



Innovation, Science and
Economic Development Canada

Innovation, Sciences et
Développement économique Canada

Canada

Evaluation of
Innovation, Science
and Economic
Development (ISED)
Canada funding to
Let's Talk Science (LTS)

Audit and Evaluation Branch

REPORT

December 2021

This publication is available online at https://www.ic.gc.ca/eic/site/ae-ve.nsf/eng/h_03946.html

To obtain a copy of this publication, or to receive it in an alternate format (Braille, large print, etc.), please fill out the Publication Request Form at www.ic.gc.ca/publication-request or contact:

ISED Citizen Services Centre
Innovation, Science and Economic Development Canada
C.D. Howe Building
235 Queen Street
Ottawa, ON K1A 0H5
Canada

Telephone (toll-free in Canada): 1-800-328-6189

Telephone (international): 613-954-5031

TTY (for hearing impaired): 1-866-694-8389

Business hours: 8:30 a.m. to 5:00 p.m. (Eastern Time)

Email: ISED@Canada.ca

Permission to Reproduce

Except as otherwise specifically noted, the information in this publication may be reproduced, in part or in whole and by any means, without charge or further permission from the Department of Industry, provided that due diligence is exercised in ensuring the accuracy of the information reproduced; that the Department of Industry is identified as the source institution; and that the reproduction is not represented as an official version of the information reproduced, or as having been made in affiliation with, or with the endorsement of, the Department of Industry.

For permission to reproduce the information in this publication for commercial purposes, please fill out the Application for Crown Copyright Clearance at www.ic.gc.ca/copyright-request or contact the ISED Citizen Services Centre mentioned above.

© Her Majesty the Queen in Right of Canada, as represented by the Minister of Industry, (insert year of publication)

Cat. No. Iu4-410/2022E-PDF

ISBN 978-0-660-42591-7

Aussi offert en français sous le titre *Évaluation du financement d'Innovation, Sciences et Développement économique Canada (ISDE) pour Parlons sciences*

Table of Contents

3



Key Definitions

4



Background

9



Methodology

14



Findings

50



Summary

53



Appendices



Key Definitions



STEM literacy refers to the knowledge and understanding of scientific and mathematical concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity.¹

Inquiry-based learning is an educational strategy in which students follow methods and practices similar to those of professional scientists in order to construct knowledge.²

Project-based learning involves investigating an authentic problem, question, or challenge, where students can make connections to real world contexts and apply the concepts they are learning.³

Outreach refers to the provision of programs, services, activities, or expertise to those outside the traditional university community. Outreach provides contact or a service on a reduced or no-fee basis.⁴

Educators undertake **Professional Learning** to enhance their pedagogical techniques and create a captivating learning experience for their students online and in the classroom.⁵





Background

- Program Context
- History and Evolution of LTS
- LTS Governance & Partnerships
- Overview of LTS Programming



Program Context

Science, Technology, Engineering and Math (STEM) skills contribute to Canada's research and innovation capacity. These are key components to competitiveness, productivity, economic growth, and job creation that will guide the future success of the Canadian economy. STEM graduates offer the potential to help Canada develop innovative firms that provide high value-added products and services, increase Canadian productivity, and provide companies in Canada with access to highly qualified personnel that are vital for a knowledge economy.

However, many youth in Canada are dropping STEM courses once they are no longer compulsory. By the end of high school, the majority of students in Canada are not completing senior level science courses, which are needed to enrol in post-secondary STEM studies. **Let's Talk Science (LTS) programming seeks to address this disengagement from STEM participation and gaps in the talent pool in STEM disciplines** by supporting initiatives that encourage greater youth participation in STEM education and careers.

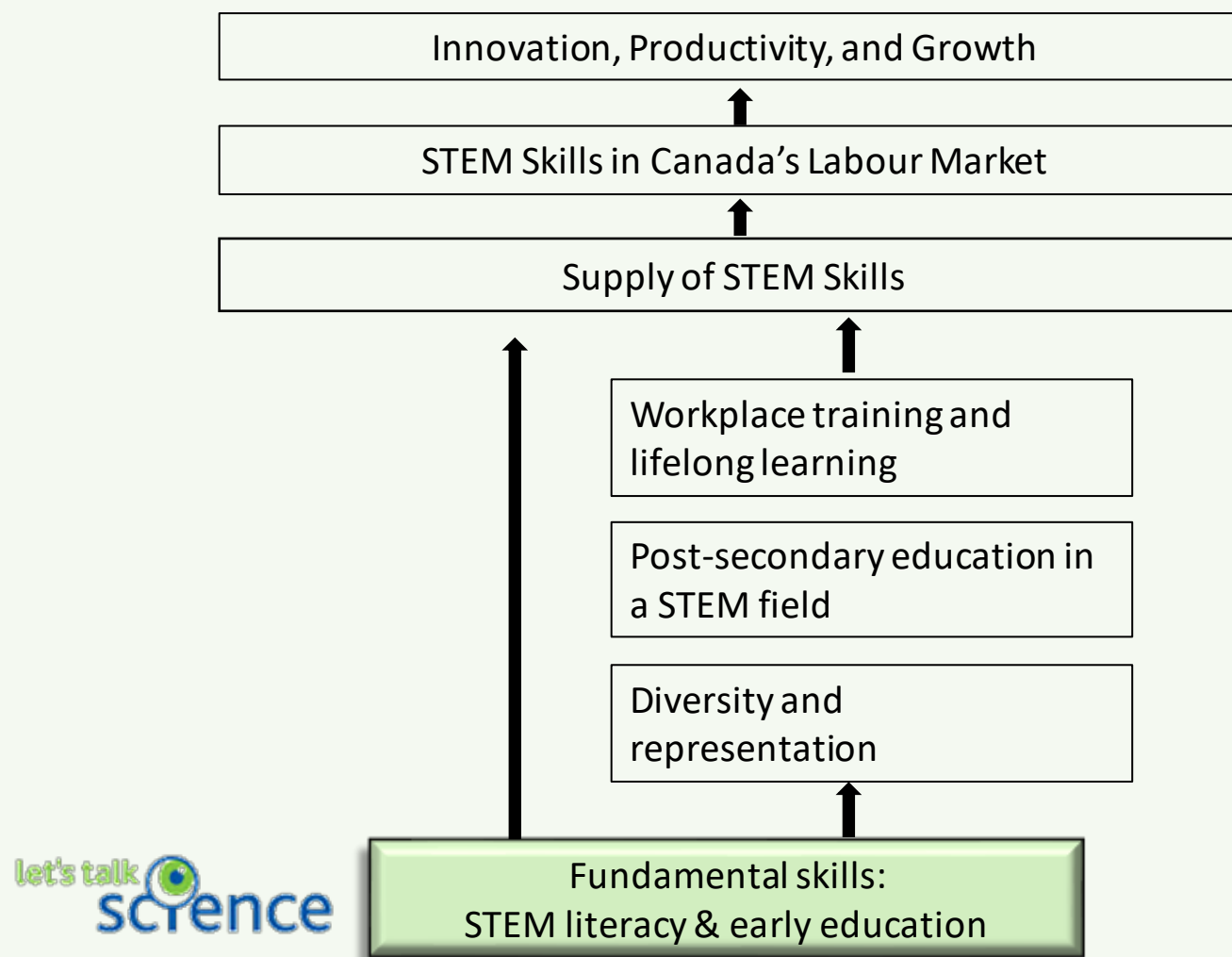
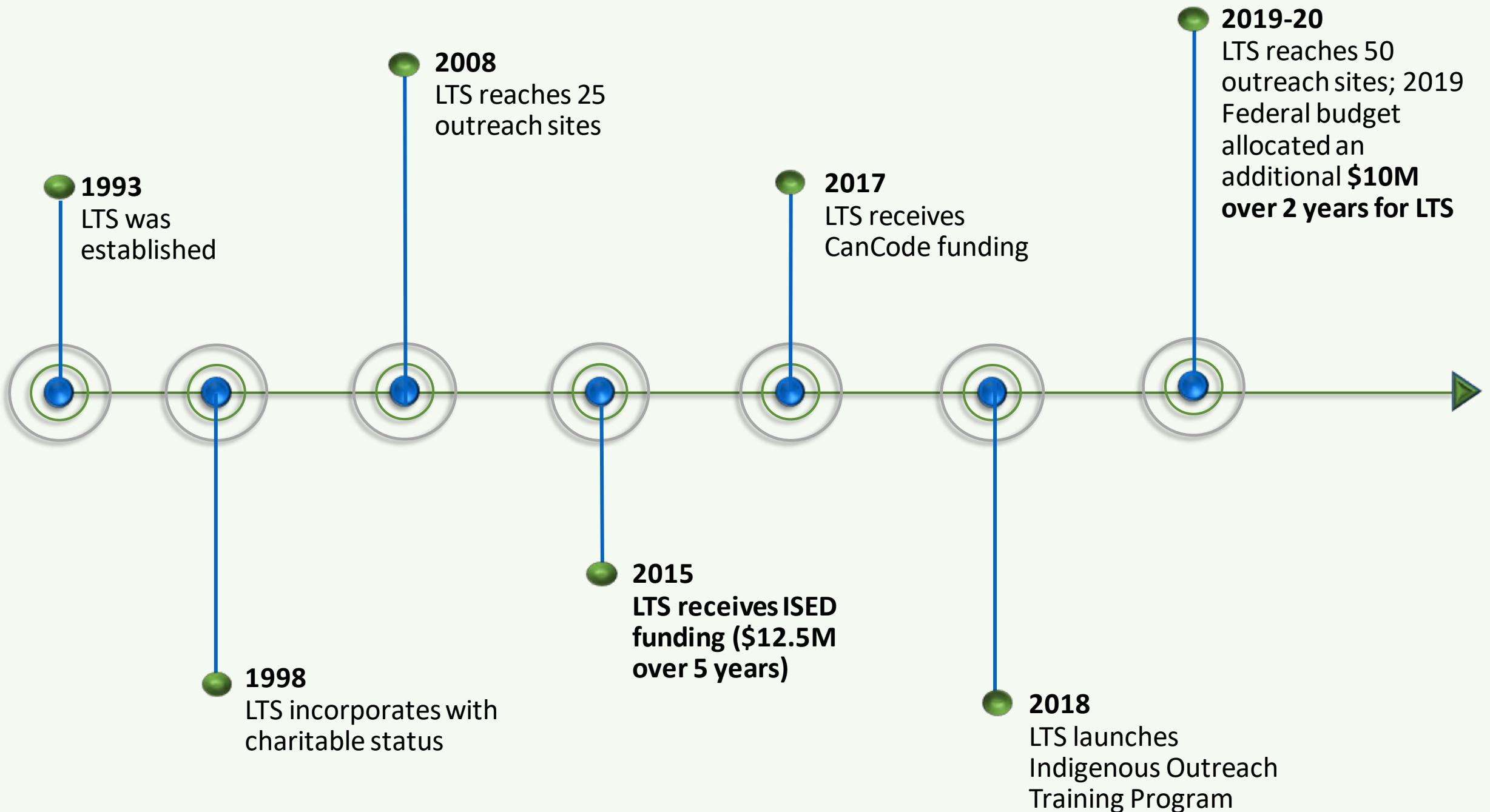


Figure 1 amended from: Council of Canadian Academies, 2015. *Some Assembly Required: STEM Skills and Canada's Economic Productivity*. Ottawa (ON): The Expert Panel on STEM Skills for the Future, Council of Canadian Academies.

History and Evolution of LTS

LTS is a national, not-for-profit corporation and registered-charitable organization that offers free programs, services and resources to help promote youth engagement in STEM





LTS Governance & Partnerships

LTS is governed by a Board of Directors with representation from academia, education, business and government which provides the organization with strategic guidance to improve science literacy across Canada. LTS is also supported by three advisory committees that help guide the development of all LTS programs to ensure they remain relevant to youth and their educators, they include:

LTS Educator Advisory Panel (LEAP)

LEAP is a consultative forum, providing strategic advice to ensure all LTS programs address pedagogical and jurisdictional needs.

National Indigenous Advisory Council (NIAC)

The NIAC plays an important role in guiding the successful development of Let's Talk Science programs and initiatives to support the needs of Indigenous children and communities.

Community Advisory Panel - Newfoundland and Labrador (CAP)

CAP members provide advice and input into the implementation of Let's Talk Science programs in all schools within Newfoundland and Labrador.

The following partnerships support the development and delivery of LTS and partner programs and resources:

Program Delivery Partners

LTS engages in partnerships with other youth-serving organizations. LTS provides its support and program resources to these partners to leverage their programming and extend its reach to more youth (e.g., ChatterHigh, Shaftesbury Productions, and Frontier College).

Science Mobilization Partners

LTS has a variety of partnerships with science and technology organizations. LTS leverages these organization's science knowledge by adapting their content for LTS programming (e.g., Genome Canada, Stem Cell Network, and Oceans Canada).

Federal, Provincial and Institutional Partners

LTS partners with federal, provincial and institutional partners to mobilize their expertise and enrich its programming for youth (e.g., Canadian Space Agency, Nuclear Safety Commission, provincial ministries of education, school boards, and universities and colleges).

Donor Partners

LTS donors (e.g. Amgen, Bayer, and RBC Foundation) provide financial or in-kind support (e.g., industry volunteers and materials), allowing LTS to deliver programming at no cost. LTS creates mutually beneficial relationships to meet the strategic goals/objectives of its donors.



Overview of LTS Programming

LTS's partnership approach promotes youth STEM engagement, by supporting educators and students (Early Years– Grade 12 (EY-12)), and volunteers with the following free-of-charge, STEM-based initiatives, which were offered over the contribution agreement period of 2015-16 to 2019-20:

EDUCATORS

Digital Resources

LTS's online collection of curriculum-aligned, STEM resources are available in English and French, and support educators with guides for hands-on activities and projects, background information on various STEM topics, learning strategies, access to science videos, and career exploration lessons and career profiles.

Professional Learning

The LTS Professional Learning program blends four methods of delivery to support ongoing and connected learning opportunities for educators. LTS offers: co-learning broadcasts, live and on-demand webinars, self-paced modules, and in-person sessions.

EDUCATORS & STUDENTS

Projects

Tomatosphere: using scientific inquiry, students examine the effects of the space environment on seed germination.

Living Space: students study and compare key environmental conditions needed to keep astronauts healthy.

Fish Market: using DNA sample collection kits, students contribute real data to a project about food fraud.

Career Exploration

Career Profiles: LTS has hundreds of career profiles on its website featuring STEM professionals, which describes the job, talks about the person, and explains what led them to working in their field.

ChatterHigh: LTS's partnership with ChatterHigh provides a learning resource that engages, informs and guides students through higher education and career options.

EDUCATORS, STUDENTS, & VOLUNTEERS

Outreach

LTS Outreach sites (see [Appendix B](#) for outreach delivery model) are community-based programs currently offered at 51 post-secondary institutions, that connects educators and students (EY-12) with volunteers who facilitate hands-on STEM learning in schools and community settings in every province and territory. Volunteers, in turn, receive training and experience, which is aimed at developing their skills and enhancing their employability.

Events

LTS Challenge: is a team-based competitive enrichment event held by post-secondary volunteers at a local college or university (or online), giving Grades 6-8 students the opportunity to visit the campus and interact with post-secondary students and faculty.

Symposiums: Post-secondary volunteers facilitate their delivery at outreach sites, connecting high school students with leading researchers to discuss current/emerging research and explore career paths.



Methodology

- About the Evaluation
- Evaluation Areas and Questions
- Data Collection Methods
- Challenges for the Evaluation



About the Evaluation

An evaluation of ISED's funding to LTS is being conducted to address an identified departmental need.



The **objectives** of the evaluation are to examine the relevance, performance, and efficiency of ISED funding to LTS in accordance with the Treasury Board *Policy on Results*.



The **scope** of the evaluation covers ISED funding to LTS from 2015-16 to 2019-20. It is important to note that LTS reporting follows the school year, therefore data used in this report covers the period from September 1, 2015 to August 31, 2020.



The evaluation was conducted in-house by ISED's Audit and Evaluation Branch. The evaluation used a **results-based approach**, examining the achievement of expected outcomes, as identified in the LTS logic model in [Appendix A](#).

All evaluation findings were supported by at least three lines of evidence.



Evaluation Areas and Questions



Relevance

- To what extent is LTS addressing a unique and continued need for youth STEM engagement and awareness?
-



Performance

- To what extent has LTS increased:
 - Engagement and participation of youth, volunteers and educators?
 - Youth interest in STEM and youth awareness of STEM-related career paths?
 - The capacity of educators to support youth STEM engagement?
 - The professional skills and employability of LTS post-secondary volunteers?
-



Efficiency

- To what extent is the LTS funding model an efficient and effective model for increasing youth STEM engagement and awareness?



Data Collection Methods

Four data collection methods were used to support the evaluation.



Literature and Document Review

The literature review was comprised of pertinent literature to gain a thorough understanding of youth STEM programming in in Canada and internationally, in order to assess the unique and continued need for LTS to support youth STEM engagement and awareness. The document review comprised of key program and reporting documents to support the assessment of performance and efficiency.



Performance, Administrative and Financial Data Review

LTS performance data, collected as part of their Performance Measurement Strategy, was reviewed in order to assess the extent to which progress has been made towards achieving the expected short- and medium-term outcomes outlined in the LTS logic model. An analysis of administrative and financial data and survey data of youth, educators, and volunteers was performed to assess performance and efficiency.



