic opportunities and achievement
- Taiwan public schools have limited exposure to STEM in their formal curriculum
- Club participation is a significant factor in improving STEM opportunities
- Demand for STEM majors has not been met
- The percentage of STEM majors has dropped

https://www.researchgate.net/publication/271322794_An_Analysis_of_Taiwanese_Aboriginal_Students'_Educational_Aspirations
https://www.researchgate.net/publication/375414573_Status_and_Trends_of_STEM_Education_in_Taiwan

IMPACT OF THE ISSUE

THE ISSUE:

Disparity in STEM educational opportunities in early formal education for the majority of students, and aboriginal students in particular.

IMPACT of the ISSUE:

Today's youth, tomorrow's future.

The lack of emphasis for higher STEM learning in Taiwan presents a growing issue for Taiwan's future. With limited learning opportunities, not enough of Taiwan's children are filling the critical STEM needed for continued innovation and development.

即時 要聞 娛樂 運動 全球 社會 地方 產經 股市 房市 生活 健康 橘世代 文教 評論 兩岸 科技 O

台北美國學校高中生陪伴弱勢童 組裝機器人培養興趣

2023-08-13 18:36 聯合報／記者王思慧／花蓮即時報導 + 弱勢家庭

台北美國學校機器人社團、原住民社團與台灣揚帆協會合作，舉辦「2023機器人營」，教導花蓮弱勢部落孩童學做機器車。記者王思慧／攝影

讚 0 分享 分

台北美國學校機器人社團、原住民社團與台灣揚帆協會合作，今天在國立東華大學舉辦夏令營活動，結合兩個社團在機器人與英語教學方面的專長，教導弱勢部落家庭的兒童與青少年學英文、製作機器車，盼能發揮所長，培養小朋友的興趣。

台北美國學校社團主辦「2023機器人營」，邀請14名花蓮弱勢家庭的小朋友參與，不但有品格教育，還有學做機器車與英文遊戲教學。今年要升小學三年級的陳小妹妹對於機器車愛不釋手，非常專注控制車輛的方向，其他小朋友更玩起機器車的競賽，玩得不亦樂乎。

機器人社員紀東曜表示，營隊花了兩個下午的時間，教導小朋友們英文單字，與簡單組裝機器車，機器車的零件來自於之前競賽的多餘材料，像是馬達、主機等，也有用學校的3 玩。

「看 陳宥蓁說，原住民 自己與同學負

Team 4253R featured in a Taiwanese News article

INDIGENOUS IMPACT

Summary of the news article as follows:

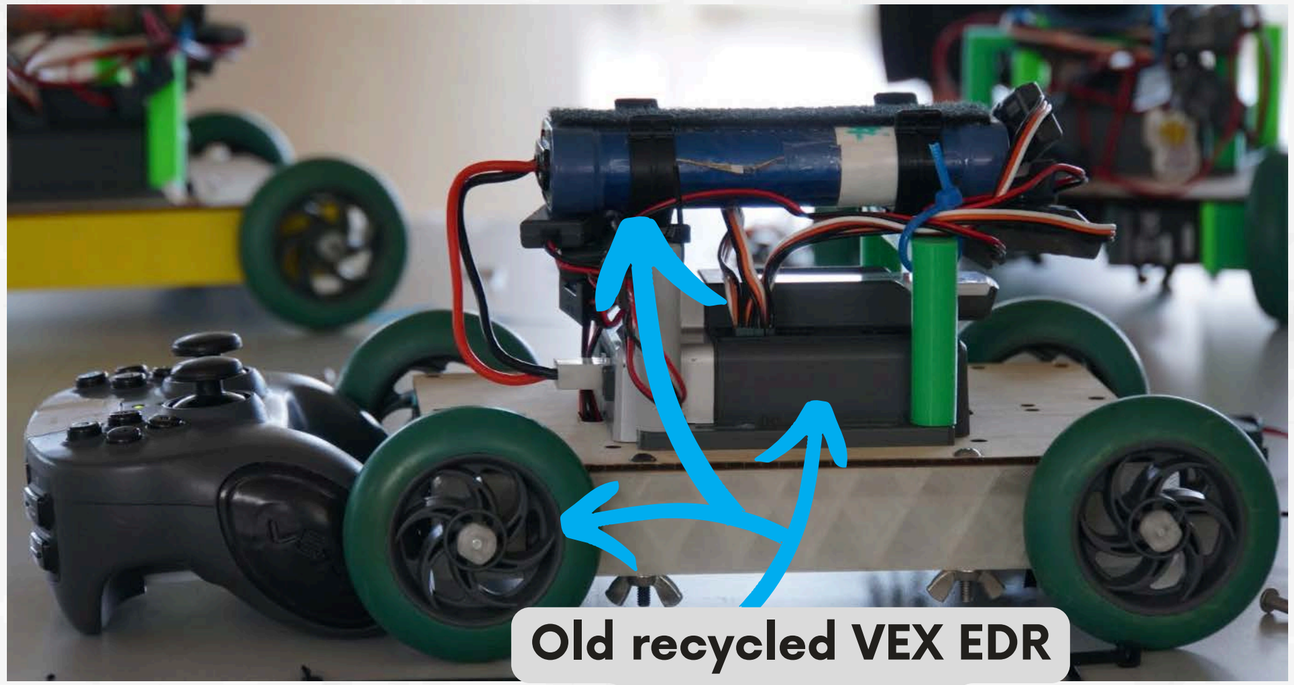
"The Taipei American School Robotics Team (4253), Indigenous Impact Club, and Sail (NGO) hosted the "2023 Robot Camp" at National Dong Hwa University, teaching 14 disadvantaged tribal children in Hualien English and robotics.
Participants assembled simple, easily sourced robot cars without prior experience and took them home to continue learning.
This initiative expanded STEM access for underserved communities, fostering hands-on learning and inspiring interest in technology."

