OVIN 1.0 Regional Future Workforce Program: Engaging the Future Automobility Generation

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Ontario

Program Overview

The OVIN Region Workforce Program set out to prepare the next generation of students for the shifting economic needs of the region/ nation. The program was developed to spark student interest in post-secondary and career pathways in STEM and Automobility to create a talent pipeline by developing an evidence-based summer camp and fall in-school robotics program for students in grades 7 and 9. St. Clair College along with community partners developed a robust STEM robotics program/ curriculum with the capacity for replicability and sustainability. The data below is a preliminary analysis of the data captured pre- and post-test, via surveys distributed to both teachers and students who participated in the program. The pre-post student survey has been developed for both elementary and high school students (Grade 7 and Grade 9) utilizing Unfried's et al. (2015) S-STEM survey.

Program Logistics

Curriculum and Resources:

- 400 LEGO SPIKE Prime robots were purchased from Studica Ltd for the in-school program. Studica was selected through the RFP process at a rate of $425/robot (retail $500/robot). These were provided at a ratio of 1 robot to 2 students.
- 3 St. Clair College Robotics Faculty and 2 PhD candidates from the University of Windsor's Faculty of Education were hired to develop the curriculum in conjunction with the LEGO robots.
- 4 resources per lesson:
  - Lesson Plan document
  - PowerPoint Lesson
  - Teacher Resource
  - Student Resource
- Schools were required to provide access to a laptop/iPad/Chromebook cart with a class set, in order to run the free LEGO Spike Prime app.

Program Staff:

- 20 St. Clair College robotics students and 15 University of Windsor Faculty of Education pre-service education students were hired to deliver the program.
- 35 instructors total.
- Mileage was compensated for those travelling to Chatham.
- 2 Part-time administration staff were assigned to the project for 20hrs per week.

AT A GLANCE

- Grade 7 and Grade 9
- 4 school boards:
  1. Greater Essex County District School Board
  2. Windsor Essex Catholic District School Board
  3. St. Clair Catholic District School Board
  4. Lambton Kent District School Board
- Hosted on Fridays in both Windsor-Essex and Chatham-Kent schools.
- 5 weeks in duration.
- 1-hour long lessons.
- Alignment with Ontario science and math curriculum.
- Goal: Increase student **and** teacher understanding/confidence in STEM as well as interest in Automobility!

33 Classrooms
11 Schools
800 students

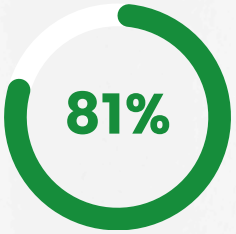
PARTNERS

WE-tech ALLIANCE
ST. CLAIR COLLEGE
centerline
University of Windsor
FIRST CANADA
INVEST WINDSOR ESSEX
WEST
Women's Enterprise Skills Training of Windsor Inc.
St. Clair Catholic District School Board
LEGO education
Lambton Kent District School Board
Windsor-Essex Catholic District School Board

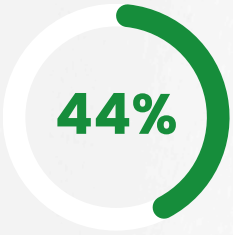
Note: Research Ethics Board (REB) clearance was obtained for the collection of data, in accordance with the Tri-Agency. To maintain confidentiality, data was collected without identifiers.

Impact

Students: Sample size- approx. 550 students (out of 800)
68% Response Rate

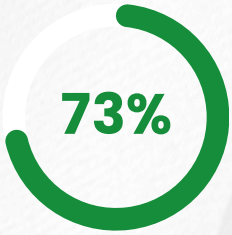


81% of student respondents indicated that they had a "very positive" or "positive" perception of the program.



44% of student respondents indicated that the STEM program altered their opinions and interest in STEM.

78% of student respondents indicated that the STEM program content was at a level they could easily understand and learn from.



73% of student respondents indicated that they found the STEM program instructors to be engaging.

"The people who came into our class where great teachers and helped me and my partner in need. The course was very fun, and I enjoyed it."

