CODE HEROES

DIGITAL LITERACY IN CORNWALL AND SURROUNDING AREA: CODE HEROES PROGRAM EVALUATION

Program Evaluation of Code Heroes

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EASTERN ONTARIO
TRAINING BOARD
COMMISION DE FORMATION
DE L'EST ONTARIEN

For the

Social Development Council
of Cornwall & area
"building stronger communities"

Conseil de développement social
de Cornwall et de la région
"renforcer les communautés"

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Background

The Ontario Trillium Foundation Seed Investment Stream supports the development of new ideas and different approaches to achieving results. The funding allows non-profit organizations to experiment with new or better ways of doing things, test ideas, and then evaluate their hypotheses[1].

In November 2016, the Social Development Council of Cornwall and Area (Stormont, Dundas & Glengarry and Akwesasne), in partnership with Code Heroes, was successful in securing support from the Ontario Trillium Foundation Seed Program to pilot the economical delivery of digital literacy training within Cornwall, Ontario and surrounding rural communities.

The Social Development Council of Cornwall and Area strives to promote positive social change through advocacy, innovation and facilitation. Under the leadership of The Board of Directors and Executive Director, Alex de Wit, the organization endeavours to build communities and support social development through change.

Code Heroes was launched in May 2016 by Kelly Bergeron as a non-for-profit organization who had tested a workshop-type approach to digital literacy and found that the feedback confirmed these types of educational opportunities were lacking in this region. She set out to create a program similar to Ladies Learning Code that would bring tech education to the youth of the region.

The Social Development Council of Cornwall and Area and Code Heroes contended that digital literacy training was less available in rural communities than in large urban centres. Making this training available in rural communities at a nominal fee would provide youth in rural communities with the same opportunities of youth in urban areas. This early exposure is viewed as key to inspiring the interest of learners that leads to further education and the opportunity to pursue a career in computer technology.

The goals of the pilot project was to:

1. Deliver digital literacy to 50 youths per week over a 52 week period with no more than 20 students per class.
2. Collect data related to the demographics of the participants
3. Evaluate the benefit to the participants and the community at large.
4. Evaluate the sustainability of the training delivery using a pay per service model.
5. Conduct a literacy review of similar programs in other communities.

Code Heroes approached The Social Development Council of Cornwall and Area in the summer of 2016 to partner on bringing these workshops to the area, during a successful summer pilot of Code Heroes programming in downtown Cornwall. Code Heroes is a sole-proprietorship with a mandate to bring equal-opportunity technology and innovation classes to their rural communities in Eastern Ontario. Digital literacy training delivered by Code Heroes includes coding, graphic design, game design, and digital marketing. In the summer of 2016, Code Heroes chose to dissolve as a non-profit community agency and became a for-profit entity. Due to this change from the non-profit to for-profit, we decided to hire the Kelly Bergeron with the Social Development Council of Cornwall and Area as our Director of Digital

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[1] OTF Investment Stream: SEED, Ontario Trillium Foundation, http://www.otf.ca/sites/default/files/seed_stream.pdf

Services and signed an memorandum of understanding to split %50 of any income generated over and above that offered through the Ontario Trillium Foundation. The 50% paid to Code Heroes was to purchase the creative material owned by Code Heroes and offered through the program in accordance with generally recognized accounting procedures for the non-profit sector. Leading up to and over the span of the granting period, Code Heroes contributed an estimated $30,000 in start-up funds and in funds for marketing and promotional materials.

With the pilot project concluding in November 2017, The Social Development Council of Cornwall and Area commissioned the Eastern Ontario Training Board to conduct an independent, third party-review focused on evaluating the benefit of the digital literacy classes to participating youth and the communities of Cornwall and surrounding area as well as to conduct an overview of the operation of similar digital literacy programs offered in other communities.