Virtual Interviews

A total of 24 virtual interviews were conducted using either MS Teams or WebEx meetings to gather diverse perspectives on the relevance, performance and efficiency of LTS. Stakeholder groups interviewed include:

- Educators/teacher leaders;
- Outreach site and online engagement coordinator volunteers;
- Partner organizations;
- Advisory Committee members;
- Senior managers and Board Members; and
- ISED program management.



Case Studies

Two case studies focused on specific LTS-supported initiatives, Tomatosphere and the LTS Challenge, were conducted to provide a more detailed perspective on the impacts of these initiatives on youth STEM engagement and awareness. The case studies relied on the document/literature review, administrative data, and a total of 6 interviews with program staff, volunteers, partners and educators.

The evaluation encountered three potential challenges:

Attribution

The presence of other funding partners (e.g., other levels of government, private sector, etc.) make it more difficult to isolate and measure the impact of the federal government's contribution.

To alleviate this challenge, data collection methods (particularly interview questions) were designed and articulated in a way that respondents can answer, to the extent possible, the incremental impact of ISED's funding to LTS.

Youth Privacy

Due to youth privacy issues, it was not feasible to conduct interviews directly with youth participants.

To address this challenge, interviews were conducted with educators and volunteers to provide indirect views of youth experiences. Further, data collection related to Equity Diversity, and Inclusion (EDI) and gender may also be limited due to youth privacy and consent issues. To alleviate this challenge, the evaluation relied on self-reported data from LTS surveys, where available, to capture the views of youth and EDI data.

Respondent Bias

Some interviewees are involved in program design and delivery, which may contribute to findings that are positively biased.

To mitigate this, the purpose of the interview and strict confidentiality was clearly communicated to participants and responses were cross-validated across stakeholder groups. Additionally, data collected from interviews was triangulated with other lines of evidence.

Findings

- Relevance
- Performance
- Efficiency



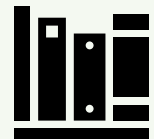
Findings

Relevance

Performance

Efficiency

Finding 1: There is a continued need to support youth STEM engagement in Canada. This need for youth STEM engagement has increased over time, particularly for underrepresented groups. LTS addresses a need for youth STEM engagement by convening education stakeholders and coordinating the delivery of a national scale platform for youth STEM engagement. The delivery platform uses a broad (EY-12), holistic (youth, educators, volunteers, parents), and evidence-based approach to address barriers to youth STEM participation that is very adaptable in meeting diverse needs.



Literature indicates that STEM graduates are significant contributors to innovation, productivity, and economic growth. Interviews found that with accelerating technological/scientific change, there is a growing need to increase the scientific literacy of the population, including increasing STEM critical thinking/inquiry skills, as they are not adequately covered in school curricula. Literature further indicates that a significant portion of careers will require some form of STEM literacy and skills.⁶ Literature and interviews also found that Canada needs to increase its STEM performance to remain competitive with other jurisdictions. Canada has a high number of adults with tertiary degrees and has seen some improvements in the portion of STEM graduates, however, Canada continues to underperform, ranking 18th among OECD countries in the portion of graduates with STEM degrees.

2005	2015
Canada ranked #1 in OECD countries: 54% of adults 25-34 had tertiary degree	Canada ranked #2 in OECD countries: 61% of adults 25-34 had tertiary degree
Canada ranked #22 in OECD countries: 20% of tertiary graduates were in STEM	Canada ranked #18 in OECD countries: 21% of tertiary graduates were in STEM

Source: OECD. 2017. Education at a glance.

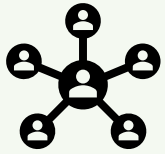
While there is a growing need for youth to participate in STEM education, literature and interviews indicate that interest in STEM starts to drop by grades 7-8, with youth opting out of STEM courses when they are no longer compulsory (after grade 10). This is due to negative perceptions of STEM; lack of awareness of career options/education pathways; lack of perceived relevance and role models; and lack of capacity within schools. Literature points to the value of early childhood interventions to strengthen skills needed for careers within the STEM sector. In particular, youth engagement in STEM can be increased by supporting their involvement at an early age, fostering interest throughout school, and creating opportunities to build skills and positive attitudes towards STEM.



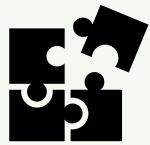
According to literature and interviews, there is also an increased need to focus on underrepresented groups, including by sub-discipline (e.g., representation of women in engineering). Underperformance is more acute for underrepresented groups, as there is less access to STEM education resources, particularly in low socioeconomic communities and remote regions.



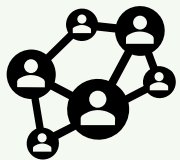
LTS addresses a need for national scale coordination and delivery of youth STEM engagement through building a national platform and acting as a convener to address barriers and reach all stakeholders



To improve STEM education, literature and interviews points to a need for national scale coordination and leadership for STEM, as well as horizontal collaboration and engagement of stakeholders.^{7,8} According to interviews, to move education forward, you cannot do it in silos. You need alignment in the philosophy, research, and implementation.



However, interviews and literature noted that Canada does not have a national education program, strategy, or common operational definition for STEM and so there is a risk of disconnect between provinces.⁹ It was also said that provincial curricula are moving further apart with respect to approaches and content, with literature finding some provinces realigning their curriculums around a new set of core competencies.¹⁰ In 2016, a coalition of Canadian STEM education organizations, including LTS, Actua, and Youth Science Canada, identified a need for national strategy for youth STEM promotion.¹¹



Interviews suggested that LTS helps fill this need for national coordination by acting as a national convener for education stakeholders, that allows stakeholders and ideas to coalesce and reduces duplication of effort. According to interviews, LTS is building a national organization, with a platform and processes, to achieve efficiencies, address barriers, and reach all stakeholders (teachers, kids, parents, post-secondary, industry, and government).

Highlight – Canada 2067

The goal of LTS's Canada 2067 initiative was to catalyze large-scale STEM education improvement by developing a national vision and goals for STEM learning through multi-pronged stakeholder engagement. Canada 2067 started as an idea for a single conference and grew to include an international policy review, five youth summits, six millennial roundtable consultations, a national leadership conference, a youth-focused web series and documentary, and significant social media and outreach.

According to interviews, the Canada 2067 initiative was important in terms of LTS's objectives for systems change. Canada 2067 was unique because in Canada there is no national view towards education. It provided an opportunity to bring everyone together to connect and share ideas. Canada 2067 used an evidence based approach to look at how all of the different pieces worked within the education system and determine what changes are needed to the education system to adapt to the educational requirements and jobs expected in the future.

LTS uses a broad, holistic approach to youth STEM engagement to address barriers to participation



LTS has a broad focus (EY-12) and addresses barriers at multiple levels (youth, volunteers, educators, parents) to achieve a 'wrap around effect' that is inclusive for all students (not just those interested in STEM).



According to interviews and document review, **LTS is accessible to all types of learners.** LTS uses hands-on activities and inquiry based learning, which involves posing questions/problems. Literature and documents found that inquiry based learning is a more effective strategy for teaching STEM and leads to increased student knowledge, skills and positive attitudes for STEM.^{12,13} It is also more engaging for all learners, especially underserved groups (women, at-risk youth, and Indigenous youth), particularly when its catered towards cultural topics/experiences."¹⁴ LTS is also accessible, as it reaches all youth via free in-class STEM activities, thereby removing barriers of fee based after-school programs (cost, location, etc.), particularly for underrepresented groups.¹⁵



According to interviews, **LTS addresses gaps in educator capacity.** Many teachers feel ill-equipped to provide hands on STEM activities, particularly early years educators lacking STEM backgrounds. Literature shows only half of Canadian educators feel adequately prepared to teach STEM, and those without a STEM education feel even less prepared.¹⁶ Interviews found that LTS supports interest and confidence in teaching STEM by providing professional learning and easy to use activities and materials. LTS also includes a career focus that exposes youth to role models and career pathways. Interviews and literature found there is a need for LTS to link STEM to the 'real world' and show youth career pathways, so youth can 'see themselves in STEM', because school curricula and educators do not adequately cover information on STEM career paths^{17,18}.



Tomatosphere is the only plant- and inquiry-based program in Canada that provides educators, of all grades, with the resources required to conduct full experiments. LTS provides educators with packages containing seeds sent into space and untreated "control" seeds. Students plant the seeds and conduct experiments to explore the effects of the space environment on the germination of tomatoes.

The versatility of Tomatosphere allows educators to take the program in the direction they want, whether it be in the classroom through cross-curriculum connections or outside the classroom in a community setting, both of which provide opportunities to further support youth STEM engagement.

Findings

Relevance

Performance

Efficiency

LTS is effective in monitoring, predicting, and adapting to changes in need, because of its flexible and evidence-based approach to programming, and use of feedback from users to make adjustments



Document review and interviews found **LTS uses research to determine what type of programming is needed and to make improvements** to program delivery (e.g., surveys). For example, LTS collaborated with one of its corporate donors, Amgen Canada, to produce the ‘Spotlight on Science Learning’ reports examining the state of STEM learning in Canada. Interviews and document review also found that LTS regularly measures the impact of engagement efforts by seeking feedback from youth, educators and volunteers, including ways to identify potential enhancements (e.g., impact assessments, longer term studies with the University of Guelph and Wilfred Laurier University, and a longitudinal study of students). According to interviews, the Board of Directors examines the program metrics on an ongoing basis to ensure there are no impediments/barriers to engagement and uses the information to make recommendations to management for adjustments to the program, while taking into account any risks associated with the proposed changes.



Interviews found that **LTS has a continuous improvement mindset** and is effective at understanding and reading the environment and context, permitting its programs to evolve and continue to meet the needs of stakeholders. Interviews found that **LTS is very adaptable to different needs and delivery contexts**, demonstrating flexibility in how it provides support to its partners (e.g., unique delivery models for northern outreach via Aurora Research Institute and Frontier College).



LTS’s adaptability was demonstrated by its pivot to online programming in response to COVID-19, where it adjusted quickly to meet the needs of students and educators. Interviews found that **LTS adapted to constantly changing educational delivery formats** (e.g., blended, fully online, and in-person classes), using technology in an effective manner and pivoting to digital platforms (e.g., self-paced learning modules, online professional learning, and ‘STEM at home’ activities for youth).

Findings

Relevance

Performance

Efficiency

Finding 2: There are a variety of youth-focused STEM programs in Canada; however, LTS is relatively unique in having a larger scale and scope and a highly collaborative delivery model.



Interviews, literature, and documents identified a variety of youth-focused STEM programs (e.g., Relay Education, Mind Fuel, Mad Science, Scientists in School), including university, non-profit, and public-private STEM-based organizations. However, interviews explained that **there was a lot of unmet need for STEM programming in Canada** and that all programs are a little bit different, so it's important to have a diversity of organizations. Further, literature review and interviews found that **most youth STEM programs have a more limited scope than LTS** (e.g., focused on a specific subject such as coding or activity such as science fairs), are small-scale, local or regional, and charge fees for their services.

Interviews identified **LTS's comparative advantage as being its broad scale and scope**. LTS leverages a large network of resources and expertise to support delivery by its outreach sites. LTS has a broad scope (e.g., hands-on outreach, online resources, action projects, LTS Challenge) and age range (EY-12), which enables a more holistic approach. LTS also has a broad STEM focus, including a career focus, while other organizations focus on more specific areas (e.g., Oceans Canada). LTS supports students, teachers, and volunteers (a unique component of LTS). Other organizations tend to be more piecemeal and cover some components (e.g., volunteer role models).

According to literature review and interviews, **LTS's collaborative model is also unique**, and is aligned with evidence that the successful delivery of youth STEM education requires collaboration with a variety of stakeholders.^{19,20} Interviews found that LTS has a strong and diverse network that serves as a “connective tissue” for the many stakeholders that support delivery of its programming. It allows LTS to reach diverse audiences and communities, while minimizing duplication of effort with its partners. LTS also provides a balance between a centrally managed approach and a location specific approach, allowing its partners to adapt the delivery approach to local contexts. For example, for its outreach sites, LTS provides back-end infrastructure similar to a franchise (e.g., volunteer management system, training processes, kits), allowing partners to be more responsive to the local context and needs of stakeholders.

Findings

Relevance

Performance

Efficiency

LTS, Actua, and Youth Science Canada (YSC) are the only national scale, non-profit organizations that support STEM education by delivering activities to increase youth awareness and engagement in STEM; however, there are a number of differences in their delivery models and areas of focus, with LTS having the broadest scope of activities and target audience.

	LTS	Actua	YSC
Program Delivery			
All programs free-of-charge	Y		
Some programs free-of-charge		Y	
Post-secondary student and outreach site delivery	Y	Y	
Volunteer-based program delivery	Y		
Outreach to underrepresented/remote communities	Y	Y	
Programming in English and French	Y	Y	
Educator Resources			
Online resources	Y	Y	
Curriculum-linked resources	Y		
Inquiry projects	Y		Y
Professional Learning for Educators			
Self-paced learning	Y		
Webinars	Y	Y	Y
In-person learning sessions	Y	Y	
Educator training program	Y	Y	
Teacher Leader Program	Y		
STEM Career Awareness (e.g., career profiles, career panels)	Y		Y



Interviews and a comparative review of the programs found that Actua has the most similarities to LTS, with YSC focused mostly on science fairs. LTS and Actua provide outreach, facilitated by a network of post-secondary students, to communities across Canada. LTS relies primarily on volunteers to deliver its outreach programming, while Actua largely relies on staff paid by Actua or its network members. LTS delivers outreach activities in schools, while Actua primarily delivers its activities at its partner outreach sites. Actua also differs from LTS in that it uses pre-existing university STEM programs, with a focus on summer camp programs, for its outreach sites.

LTS offers a wider variety of resources and covers a wider number of science topics (Actua is more focused on technology). LTS offers national inquiry projects such as Tomatosphere, which can be scaled for various grades, linked to curriculum, and expanded to other topics/subjects. In addition, LTS includes STEM career awareness throughout its programming, whereas YSC has an annual STEM Expo which exposes youth to STEM career opportunities.

Both Actua, YSC, and LTS offer professional learning to educators, however, LTS offers a wider variety and more comprehensive training options. According to interviews, Actua has only recently moved into providing learning options for educators. While Actua offers an educator training program, LTS's Teacher Leaders provides support, resources and professional learning to a cohort of educators.



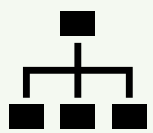
Findings

Relevance

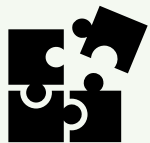
Performance

Efficiency

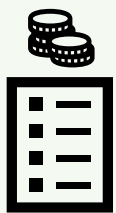
Finding 3: LTS is aligned with ISED’s Departmental Result, “Canadian businesses and industries are innovative and growing” and supports the objectives of the Innovation and Skills Plan in providing youth with access to formative experiences that promote increased STEM participation.



Contributions to LTS are part of ISED’s Talent Development program, supporting the Department’s Core Responsibility, “Canadian businesses and industries are innovative and growing.” By providing access to STEM enrichment activities to all youth free of charge, LTS helps encourage Canadian youth to participate in STEM careers.



LTS also aligns with the objectives of the Innovation and Skills Plan (ISP) announced in Budget 2017. The ISP also specifically includes an objective to “promote STEM to young Canadians”. The ISP states that “young Canadians are curious, talented, entrepreneurial and well-educated—traits that make them well-positioned to deliver the next great breakthrough in STEM. In order to unlock this potential, young Canadians need to have equal access to the formative experiences that can spark new ideas and inspire careers in these important fields. This is especially true for those young Canadians who are traditionally underrepresented in the STEM fields, including women and Indigenous Peoples.” LTS’s provision of STEM activities to youth free of charge, as well as its large share of female volunteers, use of learning strategies that align with the needs of diverse groups, and its Indigenous Outreach Strategy, support these Government of Canada objectives.



The 2019 Budget identifies its investment in LTS as a program that contributes to its objective “to help young Canadians more seamlessly transition into good careers.” The budget states that “Programs like Let’s Talk Science and PromoScience engage young people in hands-on STEM activities and science experiments, helping youth develop critical thinking skills and opening up doors to future study and work in these fields. They also help ensure more girls — and other groups that are underrepresented in STEM — gain an interest in STEM from an early age.”



According to interviews, LTS supports the federal government’s science and economic priorities pertaining to education. LTS is able to influence and support education in a way that would be difficult for the Government of Canada, because LTS can deliver on policy objectives at every level of government, without encroaching on jurisdictional responsibilities for education. LTS can act as an intermediary between federal and provincial priorities by developing education programs that support skill development and jobs that teachers will embrace and by influencing curriculum development in the provinces.

Findings

Relevance

Performance

Efficiency

Finding 4: LTS increased its reach to youth and increased youth interest in STEM, because of the variety of engaging ways it reaches youth, directly via LTS programming, and indirectly via its partnerships with other youth-serving organizations. To support youth interest and awareness in STEM careers, LTS effectively incorporates career pathways into this programming, via a large and diverse array of career profiles and the use of university volunteer role models.

