

doTech Project

Summary

The long term needs of the hi-tech industry in Ottawa for a trained technology workforce confront three interrelated problems:

- declining enrolments in High School applied technology courses
- declining enrolments in post-secondary technology programs
- declining participation by women in technology programs and the IT industry.

This paper proposes that hands-on, applied engineering projects are good ways to meet industry needs for new talent, and an effective way for industry, professional organizations, high schools and post-secondary stakeholders to come together to address these issues.

doTech is an initiative that recommends the establishment of a forum for stakeholders who will engage and support high school teachers to facilitate student learning and encourage more participation by young women through FIRST Robotics and the Ottawa Regional Science Fair.

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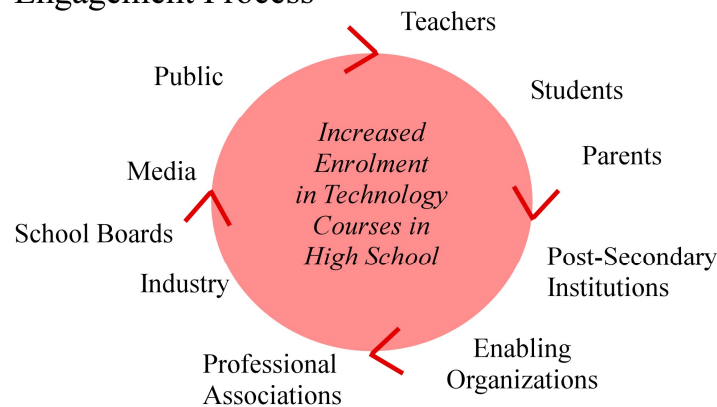
First Steps

The first objective of this initiative is to take measures to address the declining enrolments in high school technology classes. The first step is to seek advice and ideas of engaged high school and college technology teachers who confront this problem every day. They are in a good position to recommend actions and reach out to their colleagues in the high schools so that teachers not currently engaged in technology enrichment activities may become more involved.

Increased engagement of high school teachers leads to the involvement of other stakeholders: students, their parents, enabling and professional organizations and industry and government. Working together, stakeholders will develop appropriate strategies to address this issue, building on the extensive resources that already exist.

1. The first step in implementing this initiative is to engage stakeholders in a communication exercise, aimed at the following outcome: High School teachers will provide more in-class and extra curricular projects with the goal of participating in robotics and science fair competitions.
2. Through increased engagement of technology teachers more students will be attracted into high school science and engineering courses. This activity will attract the interest of local industries, which have a manifest interest in developing a local technical workforce.
3. With the support of industry in the form of mentoring, resources and funding, teachers will have greater opportunity to develop attractive technology enrichment activities which will attract students and the attention of their parents.

Engagement Process



Preliminary objectives of this project are the following:

- to increase communication among high school teachers in local school boards around technology education.
- to help high school teachers choose and participate in meaningful enrichment activities, particularly the Ottawa Regional Science Fair and First Robotics.
- to develop a network of support for teachers interested in delivering technology education; a network that steps outside the traditional board boundaries.
- to identify easy first steps and resources to enable greater teacher participation.
- to attract additional industry support in the forms of mentorships and funding.

Conversations are happening with regional organizations such as OCRI and a meeting was held at Algonquin College on 4 June¹. At that meeting a group of experienced technology teachers from the two school boards and Algonquin College, members of the public involved in Lego League and mentoring the All Saints Robotics Team came

¹ This meeting took place on 4 June and the notes from it are attached as Appendix B.

together to set out some initial action items leading to a meeting later in the summer (probably at the end of July/start of August).

Through this process we hope to help attract more young people to high school science and engineering courses, so that they might be prepared to pursue these studies into post-secondary education and on into their careers.

The approach here involves

1. the alignment of applied projects in high school science and engineering to meet teachers' need to complete science and technology course outcomes and
2. the positioning of that process as a means of addressing industry needs for a technologically-education workforce, through the
3. increase of enrolments in high school technology courses.

The first steps, outlined below, involve increased communication among stakeholders in our community with a view to engaging more high school teachers in applied science and engineering in-class and enrichment projects through, for example, the Ottawa Regional Science Fair and FIRST Robotics.

A short statement of the problem to be addressed is followed by a review of resources and organizations already engaged with this issue. This leads to some suggested actions.

The Problem

The problem is that enrolment in high school technology and applied science courses is declining and there are fewer women in information technology careers than there were fifteen years ago. There is declining enrolment in post-secondary engineering, applied sciences and technologist programs.

*The Canadian ICT industry is facing a skills shortage in the next 3-5 years and ICTC recognizes the large pool of talented women who will be able to play a critical role in addressing this issue" says Keith Sinclair, President and CEO of Harris Consulting Corporation. "I believe that there are fantastic opportunities for women to forge exciting careers in the information and communications technology industry in Canada."*²

There is a robust participation in the Science Fair by elementary students (boys and girls) but very small participation in the senior categories; FIRST Robotics attracts people in the high schools, but scarcely any young women.

Teachers involved in FIRST Robotics in particular report difficulties getting industry sponsorships: both to provide industry mentors for projects and for funding.

