

Science Communication 101

(Led by Tristan MacLean, PhD, and Farah Qaiser, MSc)

Module Overview

- Fundamentals and key concepts in science communication
- Science communication landscape and opportunities in Canada
- Inclusive science communication practices
- Misinformation management and strategies

Module Summary

- Effective science communication involves understanding the target audience and being strategic in how to convey scientific issues. It can be practiced in several mediums.
- Science communication in Canada was fostered by the founding of science institutions and centres, and it has since diversified into many forms, including events, public engagement and entertainment, among others.
- Most science communication is focused on English-speakers with access to the internet, and there needs to be more effort to approach different audiences.
- Misinformation and disinformation come in a variety of forms, and they can lead to decreased public trust in science, but there are effective strategies for tackling them.

An Introduction to Science Communication

Science communication encompasses a diverse range of communicators (e.g., scientists, journalists, and communications professionals) and audiences (e.g., the public, school students, community groups, and policymakers). This diversity also extends to the varied mediums in which science communication is practiced.



Writing



Television,
Video & Podcasts



Public Speaking



Comics &
Animations



Social Media



Public Outreach



Community
Engagement



Theatre &
Comedy

Practices for Effective Science Communication

As communicators, it is important to understand that science is more than a set of facts or a unified consensus on what is and is not science. The science community and the audiences they engage with may have different understandings of science. Reflecting on what you understand and mean when you talk about 'science' is vital in being able to effectively communicate science to others.

(1) Develop your goals and objectives.

Define your goals and objectives, and then choose your tactics and required skills.



Example - Permafrost monitoring in Northern Canada




(2) Identify your audience.

While we often group the 'general public' into one homogenous group, the general public is composed of diverse people. It is important to further narrow down the target audience and tailor the message and content appropriately.




(3) Choose your tactics.

There tend to be two main ways of approaching science communication.

**Deficit Model**

Communicating information is unidirectional (scientist talking to the public)

**Dialogue Model**

Communicating information is bidirectional (scientist and the public share a conversation together)

The Dialogue Model is considered to be more effective than the Deficit Model at engaging some audiences and fostering productive dialogue and trust. It provides the opportunity to build relationships and fill the gaps in knowledge together.

(4) Use evidence-based science communication.

Science communication research can help us understand the target audiences to better shape effective language, narratives, and key messages.

Example 1:

Climate change labelling in Taiwan (Hung & Bayrak, 2020)

- Scientists and the media are using the terms 'climate emergency' and 'climate crisis', rather than 'climate change', to instill a sense of urgency in behavioural changes.
- Hung & Bayrak (2020) found that in Taiwan, 'climate crisis' and 'climate change' both elicited similar responses and reactions on a general public level.
- On a sub-group level, they found that men were less likely to engage with 'climate crisis' than 'climate change' compared to women. Researchers speculate that men are less likely to change behaviours when presented with negative frames of climate issues. The same trends were found with participants with hierarchical, individualistic, and fatalistic worldviews.

TIP: Communicators need to be strategic in language use and framing of climate issues for certain audiences when taking cultural and gender differences into account. Overall, the Taiwanese public responds similarly to both 'climate crisis' and 'climate change'.

Example 2:

Public engagement on climate change and energy in Alberta (Marshall & Bennett, 2018)

