Ontario

# Decolonizing & Indigenizing the Curriculum

## Learning Needs Assessment

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FOR STUDIES IN EDUCATION

## Table of Contents

Part 1. Background of the Project ..... 3
Problem ..... 3
Research Strategy ..... 3
Part 2. Results ..... 3
Restate the Request ..... 3
Business Need ..... 4
Performance Problem ..... 4
Scenario of Ideal and Current Performance ..... 4
Task List for Ideal and Current Performance ..... 4
Entry Tasks ..... 8
Gap Between Ideal and Current Performance ..... 8
Learners ..... 9
General Characteristics ..... 10
Personas ..... 11
Constraints in the Learning Environment ..... 12
Part 3: Requirements ..... 13
Objectives ..... 13
Business objective ..... 13
Content Objectives ..... 14
Prerequisite objectives ..... 17
Evaluation ..... 18
Level 1 (satisfaction) ..... 18
Level 2 (learning) ..... 19
Appendix ..... 28
References ..... 33

# Learning Needs Assessment

Topic: Explain the importance of indigenizing Ontario's high school biology curriculum

## Part 1. Background of the Project

This section will introduce the central problem of this project and will briefly summarize the research strategy used to analyze it.

**Problem**

The Ministry of Education in Ontario has already taken steps to incorporate Indigenous knowledge into the high school biology curriculum. To better equip teachers, they have asked the Ontario Institute of Studies in Education (OISE) to create a mandatory two-day training for Ontario teachers. My manager has asked me to develop a 30-minute module for teachers to explain the importance of incorporating indigenous knowledge into the high school biology curriculum. This module will kick-off the two-day training and is intended to maximize the time spent with speakers and in workshops.

**Research Strategy**

1. Literature: journal articles, theses, and governmental reports centred on indigenous issues and indigenizing the curriculum were reviewed.

2. Other Reference Materials: websites, blogs, and other online resources were reviewed. These provided demographics and perspectives of teachers and greater information about indigenous issues and indigenizing the curriculum.

3. TED Talks: various TED talks given by indigenous people and allies were watched on YouTube. These provided information about indigenous knowledge and culture and their perspectives on indigenizing the curriculum.

The complete list of references can be found at the end of this document.

## Part 2. Results

This section will delve deeper into the central problem of the project. It will state the exact request and business need surrounding the project and review the performance problem. To review the performance problem, the ideal and current performance will be reviewed, first as a scenario and after as a task list. The gap between the ideal and current performance will also be assessed.

Next, learner characteristics will be summarized including their demographics, previous knowledge, and influences. Personas of different types of learners are presented and constraints on the learning environment are reviewed. Constraints on the project are also summarized.

**Restate the Request**

Create a "30-minute module for current high school biology teachers in Ontario, so that they will be able to explain the importance of indigenizing the curriculum".

**Business Need**

The business need for this project is to comply with regulations set by the Ministry of Education. The Government of Ontario has committed to indigenizing its high school biology curriculum. For the initiative to be successful, current teachers need to be able to explain its importance.

**Performance Problem**

***Scenario of Ideal and Current Performance***

*Ideal*

Carla is a high school biology teacher in Thunder Bay, Ontario. She is conscientious of her students and has committed to indigenizing her curriculum. She attends external events and collaborates with the local community to create learning opportunities for her students. Carla is readily able to explain the importance of indigenizing the biology curriculum, both for indigenous and non-indigenous students. She discusses this with colleagues who are interested in Indigenizing their curriculum.

*Current*

Carla is a high school biology teacher in Thunder Bay, Ontario. She believes that students need to learn about biology from a Eurocentric, science perspective only. When asked if she has considered indigenizing her curriculum, Carla expresses concern about Indigenous knowledge being a gateway for incorporating religion and states that science is the only valid method due to its rigorous method.

