Robotics Workshops

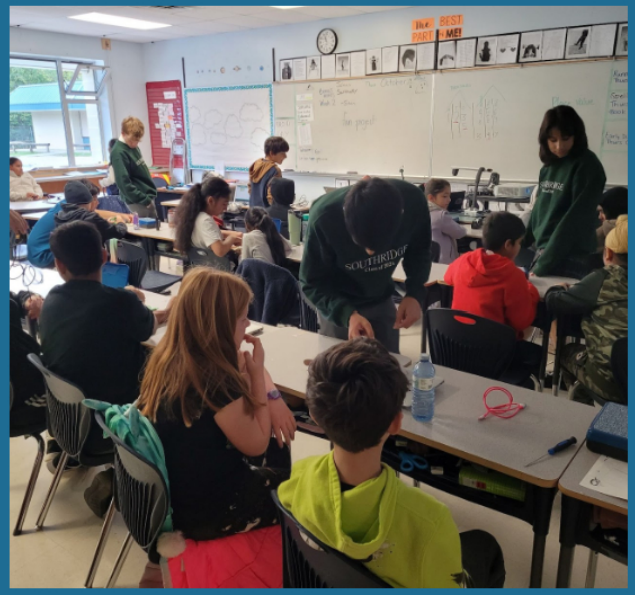
From The Southridge School IRHS Team 87265B

Surrey, British Columbia, Canada

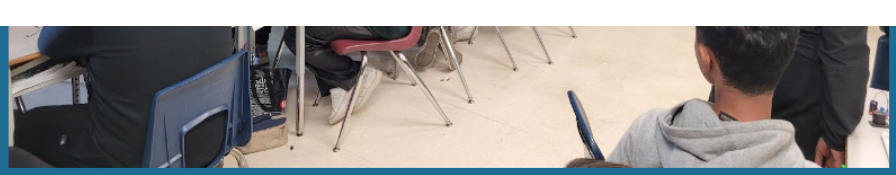
Members: Kavita, Zachary, Amari, Cooper, and Hudson

Our Project:

The project of the Southridge School chapter of the International Robotics Honors Society was to host robotics workshops for grades 5-7 at local elementary schools who do not have an electronics or robotics program in order to promote inclusivity and participation in STEM.



In the end, we were successful in hosting multiple robotics workshops at local elementary schools with a total of over 200 students between the ages of 10 to 12. We hope this initiative has not only expanded access to STEM education, but also sparked



enthusiasm and curiosity among the next generation of innovators, leaving a lasting impact our community.

As a group that exemplifies dedication and excellence, we have been designing, practicing, and perfecting all aspects of our robotics workshop for the past two years. Our journey began in May 2022, where decided to base these workshops around the Arduino, a microcontroller board with an open-source software that can be used to design, build, and program devices that interact with the real world. By basing the curriculum of the workshops on the Arduino, it allowed us to teach the basics of circuitry, electronics, and programming all together without any complex theories in order for the young students to start building and coding their own robots right there and then. We created, and provided dozens of kits for the students to use, which included: an Arduino board, a potentiometer, wires, motors, and 3D-printed parts. As a group, we used our robotics skills to solder together the outputs of every motor, use Fusion360 to design the 3D-printed parts, and create a teachable code for the young students to learn. In total, we spent two years designing, creating, and refining our robotics workshop to ensure a comprehensive and effective learning experience. This extended period allowed us to carefully craft a program that seamlessly blended educational content with hands-on activities, so that each aspect was not only informative but also engaging for the young participants.

Why We Chose This Project:

The main goal for these workshops was to foster a more inclusive environment within the community, and provide opportunities for young students to explore robotics. By making technology and robotics more accessible to youth, we hope to pave the way for a more diverse and inclusive participation in this field.