https://udn.com/news/story/6898/7366582 (In Chinese)

How we have continued to make an impact

Indigenous Impact enriches the education of indigenous children through bi-annual trips, extending our efforts to support and inspire underserved communities.

What did we do?



Old recycled VEX EDR components

We designed miniature robots using a variety of old VEX EDR components that were rendered illegal and could not be used for the VRC competition. Paired with laser cut and 3D printed materials, we were able to bring new life to the otherwise useless VEX EDR components.

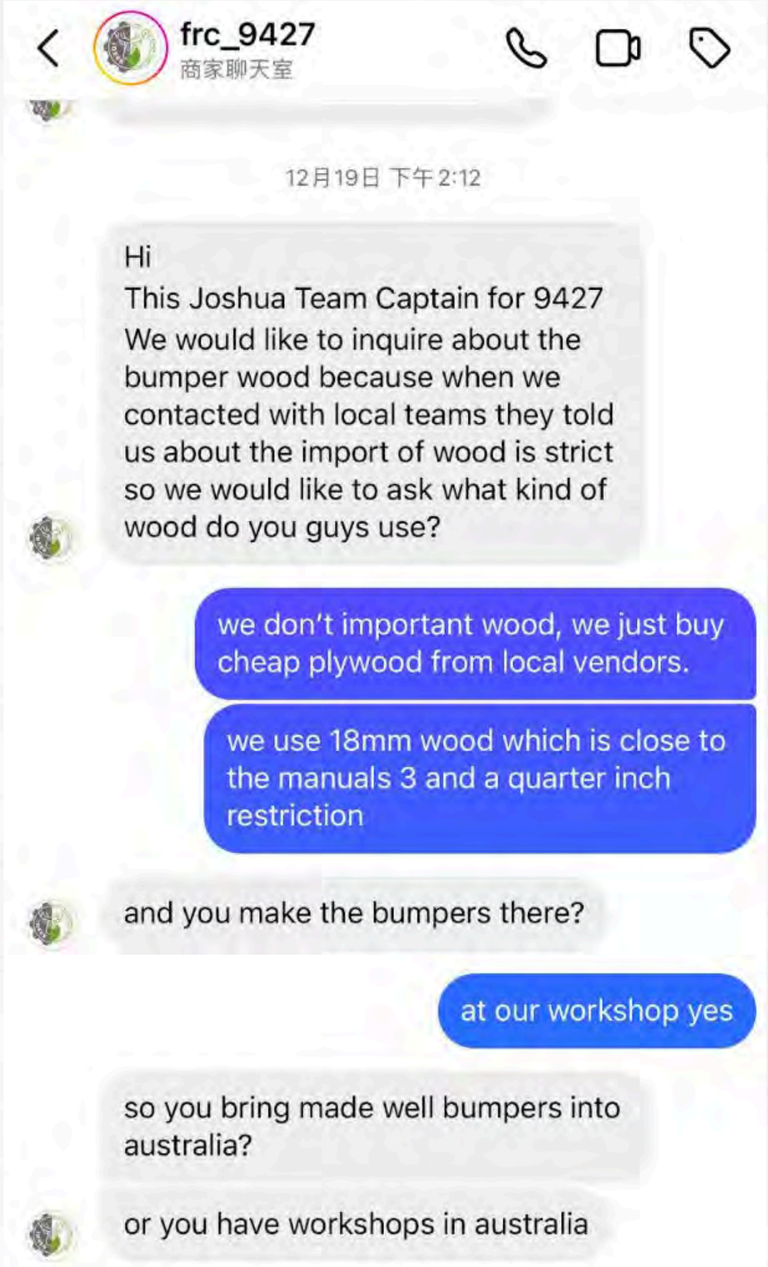
27 schools with 220+ students from across Taiwan visited the TAS Tech Cube during a Robotics Conference hosted by us