² Information and Communications Technology Council, *Women in ICT National Forums: Action Report* http://www.ictc-ctic.ca/en/Content.aspx?id=1728&ekmense=207f32ac_20_94_1728_1

Many theories propose to explain this:

- High School students don't want to participate in events that they perceive to be for elementary students
- Young women don't see technology education leading to the careers that interest them³.
- Young women don't find the kinds of challenges presented by FIRST (game-playing robots) interesting but would be more interested in more social issues such as ICT for Development or Environmental/Green challenges.
- Most of the high school technology teachers are male.
- Girls don't want to participate in small numbers in activities dominated by immature boys
- Although there are inspiring events and speakers, there is a lack of start-up programs that teachers and students new to this area can pursue to get started in this area
- Too many resources and too much time are needed to participate meaningfully in senior science fairs or FIRST robotics competitions.
- The semester system makes it difficult for high school science teachers to incorporate participation in the science fairs or FIRST robotics into the curriculum (the Winter semester students can't participate – too early in semester; Fall students completed 2 months earlier).
- Many of the current science and technology programs for youth are offered outside high school (events, competitions, speakers, tours, residential programs, etc.) and in competition with other extra-curricular activities, rather than through high school with the involvement of science teachers.
- High school teachers want projects done in class, where they can observe that the work is actually being done by the students rather than by the parents.

Resources On Hand

There is a bewildering array of organizations active in Ottawa that are engaged in addressing these issues:

- ACTUA <http://www.actua.ca/ontario>
In Ottawa
 - Adventures in Engineering and Science
https://web3.uottawa.ca/01/adventures/engsci/engsci_en.html – aimed at 8 – 13 year olds
 - Virtual Ventures -- <http://www.virtualventures.ca/new/> up to Grade 10
- Canadian Advanced Technology Alliance <http://www.cata.ca/>
and CATA Women in Technology Forum
<http://www.catawit.ca/home/default.asp> aimed at corporate membership only.
- Canadian Association for Girls in Science <http://www.cagis.ca/> aimed at girls 7 – 16 interested in STEM subjects. There is an Ottawa chapter but no website.

³ Heather Smith, Queens University, *The Focus on Information Technology (FIT) Program: Gender-based Analysis* ICTC December 2009 http://www.ictc-ctic.ca/uploadedFiles/Career_Awareness/FIT_Program_Gender_Review_Report-FINAL.pdf

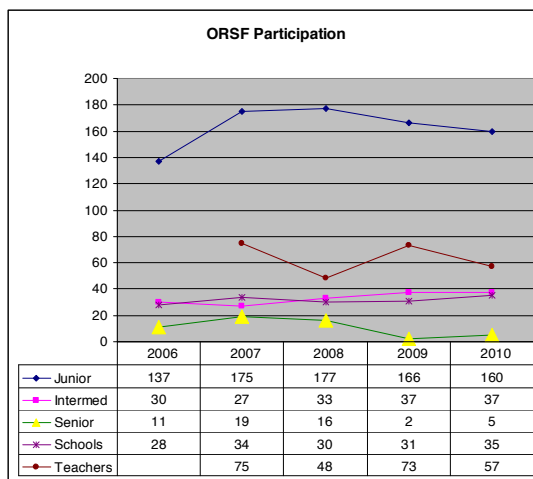
- Canadian Council of Technicians and Technologists and Algonquin College: Go Tech Girl <http://www.techfutures.cctt.ca> for girls in grades 7 – 10
- Carleton University, Ottawa U and Algonquin College
<http://www2.carleton.ca/events/index.php?com=detail&eID=693&year=2008&month=12>: Design Tomorrow's World/Batir le monde de demain
http://www.site.uottawa.ca/~frize/MF/Pathmakers/e_dtw.htm for students in grades 8 – 11 (aimed at girls)
- Carleton University, Saturday Engineering and Design Sessions
<http://www2.carleton.ca/admissions/newsandevents/saturday-engineering-and-design-sessions-agenda/>
- Deep River Science Academy <http://www.drsa.ca/> (residential summer school for students with interests in science and technology careers)
- DiscoverIT http://www.discoverit.org/guiding_student_choices.aspx (ICTC website to help teachers/students choose information technology careers)
- Engineers without Borders: Youth Engagement <http://carleton.ewb.ca/what-we-do/in-canada/school-outreach/>
- Global Challenge <http://www.globalchallengeaward.org/display/public/Home> (Students are formed into international teams to solve the global challenge of "Climate Change and the Future of Energy," using science, technology and engineering.)
- High Performance Computer Virtual Laboratory at Queen's University
<http://www.hpcvl.org/>
- IEEE
 - Ottawa Chapter <http://ottawa.ieee.ca/welcome.html>
 - Annual Robotics Competition www.ottawa.ieee.ca/robotcomp/
 - Teacher-in-Service program
http://www.ieee.org/education_careers/index.html#sect4
- Let's Talk Science <http://www.letstalkscience.ca/> and the Ottawa U/Carleton chapter at <http://intermed.med.uottawa.ca/lts-ps/index.php>
- Ministry of research and innovation (Ontario)
http://www.mri.gov.on.ca/english/programs/ystop/program_awards.asp
- NEMO (Non-Engineering Mentors Organization)
<http://www.firstnemo.org/> (for which there is no Canadian organization at present)
- Ontario Science Centre
<http://www.ontariosciencecentre.ca/resources/sciencefair.asp>
- Ontario Society of Professional Engineers: Go Eng Girl
<http://www.ospe.on.ca/goenggirl/> for girls in grades 7 – 10
- Ottawa High School Technology Program <http://www.ottawatechstudents.com/>
- Ottawa University, Carleton University and la Cité collégiale: Enrichment Mini-Courses <http://www.emcp-pmce.org/home.asp>
- Pathmakers <http://www.pathmakers.ca/>
- Passport to Prosperity <http://www.ocri.ca/education/p2p.asp> OCRI project intended to provide experiential learning opportunities for high school students