Youth Participation in Outreach



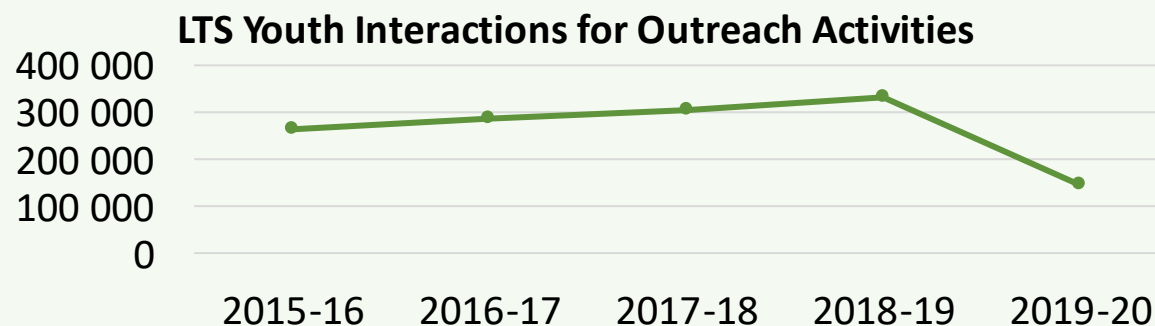
Youth Interest In STEM



Youth Awareness & Interest In STEM Careers



For the period 2015-16 to 2018-19, LTS showed sustained yearly increases for in-person and online youth interactions. LTS had 4.6 million youth interactions for the period 2015-16 to 2019-20, just short of its target of 5 million, due to COVID and changes in the measurement of online interactions;* however, LTS web analytics indicate online youth interactions continued to increase in 2018-19 and 2019-20. According to interviews and document review, demand for in-person outreach visits has exceeded capacity, resulting in sites creating waitlists, such that LTS put limits on the number of visits for some schools and provided additional resources to deploy (paid) outreach teams via the ESDC Canada Summer Jobs program. From 2015-16 to 2018-19, the number of LTS volunteer outreach activities held and the number of interactions with youth steadily increased by 27%, until being impacted by COVID in 2019-20 with a 50% decline. In addition to direct reach to Indigenous youth (around 3-5% of interactions), LTS extends its reach to Indigenous communities via partnerships (e.g., Frontier College for summer camps and Aurora Institute for outreach).



*In 2018-19, LTS removed the requirement to register for an account to access certain services, which LTS had used to track the number of online youth and educator interactions. In lieu of account registrations, LTS now uses web analytics to track online youth and educator interactions.



The LTS Challenge (LTSC) provides an opportunity for youth to connect with volunteer role models, get exposure to STEM topics, and connect with other students in a competitive team environment. Surveys show that most youth participated to learn about new ideas in science. The demand for LTSC is high, with registration filling up quickly and spin-off events created by educators to fill unmet demand. Data shows an increase in the number of events, participating schools and youth interactions. In response to COVID-19, LTSC pivoted online to an 11 week series of one-hour activities for grades 5-8 that included career panels, hands-on activities, design challenges, and prizes. The LTSC reached a broader range of youth and went from 3,000 students for the in-person event in 2019 to 15,000 for the virtual event in 2021.

LTS increased youth interest in STEM through the provision of engaging outreach activities to classrooms

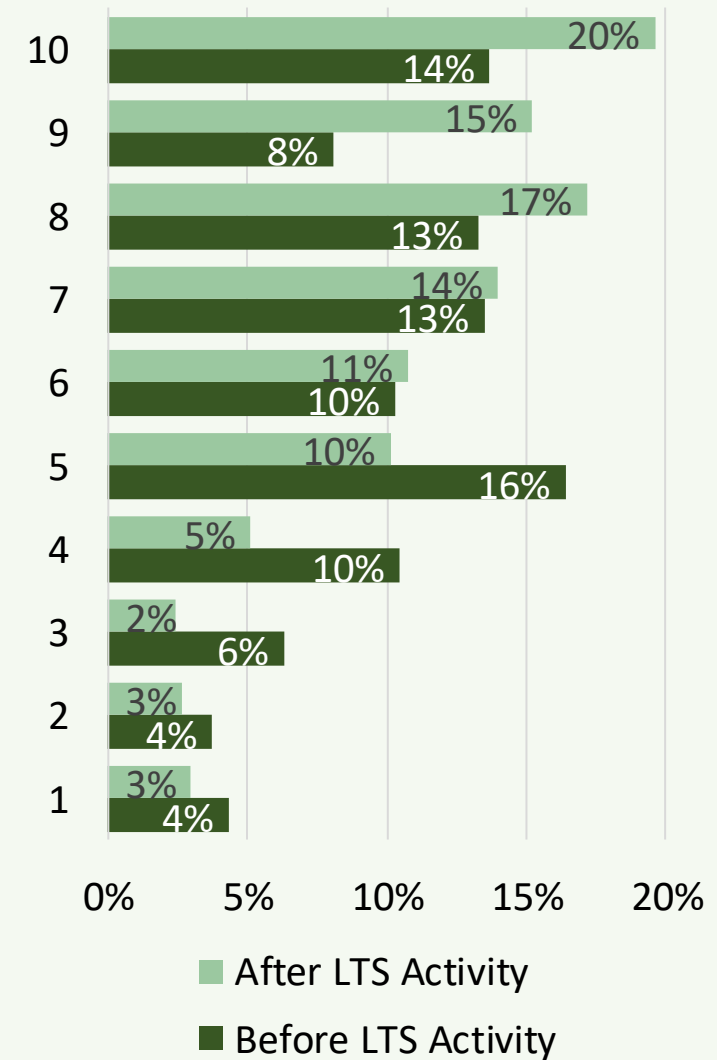


Document review found that youth interest in STEM increases the desire to pursue STEM education or occupations. With science courses optional after Grade 10 for the majority of provinces and territories, students risk limiting their career choices very early on by closing the door to an estimated half of university and college paths. LTS surveys found that the primary reason (51%) for educators bringing LTS into their classroom was "to provide students with exposure to 'real' science." Over 70% of youth surveyed found that the activities were fun and youth wanted to participate in the activities with the volunteers again, and over 50% of youth said that it increased their excitement about science.

LTS had a target of 70% of youth reporting an increased interest in STEM by March 31, 2020. For 2015-16 to 2017-18, around half of youth indicated that their experience with the LTS volunteers increased their interest in STEM. In 2018-19 and 2019-20, around two-thirds of youth experienced an increased interest in STEM and excitement about science "to some extent" or "to a great extent", with another third indicating that their interest was increased "to a small extent." On average, youth who received LTS outreach reported their interest to have increased by 15% relative to their baseline level of interest (from 6.3 to 7.2, on a scale of 1-10). LTS surveys also found that almost half of youth experienced at least a moderate increase in their desire to take optional high-school classes and study STEM after graduation.

According to interviews, LTS outreach provides students with an understanding and appreciation of STEM. Students are very engaged with the materials when volunteers deliver outreach activities in class. The design and the wide variety of activities that volunteers bring to the classrooms get youth excited/interested about science. Interviews found that the breadth and depth of programming for a variety of stakeholders and learners was critical to the success of LTS in terms of increasing youth interest in STEM.

Youth Interest in STEM (Scale of 1-10)



Findings

Relevance

Performance

Efficiency

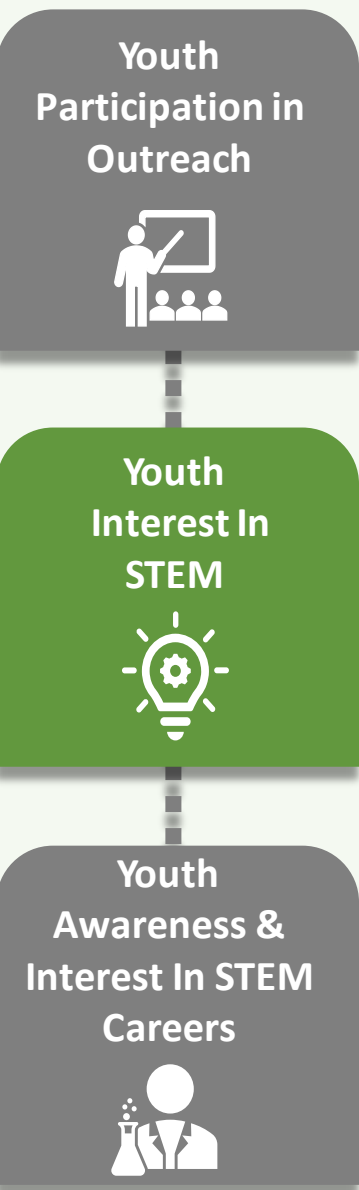
LTS is effective in increasing youth interest in STEM due to the variety of ways it reaches youth, including directly via LTS programming and indirectly via its partnerships with other youth-serving organizations

Interviews also found that LTS was effective in increasing youth interest in STEM due to the variety of ways in which it reaches youth directly via its programming. LTS is effective in customizing its programming to the local context, needs, and activities. LTS thinks about what the kids who will be engaged will have access to, including what resources are accessible. Interviews found that since youth have a variety of learning styles (i.e., visual, descriptive, experiential, etc.) and interests, LTS has different ways of offering the resources and the learning experiences. For example, volunteer outreach activities provide a broad range of engagement of all students in a classroom to participate in hands-on STEM activities and action projects give all students the opportunity to participate in real world science using online learning resources and hands-on science experiments. The LTS Challenge and symposium events are important for kids who are already excited about science, as they provide STEM enrichment and an opportunity to meet like-minded youth and scientists.

LTS also reaches youth indirectly via its partnerships. According to interviews, LTS is effective in engaging youth through its partnerships and supporting its partners by helping them grow and develop, thereby extending its reach to more youth. For example, LTS did a lot of work to ensure its activities with Frontier College could be done in Indigenous communities with limited access to technology, internet, and materials. Interviews said youth enjoyed participating in the LTS activities delivered by the camp counsellors. Document review and interviews also found that LTS supported its outreach site, Aurora Research Institute, in increasing its reach to more youth and spurring youth interest in STEM.



Surveys found that the LTS Challenge is effective in increasing youth interest and excitement in STEM. Interviews and document review found that kids look forward to the LTSC and that it is engaging, because of the variety of science topics covered and the competitive and fun/playful nature of the event. Surveys and interviews found that the LTSC is particularly valuable as an enrichment activity for kids who are already interested in science, as they can meet like minded youth and STEM role models and engage in material that goes beyond their grade level and curriculum. Surveys found LTSC was effective in increasing desire among youth to take optional science classes in high school, with the majority (63%) saying they would take biological and physical science courses. Youth said they would take these optional courses because they were interested in STEM and it would be helpful for their post-secondary and professional careers.



Findings

Relevance

Performance

Efficiency

LTS incorporates career pathways into its programming to help counteract low youth awareness of available STEM careers, which also helps address their reduced participation/interest in STEM

Document review, literature, and interviews found that youth lack knowledge about the variety of STEM careers available to them,²¹ with the OECD identifying career awareness as a key barrier to youth STEM engagement.²² According to literature, better knowledge about scientific careers also improves the image of STEM and encourages young people to pursue STEM jobs.²³ Literature suggests that embedding career education in the curriculum and providing career guidance is needed to improve understanding of the connection between STEM disciplines and careers.²⁴

LTS's focus is to bridge a gap in youth STEM career awareness by incorporating career pathways into all of its program areas. LTS infuses its professional learning and educator resources with career awareness components and does work with volunteers to incorporate career information into outreach activities.

To increase career awareness, LTS reaches youth via online career awareness resources and activities

Career Discovery (programming formerly included under CurioCity), launched in 2019-20, brings together career profiles, videos, and resources. According to documents, Career Discovery allows students to explore careers in a way that engages, informs and guides students through higher education and career options. Document review found that LTS has hundreds of career profiles, as well as videos and other resources (e.g., it has VR kits that it lends to volunteers) on its website.

LTS also facilitates STEM and career awareness events and activities, such as ChatterHigh, where LTS linked its career profiles to this platform which runs daily quizzes to help youth target career interests, and reached 13,146 youth in 2018-19 and 13,580 youth in 2019-20. LTS also ran a social media career awareness campaign in 2018/2019 called "That's a Real Job" which had over 2.5 million impressions and 50,000 completed video views (watching the video to the end) for its pilot campaign of four videos.

Youth
Participation in
Outreach



Youth
Interest In
STEM



Youth
Awareness &
Interest In STEM
Careers



The large and diverse array of career profiles are an effective and unique means of increasing youth awareness and interest in STEM careers and are incorporated into the programming delivered by LTS and its delivery partners

Youth Participation in Outreach



Surveys found that one-fifth of educators brought in outreach volunteers to provide science role models to their students. While it wasn't the main reason educators brought the volunteers into class, most educators surveyed (88%) found that LTS was "extremely valuable" or "very valuable" in supporting their students' in pursuing a STEM education, by providing post-secondary and professional role models and opportunities to hear about the range of careers and post-secondary studies in STEM.

Youth Interest In STEM



In addition to volunteer career role modelling, interviews found that LTS provides a wide range of diverse career profiles on its website that include non-traditional STEM careers (e.g., trade professions). LTS regularly adds new career profiles, and as of April 2021, had 531 English career profiles and 400 French career profiles.

Youth Awareness & Interest In STEM Careers



The profiles are focused on personal stories; LTS doesn't just describe the job, they also talk about the person doing the job and what led them to working in their job. Interviews explained that this provides youth with a connection to the person outside of the job itself. The career profiles are embedded into every facet of LTS activities (outreach, professional learning, etc.), and target all age groups (to get youth thinking about careers from an early age). For example, in 2019-20 LTS added curriculum-aligned career lessons for educators.



In 2018-19, LTS teamed up with ChatterHigh, who operate an online career platform. Students answer questions after reading or watching material on a career and, once they provide a correct answer, they gain points that can be put towards monetary rewards. Students explore hundreds of careers, including LTS career profiles which are fed through the ChatterHigh platform. In 2019-20, LTS co-hosted ChatterHigh's Let's Talk Careers, which had 13,000 students from over 300 schools participating in competitions. According to interviews, students are significantly more aware of STEM jobs after using ChatterHigh and are significantly more likely to want to pursue STEM at the post secondary level. Document review found that for around 47% of the careers profiled, students said they had not previously heard of the career. Overall, participating through this platform resulted in a 12% increase in youth awareness of potential career opportunities. Youth also showed an increased interest in the careers they had heard of prior to the competition.

Findings

Relevance

Performance

Efficiency

LTS increased youth awareness and interest in STEM careers by providing post-secondary volunteer role models

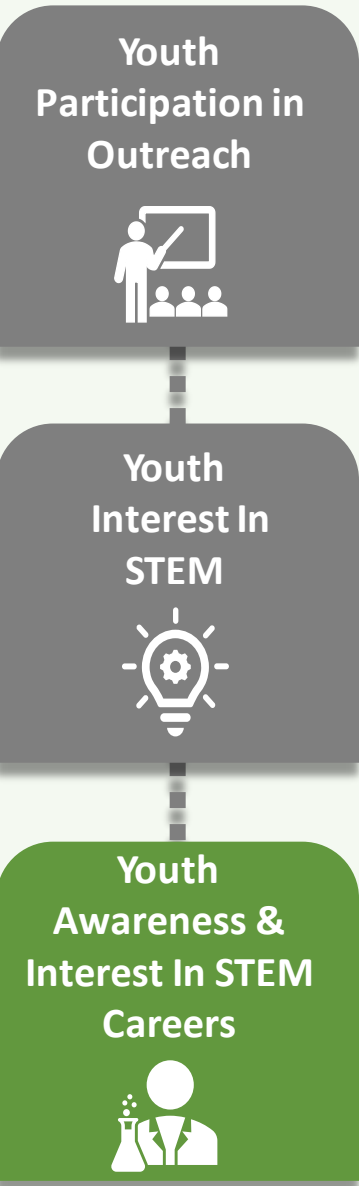
For the years 2015-16 to 2017-18, over two-fifths of youth (44%) indicated that LTS post-secondary volunteers increased their awareness of jobs/careers that need a STEM background and over two-fifths (42%) indicated that LTS volunteers increased their desire to have a career that uses STEM. For the years 2018-19 and 2019-20, almost half of youth (46%) indicated that their experience with LTS volunteers increased their awareness of jobs/careers that need a STEM background and over half indicated that LTS volunteers increased their desire to have a career that uses STEM "to some extent" or "to a great extent."

According to interviews, the role modelling aspect is an important part of LTS activities, and outreach in particular. For outreach, volunteers provide their background, interests, and their pathway and they identify careers related to the activity. At the end of the outreach activity, volunteers describe the STEM career paths related to the activity. By providing role models, kids can better see themselves in STEM jobs.

Interviews found that over the last 5 years, LTS increased its emphasis on promoting career awareness via volunteer outreach. LTS started providing training to teach volunteers to talk about their background and make career connections, including post-secondary and career pathways.



According to surveys, the LTSC was effective in increasing desire among youth to study STEM at college or university. Further, document review found that 70% of LTSC participants who graduated are currently registered in a post-secondary STEM-related program. Anecdotal examples were also identified in document review and interviews, where participants in the LTSC went on to study STEM in post-secondary after having their interest sparked. Interviews said that LTSC helps youth to visualize a career path in a broad variety of careers, and help youth see themselves represented by diverse volunteers. The LTSC includes a variety of post-secondary and professional volunteers (as judges, guest speakers, etc.), and highlights career profiles in the handbook and throughout the event. LTS surveys of youth found that the LTSC is effective in increasing youth understanding of STEM careers and desire to have a STEM career, as the material provides "real world examples" and "brings science to life for the students."