TECH CUBE VISITS
AND TRAINING SESSIONS

Understanding that some schools in Taiwan have relatively fewer opportunities and funding towards robotics, we invited local students to visit our school's "Tech Cube", a building dedicated to STEM and robotics education. In these visits, we introduced them to advanced machining methods. We also gave local students in depth workshops detailing in different aspects of robotics - design, fabrication, programming, and electrical.

As the vast majority of CAD software tutorials are published in English, many Chinese speaking Taiwanese teams have difficulty understanding these tutorials. In order to better their overall experience with using CAD softwares, we introduced new teams to CAD softwares and gave them step by step tutorials on the basics of CADing in Chinese.

During this outreach event, we introduced Taiwanese teams to our facilities and ran training sessions on using CAD software, machining parts and programming different types of chassis'.

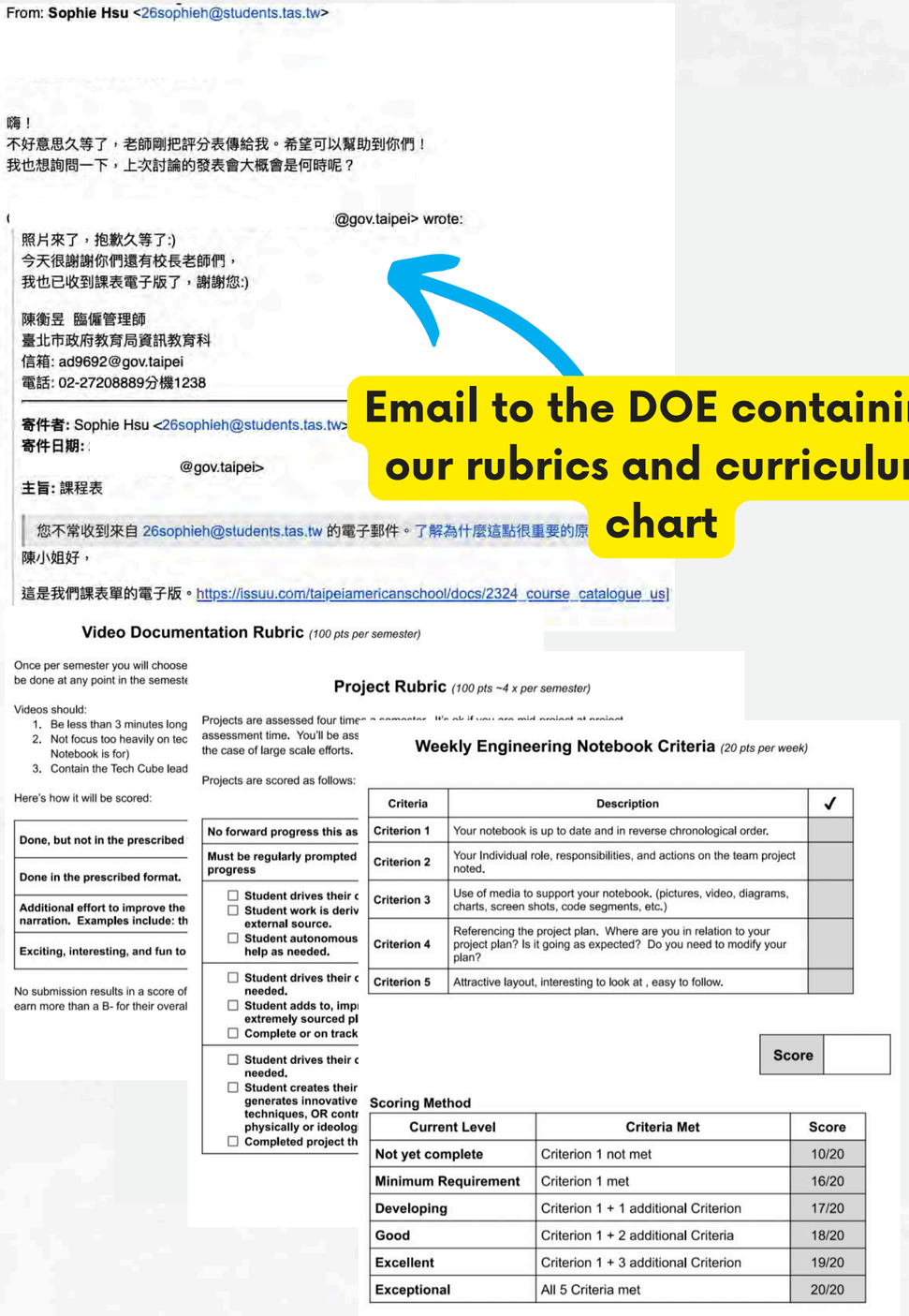


We identified a language barrier for Taiwanese teams, as most Onshape and CAD resources were in English - a language some struggled to understand. To address this, we created Chinese tutorials and launched an online system for quick, accessible support in their preferred language.

We created bilingual tutorials on advanced Onshape features, which we used at an outreach event to teach students valuable CAD skills.

We host scrimmages at our campus to improve the accessibility of FRC fields in Taiwan. Since numerous teams in Taiwan don't have access to an FRC field, holding these scrimmages allows teams to test their robots in a simulated competition environment, leading to higher levels of success.

COLLABORATIONS WITH THE DEPARTMENT OF EDUCATION



After getting involved with initiatives at our school, our organization was given the opportunity to talk to the Taipei DoE (Department of Education).