- Science Media Centre
http://www.sciencemediacentre.ca/smc/index.php?option=com_content&view=article&id=47&Itemid=57&lang=en potential source of sponsors/partners
- Science Teachers Association of Ontario (STAO) <http://www.stao.org/> They have an annual conference, in November, in Toronto - a handful of Ottawa area science teachers attend this each year. Sessions on how to run a successful science fair sometimes come up.
- Shad Valley <http://www.shad.ca/shad/myweb.php?hls=10142&lang=1> (residential summer programs at universities for high school students) and local contacts at Carleton University <http://www.carleton.ca/shad/>
- Skills Canada (resource on upcoming programs and events offered to encourage more Ontarian youth to explore the many career opportunities that are available in the skilled trades and technologies) <http://www.skillsontario.com/>
- Smarter Science (Lesson plans and other materials that integrate with the Ontario science curriculum – up to grade 12)
<http://www.smarterscience.ca/content/ss/index.html>
- Women in ICT National Forums (resources from the ICTC) http://www.ictc-ctic.ca/en/Content.aspx?id=1728&ekmense1=207f32ac_20_94_1728_1
- Women in Nuclear (at Bruce Power and AECL)
<http://www.wincanada.org/> (We have a contact who would be willing to come to Ottawa to make presentations)
- Women in Science and Engineering Ontario <http://www.carleton.ca/cwse-on/cwse.htm> and Women in Science and Engineering, Ottawa Chapter <http://www.wise-ottawa.ca/cgi/Home.html> (Students chapters at Ottawa U and Carleton)
- World Wide Web Virtual Library: Physical Science Fairs
<http://physics.usc.edu/ScienceFairs/> Very useful listing identifying competitions sponsored by specific companies such as Intel, Siemens, etc., as well as a fairly long list of state, provincial, regional and national science fairs.
- Youth Science Canada <http://www.yzf.ca/Home.aspx>
- Youth Science Ontario (The Youth Science Ontario website provides access for youth, parents, teachers and community volunteers to information on engaging science-oriented events and programs for Ontario youth in grades K-12.)
<http://www.youthscienceontario.ca/>; Science Fair Resource Page:
<http://www.youthscienceontario.ca/science-fair> ; Curriculum document for grades 9 – 12 <http://www.youthscienceontario.ca/sites/default/files/images/9-12currdoceng.pdf>

Engagement of High School Teachers is the Key

The route to increased high school participation in these activities is the engagement of high school teachers. At present in Ottawa there are approximately 160 schools (Public, Catholic, French Boards, Private, Grades 7 - 12), of which approximately 40 (25%) participate in Science Fair (2008, 2009, 2010). Teachers of Grades 7 – 10 (Junior and

Intermediate) are already well engaged, but teachers of Grades 11 and 12 (Senior) are not.⁴



The IEEE Ottawa Chapter Robotic Competition for Grades 5 – 7 attracted 20 schools and 51 projects from a range of schools: public, catholic, English, French and private, both from within the city and from the outlying rural communities.

The Ottawa Regional Science Fair and FIRST Robotics demonstrate that the front-line classroom teacher is the critical participant here. Elementary science teachers have bought into Science Fairs big time and the result is great participation from their students.

The statistics for the last 4 years show that students participate in science fair when they are in classes led by teachers who participate. Students who have been at science fair in, say, Grade 8, will not be likely to return if their Grade 9 teacher is not participating. There are some individuals who brought forward projects without formal support from their science teachers or the school, but they are the exception.

Given all the competing demands for the attention of high school science teachers, there is also a need to consolidate the relevant information, programs and resources to make them more accessible to teachers and to enable them to take first steps in this area.

The culture of the school is also important: teacher engagement and support from the administration. In a school like Longfields-Davidson Heights, the site of the IEEE Lego League Robotics competition this year, the teachers are involved in Lego League and also held a school science fair from which outstanding projects went on to the Ottawa Regional Science Fair.

⁴ A list of the target schools sorted by postal code has been prepared and is attached as Appendix A.

Specific Initiatives

As a way to start, it is proposed that Algonquin College become more of a focus for community-based (as opposed to individual school-based) promotion of technology and engineering, of learning beyond the classroom and of support for young women in science and technology. Steps that could be taken might be to

1. Help local school boards implement FIRST Robotics in their curriculum and access the monies set aside by the Ontario government for this purpose:
 - o The Ontario Government has given FIRST Robotics \$3 million over 5 years to extend FIRST robotics to every school board in the province. <http://www.news.ontario.ca/edu/en/2010/04/more-students-to-receive-hands-on-technology-training.html>
 - o Help establish a FIRST Robotics region in Ottawa area and support the holding of a competition in Ottawa (potentially with Ottawa U and Carleton)
 - o Provide mentors, access to resources/labs, space for competitions/exhibitions for First Robotics <http://www.firstroboticscanada.org/site/index.php>, potentially in cooperation with organizations such as *Let's Talk Science*.