Digital Literacy in Canada

In 2016, the Information and Communications Technology Council published "Digital Talent – Road to 2020 and Beyond – A National Strategy to Develop Canada's Talent in a Global Digital Economy. The report highlights the importance of the Information and Communication Technology sector to the growth of the Canadian economy stating that "Canada's leadership in the global economy will depend on its ability to capture the benefits of emerging digital trends. In the next 3 to 5 years, the adoption of smart and connected technologies such as the Internet of Things (IoT), will continuously reshape all industrial sectors, including manufacturing, financial services, health, transportation, essential services and cities, as well as media and creative industries…Despite the importance of technology adoption to business

sector innovation and competitiveness, Canada's adoption rate remains low compared to our international counterparts"[2].

The report points to the lack of skilled workers as a significant contributor to this limited adoption and identifies a strategic focus on seven areas:

1. Nurturing a strong youth talent pipeline.
2. Leverage Canada's diverse talent.
3. Supporting workforce upskilling to enhance digital adoption.
4. Attracting and retaining global digital talent.
5. Strengthening digital literacy and digital skills for Canadians.
6. Fostering digital entrepreneurship.
7. Building labour mobility pathways to fill high demand occupations.[3]

Recognizing that digital literacy can have a significant impact on personal and community economic prosperity, a number of grassroots initiatives have taken form across Canada including Kids Code Jeunesse, Actua Canada, Canada Learning Code (formerly Ladies Learning Code) and the newly-formed Black Boys Code.

They share a number of common traits:
- Established as non-profits with the vision of impacting not only their specific audience but creating digitally fluent communities.
- Participants register for training options including workshops, boot camps, code camps and events
- Many of the events are available at no or low cost through the support of corporate sponsors and private donors.
- Rely on volunteer mentors to provide learner support.
- All of the initiatives provide Educator training in order to broaden the reach of their initiative.
- Ladies Learning Code had launched a "Code Mobile", a mobile computer lab that brings training to learners.

It is within this environment that the Social Development Council of Cornwall and Area and Code Heroes sought to utilize the workshop model to test the feasibility of the delivery of pay-for-service digital literacy to bridge the gap in innovation that exists between large cities and less populated areas.

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[2] Digital Talent – Road to 2020 and Beyond – A National Strategy to Develop Canada's Talent in a Global Digital Economy, Information and Communications Technology Council, 2016 p. 6

[3] Ibid, p. 7

The Code Heroes experience in Cornwall and the United Counties of Stormont, Dundas and Glengarry (SDG)

The Social Development Council of Cornwall and Area partnered with Code Heroes, a digital literacy initiative established in Cornwall, Ontario to deliver affordable and fun workshops that empower the residents of SDG through digital literacy training. Together they proposed to provide 2 to 4 hour-classes to an average of 50 youths per week in a variety of topics such as Digital Marketing, Programming, Robotics and Game Design. They set the cost at $20.00 per trainee per class, much lower than the $80.00 to $100.00 cost of classes in urban centres. The goal of the SEED Grant was to gather data on the learners over a one-year period, evaluate the benefit of the training to both individual trainees and the community and to assess the long-term feasibility of the training model.

The initiative launched in November 2016 (thanks to the successful OTF Seed Grant) in a computer lab set up in the centrally-located municipality of Cornwall, Ontario. However, interviews with the Code Heroes founder and the Executive Director of the Social Development Council of Cornwall and Area revealed that the proposed model of having learners gather at a centrally-located computer lab would neither achieve the required level of participation nor meet the needs of learners outside of the municipality.

During an interview, the Founder of Code Heroes(Kelly Bergeron) attributed the lack of response from the residents of Cornwall was due to a consistently demonstrated low level of interest in technology-related activities. The number of people employed directly in technology-related occupations in Stormont, Dundas and Glengarry substantiates this view. The latest Statistics Canada Census data available identifies 945 individuals working in eleven information technology occupations in SDG as compared to 1,190 in neighbouring communities of the United Counties of Leeds and Grenville and 1,805 in Prescott and Russell.

