Equity, Inclusion and the Future of STEM Canada

Exploring the Intersection of SDG4 and Canada 2067
Event Proceedings

Presented by

let's talk **science**

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Educational, Scientific and
Cultural Organization

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INTRODUCTION

As a signatory in 2015, Canada committed to contributing to the achievement of the United Nations' 2030 Agenda for Sustainable Development. The international community recognizes that education is essential for the success of all 17 of its goals. Sustainable Development Goal (SDG) 4 is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. It includes a suite of objectives to guide the efforts of countries around the world.

Canada 2067 was conceptualized to shape the future of education in Canada – specifically related to Kindergarten to Grade 12 learning in science, technology, engineering and math (STEM). Developed through a year-long effort that convened stakeholders, gathered insights, and reviewed global policy initiatives, Canada 2067 looks towards the bicentennial year when today's teens will be considering their retirement to enhance learning opportunities today.

When taken together, Canada 2067 offers a set of meaningful indicators and stakeholder recommendations that contribute to meeting SDG4 targets. This event, which was held in Ottawa on November 27, 2018, convened key agents of change to discuss and explore how Canada can fulfill its obligations related to UNESCO's Sustainable Development Goal 4 (SDG4) in synergy with Canada 2067.

Several recurring themes emerged throughout the day.

Community and Collaboration
Multiple discussions revolved around the need for better collaboration among all stakeholders to build a true community with authentic ways of connecting. By working together strategically much more can be achieved.

Fundamental Skills
A shift is required away from content acquisition towards helping youth build global competencies and fundamental skills. With uncertainty about the types of future jobs, it is increasingly important that youth develop transferrable skills to thrive in the workforce. In building these skills youth are also more likely to become life long learners.

Avoid Getting Trapped by Vocabulary and Buzzwords
Issues should be approached with a focus on youth and their abilities and skills rather than on subjects or fields of study. Too much focus on acronyms that emphasize subjects distracts from where the attention should be – on the learner.

The Learning Continuum
Challenges related to equity and inclusion at post-secondary usually begin early on. It is important to consider opportunities and challenges that face learners in more holistic ways across the full continuum from early years through adulthood.

One Size Doesn't Fit All
Customized approaches are needed to address issues in different fields and in different regions.

OVERVIEW OF SESSIONS

Christine Stevens
Anishinabekwe, Cultural Knowledge Keeper

- Traditional welcome

- Interpretation for STEM - The connection and association with the ecosystem

- Women are the driving forces of the teachings for young girls and children

Opening Remarks

Sébastien Goupil, Secretary-General, Canadian Commission for UNESCO

Bonnie Schmidt, President and Founder, Let's Talk Science

- UNESCO – main goals are peace, inclusion, gender equality, and sustainable development – goals can be reached as an individual nation or global society

- Important to facilitate nonlinear pathways in post-secondary education

- Need to ensure inclusivity and equality – but also need to keep pace with modern learning styles and evolving technologies

- Need to boost Canadians' STEM participation; numeracy, scientific literacy and digital skills are relevant to all citizens

- Recognition of the L'Oréal-Canada For Women in Science 2018 award recipients

- Let's Talk Science is celebrating its 25th anniversary with focus on helping young people build the skills and attributes that they need for a rapidly changing world

- STEM provides a learning platform to help children understand the world around them and help them prepare for the jobs of the future

- Current discussion provides a global perspective from SDG 4 and a national perspective from Canada 2067

- Intersections are about: access, equity, inclusion, making sure everyone in this country has equal opportunities to build skills necessary for a new economy

Keynote

Liette Vasseur, President, Canadian Commission for UNESCO
The Non-Linear Paths of Women in STEM:
The Barriers in the Current System of Professional Training

"The pipeline is not linear and there are many leaks"

- Why do women attend post-secondary as mature students?
  - ◇ Need for more credentials
  - ◇ Improve job opportunities
  - ◇ Increase level of profession
  - ◇ Self-interest

- Barriers for women returning to school include:
  - ◇ Perception by faculty about motivation
  - ◇ Discrimination – sometimes at the classroom level
  - ◇ Limited support, including access to childcare, funding for scholarships and summer employment
  - ◇ Some institutions prefer not to have mature students enroll and some programs even refuse
  - ◇ STEM Trades – female enrolment still low in trades compared to men
  - ◇ 20% of colleges have programs that do not allow mature students
  - ◇ 69% of colleges consider equivalent life experience (higher than universities)
  - ◇ 30% of colleges have additional support for mature students (higher than universities)
- What is the solution to removing these barriers?
  - ◇ Change in culture and norms
  - ◇ Remove stereotypes
  - ◇ Provide accommodations (e.g. childcare)
  - ◇ Change assessment and admission criteria
  - ◇ Pedagogical reform for math and science for girls at an early age