Findings

Relevance

Performance

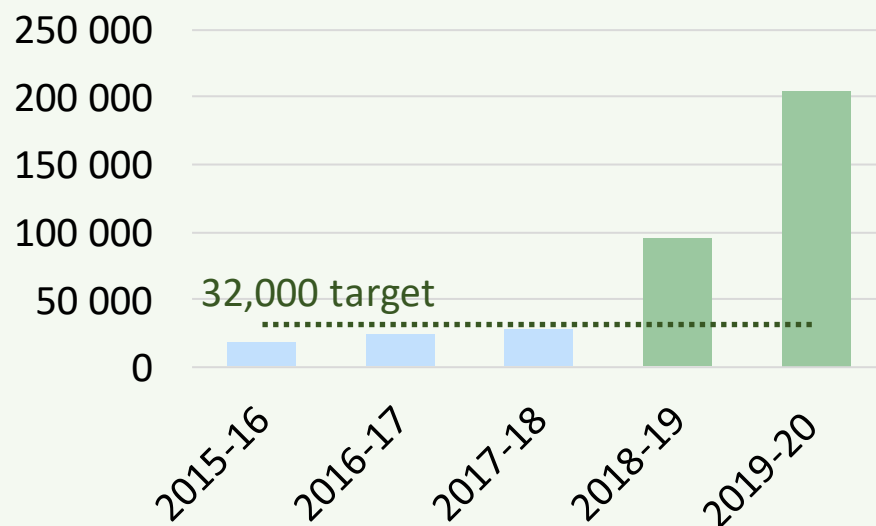
Efficiency

Finding 5: LTS was effective in increasing engagement of educators and their participation in multiple programs, thereby surpassing targets. LTS’s volunteer outreach in classrooms, library of digital content and classroom-ready learning and Professional Learning opportunities were found to have been effective at increasing educator capacity to teach STEM and inquiry-based science, particularly for teachers with less experience in STEM.

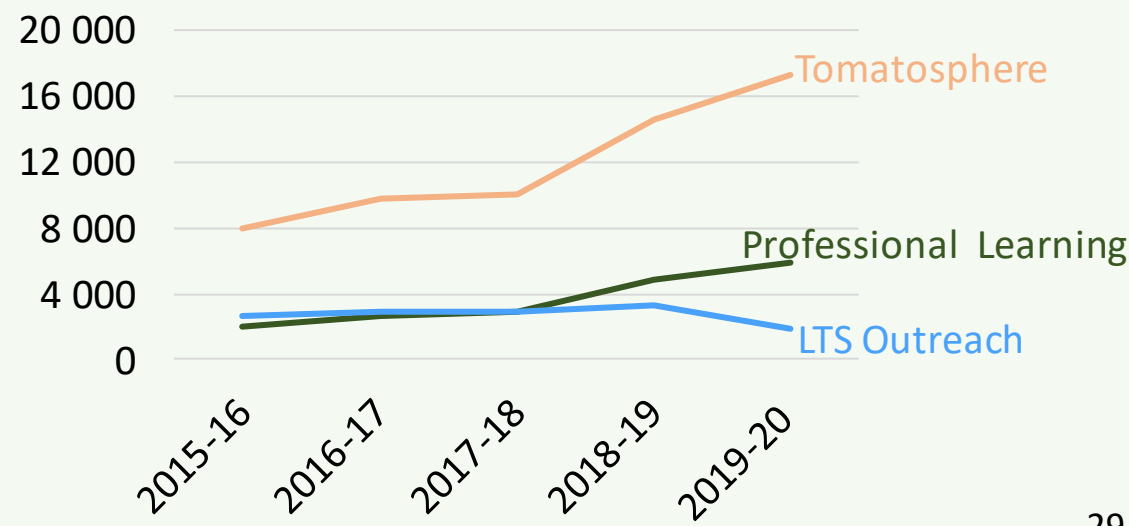


LTS offers educators hands-on STEM activities delivered in class by volunteers and offers educators digital content, classroom-ready resources and professional learning opportunities, at no cost. The resources emphasize the development of critical thinking, communication, and collaboration skills through STEM-related explorations. In 2016-17, LTS achieved a rate of 42.6% of schools accessing its programs, ahead of its target of 42% by March 31, 2020. LTS also exceeded its annual target of 32,000 educator interactions by March 2020 by a large margin. LTS showed a steady increase from 2015-16 to 2017-18, followed by a large increase in 2018-19, and another large increase in 2019-20 when programming went online in response to COVID-19, totalling over 200,000 interactions. This increase is partly due to changing from using website registrations to using web analytics to track interactions. Direct interactions with educators also increased annually (from 2015-16 to 2018-19), including outreach, professional learning, and Tomatosphere, which accounted for most of interactions (62%). Interviews found LTS increased awareness by meeting or partnering with community groups, ministries of education, school boards, and STEM groups/events, which led to more requests from educators.

Educator Interactions - Total



Educator Interactions, by Program



Findings

Relevance

Performance

Efficiency

Outreach activities delivered by volunteers increased educator capacity, helped teachers less experienced in STEM, and demonstrated to educators how to deliver inquiry-based science

Educator Participation in LTS Programs



Educator Outreach



Educator Learning Programs & Resources



According to interviews, there are many science-based topics where teachers have limited expertise and many do not have a strong science background. Literature indicates that educators with no science background have less confidence in teaching STEM.²⁵ Over 70% of educators surveyed found that LTS supported their students' success by bringing current STEM topics into the classroom, providing hands/on minds-on learning and enriched learning in STEM, delivered by volunteers who are knowledgeable in the subject matter. A majority of educators (71%) indicated that LTS offered an opportunity to learn more about the topic presented by the volunteers "to a great extent", with 90% indicating an increased confidence in teaching the STEM topic covered to "a great extent" or "some extent".

Interviews found that educators are engaged and excited to have volunteers come into their classroom and LTS is increasing their capacity to deliver. Teachers like having volunteers come in and be role models for the students. Educators also benefit from seeing STEM being taught, which helps them feel more comfortable. According to surveys, most educators indicated that LTS outreach activities increased their enthusiasm (90%) and confidence in teaching STEM (84%) to "some extent" or "a great extent". A majority (63%) indicated that LTS outreach activities provided them with ideas they can use to teach the topic in their classroom "to a great extent," with most educators reporting that LTS outreach activities had an impact on encouraging them to do more hands-on STEM activities at least "to some extent" (90%).



Interviews found that the LTSC was effective and teacher friendly, as were the support and materials provided by LTS staff and the post-secondary volunteers, which helped facilitate delivery to students, particularly for educators without a science background. Interviews found that the LTSC resulted in increased time spent on STEM content and activities by educators, which was corroborated by survey findings which found that around half of educators spent time helping their students understand the material and/or worked with the team during or after school. Due to the annual nature of LTSC and the provision of the detailed study handbook (revised in 2020 to a digital format, with improved curriculum and grade alignment and French content), educators used the LTSC for their science curriculum for their whole class, sometimes as the core component. The virtual LTSC made it even more useful to teachers by making it accessible to all students in a classroom and the weekly competitions allowed for increased engagement of students.

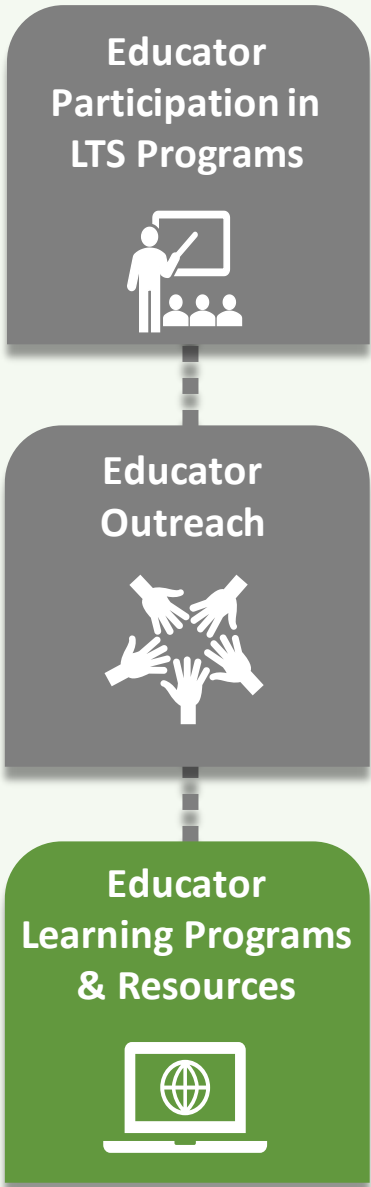
Findings

Relevance

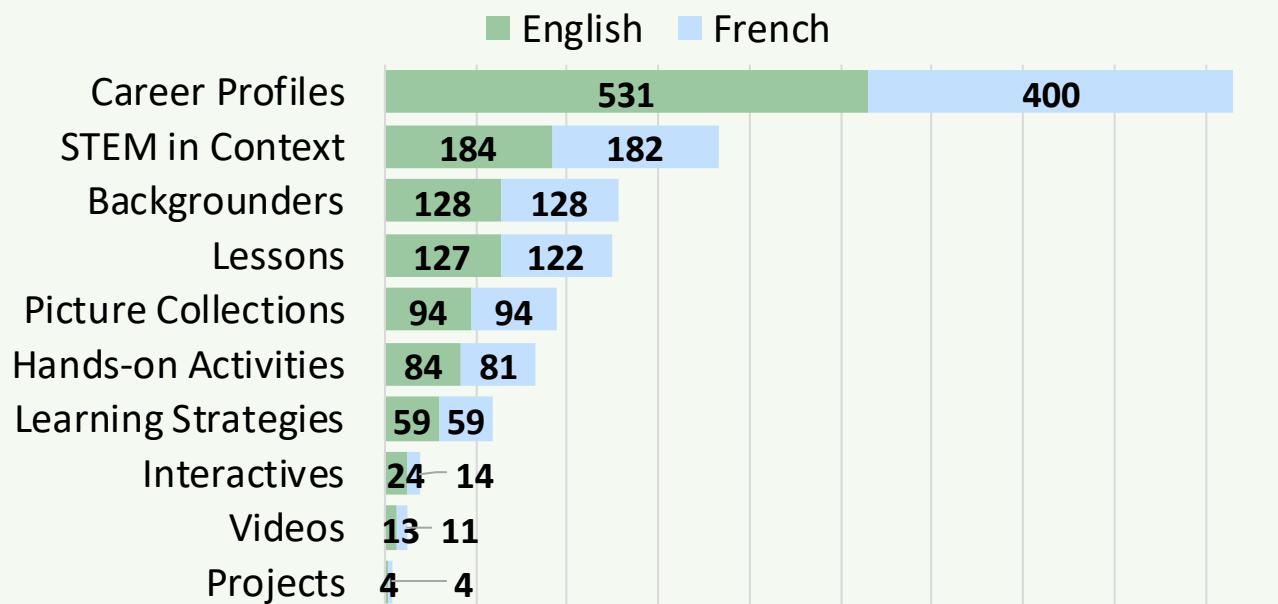
Performance

Efficiency

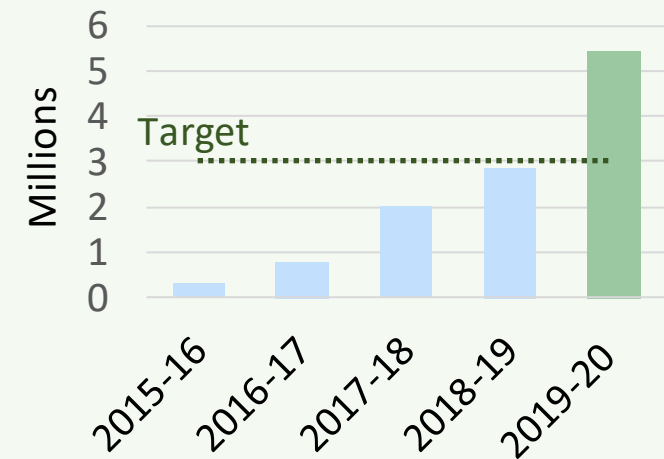
LTS offers educators a library of digital content and classroom-ready learning opportunities



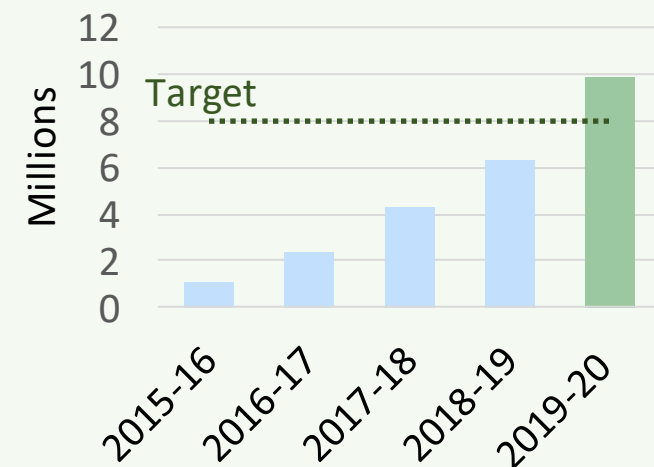
The digital and classroom resources were delivered through CurioCity and IdeaPark programs, which were consolidated in 2018-19, and LTS added hundreds of new resources, aligned to all grades and all jurisdictions. The new searchable website provides free 'one-stop shopping' for educators and youth looking for resources on diverse EY-12 STEM topics, which can be searched by province/territory, grade, course and topic. The renewed content is available with integrated media, lesson plans and action projects. The online resources available for educators include 1,248 resources in English and 1,095 resources in French as of April 2021. According to interviews, these resources emphasize the development of critical thinking, communication, and collaboration skills through STEM-related explorations.



As a result of transition to digital programming in 2019-20, LTS exceeded its target of 3 million cumulative online web sessions by 81%



LTS surpassed its target of 8 million cumulative page views for its web-based programs by 23%



COVID-19 Impacts

In response to the COVID-19 pandemic, LTS transitioned all its programming online, developed a variety of new hands-on activities, and consolidated resources into themed packages for parents and children, to support the move to at home delivery of programming previously delivered in school.

Findings

Relevance

Performance

Efficiency

Learning programs and resources have been effective in increasing the capacity of educators to engage in activities

Educator Participation in LTS Programs



Educator Outreach



Educator Learning Programs & Resources



According to interviews, LTS focuses its online resources towards meeting areas where educators have unmet needs. LTS examines what teachers in a specific grade need and provides them with resources and information. LTS has programs for all grades and curriculums and emphasizes curriculum alignment and making sure projects are right for students. LTS regularly evaluates its online content and removes what is no longer relevant or current. To further increase engagement, LTS has been focusing on better integrating its programs (e.g., providing referrals and linkages to other LTS programs), so that educators are encouraged to use multiple LTS programs.

Interviews found that LTS provides excellent support for teachers. LTS strives to provide material that makes the teachers feel comfortable and is easy for students to understand. It was said that LTS does a great job providing educators with different learning strategies, lessons and methods of delivery and showing how the resources can be adapted to the specific educational context.

LTS program resources empower teachers and build their capacity. The format, delivery method, and physical resources are user-friendly and accessible for non-science based educators. LTS provides materials and ideas, but the activities are not excessively prescriptive and can be adapted to the educator's needs. Action projects such as Tomatosphere, Living Space, and Radi-N2 and You provide relevant information that teachers can use to enhance their teaching techniques and require students to do hands on thinking and engagement. Providing the kits, the photocopies, and the answers to questions is useful, as educators don't always have the resources to deliver these types of activities.



Tomatosphere is the most used action project and has shown an increase in educators using the program. After taking over Tomatosphere from the Canadian Space Agency and its consortium partners in 2014-15, LTS used its database of educators to introduce Tomatosphere to a wider audience of educators, including northern communities. Interviews and surveys found that by providing educators with tools (materials/resources) to perform the experiment, LTS increased educators' confidence and interest in teaching STEM, and as a result, increased youth engagement. LTS increased the capacity of educators by: developing a new, user-friendly website, in both English and French; updating the registration system, allowing for connections with other LTS programs; redesigning the online educator resources to be grade- and curriculum-aligned; and continuing to evaluate its user experience (program design) with respect to program changes in response to COVID-19.

Findings

Relevance

Performance

Efficiency

LTS Professional Learning blends multiple methods of delivery to support diverse learning opportunities for educators

Educator Outreach



Professional Learning is offered to educators free of charge. In-person training is delivered via education workshops focused on addressing curriculum outcomes, incorporating LTS career resources into their curriculum, and supporting digital literacy (supported by CanCode and a limited partnership with Fair Chance Learning).

Over the 2015-16 to 2019-20 period, Professional Learning has continued to grow into a full LTS educator experience team that offers training for EY-12 educators. Professional Learning was previously very specific and very static, as the primary means of providing professional learning was via in-person training sessions. LTS now provides a co-learning model delivered through live broadcast technology, live and on-demand webinars, micro-learning in the form of self-guided online modules, in-person hands-on individual sessions, and online collaborations. There are also self-paced modules which are accompanied by resources the teacher can use in their classroom. Interviews found that this new approach better supports maintaining an ongoing engagement with teachers, which is more effective in increasing educator confidence and competence.

LTS is now working on further deepening engagement by developing pathways for professional learning, so that LTS can build upon the educators base learning levels, rather than professional learning being a one-time activity, which limits the material to a more introductory level of learning.