Recently released Statistics Canada Census 2016 data highlights a disturbing lack of interest in technology. Between 2006 and 2016, there were 28% fewer graduates in Visual Arts and Communications which includes communication technologies and support services. The other fields experiencing decline include architecture and engineering, math and technology with an 11% decline in the number of graduates.

At the same time, leaders in the community are beginning to recognize the need for increased digital literacy. A gathering of Employment Ontario services in November 2017 focused on the need for digital literacy to enhance the employability of jobseekers in the area.

A second session conducted that month(November 2017) used research by the Brookfield Institution to focus on the impact of automation on skills requirements was conducted collaboratively by the Ministry of Advanced Education and Skills Development and the Ministry of Economic Development and Growth (Ontario).

Early in January, 2017, the Social Development Council of Cornwall and Area and the Code Heroes project team decided that, to meet both the needs of learners and the interest expressed in rural communities, it would be necessary to take the training to the learner. The team decided that pivot was required in

their business plan, and they decided to begin offering the program in classrooms throughout the Champlain Region.

Number of Learners and Workshops

Upper Canada District School Board and outreach to schools across communities began. A fee schedule was established charging a nominal fee of $100.00/training session to be paid by participating schools.

During the one-year period from November 2016 to November 2017, 100 workshops were delivered to a total of 2,180 learners. The following table highlights the number of workshops delivered, the locations delivery took place and the total number of participating learners in each location.

Communities in Eastern Ontario	Number of Workshops / Training Days	Number of learners
Alexandria	12	182
Avonmore	5	249
Brockville	5	39
Chesterville	1	10
Cornwall	24	358
Finch	1	18
Ingleside	4	66
Iroquois	16	735
Maxville	5	99
Morrisburg	2	30
Smith's Falls	5	23
Vankleek Hill	9	189
Williamstown	10	164
Winchester	1	18
Total	**100**	**2,180**

Over a 52 week period, there were a total of 2,180 learners or an average of 42 learners per week. This average is slightly lower than the objective of 50 learners per week. There were six training days that had to be cancelled due to poor weather conditions. Had these sessions taken place, it is likely that the participation goal could have been met.

The Seed Project outline also indicated that 1 to 3 volunteers would support the instructor at each session. This is a model used successfully at other code training non-profits such as Ladies Learning Code and Kids Code Jeunesse. The volunteers not only maintain an ideal learner/educator ratio but introduces the learners to a variety of advocates for opportunities in technology.

While there were some experiences where volunteers were available in the classroom, the goal of using volunteers in all the Code Heroes training sessions was not achieved. The trainer pointed to a simple lack of people locally who are involved and passionate about technology to meet the volunteer goal.

Learners' Evaluative Feedback

Exit surveys were completed by 127 or 6% of the total participants. The following charts summarizes their demographics and responses.

Learner Demographics

Age	Number of Respondents
7	1
8	5
9	16
10	25
11	33
12	20
13	8
14	4
15	1
17	3
No response	11
Average and median age - 11	

Gender of Respondents							
Female		**Male**		**Prefer Not to Say**		**No Response**	
45	35.4%	74	58.3%	5	3.9%	3	2.4%

Session Related Question

Q 1. What was the name of the workshop you participated in?		
Workshop	**Number of Participants**	**Percent**
Building a Mobile App	3	2.4%
Canva	1	0.8%
Code.org/Minecraft	21	16.7%
CSS	5	4.0%
Gamemaking with Scratch	15	11.9%
Graphic Design with Pixlr	9	7.1%
HTML	20	15.9%
Intro to Python	1	0.8%
Makey Makey	40	31.7%
Minecraft	8	6.3%
Python	2	1.6%
Ruby	1	0.8%
Total	**127**	

Q 2. How much did you like learning about technology and coding?							
A great deal		A lot		A moderate amount		A little	
51	43.6%	37	31.6%	19	16.2%	10	8.5%
Other comments: I loved learning I only enjoyed Minecraft It was AWESOME Loved it Not at all							

Three of four learners indicated they either liked learning about technology and coding a great deal or a lot.