Panel 1

What's working – Equity and Inclusion in Post-Secondary STEM Learning

Eden Hennessey, Research and Programs Director at Laurier Centre for Women in Science (Chair)
Mona Nemer, Chief Science Advisor
Barbara Vanderhyden, University of Ottawa
Alejandro Adem, Mitacs
Taylor Rae Jamieson, University of Ottawa (student)
Tina Kalopisis, 3M Canada

Key Messages from the Panel

- Variability in women's representation across different fields
- Must address issues earlier, including elementary and secondary school
- Need role models and mentors to share knowledge and show how family/career balance can work
- Need support at all levels, from everyone involved – institutions, government, females and males in academia and in industry
- Uniform policies don't work; need affirmative action and asymmetric policies
- Increase the pool – post-secondary programs need to evolve to address challenges for specific groups
- Recruitment efforts for post-secondary programs and jobs must focus on diversity, equity, and inclusion
- Scaling up needs to happen locally

RELEVANT CANADA 2067 LEARNING ROADMAP RECOMMENDATIONS

- Student participation in STEM courses is made more equitable and inclusive in terms of gender, culture, socio-economic background, and region.

- STEM education evolves to address the specific needs of Indigenous students and to incorporate other worldviews.

- All provinces and territories work to achieve balanced representation of youth participating in senior level STEM courses, starting by establishing baseline measures related to: gender, Indigenous and racialized students, students from economically disadvantaged backgrounds, rural, urban, and suburban students

- All provinces and territories incorporate Indigenous ways of knowing and perspectives into their curricula as learning objectives and expected outcomes.

- All teachers and education partners have access to ongoing Professional Learning & Development focused on recommendations from the Truth and Reconciliation Commission to improve their cultural proficiency, guard against undue cultural appropriation, and improve their ability to incorporate culturally sensitive teachings and techniques into their teaching practice.

Keynote

The Honourable Kirsty Duncan, Minister of Science and Sport

In discussion with Robert Annan, VIce President, Genome Canada and Vice-Chair, Let's Talk Science

"We cannot afford to leave any of our great thinkers on the sidelines"
"Our diversity is our advantage"

What has the government done?
- Reinstated long-form census for evidence to make good decisions
- Created the position of the Chief Science Advisor
- In budget 2018 made the largest investment in research in Canadian history
- Brought back University and Colleges academic staff survey
- Put in place new equity and diversity requirements for the Canada Research Chairs
- Required every university to put in place an equity and diversity plan
- Introduced made in Canada Athena SWAN (Scientific Women's Academic Network) program to track and inspire progress for women, Indigenous peoples, minorities, persons with disabilities, and adding in LGBTQ community

What comes next, what is left to be done? How can we continue to effect change when it comes to policies and culture?
- What happens when women are not included:
  ◇ First voice recognition software was calibrated for men
  ◇ First heart valves are not suitable for all women
  ◇ First airbags in cars, created prototypes for males
- We need everyone at the table to ask different questions and get better results

Question: Looking at K-12 and a broader sense of inclusivity, do you have any thoughts on what we can be doing earlier in the process?
- Children are like little scientists trying to figure out the world
- We want to attract more youth into STEM fields
- Numbers are increasing, but are we retaining them?
- "All children are curious, let's make sure we foster that"

Canada 2067 Keynote

Bonnie Schmidt, President and Founder Let's Talk Science

"It's about the kids not the acronyms and subjects"

- Canada 2067 engaged diverse stakeholders in crafting a vision and learning framework

- Canada 2067 Hub has all of the background and material

  ◇ Developed Canada 2067 Learning Roadmap

  ◇ Wrote a book about what the youth were saying

  ◇ Paper on global comparator countries

  ◇ Partnered with Shaftsbury to develop web series about coding

  ◇ Worked with many partners to design and implement the project

- Six Pillars (outlined in the Canada 2067 Learning Roadmap) are areas of interest that are commonly addressed by comparator countries around the world

- Deep alignment amongst millennials, high school students, educators, policy makers led to development of the Learning Roadmap

Some Learnings:

- Need to transition towards inter-disciplinary, issues-based, student focused, skills oriented learning

- Educators are key; they need training and support

- More community engagement desired; bring partnerships into classroom to support students and educators (e.g. mentorship, integrated work learning opportunities)

- Better career education is needed to help youth understand the changing nature of work

- Facility design can make spaces conducive to learning for everyone

Panel 2

Technology Access and Use

Mohammad Asadi-Lari, University of Toronto student (Moderator)
Mark Ramsankar, Canadian Teachers' Federation
Sandra Saric, Information and Communications Technology Council
Marianne Mazzorato, Dufferin Peel Catholic School Board
Juliet Waters, Kids Code Jeunesse

"Technology as a vehicle – it's useless if you don't know how to drive"

Key Messages from the Panel (Summary)

- Technology is not a replacement for the relationship between teachers and learners but a tool that can bring curriculum to life

- Focus more on connecting "how to use" with "why use"

- Dispel the concept of technology as an independent subject

- Students and educators should have input and influence the development of the tools to ensure they reflect the desired learning experience

- Don't always have to use technology to build the skills for technology use

RELEVANT CANADA 2067 LEARNING ROADMAP RECOMMENDATIONS

- In addition to promoting fundamental skills like literacy and numeracy, school curricula – as well as learning activities offered by community partners – increasingly include:

  ◇ competency- and inquiry-based approaches to learning;

  ◇ interdisciplinary and experiential (hands-on) approaches to learning;

  ◇ new technologies to enable more creative, interactive and student-centered approaches to learning and to promote digital literacy.