2. Provide a venue to bring teachers together to develop curriculum and resources around participation in the Ottawa Regional Science Fair (<http://www.orsf.ca/faq.php>) and FIRST Robotics potentially with funding from the Ontario Government Youth Science and Technology Outreach Program <http://www.mri.gov.on.ca/english/programs/ystop/program.asp>

This might be something along the lines of what has been done under PASS (funded under the School to College to Work initiative) in the past, where for example, robotics kits were distributed to teachers and some in-service training provided to incorporate electronics, photonics, communications technology to meet technology outcomes. Another model is what Algonquin did to bring high school teachers together to work on integrating the Everest expedition into their curriculum in a week-long workshop setting.

Participatory activities like this could complement the work being done by, for example, *Let's Talk Science* which partners graduate students with science educators in schools to visit classrooms, help teachers to update classroom materials, act as mentors for student projects, lead professional development activities, provide information about careers in Science, facilitate activities at school science days.

As a first step, a small number of very experienced high school technology teachers from

the Ottawa Carleton District School Board and the Ottawa Carleton Catholic School have been invited to a meeting at Algonquin College on 4 June.⁵

The purpose of the meeting is to bring together teachers from the two school boards who are experienced practitioners of technology education to identify actions that we could take (Algonquin, the school boards, schools, teachers, organizations in our community like OCRI and IEEE, industry, mentors) to promote robotics and technology education in our community. This is intended to be an initial meeting at which a small number of experienced teachers like you can help identify steps we could take to have wider participation in our community. The meeting will take a straight-forward problem-solving approach and promises to be productive of ideas and action items, given the experience of the participants. It is expected that it might address questions such as

- How to align regional Science Fair/Robotics participation into your high school science curriculum (led by teachers already involved)
- What it takes to participate in FIRST Robotics (led by teachers already involved)
- Creating a “buddy” or “mentor” network so that teachers new to these events can get advice from people already involved
- Establishing connections among schools by region of the city across board and public/private boundaries to share ideas, support, techniques and resources
- Conducting research and interviews around this issue
- Developing strategies to involve students (male and female) in science and technology
- How to develop business plans, fundraising and industry involvement to support FIRST Robotics across the region

Other Actions

Other actions might be the following, although the correct approach would be to ask the teachers involved what they would need to surmount barriers and help them do that.

- Develop focus groups with local school boards to identify young peoples’ attitudes (youth in general, girls?) to engineering and science and identify barriers to participation in the regional science fair and FIRST robotics. (OCRI did some of this through the Ottawa High School Technology Project in 2006 – 2007 but they feel the research is now out of date.)
- Create a Network of Support for information for young people, their parents and teachers in the high schools about applied science, technology and engineering in light of the number of organizations and programs involved.
- Create tools to help teachers identify curriculum alignment between their curriculum outcomes and the competencies of industry-sponsored programs such

⁵ This meeting took place on 4 June and the notes from it are attached as Appendix B.

as Focus on Information Technology from the ICTC;

- o Women in Technology, WIN, IEEE etc.
 - o Students who have participated in Science Fairs and FIRST Competitions
 - o Teachers who have been involved
 - Easy First Steps: What it takes to support students participating in the science fair
 - Completing projects on school time with teacher supervision (so we know the students actually did the project rather than the parents)
 - Organizing mentors to assist in projects
 - Fund raising
- Help High Schools develop Robotics/Technology Projects to take learning beyond classroom walls and allow students to have these experiences without the need for extensive lab facilities in the schools.
 - o for Ottawa Regional Science Fair
 - o for FIRST Robotics Competitions
 - o Help high schools support FIRST Lego League in elementary schools <http://www.flontario.org/index.html>
 - o Build on the success of IEEE Lego League competitions at the Grade 5 – 7 level and continue student participation into higher grades.
- Access existing resources to provide support and industry/parent/student mentors to support projects and new teachers.
- Develop mechanisms to involve local industries more closely in mentoring, support and funding these initiatives.
- Strengthen community recognition and involvement in engineering and technology (in cooperation with OCRI and School Boards)
 - o Create a recognition mechanism for companies that support the effort to expand awareness of engineering and technology in the community.
 - o Encourage organizations such as CATA to develop communities for schools and colleges involved in teaching science and technology and related business studies.
 - o Encourage organizations such as NEMO to develop Canadian branches.
 - o Develop strengthened partnerships with organizations that advance the cause of science and engineering in our community.
- Develop new communications strategies to attract new people to these activities
 - o Publicize local winners:

- <http://www.ottawacitizen.com/news/Whiz+kids+path+change+world/3080916/story.html>
- Involve OCRI in communications and publicity around this project.