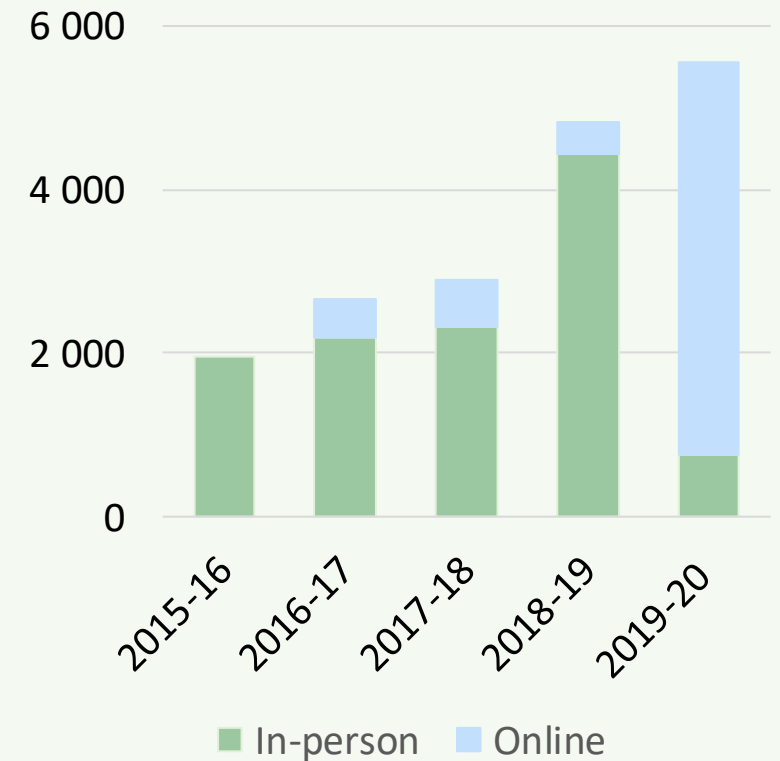
Educator Learning Programs & Resources



Educator Professional Learning



The number of educator interactions through professional learning sessions (in-person and online) **increased by almost 200%** between 2015-16 and 2019-20 (from 1,955 to 5,564)



The Teacher Leader program develops a network of LTS-trained educators, which increases and **strengthens LTS's reach to a larger group of educators**

Educator Outreach



In 2019-20, LTS created the Teacher Leader program. Teacher Leaders are individuals who share their experience and knowledge through facilitated sessions, within their local community of educators. Teacher Leaders and LTS facilitators support local educators across Canada with classroom and online learning. According to interviews, this allows LTS to reach a much larger group.

LTS trains Teacher Leaders who then provide training sessions to their peers. LTS also distributes its content to the Teacher Leaders, who then distribute it to their cohort, with a new kit of materials provided every two months. The Teacher Leaders vet the content and explain how to use the resources. Interviews found that it is an effective way of reaching teachers, as they rely on peer advice and are more likely to use materials if they are endorsed by a colleague. In 2019-20, forty-one educators, including six from Indigenous schools, were named LTS Teacher Leaders and began training.

Interviews found that the Teacher Leader Program had a positive impact on educators; it led to increased confidence, more strategies to engage students, and a growth in abilities. The program leverages existing relationships among teachers. It also provides teachers with regular access to a coach, thereby contributing to long-term sustained change. The cohort can reach out to the Teacher Leader, who in turn can reach out to LTS for further assistance.

According to interviews, the cohort of teachers also felt that they were supported and that the LTS material allowed for self-direction. There were no resource barriers, as LTS provided all the resources, lesson plans, photocopies, and materials for the hands-on activities.

Educator Learning Programs & Resources



Educator Professional Learning



Findings

Relevance

Performance

Efficiency

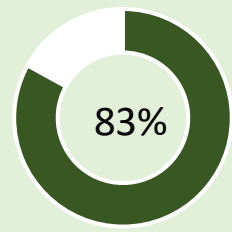
Professional Learning sessions have been effective in increasing the capacity of educators to engage in STEM activities with their students

According to interviews, LTS's Professional Learning is designed to improve educators' ability to teach STEM. LTS educator surveys found that capacity was improved. Educators that participated in training provided by LTS reported that the sessions:

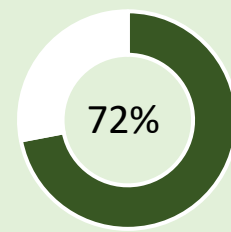
Educator Outreach

Educator Learning Programs & Resources

Educator Professional Learning

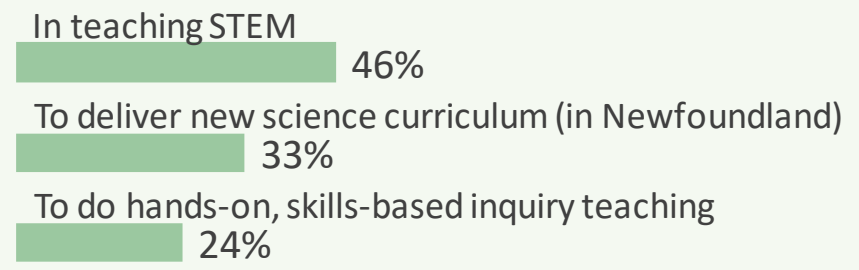


Increased their understanding of the subject matter, "to a great extent"

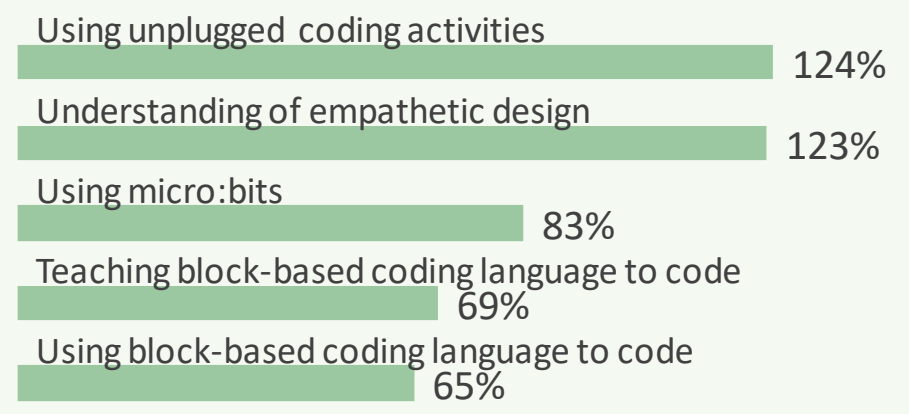


Provided resources they could use immediately, "to a great extent"

The Professional Learning sessions and curriculum implementation training **increased educator confidence:**



The Digital Literacy Summit training **increased educator confidence** in:



COVID-19 Impacts

LTS's blended delivery method allowed them to shift quickly to provide all of its Professional Learning via online delivery through additional webinars instead of in-person sessions and shifting training of new Teacher Leaders to a virtual model. The pivot to online training and webinars extended LTS's reach to more educators. Previously, LTS only offered in person sessions and recorded the session for other educators to view online.

Findings

Relevance

Performance

Efficiency

Finding 6: LTS grew its outreach program, surpassing most of its targets for outreach sites, registered volunteers, and total volunteer hours. LTS increased its focus on professional development and skills training; with volunteer participation and satisfaction increasing. LTS has contributed to the development of a variety of skills and provided volunteers with career training, such as resume building and skill transference to help them navigate from post-secondary to the job market.

Volunteer Participation in LTS Programs



LTS surpassed its target of having 48 outreach sites, with 51 sites as of 2019-20

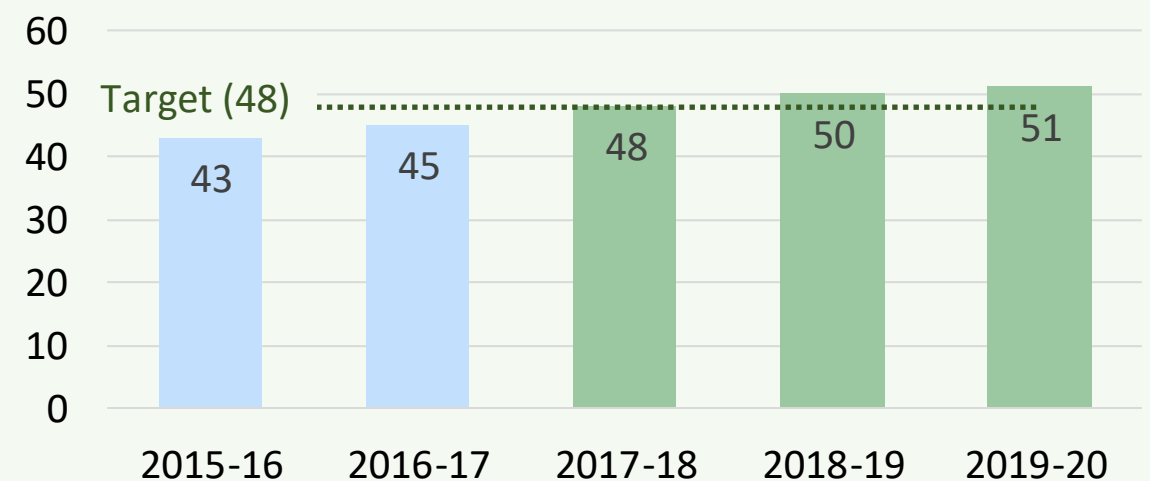
Post-secondary volunteers are critical to the delivery of the LTS Outreach Program (e.g., in-class visits, LTS Challenge, community outreach visits, and symposiums) and are responsible for leading youth through interactive STEM activities in the classroom or at events. Post-secondary students in STEM fields register with their outreach site as volunteers and they are assigned an LTS volunteer coordinator responsible for recruitment, screening, orientation, training, and managing the volunteer's responsibilities. Post-secondary outreach sites offer STEM based hands-on workshops, symposium and events for local classrooms as well as other events.

The coordinators operate out of outreach sites at 51 post-secondary institutions. The sites recruit, train, and manage the volunteers and host symposiums and the LTS Challenge. Program data shows that LTS has added between 1-3 outreach sites in each year of the agreement.

Over the evaluation period, LTS achieved its target of 48 outreach sites in 2017-18 and was able to add another 3 sites by 2019-20.

According to interviews, ISED funding helped LTS add additional outreach sites that were previously waitlisted, including institutions in harder to reach locations and areas where LTS had a smaller presence (e.g., Aurora Research Institute in the NWT, First Nations University in Saskatchewan, and Francophone regions in Quebec).

Number of post-secondary Outreach Sites



Volunteer Training and Skill Development



Volunteer Employability



Findings

Relevance

Performance

Efficiency

LTS reached a critical mass of volunteers, surpassing its target for registered volunteers by 42% in 2018-19 and its target for the total number of volunteer hours by 26% in 2019-20

Volunteer Participation in LTS Programs



Interviews noted that succession has not been an issue, as LTS is known and respected and sought out as a volunteer opportunity, and the pipeline of volunteers filling vacant positions indicates that students are benefitting from the volunteer experience. According to interviews, coordinators used to have to do more work to continually raise awareness and build a network of volunteers, but now the volunteer base is better able to renew itself.

Volunteer Training and Skill Development



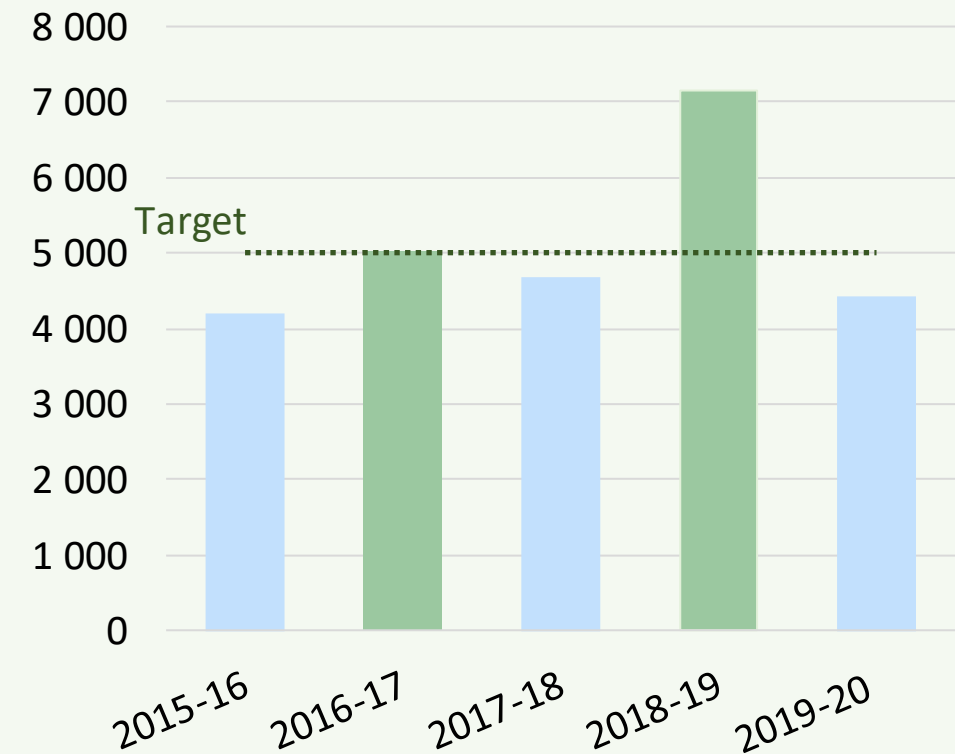
LTS had a target of 5,000 volunteers per year operating from the outreach sites. LTS met this target in two out of the five years, with 5,029 registered volunteers in 2016-17 and 7,146 registered volunteers in 2018-19 (42% above its target), with the COVID-19 likely impacting the number of volunteers in 2019-20. LTS also increased the annual number of volunteer activities undertaken and surpassed its target of 200,000 cumulative volunteer hours with 251,476 hours by 2019-20, 26% above target.

Volunteer Employability



Industry volunteers also increased from 78 in 2015-16 to 821 in 2018-19 (declining to 205 as a result of the Pandemic). According to interviews, private sector donors who provide funding to LTS increasingly want LTS to engage their staff and LTS has also become better at engaging them (e.g., at the LTS Challenge and symposiums).

Number of Registered Volunteers



Findings

Relevance

Performance

Efficiency

LTS has increasingly focused on volunteer professional development and skills training, because when volunteers have improved capacity, the overall impact of LTS is amplified

Volunteer Participation in LTS Programs



Documents and interviews found that LTS volunteers receive training specific to their program and appropriate to the volunteer role (e.g., volunteer handbook, writing guide, assigned reading). Mandatory basic training is provided to new post-secondary volunteers, focused on effective science communication, teaching practices, and guidance for outreach visits. Additional, optional training is provided based on volunteer interests and identified needs related to the volunteer site.

For example, for volunteers working in Indigenous communities, LTS provides training on awareness of Indigenous histories, cultures, and peoples. Interviews said LTS is continuously examining opportunities to improve volunteer training (e.g., LTS is working on developing a new volunteer management system to identify their interests, track their training and skill development, and provide micro-credentialling). For volunteers who contribute to online resources, LTS also developed guidelines and modules for training, to ensure a consistent standard for online material.

According to interviews, LTS has increasingly focused on volunteers as a target audience of its programming by providing them with training and developing their skills. It was said that the foundational skills LTS provides for volunteers can enable them to become site coordinators. Given their critical role in program delivery (coordinators are responsible for running their outreach site and overseeing volunteers), LTS invests significantly in the development of coordinators.

Volunteer coordinators receive targeted training aimed at supporting their ability to effectively run their site, such as HR management, budget development, fundraising, strategic planning, conflict resolution, communication, work planning, problem solving, and leadership. This includes an annual national conference and regional conferences, which include training sessions and play a crucial role in their education, professional development and engagement. New coordinators also receive two additional days of training and orientation from LTS staff as part of the national conference.

Volunteer Training and Skill Development



Volunteer Employability



Findings

Relevance

Performance

Efficiency

The number of training sessions and participants has increased and volunteers' satisfaction with the level of training and support has also increased

Volunteer Participation in LTS Programs



Program data shows that the number volunteer training sessions increased by 78%, most of which was basic volunteer training (75%) and leadership and career development (19%).

Similarly, volunteer participation in these training sessions increased by 76%, from 1,519 in 2015-16 to 2,614 in 2019-20. Participation in leadership and career development sessions increased from 2015-16 to 2018-19 (341%), indicating an increased emphasis on development of these skills.

Surveys found that most volunteers agreed or completely agreed (87%) that LTS provides training, support, and resources necessary to be successful in their volunteer work. The level of agreement increased from 75% in 2016-17 to 95% in 2019-20, suggesting that training, support, and resources have improved over time.