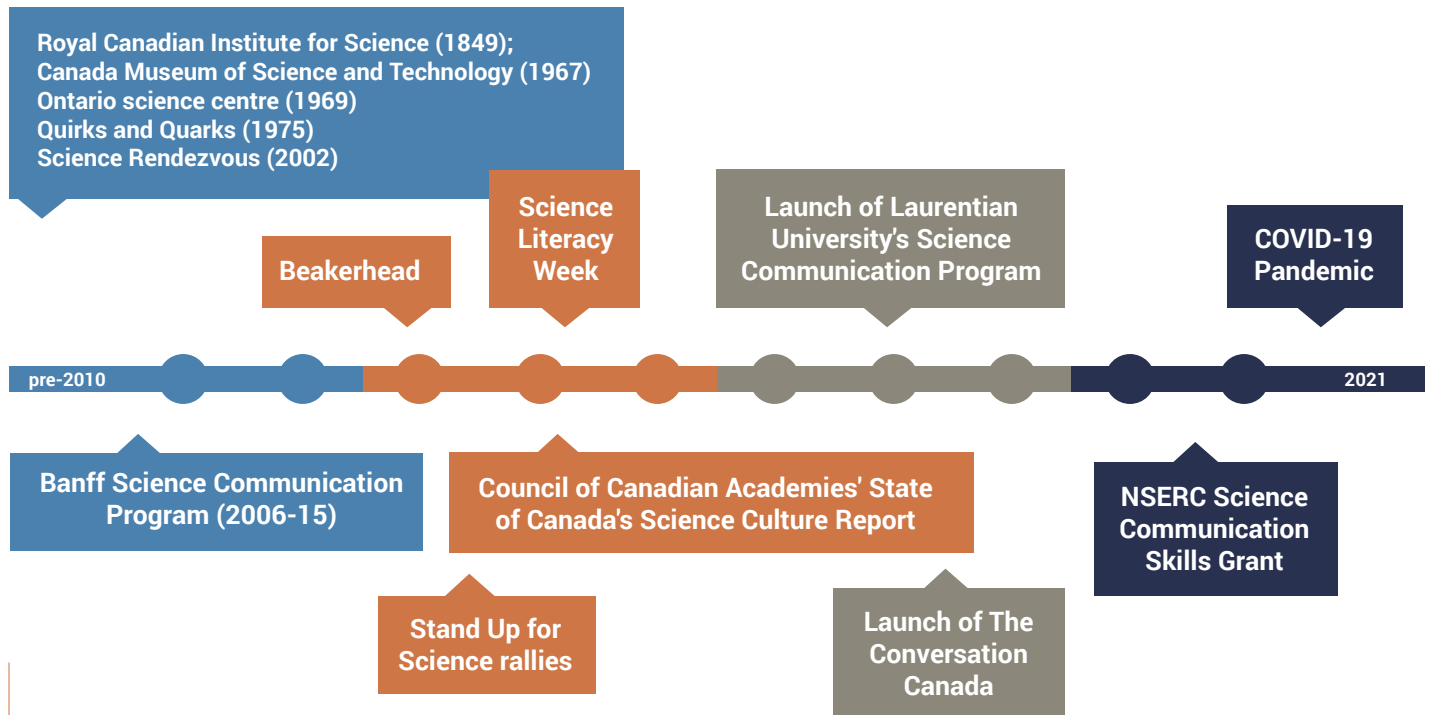
- Albertans do not find that climate change is a top priority, but rather view climate change as an emerging challenge.
- While Albertans believe renewable energy has strong economic potential, most do not believe that it could replace fossil fuel production. Marshall and Bennett (2018) found that phrasing this as 'diversification' of energy options was better received than as a 'transition' away from oil.
- Albertans preferred 'straight' talk where communicators avoid using jargon, such as 'emissions' or 'carbon'.

TIP: Public engagement can lead to a better shared understanding of the language used when discussing science and environmental issues. Avoiding politicized terms associated with climate issues may lead to better dialogue and trust when communicating with certain audiences.

A Timeline of Canada's Science Communication Landscape

Communication of people's knowledge and understanding of the natural world has existed in many forms on the land that we now call Canada, often passed on through oral traditions well before science institutions or centres. The founding of the Royal Canadian Institute for Science in 1849 marked the beginning of the formal communication of Western science in Canada. This has increased significantly over the last decade alone with more events, sources of information, mediums of communication and training programs.

The last decade: Canada's science communication landscape



Inspired by Alan Shapiro's "Looking Back: A Decade of Canadian Science Communication."

Science Communication Opportunities

As the Canadian science communication landscape has grown, more opportunities have also appeared.

- 1 Training opportunities include** courses, programs, conferences, virtual resources to improve science communication skills.
- 2 Practice and honing skills** can look like public speaking, science outreach, science writing, science policy, to name a few.
- 3 Forge your own path** with getting creative with podcasts, video, knitting, or even crocheting science.

Inclusive Science Communication Practices

Currently, most science communication is targeted towards English-speakers with access to the internet. Building more inclusive science communication practices in our work helps build knowledge exchanges, mutual learning, and capacity building.

Here are a couple of ways we can be more inclusive in science communication:

- Create opportunities for multilingual engagement.
- Cater to different audiences and work towards increasing accessibility.
- Avoid jargon, and if it is needed, contextualize and explain the terms.

Misinformation Management and Strategies

Misinformation has increasingly become a forefront issue in all sectors. Misinformation is harmful because it erodes public trust in institutions and undermines democracies.

Depending on the intent, the term used to describe misinformation differs:

Misinformation

false information shared with no harm meant.

Disinformation

false information shared with intended harm.

Malinformation

genuine information shared to cause harm, often by altering and moving information designed to stay private into the public sphere.

It can get overwhelming trying to address misinformation. Here are some proven strategies:

- Always consider what is being shared and its credibility.
- Use facts and evidence from trusted sources only.
- Craft messages that are clear and shareable.
- Report harmful misinformation instead of sharing and critiquing it.
- Be empathetic and humble when debunking (it's important to give people the room to change their mind).



Additional Reading(s):

- [Looking Back: A Decade of Canadian Science Communication](#) by Alan Shapiro
- [A beginner's guide to scicomm opportunities in Canada](#) by Farah Qaiser
- [The State of Inclusive Science Communication: A Landscape Study](#) by Canfield & Menezes (2020)
- [Information Disorder Toward an Interdisciplinary Framework for Research and Policymaking](#) by Council of Europe (2017)
- [Misinformation resources](#) from the Faculty of Law at University of Alberta
- [Combating climate change misinformation: Evidence for longevity of inoculation and consensus message effects](#) by Maertens et al. (2020)*

*This is a paywalled article. There are ways to obtain paywalled articles, such as contacting the paper authors. [Here are some other ways to obtain paywalled articles.](#)

Content and Storyboards: Ki-Youn Kim, MScComm • **Graphic Design:** Krista Leroux • **Editing:** Tristan MacLean, PhD