Q 3. How comfortable do you feel about using technology after taking Code Heroes workshops?							
Very		So-So		A little		Not at all	
71	59.7%	30	25.2%	16	13.4%	2	1.7%
Other comments: Awesome							

Q 4. How would you rate your interest in getting a job in this field?		
	Number of Responses	Percent
Extremely interested	27	22.1%
Very interested	22	18.0%
Moderately interested	24	19.7%
A little interested	23	18.9%
Not interested	25	20.5%
I don't know	1	0.8%

After completing the workshop, over 40% of respondents indicated they were either 'extremely interested' or 'very interested' in a technology-related job. However, 39% indicated little or no interest.

The exit survey provided participants an opportunity to add other comments. The vast majority of the comments were highly positive. A list of these comments is included as Appendix One.

Educators' Evaluative Feedback

In addition to reviewing the exit interviews, we made contact with fifteen educators who were involved in organizing the workshops. The following table summarizes responses received by five Educators.

Organizer	Response
Q 1. At what grade level were the participants in Code Heroes instruction?	
Educator One	Grade 6 and 7
Educator Two	Grade 7 and 8
Educator Three	One session with Grades 5 to 8 and one with Grades 9 to 12
Educator Four	Grades 9 to 12
Educator Five	Grade 9
Q 2. Please rate between 1 and 5 your satisfaction with the workshop(s) ability to teach your students new and valuable skills. A rating of One indicates very dissatisfied, Five indicates very satisfied and 3 indicates that you are neutral.	
Educator One	5 I am very happy. Students are applying their knowledge and are always trying to help each other as well!
Educator Two	5
Educator Three	5
Educator Four	5
Educator Five	4
Q 3. How likely would you be to schedule a repeat or new workshop in the future? Very likely; Likely; Possibly if time permits; or I would not schedule another workshop.	
Educator One	Likely. I would love to... just not sure there is room in the budget? Even so, I may pay out of pocket for it to enhance thinking and problem-solving skills in this generation.
Educator Two	Very Likely if it is the same price is the same as last year (grant money was included)
Educator Three	Very Likely
Educator Four	Very Likely
Educator Five	Very Likely. I am in the process of setting up the next session now.
Q 4. Is there anything else we should know?	
Educator One	Kelly is knowledgeable, approachable, adaptable. The students appreciate a non-judgmental person who can think on their feet! Problem-solving skills are an issue with this group because they have potential, but are not motivated. They also seem to require adult affirmation for task completion, so I have many hopes for where the learning goes after Kelly is through with us!
Educator Two	Thought it was super engaging for the students who are not always included in school athletics- this was another way to engage our student population- very much needed and appreciated!
Educator Three	Had tremendous value in introducing students to the technology. Especially necessary in rural Ontario where young people may not have the same opportunities to access technology and technology instruction as in urban centres.

	Students were enthusiastic participants and would start exploring on their own as the training went along.
Educator Four	We are closely working with our Ministry contact from TELO to ensure coding is indeed part of our curriculum in our schools.
Educator Five	Kelly is professional and easy to work with. Staff are happy. Students are engaged. She was able to adjust the content in the fifth session for a few students who were experiencing difficulty keeping up.

The comments of the educators are a strong indicator of the value of the instruction. Not only did their students gain a greater understanding of technology, but the educators were able to identify the application to soft skills like problem-solving. They also reinforced the limited access to technology within rural communities.

Community Impact

Learners were invited to participate in a follow-up "hack-a-thon" where they focused on questions related to community challenge. A total of three hackathons were conducted over a one year period. Participants were challenged to use technology to come up with a solution to challenges based on the United Nations Sustainable Development Goals and the Ontario Trillium Foundation's six Action Areas as well as business entrepreneurship and social enterprises. These participants left the session considering how technology could be incorporated into solutions to problems as well as understanding the value of a "Smart Community" approach.