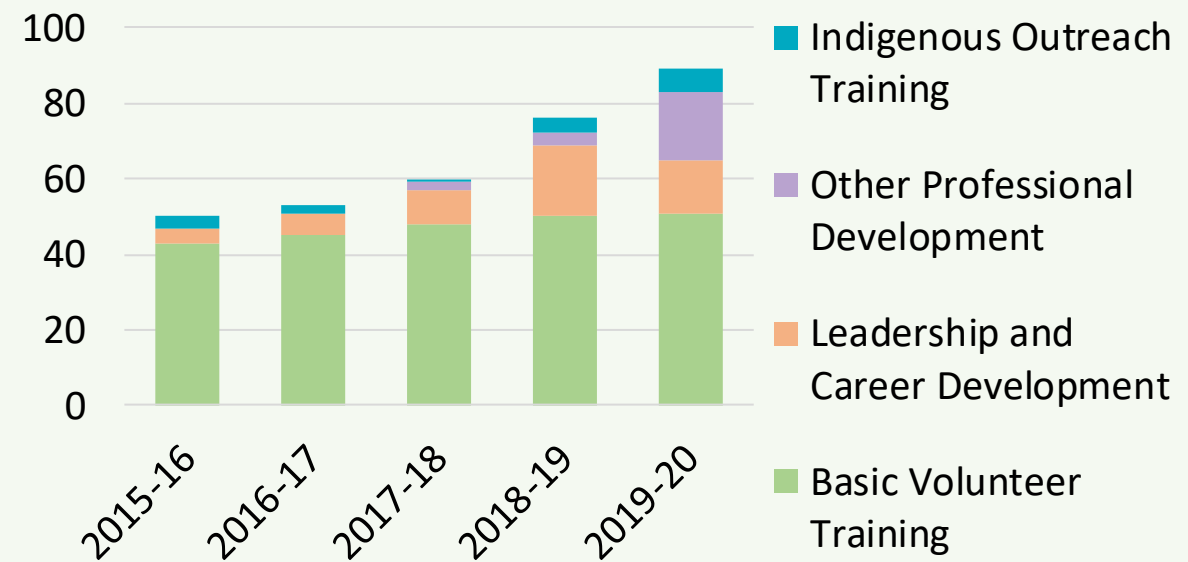
Volunteer Training and Skill Development



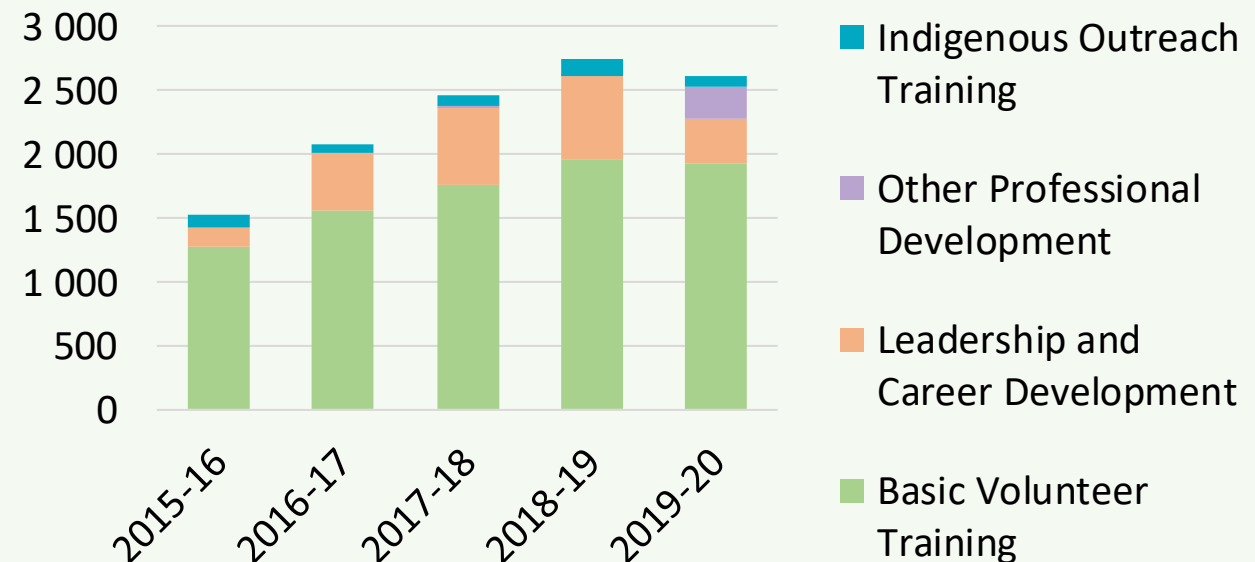
Volunteer Employability



Number of Volunteer Training Sessions



Number of Volunteer Training Participants



Participating as a volunteer for LTS contributed to skill development for post-secondary students

Volunteer Participation in LTS Programs



Volunteer Training and Skill Development



Volunteer Employability

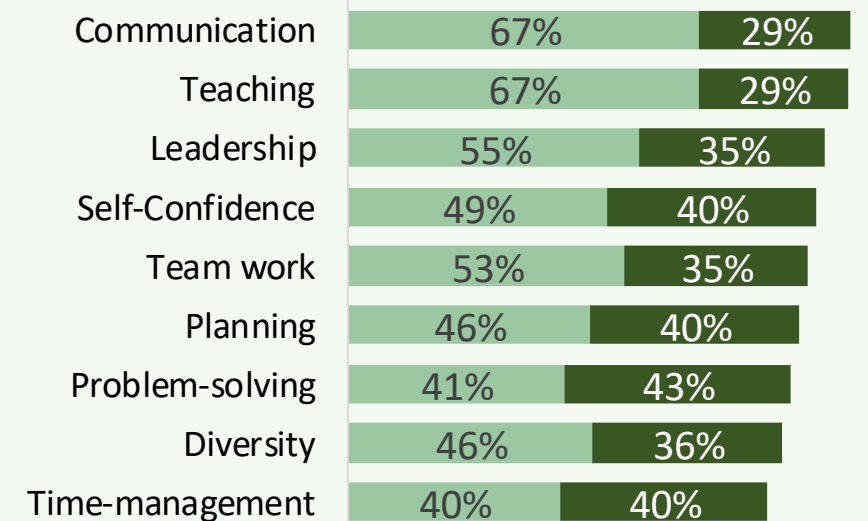


Interviews noted RBC's investment in LTS as an example of effectiveness in improving skills of volunteers. RBC provided funding for one year to optimize delivery systems and processes for volunteer development and then made a large multi-year investment, because they were impressed with the impact on volunteers demonstrated by LTS; RBC saw that LTS was exceeding other recipients' performance metrics in terms of type/skills being developed.

Interviews and surveys found that LTS helped develop the following skills:

- **Communication and presentation skills:** Volunteers learn how to present to kids, maintain their interest, keep them engaged and focused, and explain complex topics in a way that is understandable.
- **Leadership and management skills:** Coordinators develop skills on how to run an organization, such as budget, project, and people management skills and gain experience running events, such as the LTSC and career symposiums, which involves booking venues, planning activities, and recruiting volunteers.
- **Organizational skills:** Volunteers manage courses while fitting in outreach activities. Students develop their organization skills, as they cannot do all the volunteering last minute.
- **Writing skills:** LTS develops volunteer's writing skills, as contributing to online content requires presenting information in a way that is succinct, accurate, and conveys key information.

LTS achieved its target, with more than 70% indicating that LTS improved skill development



■ To a great extent ■ To some extent

The percent of volunteers indicating that LTS contributed to the development of skills “to a great extent” also increased by 10%, on average, across the various skills and attributes, with leadership (16%) and planning/organization (14%) increasing the most over the survey period (2016-17 to 2019-20).

Findings

Relevance

Performance

Efficiency

LTS provides volunteers with career training such as resume building and skill transference to help them navigate from post-secondary to the job market

According to interviews, LTS develops skills, particularly for its site coordinators, that are sought after by employers and can be highlighted on resumes, including on-the-job skills development, which universities don't always provide to students. The survey of LTS volunteers found that they believed that volunteering for LTS would improve their employability and they could showcase their LTS experience in future job applications.

Volunteer Participation in LTS Programs



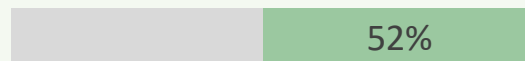
Volunteer Training and Skill Development



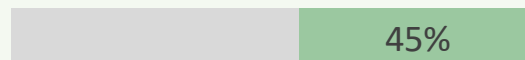
Volunteer Employability



'Completely Agreed'

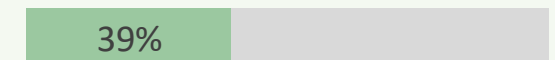
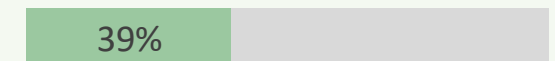


Volunteers could showcase their LTS experience in job applications



Volunteering with LTS would improve their employability

'Agreed'



Interviews explained that volunteerism is one of the first things that an employer will look at when an applicant doesn't have work experience. Interviews provided anecdotal examples of individuals from academia and industry who have said that if they see someone has experience as a LTS volunteer or site coordinator, they will pull the resume and put it in the interview pile, because they view the experience provided by LTS to be effective in developing professional skills.

According to interviews, senior executives have also said they hired people who had LTS on their resume, as they value the training it provides. There was also anecdotes from volunteers who said they were able to use their LTS experience for many of the scenarios in their interviews.

According to interviews, LTS is increasingly focusing on providing practical training where volunteers will have an opportunity to demonstrate the skills learned, so they can go to a job interview and demonstrate the training skills using specific experiences. For example, LTS has been increasing its efforts in helping volunteers link the skills provided by volunteering to those needed in their careers, including by providing career workshops. LTS is also focusing more on connecting volunteers with job opportunities, which includes helping them learn about careers, teaching them how to network, and helping them build their network by providing more networking opportunities, (e.g., career panels with industry professionals).

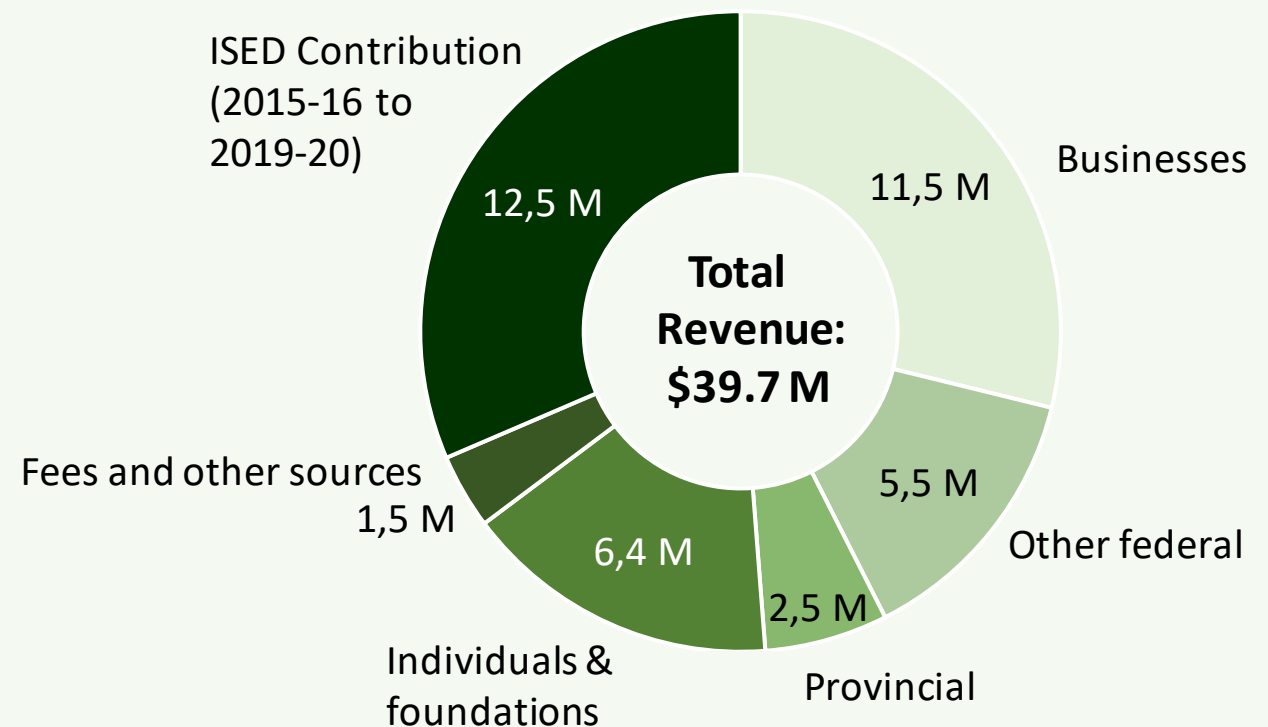
Finding 7: LTS is being delivered efficiently, with low administrative costs, centralized operations, and strategic delivery partners. Alternative sources of funding do not offer the same scale, scope, or duration offered by the ISED funding, which enables LTS to focus on its core objectives of delivering on a national STEM education mandate. ISED funding also supports LTS in securing additional financial investments, in-kind support, and partnerships, thereby extending its reach to more youth and educators.

According to interviews, ISED funding provides stability and renewability, which is critical. Interviews explained that it would be difficult for LTS to secure an alternative source of stable, long-term funding, as other sources do not offer the scope and scale needed to support the depth and breadth of LTS’s programming and its national mandate. Interviews found that ISED funding enables LTS to focus on its core objectives: delivering on a national STEM education mandate and focusing on the needs of teachers and youth. Interviews said that LTS would struggle to provide the same level of services without ISED funding, and may have to cut programs and/or charge for services. This would impact EDI, as literature shows that service fees create a barrier for underserved demographics.

For the period 2015-16 to 2019-20, data review found that just under one-third of LTS expenditures were supported by the ISED funding agreement. In total, approximately 45% of LTS funding was derived from federal departments and agencies. Increases in federal funding balanced out a decrease in funding from the provincial government over the last few years and a decrease in private funding experienced in 2019-20, likely as a result of the Pandemic.

COVID-19 Impacts
Interviews said that ISED funding has been critical for LTS during the pandemic because it mitigates against potential fluctuations in charitable donations.

LTS Revenues, by source (2015-16 to 2019-20)



Provinces and territories provide funding to LTS, but not with the same scale or scope

Provinces have their own constraints, priorities, and needs (e.g., unions, school facilities, parents, other curriculum pieces) that do not fully line up with federal innovation and economic education priorities. Interviews explained that provinces are focused on developing learners, while the federal government is focused on developing workers. As such, provincial and territorial funding is usually quite small, with a more limited scope that is often very specific (e.g., implementation of a new science curriculum), focused on specific stakeholders, and does not relate to LTS's broader national mandate.



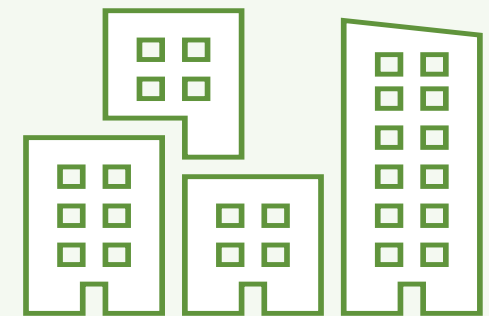
Other federal programs provide support to LTS, but not with the same scope, scale, or duration

According to interviews, the ISED contribution provides longer-term certainty than other funding programs, which are more time-limited (e.g., the ECCC Climate Action and Awareness Fund provided to LTS). For NSERC's PromoScience program, the funding is smaller in scale (up to \$200,000 over three years), as it is directed towards small, regionally based STEM learning organizations. LTS has received grants from NSERC's PromoScience, but they tend to be small, project-based funding provided to an outreach site. Interviews also identified CanCode as another source of funding which LTS has received. However, CanCode funding is very specific to a certain topic (i.e., coding). Part of LTS programming is focused on addressing the specific requirements of CanCode, but LTS's broader objective focuses on all areas of STEM. LTS is also more audience focused, as its focus is on identifying the needs of stakeholders and responding to those needs.



A large portion of funding is from the private sector; reliance on smaller SME donations has increased, as acquiring donations from foreign multinational corporations has become more difficult

Program data found that corporations, individuals, and foundations were the source of 45% of LTS funding. According to interviews, there is an increasingly complex ecosystem for funding. Canada's non-profit funding landscape has a lot of SMEs that do not have the capacity to provide large donations. It is also becoming more difficult to acquire large corporate donations, as many are multinationals with headquarters outside of Canada, whose community investment decisions are increasingly being directed by their foreign head office. As a result, LTS increasingly must rely on SMEs with small community investment budgets and so must go to more companies to get funding.



LTS also has low administrative and fundraising costs compared to other not-for-profits

Program data shows that for fundraising, LTS has a cost-per-dollar raised of under 10% and that this ratio has been trending downwards, which performs well compared to standard industry benchmarks of 20%. Similarly, the administrative costs averaged at 9.28% and there were also some indications of a downward trend in this ratio over the evaluation period.

By centralizing operations and partnering for delivery, LTS achieves efficiencies in program delivery

LTS uses a community-based approach via outreach sites. Partnering with colleges and universities makes implementation across Canada easier and more efficient. The planning, organization, and most of the costs associated with the delivery of outreach activities is the responsibility of outreach sites, while LTS is responsible for providing a centralized support system, including training, marketing, and oversight. According to interviews, LTS provides infrastructure at a fraction of the cost that its partners could on their own, because of its scalability. For example, LTS is reaching the North via a partnership with Aurora Research Institute, where they are using LTS's platform for a lower cost than developing it on their own.

LTS also engages in partnerships with other organizations (e.g., Frontier College, ChatterHigh, Shaftesbury, and Stem Cell Network), with documents indicating that LTS engaged 66 different organizations from 2015-16 to 2018-19. According to interviews, these partnerships enrich programming, facilitate knowledge transfer, and bring in new skills or assets to deepen impact and extend reach to more youth and educators. LTS's partnerships also reduce travel expenses, minimize duplication of effort, and leverage existing infrastructure and resources. LTS partners with organizations who share similar objectives and leverage each other's strategic advantages. For example, one interview said that their partnership with LTS worked well, enriched their programming, and there was close alignment in objectives. Another partner said LTS and the partner leveraged each other's assets to extend the scale and depth of their reach to more youth.