***Task List for Ideal and Current Performance***

*Tasks in the Ideal Performance*

End result: Teachers will be able to explain the importance of indigenizing the high school biology curriculum

1. Explain what indigenous knowledge is
    a. Define the term "Indigenous knowledge"
    b. Describe how indigenous knowledge has been accumulated
        i. Describe how knowledge is produced
            1. State that elders produce knowledge
            2. State that knowledge keepers produce knowledge
            3. State that observations are used
            4. State that experiments are used
            5. State that hypotheses are generated about changes in environment
            6. State that normative data is included with empirical data

ii. Describe how knowledge is stored
    1. State stories as a storage method
    2. State ceremonies as a storage method
    3. State art as a storage method
    4. State written documents as a storage method
    5. State artefacts as a storage method
    6. State songs as a storage method
iii. Describe how indigenous knowledge is transmitted
    1. State sharing circles as a method of knowledge sharing
    2. State participant observation as a method of knowledge sharing
    3. State modeling as a method of knowledge sharing
    4. State experiential learning as a method of knowledge sharing
    5. State ceremonies as a method of knowledge sharing
    6. State songs as a method of knowledge sharing
    7. State stories as a method of knowledge sharing
    8. State art as a method of knowledge sharing
    9. State artefacts as a method of knowledge sharing
    10. State meditation as a method of knowledge sharing
iv. Describe who is responsible for transferring knowledge
    1. State that elders share knowledge
    2. State that knowledge keepers share knowledge

c. Describe how Indigenous knowledge is subjective
    i. State that it links to culture
    ii. State that it links to nature
    iii. State that belief systems are incorporated
d. Describe how indigenous knowledge is holistic
    i. State that subjects are not silo-ed
    ii. State that relationships are crucial
    iii. State that everything is interrelated and interdependent

2. Explain what scientific knowledge is
    a. Define the term “Scientific method”
    b. Explain what scientific knowledge is
        i. Describe how scientific knowledge has been accumulated
            1. Describe how scientific knowledge is produced
                a. State the scientific method as how knowledge is produced
                b. State scientists as who produces it
            2. State literature as how knowledge is stored
            3. Describe how knowledge is transmitted
                a. State literature as a way to share knowledge
                b. State formal education as a way to share knowledge
                c. State experiential learning as a way to share knowledge

d. State videos as a way to share knowledge
e. State stories as a way to share knowledge

4. Describe who is responsible for transferring knowledge
    a. State professors as who is responsible for transferring knowledge
    b. State other professionals as who is responsible for transferring knowledge
    c. State colleges as where knowledge is transferred
    d. State universities as where knowledge is transferred

ii. State that scientific knowledge is objective

3. Explain how indigenous knowledge has been stunted in Canada
    a. Describe the negative purposes of the Indian Act in relation to their knowledge
        i. State that it gave the government power to control who was indigenous
        ii. State that it gave the government power to control what land they could occupy
        iii. State that it gave the government power to control what resources they could access
        iv. State that it gave the government power to control how they would be educated
        v. State that it gave the government power to control their linguistic and cultural practices
    b. Describe the purposes of residential schools
        i. State that they removed their culture
        ii. State that they removed their language
        iii. State that they removed children from their parents
        iv. State that they removed children from their communities
        v. State that they impeded their knowledge
    c. Describe the effects of the Indian Act and residential schools
        i. State trauma as an effect
        ii. State impeding their knowledge as an effect
        iii. State impeding their culture as an effect
        iv. State reduced indigenous education as an effect
        v. State language loss as an effect
        vi. State land loss as an effect
        vii. State identity loss as an effect
        viii. State community loss as an effect
        ix. State resource loss as an effect
        x. State impeded cultural practices as an effect

4. Given an example, explain how indigenous knowledge has benefited Canadian science
    a. Given the example, identify the novel knowledge the indigenous community had
    b. Given the example, identify how the researchers used the knowledge
    c. Given the example, identify how the knowledge propelled their research forward