In a community where declining numbers of students are pursuing study in Information, Communication and Technology and fewer people than the average provincially or nationally work in occupations related

to the field, the learners' evaluations indicating that over 40% of learners were highly interested in pursuing a career in technology is tremendously promising.

As the educators noted, there was a social and emotional benefit experienced during the training. The teachers observed times when learners who may not be strong in other areas like sports were able to connect positively with their peers over technology.

The educators we interviewed reinforced the overall benefit of access to this type of training not only for the learner but for their rural community at large.

Recommendations

Delivery

Fee for Service Model

The model proposed for the Ontario Trillium Foundation Seed Grant anticipated students travelling to the Code Heroes computer lab, centrally located in Cornwall Ontario. However, to meet the needs of more rural schools and to achieve the desired level of participation, it was necessary to take the training to the schools. While demanding, bringing the instruction to the schools highlighted both the interest and the significant demand for exposure to technology that can be lacking in rural communities.

However, the need to take the training to the students created additional logistical concerns for the trainer. The demands of travel time, the need to safely transport and then set up a dozen or more laptops was time consuming at best. Furthermore, the logistics of travelling and transporting computers securely across the region took away from the time necessary to complete administrative tasks, develop new programming, etc. Moving the laptops on a daily basis also caused damage to the computers and replacement of some units was required. The recommendation was made by the Social Development

Council that for future programming, the costs of mileage be added as an additional fee for schools to offset this expense.

The Seed project proved that a model charging a fee for learner was not sustainable. Instead a nominal fee of $100.00 per school was established. To resolve the logistical concerns and costs inherent in transporting computers from school to school, it is recommended that the delivery fee per school be replaced by a commitment from each participating school to purchase the required number of laptops to facilitate instruction. However, this type of investment may not be feasible in areas where there are socio-economic challenges.

Increase the number of trainers in different locations across the region.

The pilot supported one trainer responsible for conducting the training within a centrally-located computer lab as well as complete administrative functions including marketing, learner management, and product development. However, the need to deliver the training within remote locations was time-consuming and put pressure on the trainer to fulfill administrative and development tasks. It is recommended, therefore, that two additional trainers be contracted to deliver training who are situated in different geographic areas within the region. As pilot lead, Code Heroes could market, administer and evaluate the program and conduct product development as well as serve as an Educator in the program.

Launch Train the Trainers to increase learner access and build sustainability.

As word of mouth about the training grew, the project was receiving requests from schools located more than 200 km away. To accommodate the growing demand, Train the Trainer workshops should be developed and delivered within participating school.

Implement a Talent Management System

This system would better document the number of learners, workshops participated in, evaluation feedback, additional needs the learner may have, etc.

Evaluation

Organizers should have arranged to conduct pre-training evaluations in addition to the post-training exit surveys in order to better understand and measure the impact of the training on learners' views of technology, education and career aspirations, etc.

Conclusion

Recent research into the impact of automation across all occupations within the next ten to twenty years makes it clear that digital literacy is imperative to national and individual economic success.

In November 2016, the Ontario Trillium Foundation contracted with the Social Development Council of Cornwall and Area to evaluate the delivery of digital literacy instruction as a means of addressing barriers to technology in rural communities.

The volume of training conducted and the growing number of inquiries as well as evaluative feedback does demonstrate the interest and need for this type of training amongst both learners and educators. And, to the extent that it is possible to discern within a one-year project period, immediate and longer-term benefits to the community at large.

The project also provided important learnings in terms of the delivery of the training. To ensure the maximum benefit to students and communities, it is essential to invest in an adequate number of trainers as well as ensure adequate administration and product development based on the geography of the initiative.