LTS is continuously looking at ways to be more efficient and effective in its program delivery

According to interviews, the delivery systems evolved rapidly over the last five years, which was facilitated by the provision of ISED funding. According to documents, to help manage the growth of LTS and realize efficiencies, while maintaining the responsiveness and quality of programming, LTS implemented new and improved processes, structures, and tools. LTS consolidated its operational systems, frontline customer service, IT infrastructure, and project management. This included a revised organizational and program staff structure, consolidation of web-based resources (CurioCity and IdeaPark) into a single platform (previously separate websites and support staff), new software and tools, an organizational risk and compliance plan and other risk management tools, standard operating procedures, governance policies, planning processes, and project/operating performance management procedures and systems. Interviews said that the web design and digital delivery systems have gone from being simple to being more sophisticated as they have adapted to digitalization to improve efficiency.

ISED funding has supported the ability of LTS to secure additional financial commitments and in-kind support

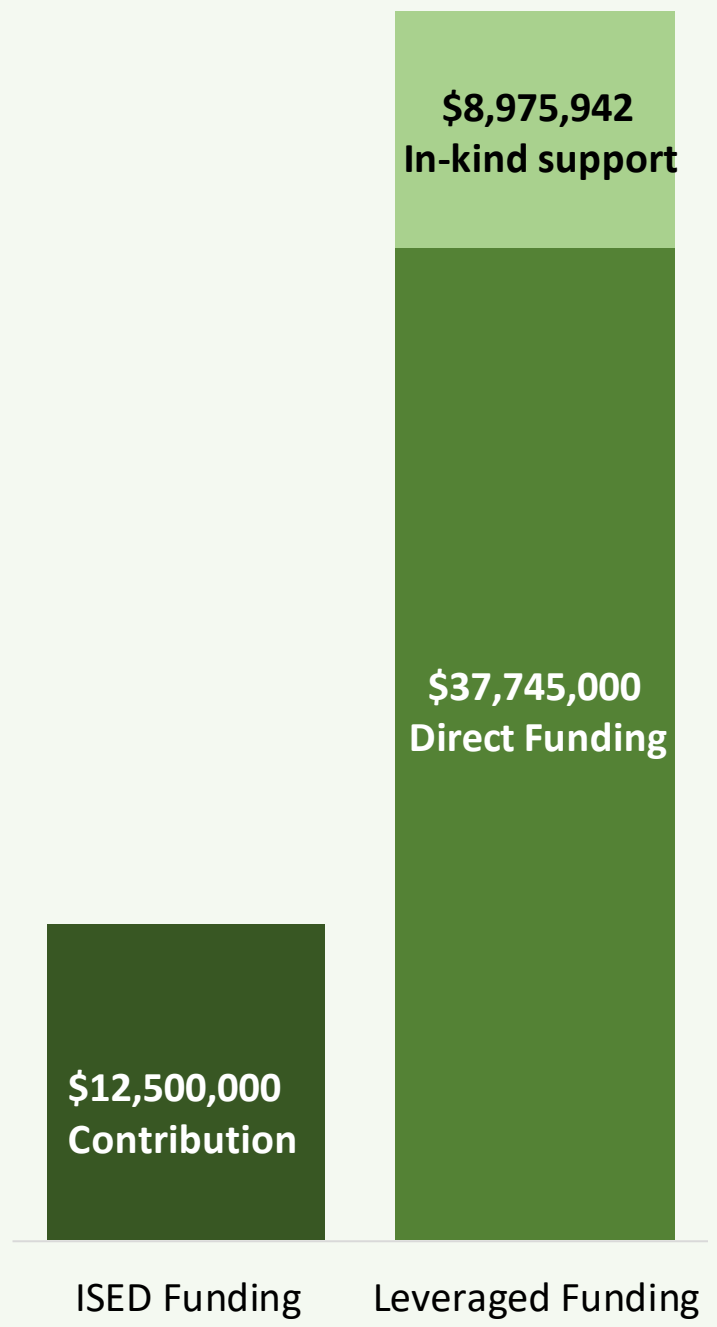
According to interviews, ISED funding resulted in an increase in the size and duration of direct funding and in-kind contributions. Program data found that LTS leveraged a total of \$46.7 million in direct and in-kind contribution commitments over the period of the ISED contribution agreement (2015-16 to 2019-20), mostly direct contributions (81%), with a leveraging ratio for each ISED dollar invested of \$3.74. LTS surpassed its target of leveraging \$21 million in direct funding commitments, with \$37.7 million received by 2019-20, 80% above target. Interviews said that the ISED funding enabled LTS to leverage a diversity of funders, with program data indicating most was leveraged from the private sector (73%). LTS surpassed its target of \$5 million of in-kind contributions, with \$9 million received by 2019-20, 80% above target. In-kind contributions consisted of volunteer hours (\$5 million of volunteer hours valued at \$20 an hour) and post-secondary outreach site investments (\$4 million via stipends for site coordinators, office and administration support, etc.).

Interviews found that without the ISED contribution, other funding would decrease. Federal funding serves as an anchor to attract donors. For many donors it is important that there is a federal investment. It shows that LTS supports federal objectives. ISED funding also provides credibility and a validation of LTS's mandate, because it demonstrates that a high degree of thought has gone into programming to secure federal funding. For example, an outreach site coordinator noted that when potential funders learn about who supports LTS, they take them more seriously as they know it is a reputable organization. Interviews also said that a multi-year federal contribution encourages donors to give over multiple years rather than just providing one-off investments, as it provides more confidence that LTS will be around in the long-term.

ISED funding allows LTS to be more strategic in establishing partnerships

Without ISED funding, collaborative partnerships would be more contingent on LTS receiving funding from its partners. ISED funding allows LTS to be more strategic in leveraging partnerships by providing its support to organizations free of charge, which allows LTS to focus on partnerships that contribute to its objectives. For example, instead of charging fees to post-secondary outreach sites, LTS is able to provide resources and support free-of-charge.

Funding Committed: \$58,720,942



LTS's objectives and programming generally align with best practices and objectives for youth STEM learning; however, there is a lack of a broader youth STEM learning network in Canada

Literature found that Canada, US, UK, Australia and Finland share a similar commitment to improving the STEM skills of youth, in line with the objectives of LTS. However, unlike Canada, these countries' established national STEM education organizations aimed at fostering partnerships and collaborative networks among levels of government, professional and educational institutions, industry and charities. According to interviews, in Europe, large agencies are funded to act as a convener and organizer, similar to the former Canadian Council on Learning. Research suggests that countries with a central STEM education organization are better equipped to have an overarching view of their STEM education programs, foster partnerships and networks, and collect data to build a stronger evidence base to inform STEM education decisions.

Youth STEM education activities in these jurisdictions involve primarily project-based and inquiry-based approaches to learning, which is in line with the approach used by LTS. However, the content and knowledge developed through these approaches varies between the countries and their educational jurisdictions. Additional educational activities include STEM clubs and camps, local and national STEM competitions, STEM events/conferences with guest speakers, and STEM workshops outside of the classroom.

Although youth STEM programming governance varies by country, the objective to increase youth STEM interest and literacy remains consistent. Building educator capacity is seen as a key action for improving STEM education, which is consistent with the objectives of LTS. Similar to LTS, the programming in other jurisdictions strongly favours the development of online resources aimed at improving educator knowledge and confidence, and supporting the adoption of STEM education practices through pedagogical research/learning. For instance, the UK Learning Centre contains thousands of free-to-access, quality-assured resources to support the teaching and learning of STEM subjects for all grades.

Examples of STEM networks in other jurisdictions



The **STEM Funders Network** is governed and funded by the US Department of Education; developed as part of the 2018

Federal STEM Education Strategic Plan. In FY2019, the network consisted of 17 government agencies with an estimated budget of over \$3.2 billion towards 125 programs.



The **STEM Learning Network** is the UK's largest provider of education and careers support in STEM. It is

comprised of a network of organizations /STEM Centres across the country. Each centre provides STEM education programming to its respective area. The STEM Learning Network is a joint initiative by the UK government (Department of Education), industry and charities.

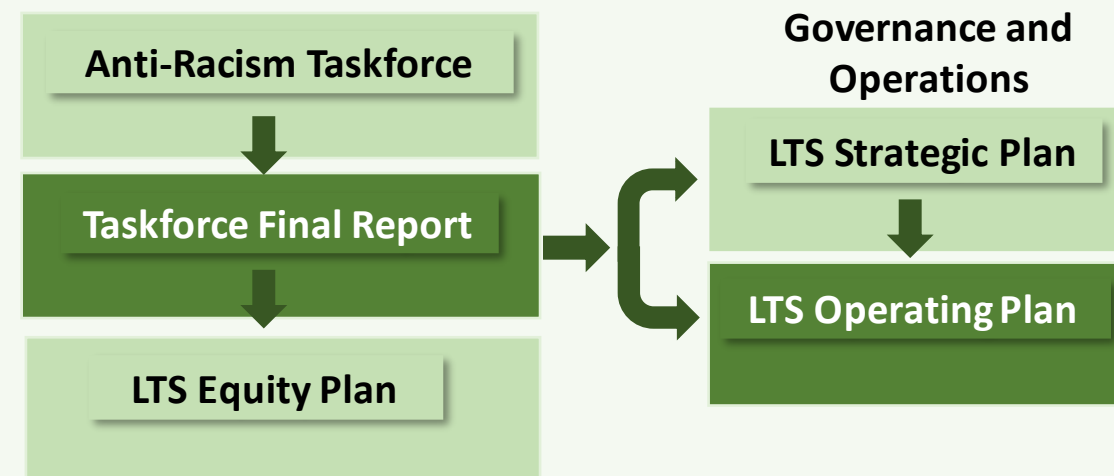
Findings

Relevance

Performance

Efficiency

Finding 8: LTS's hands-on, inquiry-based approach is effective in reaching a diversity of youth, including girls, at-risk youth, and Indigenous youth. LTS has a multi-pronged approach to engage Indigenous youth and has increased the availability of French language resources. LTS has also increased its efforts to incorporate equity, diversity and inclusion considerations by establishing an Anti-Racism Task Force and developing an Equity Plan.



LTS has been responsive in establishing groups and committees to examine Equity, Diversity, and Inclusion issues. In June 2020, LTS established an Anti-Racism Task Force, with representation from the Board of Directors, staff, and outreach volunteers. The Task Force delivered its Final Report to the LTS Board of Directors in April 2021 with recommendations to improve equitable access for all stakeholders, including racialized and Indigenous youth. The report will be used by the Board of Directors to help guide objectives in its Strategic Plan and the report recommendations were incorporated into the development of an Equity Plan. The report will also feed into LTS's Operating Plan and will be integrated into all aspects of LTS's operations, from the type of programs and the way they are delivered, to hiring practices, such as whether there are inherent biases in hiring. Notably, the Equity Plan includes

proposed targets to achieve gender parity and 30% diversity representation for the Board of Directors, staff, Teacher Leaders, Outreach Site Coordinators, and volunteers, with a timeline for achievement still to be established.

Document review found the roles and responsibilities of the Nomination Committee for Board Recruitment include diversity criteria, including consideration of the diversity of current and future board directors. According to interviews, LTS was one of the first third-party ISED funded organizations that joined the 50-30 challenge, with 50% of directors identifying as women and 40% identifying as being from a diverse group. Women are also highly represented within LTS's senior management. The Board includes a diverse array of professions (e.g., partner in an accounting firm, executive in a technology company, an educator) and diverse groups (e.g., Metis, black female, diverse regional representation, Francophone, immigrant, etc.).

In documents and interviews, LTS acknowledged that improvements are needed in the diversity of the management team. With respect to LTS staff, the Equity, Diversity, and Inclusion data available indicated that there were 17% of staff who were bilingual, 74% female, and one Indigenous staff member. While most staff are in Ontario, LTS has a growing portion of remote staff, with 35% in other regions of Canada as of 2019-20. The Equity Plan includes objectives to address many of these gaps, including assessing its composition and setting diversity goals over the next 3-5 years.

LTS's hands-on, inquiry-based approach is effective for a diversity of youth, including girls, at-risk youth, and Indigenous youth

Interviews and documents found that LTS made significant efforts to deliver programming in an equitable, diverse, and inclusive manner. LTS's objective is to reach as broad an audience as possible, in all regions, communities and socioeconomic groups, especially rural and Indigenous. Interviews found that LTS programs are inclusive of all youth, as LTS provides different approaches to meet diverse needs (e.g., behavioural, sensory, etc.) and ensures materials and activities meet the needs/context of the audience.

When implementing programs, LTS works collaboratively with each audience, such as Indigenous educators or youth, to understand the strategies or methods that will work best for the educators and youth involved. While LTS programs are not specifically tailored to a particular underrepresented group, they have some activities/resources targeted to specific groups. For

	Youth	Volunteers
Female	50%	74%
Indigenous	3%	1%
At-risk	8%	--
Rural/remote	10%	8%
French*	12%	19%
Quebec	8%	5%

Source: LTS data and surveys

*Includes youth attending French language or immersion schools and volunteers with French as a first language or are bilingual.

example, through a partnership with the San Romanoway Revitalization Association, volunteers work with youth in an after school program in Toronto's Jane and Finch community. LTS also offers financial support for volunteers to travel to underserved remote communities to deliver outreach.

According to interviews, LTS increased its reach to underserved groups, including Indigenous and remote youth. Program and survey data shows LTS reached a diversity of groups, although it had less reach among French learners and in Quebec (relative to its reach in other provinces). LTS's reach to Indigenous youth and volunteers was also lower than their share of the Canadian population (about 5%), although there is additional reach through partnerships (e.g., Frontier College). Interviews also identified other underserved groups as an area where there should be increased focus.

Horizon Project Highlight

LTS delivered the Horizon Project to disadvantaged youth that had limited access to online learning during the Pandemic. LTS provided youth in Grades 4-6 with supplies and instructions (booklet and materials) to do activities designed to engage them in meaningful and fun STEM-based learning opportunities without computer technology or adult guidance. LTS distributed 75,000 kits, including 15,000 to Indigenous students. It involved 300 organizations and was distributed by around 120 organizations. LTS raised \$600,000 for materials and received support from many organizations (e.g., NSERC, CSA, Little Inventors, Frontier College, Mining Matters). The kits were distributed by 300 community organizations, including approximately 120 food banks.



LTS has a multi-pronged approach to engage Indigenous youth

According to interviews, LTS is inclusive of Indigenous communities, with a long standing Indigenous outreach focus, where efforts are made to provide accessible programming, that takes into consideration the cultural/community context. Document review found that LTS has an Indigenous Outreach Strategy and a National Indigenous Advisory Council that provides input on programming. LTS also provides training for all outreach coordinators and volunteers who work in Indigenous communities. From 2015-16 to 2019-20, LTS provided Indigenous training to almost 100 volunteers per year. In 2017-18, LTS developed an Indigenous Outreach Training course for LTS staff and volunteers, in collaboration with Indigenous stakeholders, that provides knowledge and understanding of Indigenous histories, worldviews, current realities, and perspectives. LTS also partners with Indigenous organizations. For example, Frontier College enables LTS to reach over 100 Indigenous Summer Literacy Camps with its programming by providing counsellors training, hands on activities, and career resources. LTS also established an outreach site at First Nations University in 2018 and Aurora Research Institute in 2020.

LTS increased the availability of French language resources

While interviews and program data found that LTS's reach to the French language community represents an area where there is an opportunity for growth, LTS has grown its French resources and made significant efforts to provide equivalent programming in French. For example, during the 2015-16 to 2019-20 period, LTS launched a French language version of IdeaPark; offered French Summer Institutes; delivered its first French LTS Challenge event; made Tomatosphere resources available in French; and added 400 French career profiles. The online educators resources are now available for educators in English and French and include 1,246 resources in English and 1,095 resources in French as of April 2021, with the difference largely because some French content, such as career profiles or videos, is developed as original French content, rather than translating English content.



The LTSC aims to be accessible to all schools by providing all the resources needed to participate in the event, and if needed, any materials needed to prepare for the event (e.g., printed copies of the study handbook). The virtual Challenge has increased accessibility and led to an increased focus by LTS on how to address diverse needs. The LTS surveys found that the LTSC reached a variety of diverse youth, including women, Indigenous peoples, people with disabilities, and new Canadians. According to interviews, the LTSC also includes a diverse representation of volunteer role models. About 10% of participants are from rural regions, with the LTSC providing a rare opportunity to participate in a science event at a university. As such, LTS provides around \$10,000 annually in travel grants for those in rural areas who would otherwise be unable to attend. In 2017, the first French Challenge was delivered, which included translating all materials. The virtual Challenge increased accessibility to French participants, by reaching communities where there were no French volunteers.



Findings

Relevance

Performance

Efficiency

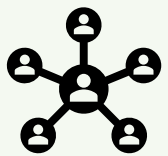
Finding 9: LTS pivoted quickly in response to COVID-19, by moving activities online and providing materials for educators, youth, and caregivers and is well-positioned to continue a blended delivery model.