Technology can be a place of creativity, problem-solving, and imagination, and at Southridge School, we are extremely privileged to have robotics and coding introduced to us in elementary school and further encouraged in high school. As a result, many students in the Southridge robotics program choose to pursue STEM-based education in post-secondary such as computer science and engineering. However, there are many young students who have an interest in technology, but aren't given the opportunity to try coding and robotics thus discouraging them from pursuing careers in the STEM-field. This is most common for young girls, as shown in a study from the *Journal of Experimental Child Psychology* titled 'Programming experience promotes higher STEM motivation among first-grade girls' which states "Girls given programming experience reported higher technology interest and self-efficacy compared with girls without this experience" (Master et al., 2017). Therefore, by targeting elementary schools that do not have robotics programs, these workshops have allowed young students to gain first-hand experience with technology, fostering passion and participation in the STEM-field.

STEM Role Model

The Southridge IRHS Role Model is Mr. Morris

Mr. Morris is not just the robotics teacher at Southridge School, but a leader who has almost single-handedly built up the robotics program at Southridge from scratch. He started the first robotics course and VEX competition team at Southridge, initiated the annual Southridge-hosted VEX robotics tournament, and was a huge support in the creation and running of this IRHS chapter. All in all, Mr. Morris is the foundation of robotics at our school.

Mr. Morris inspires inclusivity through his hands-off approach to teaching. It is a testament to his maturity, foresight, and long-term vision for our robotics program that he is able to support us through challenges without directly giving his students the answers. Instead, he equips them with the tools to succeed and figure it out for themselves. The skill that he instills the most is collaboration. In his grade 8 classes, he tells students that they cannot ask him for help unless they have tried getting help from at least three other classmates, as a way of getting students into the habit of collaborating. Additionally, his emphasis on the design process equips the entire program with the skills and information to support each other. As a group run by older students who have gone through all of Mr. Morris's classes, the IRHS is built off the participative and inclusive culture that's been set in place for us since grade 8.

Reflections

Kavita Basi, Grade 12: Founder & President

Throughout my 2-year experience as president of the Southridge International Robotics Honors Society chapter, I found that the society not only motivates and inspires the next generation of innovators but also fosters a sense of community among like-minded individuals. Growing up, I felt the sectors of STEM and service had very limited intersection, therefore the IRHS stood out to me because of their emphasis on using STEM as a tool for positive impact. The unique combination of STEM and service makes the IRHS an invaluable catalyst for propelling the future leaders of robotics towards creating a more imaginative and compassionate world.

For me, the project to host robotics workshops at local elementary schools has been a long 2-year journey, so heading into the first workshop, I was focused on everything going as smooth as possible. However once the workshop began, I connected directly with young students and was completely caught off guard from the enthusiasm and eagerness to learn. I quickly realized this was all a new experience, and the complex idea of coding and building robotics was an exciting topic they were now able to explore due to the actions of our IRHS group. I saw sparkling eyes when a robot was finally completed, I witnessed curiosity ignite when imagination was brought to life, and most of all, I saw myself in the children I was teaching and the excitement I had once felt when I first learned robotics. The big picture and tunnel vision towards the overarching goal faded, and the focus shifted towards each young individual life I was positively affecting, regardless of how big or small. All in all, this project has been the most fulfilling and illuminating experience of my life, and I am proud to have taken part in the journey towards a more inclusive STEM community.

Zachary Zeng, Grade 11: Vice President

Initially, joining IRHS two years ago, I was wary about whether I would enjoy the experience. Two years later, not only has working on the IRHS inspired my journey to continue in the field of STEM, but I have also felt that it gave the concepts I learned in school a renewed purpose. It is rare to share one of your passions with other people, and it has helped develop my passion for service and teaching. IRHS has also provided me with my first valuable leadership opportunity as vice president. After two years of occasionally leading meetings and parts of presentations during workshops, I can now give talks to the entire robotics VEX club team and feel comfortable teaching and leading younger students

students.