If sustainability is to be achieved, it is vital to gain the commitment of the school boards to implement and maintain computer labs and relevant programming in participating schools and/or dedicate teachers' participation in Train the Trainer modules so that digital literacy can be integrated throughout their curriculum.

Appendix One

Comments from 127 learners participating in exit surveys

1. Are you coming again in 2017?
2. It is great. I love game.
3. Best place ever.
4. Can we do makey makey next year?
5. Code Heroes is awesome. You are a great teacher.
6. CODE!!!!
7. I enjoyed them all.
8. I had fun learning.
9. I LIKE CHEEZE.
10. I like it it's the best.
11. I like technology but not coding.
12. I liked being myself and that Kelly was very kind to everyone and very helpful. I also loved learning a lot of things about coding and all of the coding games that we did I loved coding thank you.
13. I liked being myself when
14. I liked being my self when we learned html. I think that Kelly was very nice and helpful. I just love doing coding for the time I had and I'm grateful. Also I loved the learning process. I will practice at home and would love to do more coding next year. Thank you.
15. I love coding. I wish coding never ends.
16. I loved the class because it is awesome.
17. I loved Code Heroes and I would do it again.
18. I loved code heroes i think it is important for everyone to learn it
19. I loved learning Ruby and the Makey Makey and Scratch thing.
20. I loved this it helped me learn how to work with computers!!
21. I really liked MaKey MaKey and making apps.
22. I really liked taking your class :)
23. I think that my class did a very good job in code heros
24. I think the Minecraft workshop helped the kids focus more.
25. I would like to do more of the mine craft workshop and playing the other games.
26. It is the best
27. It is very awesome. Everyone should do coding.
28. It is very cool. You learn a lot about computers. It is fun.
29. It was a very fun class.
30. It was awesome.
31. It was awesome. Keep going across Canada.
32. It was cool.
33. It was fun and I liked working with computers
34. It was great learning all the ways to code and edit
35. it was my favorite class the entire year, I wish I could do it again.
36. It was super fun, I hope we could do the same thing next year!
37. it was very cool but I am a farmer so i did not want a job. but I want to learn more
38. It was very fun to do this
39. It was very good
40. It was very much and I hope to do more like this again

41. Kelly is a great teacher and she helps everyone. If gone through the lessons slower, it would be best. Thanks.
42. Love it there should be a class to make a full game in groups there should be classes like this in school
43. Make more video games
44. No
45. Not enough Minecraft. Scratch was cool.
46. Not that much (x 3)
47. Students gave me (the teacher) these responses. They LOVED IT!
48. That I would like to have it 2 times a week and have so more time to work more on it .
49. The best ever!
50. The last class was annoying.
51. The Makey Makey was a little confusing.
52. These workshops were very fun and I like playing around with it and trying all the tools.
53. They were good.
54. This has been the most fun I have ever had on a computer.
55. This is the best! I want to come back!
56. This was fun
57. This was one of the if the best class I've ever taken
58. We should do Minecraft again
59. Well they were fun
60. Yes, This program is amazing! but you really have to listen or else its really hard to understand the task.

<u>Code Heroes Project</u>

Costs Breakdown for Sustaining Code Heroes

Programing for each individual session without outside funding

Quantity	Description	Unit Price	Total
1.00	Salary Costs for Faciliator @ $32.70/Hour, Prep/wrap up Classs = 3.5 hours	114.45	$114.45
	Administrative Time = +30%	34.33	$148.85
	Funds to offset Vacation Time = +4%	5.95	$154.80
	Funds to offset in Lieu of Benefits =+3%	4.64	$159.44
	Funds to offset equipment replacement =+18%	28.69	$188.14
	Funds to offset Office related expenses = +10%	18.81	$206.96
	Funds for Marketing = +6%	12.41	$219.37

Grand Total	$219.37

*It is worth noting that this budget breakdown does not sustain a full time positions or dedication staff.

*Code Heroes believes that $100,000 annual budget would be required to sustain the program.