- Teachers and students take advantage of the opportunities afforded by new ICTs to transform teaching and learning by making them more accessible, interactive, individualized, dynamic and experiential.

- All teachers have pre-service training and access to ongoing professional learning and development opportunities focused on elective use of ICTs for teaching and assessment to leverage their potential to change pedagogy, impact learner experience and improve outcomes.

- Teachers have the opportunity each year to participate in professional learning and development that build capacity to use ICTs for learning.

- Non-technical ICT skills to ensure good digital citizenship and ethical behaviour are explicitly incorporated in the curricula.

Panel 3

STEM Learning: A Community Responsibility

Mohammad Asadi-Lari
David Lapides, Let's Talk Science (moderator)
Kim Furlong, Amgen Canada
Alanna Jane, University of Ottawa
Bruce Rodrigues, former Deputy Minister, Ontario Ministry of Education
Sandra Corbeil, Ingenium

"Community partners need to be co-creators in an ongoing relationship rather than just brought in for information or consultation"

Key Messages from the Panel

- Relevance - bridging industry, community and education allows students to see relevance

- Community partners need to be brought in to collaborate and co-create information/curriculum rather than just as providers of information

- Create ongoing, sustainable relationships rather than one-off events

RELEVANT CANADA 2067 LEARNING ROADMAP RECOMMENDATIONS

- Schools and STEM learning community partners work together so that all students engage in experiential learning opportunities with community partners at least once every year.

- Every student graduates secondary school with at least one work-integrated learning experience with a STEM industry or community partnership.

- All teachers have access to ongoing professional learning and development, and support from their schools for making and integrating STEM learning partnerships with external stakeholders.

- Businesses support education outreach through the engagement of their employees.

- All provinces and territories collect data to establish a baseline measure of the percentage of schools that have STEM learning partnerships with community partners

- % of businesses and community partners that support K-12 STEM learning increases.

- Businesses align 20% of their community investment goals related to education to support achievement of Canada 2067 recommendations.

- Community partners align the focus of their own STEM education programs with the Canada 2067 recommendations.

- Annual national and regional conferences exist for STEM- focused organizations to attend and at which they can organize collaborations and share ideas and best practices.

- Increase the number of community partnerships with STEM- focused organizations and businesses that include mentoring of students by a STEM practitioner.

- The provision to students of information about STEM education and future careers is strengthened by improving links between STEM learning in the classroom and experiential learning involving community and workplace partnerships.

Closing Keynote Address

The Honourable Elizabeth Dowdeswell, Lieutenant Governor of Ontario

"Science tells us what we can do, ethics tells us what we must do"
"Need to connect the dots between economic prosperity, environmental stewardship, and social and cultural cohesion"

- Important to:
  - ◇ Foster curiosity
  - ◇ Engage in intelligent risk taking
  - ◇ Think and be in situations beyond our comfort zone
- Need to work on connecting economic prosperity, environmental stewardship, and social and cultural cohesion

CONCLUSIONS

- There is a need for better collaboration among all stakeholders
- It is important that youth develop transferrable skills
- Attention and focus should be on the learner
- Opportunities and challenges must be considered in more holistic ways across the full continuum from early years through adulthood
- Customized approaches are needed to address issues in different fields and in different regions

NEXT STEPS

We all benefit from an inclusive approach to learning that engages people regardless of gender, culture and socio-economic status. Tremendous alignment exists regarding the competencies that are needed in an increasingly complex world. We all play important roles in achieving Canada 2067 and SDG4 goals, which promote inclusivity and skill development. To share your achievements at the Canada 2067 hub, please contact Let's Talk Science.

PARTICIPANTS

Special Guests:
Her Honour, the Honourable Elizabeth Dowdeswell, Lieutenant Governor of Ontario
The Honourable Kirsty Duncan, Minister of Science and Sport
Dr. Mona Nemer, Chief Science Advisor

Participating Organizations

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Amgen Canada
Brock University
Business Council of Canada
Canada Council for the Arts
Canadian Association of University Teachers
Canadian Commission for UNESCO
Canadian Foundation for Innovation
Canadian Museum of Nature
Canadian Nuclear Safety Commission
Canadian Space Agency

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