drafted: 11 May 2010 this version: 10 June 2010

Appendix A: Schools teaching Grades 7 – 12 in the Ottawa Region

<i>School</i>	<i>Postal Code</i>		<i>Board</i>	<i>Level</i>	<i>ORS</i>
	<i>162</i>	<i>162</i>			<i>F</i> <i>2008</i> <i>-</i> <i>2010</i>
					<i>40</i>
A. Lorne Cassidy Elementary School	K2S	1G8	OCRSB	Primary (7 & 8)	
A.Y. Jackson Secondary School	K2L	1H7	OCRSB	High	
Abraar School	K2B	8L7	Private	Primary (7 & 8)	√
Académie catholique Ange-Gabriel	K6V	6H9	CSCLFO	High	
Académie de la Capitale International School	K2H	8K7	Private	Primary (7 & 8)	
Académie Jeanne D'arc - Joan of Arc Academy	K2C	1H3	Private	Primary (7 & 8)	√
Académie St-Laurent Academy	K1K	2Z8	Private	Primary (7 & 8)	
Adult High School	K1R	7N4	OCRSB	High	
All Saints High School	K2K	3K5	OCCSB	High	√
Alta Vista Public School	K1H	7R2	OCRSB	Primary (7 & 8)	
Ashbury College	K1M	0T3	Private	High	√
Bell High School	K2H	6K1	OCRSB	High	√
Bishop Hamilton Montessori School - East and West Ottawa[5]	K2C	1H2	Private	Primary (7 & 8)	√
Blossom Park Public School	K1T	1K6	OCRSB	Primary (7 & 8)	
Bridlewood Community Elementary School	K2M	1G2	OCRSB	Primary (7 & 8)	
Broadview Public School	K2A	2L8	OCRSB	Primary (7 & 8)	√
Brookfield High School	K1V	6J3	OCRSB	High	
Cairine Wilson Secondary School	K1C	2Z5	OCRSB	High	
Canadian Montessori Academy	K2G	2Y7	Private	Primary (7 & 8)	
Canterbury High School	K1G	3A7	OCRSB	High	√
Carleton Heights Public School	K2C	1P4	OCRSB	Primary (7 & 8)	
Castlefrank Elementary School	K2L	4A9	OCRSB	Primary (7 & 8)	
Castor Valley Elementary School	K4P	1N2	OCRSB	Primary (7 & 8)	
Cedarview Middle School	K2J	4J2	OCRSB	Primary (7 & 8)	√
Centre professionnel et technique Minto	K1K	4R3	CSCLFO	High	
Centre scolaire catholique Jeanne-Lajoie, pavillon secondaire	K8A	5R3	CSCLFO	High	
Collège catholique Franco-Ouest	K2H	8X1	Private	High	
Collège catholique Franco-Ouest - École secondaire	K2H	8X1	CSCLFO	High	
Collège catholique Samuel-Genest	K1K	2H3	CSCLFO	High	√

Collège Sphere College	K4C 1H2	Private	High	
Colonel By Secondary School	K1J 7N4	OCRSB	High	√
Community Christian School	KOA	Private	Primary (7	
	2P0		& 8)	
D. Aubrey Moodie Intermediate School	K2H 8A8	OCRSB	Primary (7	√
			& 8)	
D. Roy Kennedy Public School	K2A 3G9	OCRSB	Primary (7	
			& 8)	
Dunning-Foubert Elementary School	K1E 2N1	OCRSB	& 8)	
Earl of March Secondary School	K2K 1Y4	OCRSB	High	
			Primary (7	
École élémentaire catholique J.-L.-Couroux	K7C 4K1	CSCLFO	& 8)	
			Primary (7	
École élémentaire catholique L'Envol	K8V 6V7	CSCLFO	& 8)	
			Primary (7	
École élémentaire catholique Sainte-Marguerite-Bourgeoys	K0G 1N0	CSCLFO	& 8)	
			Primary (7	
École élémentaire catholique Sainte-Thérèse-d'Avila	K4R 1E5	CSCLFO	& 8)	
			Primary (7	
École élémentaire catholique Saint-Guillaume	K0A 3H0	CSCLFO	& 8)	
			Primary (7	
École élémentaire publique Charlotte-Lemieux	K2C 0X2	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Cité-Jeunesse, Trenton	K8V 1E4	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Des Sentiers	K4A 4C4	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Francojeunesse	K1N 6S3	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Gabrielle-Roy	K1T 4A8	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Jeanne Sauvé	K4A 2Y7	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Kanata	K2K 2P9	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Le Trillium	K1L 7X5	CSLFE	& 8)	
			Primary (7	
École élémentaire publique L'Équinoxe, Pembroke	K8A 5N6	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Marie-Curie	K1G 1R7	CSLFE	& 8)	
			Primary (7	
École élémentaire publique Séraphin-Marion	K1J 7W3	CSLFE	& 8)	
			High	√
École secondaire catholique Béatrice-Desloges	K4A 3Y6	CSCLFO	High	√
École secondaire catholique Franco-Cité	K1G 1N7	CSCLFO	High	√
École secondaire catholique Gameau	K1C 1J4	CSCLFO	High	
			CSDCE	
École secondaire catholique l'Escale	K4K 1C3	O	High	
			K7M	
École secondaire catholique Marie-Rivier	8N6	CSCLFO	High	
École secondaire catholique Pierre-Savard	K2J 0H9	CSCLFO	Intermediate	
École secondaire publique De La Salle	K1N 8R3	CSLFE	High	√
École secondaire publique Gisèle-Lalonde	K4A 4X3	CSLFE	High	
			K0A	
École secondaire publique l'Académie de la Seigneurie	1M0	CSLFE	High	