For me, the project has taught me management skills more than anything else. Never before did I have to take on a task with so many interlinked phases, steps, and necessities. From emailing schools, ordering parts, assembling kits, 3D printing components, creating presentations, and teaching, the challenges faced while hosting our workshops have equipped me with skills to take on any challenge. Taking on the project of teaching robotics to elementary school-aged children has given me a new appreciation for teachers. It wasn't until I stood in front of a classroom of 20 restless children that I realized the poise and mastery it takes to command a classroom. It was when I got up to teach that I realized how impactful someone's first encounter with something can be. As I shared my first teaching experience with the kids' first encounters with robotics, I was able to witness someone's initial fascination with something they were passionate about. The project not only presented challenges that equipped me with essential skills but also made me more grateful for the teachers I have had and gave me a new appreciation for helping people discover their passion.

Cooper Luking, Grade 12: Team Member

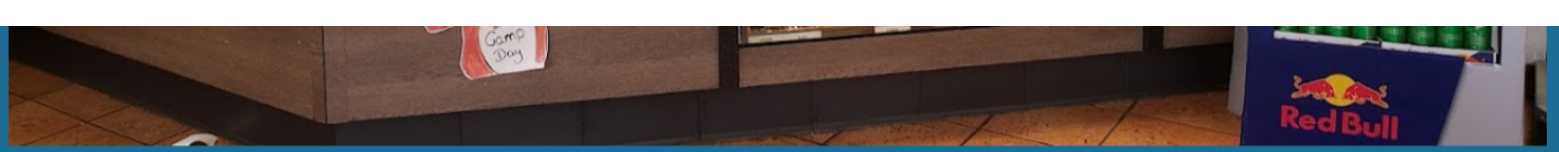
To me, the IRHS is a place where I can build my own skills as a volunteer and teacher, while at the same time sharing my love of robotics with other kids. My goal in joining this club was to foster a group of children who have a love for engineering and introduce kids to robotics who have never experienced it before.

When we started our first few workshops I was unsure about how they would receive us, but I felt encouraged after seeing the kids and helping them through the workshop. Each of the kids was very open to our help, and some of them seemed particularly interested in what we had to teach them, asking questions and being curious about all the different components and coding aspects. Seeing them be satisfied with the final product, gave me a sense of joy and accomplishment as I saw the firsthand benefits of what we were doing.

Celebration

Tim Hortons

We celebrated our success with a group trip to Tim Hortons. We decided on Tim Hortons because it had been a staple throughout our time working on the project. After many hours of teaching robotics workshops at a school, we would consistently meet at Tim Hortons to discuss future changes to the curriculum of the workshops. Therefore, after our final workshop this year, we found that Tim Horton would be the perfect spot to celebrate the project that was 2 years in the making.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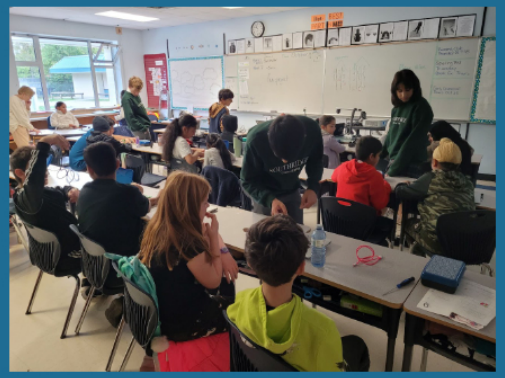

SOUTHRIDGE.
We are all one.

ONE IDEA CAN INFLUENCE THE WORLD.
ONE VOICE CAN CONNECT A COMMUNITY.
ONE SPIRIT CAN INSPIRE OTHERS TO SOAR.
ONE COMMUNITY CAN CONTRIBUTE EXTRAORDINARILY.

To whom it may concern,

I am writing to express that The Southridge School IRHS has met the criteria for the IRHS Service Award. They have successfully completed a project to host robotics workshops with a local elementary school, working with over 200 students from Grade 5-7 during this time.

If you have any more questions or need additional information please don't hesitate to contact me.

Sincerely,

Braeden Pistawka

Sr. School Vice Principal - Student Life

bpistawka@southridge.ca