In order to prepare for this meeting, we developed numerous training plans and fundraising ideas to share with the DoE. The aspect they were most curious in learning about was our curriculum and grading rubrics. To help get robotics centered curriculums launched in schools across Taiwan, we shared all of our robotics course related grading rubrics along with a copy of our curriculum chart with the DOE.

Members of 4253 meeting with Taiwan's Department of Education to increase funding for STEM related activities in Taiwan.

Meeting with Department of Education officials at the TAS tech cube where they toured our facilities and learned of our STEM and project based curriculum.

北市小小工程師培育計畫啟航－大手攜小手，共創跨世代機器人

臺北市政府教育局新聞稿　　請轉交文教記者

業務聯絡：臺北市政府教育局技職教育科　陳秉熙科長　0953-287-353

新聞聯絡：臺北市政府教育局秘書室　余品瑩督學　0930-936-532

【發稿日期：113年11月18日】

【主題：北市小小工程師培育計畫啟航－大手攜小手，共創跨世代機器人】

【臺北報導】隨著機器人技術在各行各業的廣泛應用，從設計、建構到實際運用，學生們需要具備STEAM（科學、技術、工程、藝術和數學）跨域能力。為了培養未來的跨域人才，臺北市政府教育局正式啟動「小小工程師培育計畫」。該計畫由臺北美國學校與臺北市高中職出色的FRC隊伍合作，將LEGO機器人設計轉化為國小學生可以理解的形式，結合STEAM教育探索機器人的世界，透過高中職學生大手攜小手，帶領國小學生從策略、設計、建構、程式編寫到測試，培育小小工程師。

▲北一女中、麗山高中及美國學校學生進行培訓課程

本計畫預定於113學年度第2學期由本市FRC高中職隊伍正式進入國小校園開課，首批將由南門國小、國語實小、忠孝國小、東新國小、大湖國小及士東國小等6校的學童參與，為了讓國小學生有良好的學習體驗，本局與臺北美國學校合作，於今年10月至11月辦理LEGO

Team 4253 featured in a Taipei Dep. of Education news article

Little Engineer's Program

Translation of the News Article is as follows:

The Taipei City Government's Department of Education launched the "Junior Engineer Development Program" with Taipei American School (TAS) and other top high schools to make STEAM education and robotics accessible to young students.

TAS students (Team 4253) hosted "Train the Trainer" sessions, preparing six high school robotics teams to mentor elementary school students in strategy, design, programming, and testing.

How we have continued to make an impact

Building on this collaboration, Team 4253 has continued to promote STEM accessibility. By mentoring student leaders and fostering peer-led learning, our team has expanded the program's reach to underserved schools, ensuring sustainable community impact.

Why It Matters

This initiative demonstrates how empowering students to become mentors creates a ripple effect, inspiring the next generation of innovators and reinforcing STEM's importance in education.