5. Given resources, explain the benefit of indigenizing the curriculum
    a. Given resources, describe how it helps Indigenous students

i. State higher graduation rates as a benefit
ii. State higher education levels as a benefit
iii. State feeling respected as a benefit
iv. State feeling more connected to the material as a benefit
v. State more community-based instruction as a benefit
vi. State more up-to-date materials as a benefit
vii. State more hands-on and real-world experience as a benefit
viii. State student well being as a benefit
ix. State more experiential learning as a benefit
x. State similarities between knowledge systems highlighted as a benefit

b. Given resources, describe how it helps non-indigenous students
i. State more community-based instruction as a benefit
ii. State more up-to-date materials as a benefit
iii. State more hands-on and real-world experience as a benefit
iv. State student well being as a benefit
v. State more experiential learning as a benefit
vi. State greater connectedness to the environment as a benefit
vii. State promotion of sustainability as a benefit
viii. State similarities between knowledge systems highlighted as a benefit
ix. State respect for indigenous knowledge as a benefit
x. State removal of colonial narratives as a benefit

c. Explain how true reconciliation requires an informed population
i. Define the term “Reconciliation”
ii. Describe education as the historical issue
1. State that residential schools stripped children of their knowledge and culture
2. State that public schools spread Eurocentric views

*Tasks in the Current Performance*

End result: Explain scientific knowledge as the standard

1. Explain what scientific knowledge is
a. Define the term “Scientific method”
b. Explain what scientific knowledge is
i. Describe how scientific knowledge has been accumulated
1. Describe how scientific knowledge is produced
a. State the scientific method as how knowledge is produced
b. State scientists as who produces it
2. State literature as how knowledge is stored
3. Describe how knowledge is transmitted
a. State literature as a way to share knowledge
b. State formal education as a way to share knowledge

c. State experiential learning as a way to share knowledge
d. State videos as a way to share knowledge
e. State stories as a way to share knowledge

4. Describe who is responsible for transferring knowledge
    a. State professors as who is responsible for transferring knowledge
    b. State other professionals as who is responsible for transferring knowledge
    c. State colleges as where knowledge is transferred
    d. State universities as where knowledge is transferred

ii. State that scientific knowledge is objective

2. Explain the robustness of science
    a. State the reputation of science knowledge
    b. Describe how studies are designed
        i. State how controls used in studies
        ii. State how contemporary studies are peer-reviewed
    c. State how historical scientific knowledge has been confirmed through contemporary studies

***Entry Tasks***

Learners should have already mastered how to:

1. Describe the scientific method
2. Keep an open mind when out of their comfort zone
3. Participate in a respectful conversation

***Gap Between Ideal and Current Performance***

For many teachers, the concept of Indigenous knowledge and indigenizing the curriculum will be foreign and potentially uncomfortable. They may have some knowledge of it from the Ministry of Education's initiatives following the Truth and Reconciliation agreements and new teachers may have learned about it from undergraduate or teachers college courses. As an exception, some teachers may have investigated these concepts further through professional development courses previously offered.

Despite the exceptions and considering this is the first mandatory training, most teachers are unlikely to have the depth of knowledge required to fully embrace the new curriculum standards. Teachers may have misconceptions about Indigenous knowledge and what incorporating it into the curriculum involves. They may be reluctant to 'compromise' the robust scientific information and see Indigenous knowledge as a gateway to incorporating religion and spirituality.

*End Result*

Learners will be able to explain the importance of indigenizing the high school biology curriculum.

*Foundational Concepts*

- There are different knowledge systems
- Indigenous knowledge is not inferior to scientific knowledge
- Education played a large role in the historical and contemporary issues facing indigenous students
- Canada has committed to reconciliation and indigenizing the curriculum is major step towards achieving true reconciliation
- Indigenizing the curriculum benefits indigenous and non-indigenous students

*Process for Performing the Task*

1. Explain what scientific knowledge is.
2. Explain what indigenous knowledge is.
3. Compare the knowledge systems.
4. Describe how indigenous knowledge has been stunted and exploited in Canada.
5. Explain the benefits of indigenizing the curriculum for both indigenous and non-indigenous students.

*Variations on the Process*

Realistically, teachers will explain what Indigenous knowledge is, how it has been stunted, and why the curriculum should be indigenized.

The next section will delve further into the learner profiles and the background knowledge Ontario high school biology teachers possess. Due to the requirements in Ontario, it can be assumed that teachers will be knowledgeable about the scientific method and knowledge system. Since this task should be review, teachers will be expected to complete it accurately 100% of the time. The tasks of explaining what Indigenous knowledge is, how it has been stunted, and why the curriculum should be indigenized will also have the same expectation as these will realistically be what the learners use following training.