	K1L			
École secondaire publique L'Alternative	7W8	CSLFE	High	
École secondaire publique le Sommet	K6A 3R5	CSLFE	High	
École secondaire publique L'Équinoxe, Pembroke	K8A 5N6	CSLFE	High	
École secondaire publique l'Heritage	K6H 1E1	CSLFE	High	
École secondaire publique Louis-Riel	K1B 4N3	CSLFE	High	
École secondaire publique Marc-Garneau, Trenton	K8V 1E4	CSLFE	High	
	K7M			
École secondaire publique Milles Iles	1C1	CSLFE	High	
École secondaire publique Omer-Deslauriers	K2E 7E6	CSLFE	High	
			Primary (7	
Elizabeth Park Public School	K1V 7N9	OCRSB	& 8)	
	K1M			
Elmwood School	0V9	Private	High	√
			Primary (7	
Emily Carr Middle School	K1B 3J7	OCRSB	& 8)	
			Primary (7	
Fallingbrook Community Elementary School	K4A 3E1	OCRSB	& 8)	
			Primary (7	
Featherston Drive Public School	K1H 6P4	OCRSB	& 8)	
	K1M		Primary (7	
Fern Hill School	1X1	Private	& 8)	
			Primary (7	
Fielding Drive Public School	K1V 7G1	OCRSB	& 8)	
			Primary (7	
Fisher Park Public School	K1Y 0Y6	OCRSB	& 8)	√
Frank Ryan Catholic Senior Elementary School	K2E 5T8	OCCSB	Intermediate	
			Primary (7	
Glashan Public School	K2P 1C2	OCRSB	& 8)	
Glebe Collegiate Institute	K1S 2C9	OCRSB	High	
	K1S		Primary (7	
Glebe Montessori School	3Z7	Private	& 8)	
			Primary (7	
Glen Cairn Public School	K2L 1E1	OCRSB	& 8)	
Gloucester High School	K1J 7N8	OCRSB	High	
			Primary (7	
Goulbourn Middle School	K2S 1B8	OCRSB	& 8)	
			Primary (7	
Greenbank Middle School	K2H 5V2	OCRSB	& 8)	√
			Primary (7	
Hawthorne Public School	K1G 1A9	OCRSB	& 8)	√
			Primary (7	
Henry Larsen Elementary School	K1C 5B3	OCRSB	& 8)	
			Primary (7	
Henry Munro Middle School	K1J 6J7	OCRSB	& 8)	√
			Primary (7	
Heritage Public School	K4B 1N1	OCRSB	& 8)	
Hillcrest High School	K1G 2L7	OCRSB	High	√
			Primary (7	
Hillel Academy	K2A 1R9	Private	& 8)	√
Holy Trinity Catholic High School	K2L 4A7	OCCSB	High	√
			Primary (7	
Hopewell Avenue Public School	K1S 2Y7	OCRSB	& 8)	
			Primary (7	
Huntley Centennial Public School	K0A 1L0	OCRSB	& 8)	

Immaculata High School	K1S 5P4	OCCSB	High Primary (7 & 8)	√
J.H. Putman Public School	K2C 0X2	OCRSB	Primary (7 & 8)	
Jack Donohue Public School	K2W 1H4	OCRSB	Primary (7 & 8)	
John McCrae Secondary School	K2J 4T2	OCRSB	High Primary (7 & 8)	
Kanata Academy	K2K 1L1	Private	Primary (7 & 8)	
Kanata Montessori School	K2M 2C5	Private	Primary (7 & 8)	
Katimavik Elementary School	K2L 1Y9	OCRSB	Primary (7 & 8)	
Lester B. Pearson Catholic High School	K1J 8M5	OCCSB	High Primary (7 & 8)	
Life Christian Academy	K1C 1L3	Private	High	√
Lisgar Collegiate Institute	K2P 0B9	OCRSB	Intermediate	√
Longfields-Davidson Heights	K2J 5C6	OCRSB	High	√
Lycée Claudel d'Ottawa	K1G 0E5	Private	Intermediate	√
Macdonald-Cartier Academy	K1M 1W4	Private	Primary (7 & 8)	√
Maple Ridge Elementary School	K4A 4B5	OCRSB	Primary (7 & 8)	
Maryvale Academy	K1V 6J1	Private	High	
Merivale High School	K2G 1E2	OCRSB	Primary (7 & 8)	
Metcalf Public School	K0A 2P0	OCRSB	High	
Mother Teresa High School	K2J 4T1	OCCSB	High	
Nepean High School	K2A 3V8	OCRSB	High	√
Notre Dame High School	K2A 2M2	OCCSB	High	√
Osgoode Township High School	K0A 2P0	OCRSB	High	
Ottawa Carleton E-School	K0A 1W0	Private	High Primary (7 & 8)	
Ottawa Christian School	K2A 1P6	Private	High	√
Ottawa Islamic School	K2A 1P6	Private	Primary (7 & 8)	√
Ottawa Montessori School - École Montessori d'Ottawa	K1G 0L6	Private	High	
Ottawa Technical Secondary School	K1K 1L8	OCRSB	Primary (7 & 8)	
Ottawa Waldorf School	K2S 1N9	Private	Primary (7 & 8)	
Pinecrest Public School	K2C 3E7	OCRSB	Primary (7 & 8)	
Queen Elizabeth Public School	K1K 3A6	OCRSB	High	√
Redeemer Christian High School	K2E 7L2	Private	High	
Rideau High School	K1K 3A7	OCRSB	High	
Rideau Valley Home Educators Association	K2K 2P4	Private	Intermediate Primary (7 & 8)	√
Rideau Valley Middle School	K0A 2E0	OCRSB	High	
Ridgemont High School	K1V 7T3	OCRSB	Primary (7 & 8)	
Roberta Bondar Public School	K1T 3J6	OCRSB	High	