“Little Engineer’s Program” – coming to life

Fundraising process:

- **We reached out to numerous organizations, including the YongLin foundation, a local nonprofit. As a result of our efforts, the YongLin foundation gave us funding for 30 sets of robot kits with extension sets - amounting to $18,000**

- **After fundraising for the robot kits, we reached out to the Taipei Department of Education who connected us with local elementary schools, putting in action the “Little Engineer’s Program”**

Members of 4253R conducting an outreach event at the Taipei Veterans General Hospital

ISSUE	OUR EFFORTS	OUR IMPACT
• Taiwan public schools have limited exposure to STEM	• Hosted workshops and training on advanced robotics for other schools.	• Enabled 27 schools and 220+ students to experience advanced robotics education, inspiring interest and improving STEM skills through hands-on learning.
• Aboriginal kids are not given many opportunities to succeed	• Provided hands-on robotics experiences to indigenous students using Lego SpikePrime and recycled robot kits.	• Empowered aboriginal children with robotics skills and fostered their interest in STEM, with bi-annual visits ensuring continued impact.
• Taiwan public schools not involved in enough robotics competitions	• Fundraised $18,000 with YongLin to supply Lego SpikePrime kits.	• Supported public schools' participation in robotics competitions, providing resources and reducing financial barriers for underfunded teams.
• Inaccessibility of STEM resources due to language barriers	• Translated robotics manuals and built a support network for local teams.	• Improved accessibility to STEM education by providing bilingual resources and real-time support, helping teams overcome language barriers and succeed in robotics.

Team 4253R has addressed STEM education disparities in Taiwan by empowering aboriginal students, mentoring young learners, and creating accessible resources. Through initiatives like the "Little Engineer's Program" and local robotics competitions, we continue to foster innovation and inclusivity, inspiring the next generation of engineers.

A LOOK INTO THE FUTURE - WORKS IN PROGRESS

Click here to see the full slideshow we presented to the DOE

台灣區賽

- 重新舉辦台灣區賽
- 提供技術指導與幫忙
- 增加台灣隊伍參賽的機會

Our proposal for the DOE to bring back the Taiwan FRC regional

Data from cold calling Taiwanese tech companies

Name	Type	Sector	Description	FRC Involvemen	Email	Phone Number	Reached Out	Replied	Rejected	Interested
台積電	Comp…	Tech		semiconductors	invest@tsmc.c	886-3-5682080	☑	☐	☐	☐
台大	School				meoffice@ntu.ec	233662744	☑	☑	☑	☐
中研院	Comp…				hrh@gate.sinica.edu.tw.		☑	☐	☐	☐
台科大	School					886-2-2737-64	☑	☐	☐	☐
銘傳大學	School				psni@mail.mcu.edu.tw		☑	☐	☐	☐
清華大學	School				slxbgs@tsinghua.edu.cn		☑	☐	☐	☐
鴻海	Comp…	Tech			hfj.justice@foxconn.com		☑	☐	☐	☐
和碩聯合科技（p	Comp…	Tech				886-2-8143-900	☑	☐	☐	☐
仁寶電腦工業股(	Comp…	Tech			pcsales@compal.com		☑	☐	☐	☐
明緯企業	Comp…	Tech			info@meanwell.com		☑	☐	☐	☐
信驊科技	Comp…	Tech			media@aspeedtech.com		☑	☑	☑	☐
Acer	Comp…	Tech			investor.relations@acer.com		☐	☐	☐	☐
Asus	Comp…	Tech					☑	☐	☐	☐
Lenovo							☐	☐	☐	☐
HTC	Comp…	Tech				02-2162-6788	☐	☐	☐	☐
台灣大哥大- 富邦	Comp…	Tech					☐	☐	☐	☐
Starlux	Comp…						☐	☐	☐	☐
China Airlines	Comp…						☐	☐	☐	☐
Eva Airlines	Comp…						☐	☐	☐	☐
台塑							☐	☐	☐	☐
萬海							☐	☐	☐	☐
新光							☐	☐	☐	☐
PC Home							☐	☐	☐	☐
Gogoro	Comp…	Tech			ir@gogoro.com		☑	☐	☐	☐
Chimei	Comp…	Tech			service@mail.chimei.com		☑	☐	☐	☐
力晶							☐	☐	☐	☐
富邦	Comp…	Banking					☑	☐	☐	☐

During our most recent visit to the DOE, we coordinated sponsors to bring back the Taiwan FRC regional - this allows a multitude of teams that quit due to high travel fees to compete without the burden of international travel fares

Established and developed the "Little Engineer's program" during a collaboration with the DOE

Working on a fundraising website to connect sponsors with FRC teams, and cold-called 14 companies for potential sponsorships.

STATEMENT FROM SCHOOL ADMINISTRATORS

https://docs.google.com/document/d/1tIuKLrbpp-cGnAWS6O1Jrz_RFfdzsuW0tC7a4-dhl9M/edit?tab=t.0