"I liked how we were provided with materials & lesson plans. If we weren't sure about how to build a certain step, I'm glad the instructors were able to help us."

"I enjoyed that they incorporated learning with something hands on and fun. I liked that we could work on our own time without due assignments or tests to see how we were doing. The program was good because it was made for kids to learn instead of for teachers to teach."

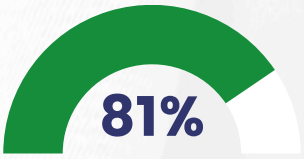
NOTE

- A common theme noted in the testimonials received about the in-school program pointed to the value of the STEM instructors who were St. Clair College and University of Windsor students.
- The dynamic (and seemingly unexpected) pairing was highly successful.
- Instructors hired for the program expressed the value of the program on their own learning and understanding of STEM/Automobility!

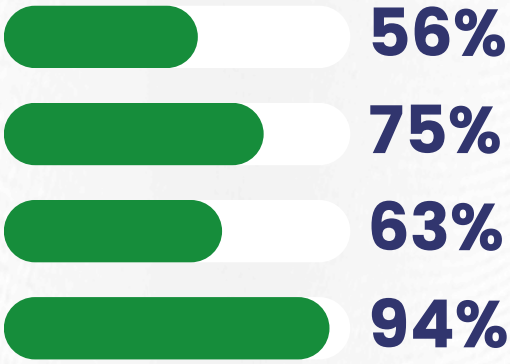
Impact

Teachers: Sample size- approx. 20 teachers (out of 25)
80% Response Rate

69% of teacher respondents indicated that they had "very positive" perceptions of the program overall. All other respondents (31%) indicated that they had "positive" perceptions of the program.



81% of teacher respondents indicated that they thought the STEM materials (robots and curriculum documents) used for the program were "great". All other respondents (19%) indicated that they felt the materials were "good".



56% of teacher respondents indicated that the STEM program positively altered their perceptions of teaching STEM.

75% of teacher respondents indicated that the program positively altered their confidence teaching STEM.

63% of teacher respondents indicated that they thought the program content provided adequate opportunities for assessment.

94% of teacher respondents indicated that they thought the program aligned well with the Ontario curriculum.

100% of teacher respondents indicated that they thought the program content was at a level that their students could understand and learn from.

100% of teacher respondents indicated that they found the STEM program instructors to be engaging.

"I loved it all. Very engaging students loved it. great program. Although coding is part of the curriculum it's very minor, the robotics would need to include topics such as chemistry, ecology, electricity (static and current), or earth and space. These are the contents of the grade 9 curriculum in science. The mini-lessons at the beginning were great. They were thought-provoking and set the tone for the lessons. lots of fun."

"This was a fantastic and hands-on program. The kids loved every moment of it. It was a great opportunity for them to practice trial and error. Thanks so much for giving our group this awesome opportunity."

"Awesome program. Great instruction by fac of ed students robotic students. The teacher did a wonderful job leading the learning experience. Consider including iPads (expensive) as part of the tech packing. School tech is not reliable. I would welcome this program back every year."

NOTE

- In 2022 the Ontario Science curriculum was updated and modernized to ensure all students have the foundational and transferable skills they need in a rapidly changing world, with an ongoing focus on science, technology, engineering and mathematics (STEM).
- The curriculum was last revised in 2007.
- The OVIN STEM robotics program met the needs of these curricular changes and supported teachers in its adoption!

Conclusion

OVIN has made this STEM Robotics Program a reality with support from the Regional Workforce Program. We all very much appreciate your consideration for additional funding so that the program can continue to ensure equitable access to STEM programming amongst all student groups in our local community. This program, if sustained, has the capacity to define best practices for talent pipelines, which can be leveraged to other communities across Ontario!

Unfried, A., Faber, M., Stanhope, D. S., & Wiebe, E. (2015). The development and validation of a measure of student attitudes toward science, technology, engineering, and math (S-STEM). Journal of Psychoeducational Assessment, 33(7), 622–639