Sacred Heart High School	K2S 1X4	OCCSB	High Primary (7 & 8)	
Sawmill Creek Elementary School	K1T 1R5	OCRSB	High	
Sir Guy Carleton Secondary School	K2G 5L4	OCRSB	High	
Sir Robert Borden High School	K2H 8R1	OCRSB	High	
Sir Wilfrid Laurier Secondary School	K1E 3E8	OCRSB	High Primary (7 & 8)	√
Sir Winston Churchill Public School	K2E 6M7	OCRSB	High	
South Carleton High School	K0A 2Z0	OCRSB	High	
St. Francis Xavier High School	K1V 2M1	OCCSB	High	
St. Joseph High School	K2J 4J1	OCCSB	High	
St. Mark High School	K4M 1B2	OCCSB	High	
St. Matthew High School	K1C 2S9	OCCSB	High	
St. Patrick's High School	K1V 7T3	OCCSB	High	
St. Patrick's Intermediate School	K1V 6A6	OCCSB	Intermediate	
St. Paul High School	K2H 7A1	OCCSB	High	
St. Peter High School	K4A 3M4	OCCSB	High	
St. Pius X High School	K2C 1X4	OCCSB	High Primary (7 & 8)	
St. Timothy's Classical Academy	K2E 7L2	Private	Primary (7 & 8)	
Stephen Leacock Public School	K2K 1S2	OCRSB	Primary (7 & 8)	
Steve MacLean Public School	K1V 1T6	OCRSB	Primary (7 & 8)	
Stonecrest Elementary School	K0A 3M0	OCRSB	Primary (7 & 8)	
Summit Alternative School	K1Y 0Y6	OCRSB	Primary (7 & 8)	√
Tancook Bell School	K2C 2C2	Private	High Primary (7 & 8)	
Terry Fox Elementary School	K1C 2S7	OCRSB	Primary (7 & 8)	
Trillium Elementary School	K4A 3S1	OCRSB	Primary (7 & 8)	
Turnbull School	K1Z 6P7	Private	Primary (7 & 8)	√
Venta Preparatory School	K0A 1L0	Private	Intermediate Primary (7 & 8)	√
Vincent Massey Public School	K1G 1N9	OCRSB	Primary (7 & 8)	
W. Erskine Johnston Public School	K2K 1G7	OCRSB	Primary (7 & 8)	
W.O. Mitchell Elementary School	K2M 2A6	OCRSB	Primary (7 & 8)	√
West Carleton Secondary School	K0A 1T0	OCRSB	High Primary (7 & 8)	
Westboro Academy	K1S 5R2	Private	Primary (7 & 8)	√
Woodroffe High School	K2B 7M8	OCRSB	High Primary (7 & 8)	
York Street Public School	K1N 5V3	OCRSB	High Primary (7 & 8)	

Appendix B: Notes from a meeting at Algonquin College 4 June 2010

(Robotics Lab and Room T321)

12:00 – 15:00

Present:

Glenn MacDonald, Algonquin, Faculty Marketing Officer, Technology and Trades

Cynthia Bruketa, First Lego League

Janet Davis, Wind River and Mentor, All Saints Robotics Team

Kathryn Reilander, Algonquin College, Power Engineering

Stephen Emmell, West Carleton High School, Technology Teacher

Carolyn MacIsaac, Algonquin College, Electrical Engineering

Misheck Mwaba, Algonquin College, Chair, Electro-Mechanical Department

Paula Walker, Longfields Davidson Heights Secondary School, Design and Technology Teacher

Richard Seniuk, Glebe High School, Computer Programming/Engineering, Teacher
Advisor Glebe Robotics

Paul McDonough, All Saints Catholic High School, Technology Teacher, Robotics Team Mentor

Rudi Aksim, Mentor, All Saints Robotics Team. (note taker)

Agenda:

12:00 Short tour of the Algonquin Robotics Lab, thanks to Lana Michele, Algonquin College, Robotics Program

12:30 Problem-solving discussion in Room T321, following the 8-Step Problem-Solving Process Model (attached at end of notes)

1. Introductions of Participants

2. **The Question:** What can we do better to support robotics/engineering education in our community?