LTS was recognized by the Policy Magazine editorial board in 2020 for **its success in moving to virtual programming**.²⁶ LTS was well-positioned, as it already had a significant digital presence. Prior to COVID-19, LTS was moving towards blended programming that included both online and in-person delivery. LTS also already had the infrastructure in place for remote working, as 30-40% of staff were working remotely prior to the pandemic.

COVID-19 resulted in an acceleration and fine tuning of online content and virtual delivery. LTS moved to an online platform, transitioned existing programming online, and revamped its website to make it more user-friendly to parents. The pivot of programming included: running LTSC virtually; visiting classrooms virtually; expanding online content; providing more activities that could be done with household materials; dropping off activity kits to schools; sending out Horizon Project activity kits to underserved youth; delivering videos; hosting virtual symposiums (e.g., Let's Talk Cancer, StemCell Talks); providing online training for volunteers and online Professional Learning for educators; creating virtual STEM clubs for grades 4- 6; STEM Storytime for K-3; and Curious Careers for grades 6-8. COVID-19 also resulted in a move towards different audiences, as parents became a part of the educator audience due to virtual at-home schooling. According to interviews, LTS immediately recognized the need for programming that could be delivered by parents/caregivers and developed programming and online resources to address this need. LTS also learned that they can go more directly to youth, with interviews finding that LTS was effective in developing 'STEM at Home' activities.

Interviews found that **professional learning and educator resources were easier to pivot online and may have extended reach** by forcing increased uptake among those previously hesitant to use online resources. The largest impact was on outreach, which relied on face-to-face interactions in class, as it was more challenging to do hands-on activities virtually. Interviews noted that LTS nonetheless did a good job in pivoting to online outreach and educators agreed it was delivered as effectively as in-person. While in some cases virtual outreach to remote communities was challenging because of low internet connectivity, virtual delivery expanded the accessibility of outreach to more French speaking classrooms and remote regions, as volunteers could engage classrooms in any location. Interviews agreed that LTS would likely resort back to providing volunteer outreach activities in-person to better support hands-on learning and skill development, while also identifying an opportunity for expanded reach 'post-Pandemic' via virtual delivery of outreach and professional learning.



✓ Conclusions

- Summary of the Evaluation



Three findings presented the relevance for supporting youth STEM engagement and resources for educators, and the continued need for LTS within the STEM education ecosystem in Canada.



Finding 1: There is a continued need to support youth STEM engagement in Canada. This need for youth STEM engagement has increased over time, particularly for underrepresented groups. LTS addresses a need for youth STEM engagement by convening education stakeholders and coordinating the delivery of a national scale platform for youth STEM engagement. The delivery platform uses a broad (EY-12), holistic (youth, educators, volunteers, parents), and evidence-based approach to address barriers to youth STEM participation that is very adaptable in meeting diverse needs.

Finding 2: There are a variety of youth-focused STEM programs in Canada; however, LTS is relatively unique in having a larger scale and scope and a highly collaborative delivery model.

Finding 3: LTS is aligned with ISED's Departmental Result, "Canadian businesses and industries are innovative and growing" and supports the objectives of the Innovation and Skills Plan in providing youth with access to formative experiences that promote increased STEM participation



Three findings demonstrated LTS' effectiveness in supporting youth interest in STEM and awareness in STEM careers, educators capacity to teach STEM, and volunteer outreach and skills development.



Finding 4: LTS increased its reach to youth and increased youth interest in STEM, because of the variety of engaging ways it reaches youth, directly via LTS programming, and indirectly via its partnerships with other youth-serving organizations. To support youth interest and awareness in STEM careers, LTS effectively incorporates career pathways into this programming, via a large and diverse array of career profiles and the use of university volunteer role models.

Finding 5: LTS was effective in increasing engagement of educators and their participation in multiple programs, thereby surpassing targets. LTS's volunteer outreach in classrooms, library of digital content and classroom-ready learning and Professional Learning opportunities were found to have been effective at increasing educator capacity to teach STEM and inquiry-based science, particularly for teachers with less experience in STEM.

Finding 6: LTS grew its outreach program, surpassing most of its targets for outreach sites, registered volunteers, and total volunteer hours. LTS increased its focus on professional development and skills training; with volunteer participation and satisfaction increasing. LTS has contributed to the development of a variety of skills and provided volunteers with career training, such as resume building and skill transference to help them navigate from post-secondary to the job market.

Finding 7: LTS is being delivered efficiently, with low administrative costs, centralized operations, and strategic delivery partners. Alternative sources of funding do not offer the same scale, scope, or duration offered by the ISED funding; the funding enables LTS to focus on its core objectives of delivering on a national STEM education mandate. ISED funding also supports LTS in securing additional financial investments, in-kind support, and partnerships, thereby extending its reach to more youth and educators.

Finding 8: LTS's hands-on, inquiry-based approach is effective in reaching a diversity of youth, including girls, at-risk youth, and Indigenous youth. LTS has a multi-pronged approach to engage Indigenous youth and has increased the availability of French language resources. LTS has also increased its efforts to incorporate equity, diversity and inclusion considerations by establishing an Anti-Racism Task Force and developing an Equity Plan.

Finding 9: LTS pivoted quickly in response to COVID-19, by moving activities online and providing materials for educators, youth, and caregivers and is well-positioned to continue a blended delivery model.





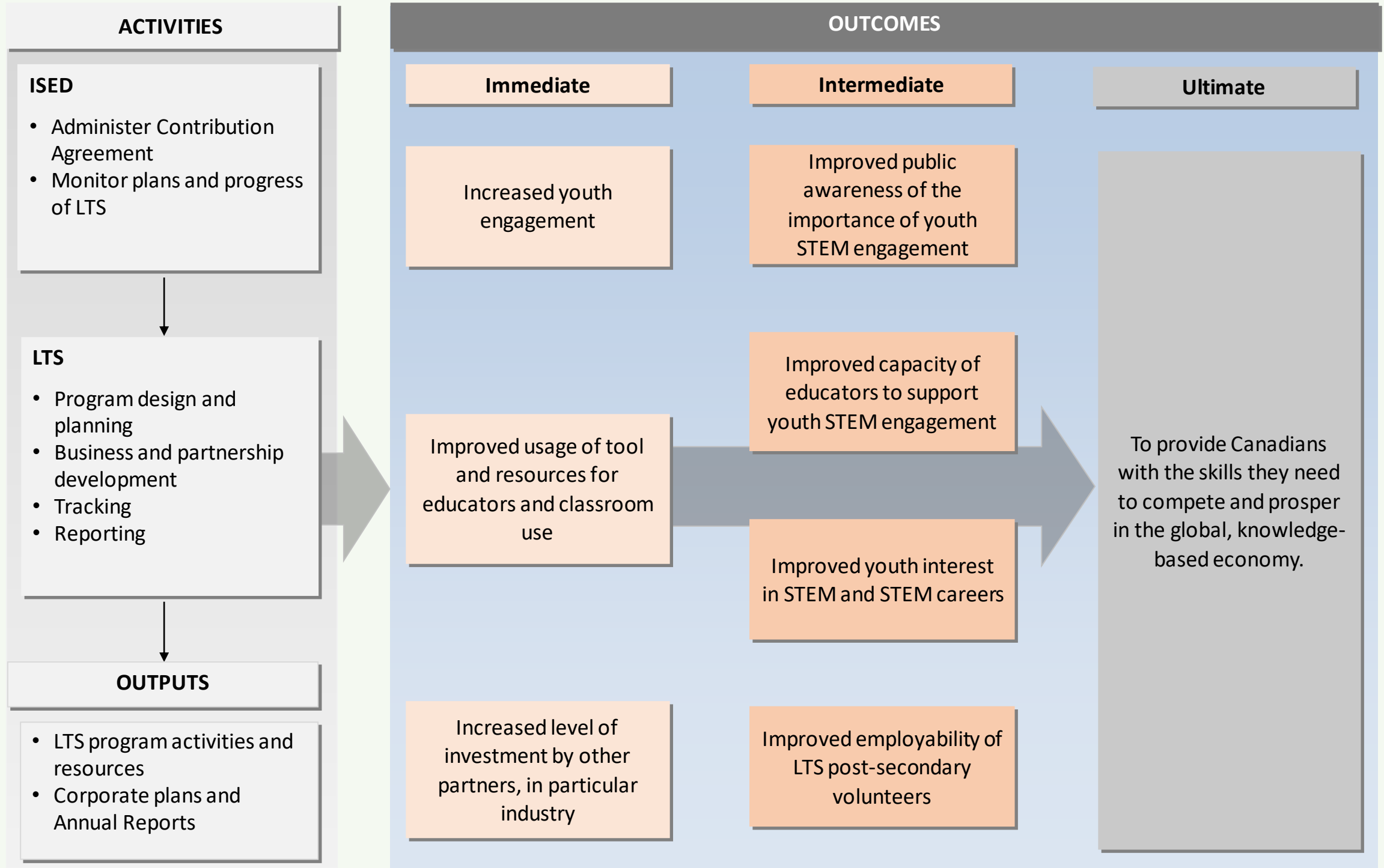
Appendices

- Appendix A: Logic Model
- Appendix B: Outreach Delivery Model
- Appendix C: End Notes



Appendix A: Logic Model

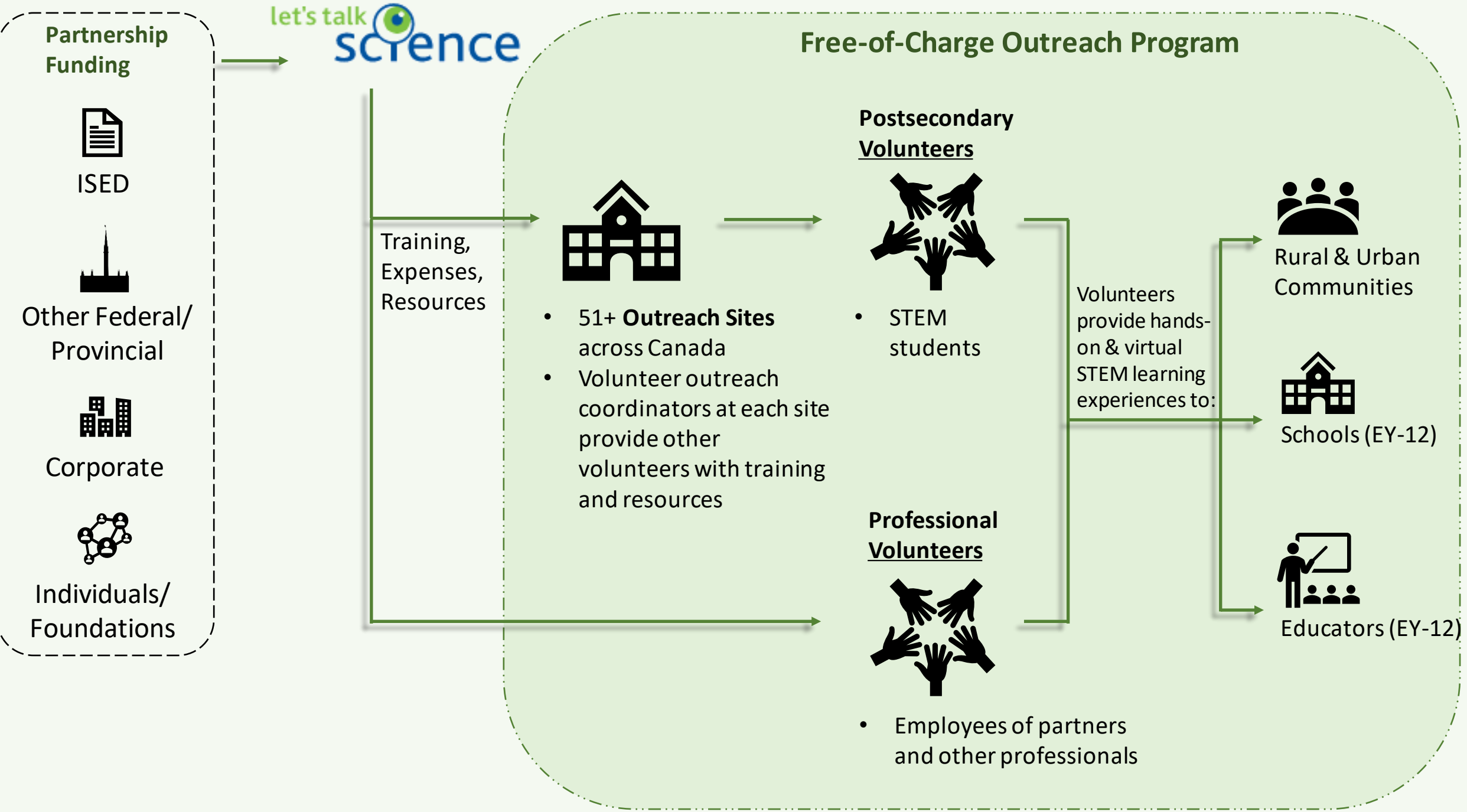
Let's Talk Science Logic Model





Appendix B: LTS Outreach Delivery Model

The LTS Outreach Program delivery model consists of the following core components:





Appendix C: End Notes

1. Council of Canadian Academies. 2015. *Some Assembly Required: STEM Skills and Canada's Economic Productivity*. Ottawa (ON): The Expert Panel on STEM Skills for the Future, Council of Canadian Academies.
2. Pedaste, M., et. al. 2015. Phases of inquiry-based learning: Definitions and the inquiry cycle, *Educational Research Review*, volume 14, p. 47-61. <https://doi.org/10.1016/j.edurev.2015.02.003>
3. Lowrie, T., Downes, N., & Leonard, S. (2017). STEM education for all young Australians: A Bright Spots Learning Hub Foundation Paper, for SVA, in partnership with Samsung. University of Canberra STEM Education Research Centre.
4. The American University in Cairo. Outreach and Engagement Terminology in Higher Education. Retrieved from, <https://talloiresnetwork.tufts.edu/wpcontent/uploads/OutreachandEngagementTerminologyinHigherEducation.pdf>
5. Let's Talk Science: Professional Learning, <https://letstalkscience.ca/professional-learning>
6. Duodu, E., Noble, J., Yusuf, Y. et al. Understanding the delivery of a Canadian-based after-school STEM program: a case study. *IJ STEM Ed* 4, 20 (2017). <https://doi.org/10.1186/s40594-017-0083-2>
7. President's Council of Advisors on Science and Technology. 2010. Report to the President: Prepare and Inspire: K-12 Education in Science, Technology, Engineering and Math (STEM) for America's Future. Prepublication version. Washington: Executive Office of the President, President's Council of Advisors on Science and Technology.
8. Australian Council of Learned Academies (ACOLA). 2013b. STEM: Country Comparisons -- Report by the Australian Council of Learned Academies for PMSEIC. Melbourne: Australian Council of Learned Academies
9. Tippett & M. T. Cham (Eds.), *Science education in Canada consistencies, commonalities, and distinctions* (pp. 265–286). Cham: Springer Nature.
10. LTS [Spotlight on Science Learning: The Evolution of STEM Education](#), p. 14
11. Building a Nation of (Young) Innovators: Supporting Economic Growth Through a National Youth STEM Development System. Source: <https://www.ourcommons.ca/Content/Committee/421/FINA/Brief/BR8397964/br-external/CanadasNationalYouthSTEMOrganizations-e.pdf>
12. Effect of Inquiry and Problem Based Pedagogy on Learning: Evidence from 10 Field Experiments in Four Countries
13. Council of Canadian Academies, 2015. *Some Assembly Required: STEM Skills and Canada's Economic Productivity*. Ottawa (ON): The Expert Panel on STEM Skills for the Future, Council of Canadian Academies.



Appendix C: End Notes

14. Estrada M, Burnett M, Campbell AG, et al. Improving underrepresented minority student persistence in stem. *CBE Life Sci Educ.* 2016; **15**(3): 1- 10.
15. Duodu, E., Noble, J., Yusuf, Y. et al. Understanding the delivery of a Canadian-based after-school STEM program: a case study. *IJ STEM Ed* 4, 20 (2017). <https://doi.org/10.1186/s40594-017-0083-2>
16. Actua. 2020. [Canadian Teachers' Readiness For Stem Education: Results from Actua's National Survey of Teachers](#)
17. OECD (2011), *Skills for Innovation and Research*, OECD Publishing. <http://dx.doi.org/10.1787/9789264097490-en>
18. OECD (2008b), *Encouraging Student Interest in Science and Technology Studies*, Global Science Forum, OECD, Paris.
19. Let's Talk Science. 2012. Spotlight on Science Learning: [A Benchmark of Canadian Talent](#);
20. Lowrie, T., Downes, N., & Leonard, S. (2017). STEM education for all young Australians: A Bright Spots Learning Hub Foundation Paper, for SVA, in partnership with Samsung. University of Canberra STEM Education Research Centre.
21. Let's Talk Science. 2017. Spotlight on Science Learning - [The Evolution of STEM Education: A Review of Recent International and Canadian Policy Recommendations](#)
22. OECD (2017) Education at a glance.
23. OECD (2011), *Skills for Innovation and Research*, OECD Publishing. <http://dx.doi.org/10.1787/9789264097490-en>
24. Let's Talk Science. 2017. Spotlight on Science Learning - [The Evolution of STEM Education: A Review of Recent International and Canadian Policy Recommendations](#)
25. Actua. 2020. [Canadian Teachers' Readiness For Stem Education: Results from Actua's National Survey of Teachers](#)
26. Innovating Through Crisis. <https://www.policymagazine.ca/innovating-through-crisis/>