3. Facts and Feelings related to the question:

- Support: mentors; funding; administration
- Access to facilities: equipment, computers
- Hard to approach Algonquin for machine-shop access
- community involvement/awareness – perception – people don't know we're there
- Companies are worried about loss of proprietary information – therefore won't invite students in
- kids don't choose schools because of robotics
- Need more media support
- Need more meetings, contacts etc/ for teachers and funding to enable teachers to attend meetings

- We need to bring corporate stakeholders on board from the start
- Perception in Business – better to advertise on the Bikeway where thousands see the advertising, rather than to support robotics (little visibility)
- People need to hear success stories
- Only U of Toronto and Waterloo offer scholarships connected to FIRST Robotics
- Cost of robotics in general – FIRST is ferociously expensive
- Interviews with two girls:
 - First girl: heard of club, sounded interesting, likes building things; had time conflicts; didn't feel she was contributing; --> dropped out.
 - Second girl: likes mechanics, pursuing math/physics, sees application in robotics; family background supports; feels will help prepare for university --> continued
- Funders need assurance that money is well spent and will help business
 - Financial plan is required
 - They need to know what's going on and how the money is being spent.
- Could we create a July/August experience for robotics students at Algonquin?
 - Could the high school *teachers* come with the students?
- There are complicated Grant rules in Canada – difficult to get funding (i.e. not for team but for individual, etc.)
- Girls only camp? Not PC?
- Girls are not necessarily attracted by the game paradigm.
 - Development (in Canada/ Third World?)
 - Ecology?
- Female only team for competition?
- Mentorship of students by other students.
- Successful teams:
 - Woburn Collegiate in Toronto: spawned 3 other successful teams
 - HOT (Heroes of Tomorrow) team in Virginia
 - Near North Robotics in North Bay

4. Resources on Hand

- Algonquin: Glenn and Program Coordinators
- Ottawa U: machine shop
- Cross-boundary transfer mechanism in the OCRSB
- Media contacts
 - A Channel
 - CJOH
 - CBC Radio
- Telus sponsorship
- IBM sponsorship re programming
- Rick Seniuk's analysis of the cost of robotics

- Radio/Pizza/Candy (to entice participation – Hansel and Gretel do Robotics – thanks Paula!)
- Parent mentors
- Algonquin: Part-time Studies Career Samplers
- Teacher contacts in schools who can approach and engage students and accompany them to events
- Experienced science/technology/robotics teachers
- Brochures/Information/Promotional Materials from Algonquin, from FIRST, etc.
- Rudi’s list: Who’s Who in the Zoo
- School Board Resources
- Tech Council in the Ottawa Board
- Board of Education in Toronto – partnership with FIRST Robotics (To teacher is coordinator)
- Successful Teams in the Region (Glebe and All Saints)
- Museum of Science and Technology and Canadian Aviation Museum
- Canadian Space Agency
- NRC – March Break Camps
- Rudi’s list of local schools

5. Resources Needed

- Media strategist
- Funding strategy
- Way for girls to develop experience/confidence
- Parent mentors outside Kanata
- Curriculum Alignment
- Student presentations to feeder schools (this is really an action item)
- Promotional items (to entice participation)
- City of Ottawa support (i.e. must buy own Ottawa pins to promote the city)
- Hoopla plan for Robotics

6. Actions and Responsibilities

- a. Student presentations to feeder schools (from Resources needed, above)
- b. Develop a communications strategy (Rudi)
 - i. speakers --> Media;
 - ii. parent outreach --> how to get your kid involved in Robotics
 - iii. strategy to promote existing competitions
 - iv. Network of support for teachers and parents
- c. Strategy to enable students to participate in several competitions (Cynthia, Paul, Carolyn)
- d. Google Groups Site and Facebook (Stephen)
- e. Promotion Strategy for Algonquin to High Schools (Glenn)
- f. Explore articulation agreements with High Schools (Stephen)
 - i. curriculum alignment
 - ii. specialist high skills majors

- g.** Summer Workshops in Robotics at Algonquin (Kathryn)
- h.** 1 week Robotics camp at Algonquin (Kathryn)
- i.** High School Teachers as part-time instructors at Algonquin (Paul, Misheck)
- j.** Strategy Paper: What are we trying to do (Rudi initially, revisions by everyone.)
- k.** Share paper outlining robotics costs (Richard)
- l.** Contact successful schools (implied in the discussion)
 - i.** Woburn Collegiate
 - ii.** Heroes of Tomorrow, Virginia
 - iii.** Near North Robotics in North Bay (Rudi)
- m.** Other suggested items arising in email after the meeting:
 - i.** Plan to visit local schools (Carolyn)
 - ii.** Job shadowing by high school and college teachers (relates to i, above)
- n.** Another meeting (Rudi and Misheck)

7. Next meeting

The group proposed that we try to get together again towards the end of July or early August.

The meeting ended at 15:00.

8 Step Problem-Solving Process

* Assumes a facilitator and a black/white board or flip-chart.

1. Introduce the members of the group or team and note their expectations of the meeting(s).

2. Identify the Question. (Normally in the form of a question.)

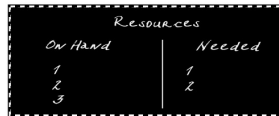


3. Identify Facts and Feelings related to the question. (These are not edited by the group or the facilitator: all facts and feelings are OK and relevant.)



-- Normally a break happens here, to allow the facilitator to sort the "Facts and Feelings" into groups --

4. Identify Resources on Hand
5. Identify Resources Needed



6. Identify Strategies to address the question.

(Normally it is a good idea to "check off" "Facts and Feelings" to be sure everyone's concerns are addressed.)



7. Assign Responsibilities to carry out the strategies.

8. Evaluate (later - but it is a good idea to identify specific time lines or meeting times while we're all still here.)