For the task of explaining how Indigenous knowledge has benefited Canadian science, learners will be provided with supplementary information during the evaluation. The objectives and evaluation sections will provide more detail of what information they will be given. The rational for this is that learners can look up this information if needed in their daily lives and missing this information is not detrimental to the overall message. Whereas the tasks of explaining what Indigenous knowledge is, how it has been stunted, and why the curriculum should be indigenized are crucial for the purpose of this project.

*Handling Common Problems*

Similar to the issues affecting learning, teachers may encounter resistance when explaining the importance of indigenizing the curriculum to other people (ex., parents who question or oppose the curriculum direction).

May need to clarify synonyms for Indigenous knowledge.

***Learners***

This section will review background information on the learners. Their general characteristics will be summarized including demographics, previous knowledge, and influences. Personas of different levels of learners will be provided that highlight the expected challenges for implementation of this project. Finally, constraints in the learning environment and constraints on the project will be listed.

***General Characteristics***

The learners' demographic information is provided below. Following this information, their expected previous knowledge will be outlined, and their anticipated influences will be presented.

*Demographic information*

In 2018, members of the Ontario College of Teachers were more than 74% female and 25% male. Most members taught for the English school boards and were located in central or south-central Ontario. Just over 36% of members paid for their own membership and the remaining were paid by the school boards or other educational organizations. Although most members worked for the English school boards, the boards only paid for 41-42% of the total memberships.

Almost 80% of male and female members fell between 31-60 years of age. For X members, over 65% were between 20-40 years of age and over 32% were between 41-60 years of age (X represents people identifying as Trans, Non-Binary, Two-Spirited, or Binary and those who did not share their gender identity). Over 60% of members obtained their degree at five universities: York University, University of Toronto, University of Ottawa (combined total from English and French departments), Queen's University, and Brock University.

English school board members had lower numbers of permanent positions, with approximately 30% of members securing a permanent position by their fifth year of work. This was increased to approximately 83% for members who were qualified to teach French as a second language. For the French school boards, approximately 86% of members were in permanent positions by year five of work.

Figures with more detailed numbers can be found in the Appendix.

The demographic information can be found in the Ontario College of Teacher's *2018 Annual Report*:

Ontario College of Teachers. (2018). 2018 annual report. Retrieved from https://www.oct.ca/about-the-college/annual-reports

Note: It does not contain any information pertaining to teacher's ethnicity. The closest indication is the figure identifying how many teachers were certified outside of Canada and the U.S. However, this only allows for assumptions of the teachers' ethnicities. Ontario teachers are predominantly white and there has been recent acknowledgement for the need of increased diversity (Ryan, J., Pollock, K., & Antonelli, F., 2009; Turner Consulting Group, 2015; Abawi, Z. E., 2018).

A report from 2015 published by the Turner Consulting Group summarizes this deficit in information well:

"In 2009, the provincial government recognized the need for greater diversity within school boards through its Equity and Inclusive Education Policy. The policy requires that school boards 'implement positive employment

practices that support equitable hiring, mentoring, retention, promotion, and succession planning.' However, while the policy notes that board staff 'should reflect the diversity within the community,' there is no requirement that boards collect data on the composition of its workforce or student population, analyze the diversity gap, or implement efforts to close the gap."

Previous Knowledge

To be a high school biology teacher in Ontario, teachers must have completed 3-5 full undergraduate or graduate credits in the subject with a minimum grade average of 70%. Or to be a general science teacher, the credits may be split between the sciences. From this requirement, it is expected that high school biology teachers in Ontario are knowledgeable about the scientific method and likely have some background in the history of science. They may also be familiar with the current buzzwords "Culturally Responsive Pedagogy" and "Social Identities".

*Influences*

- Intrinsic Motivations: New teachers want to remain current and appear versatile to be competitive in securing a permanent role. Older teachers appreciate that this mandatory training counts towards their PD hours.
- Extrinsic Motivations: The course is mandatory for all teachers. They will gain PD hours as well and a certificate for completing the entire workshop.
- Student Engagement: Most teachers want their students to be engaged – either for the students' benefit or so that the students like them. Indigenizing the curriculum also helps create an inquiry-based learning approach.
- Annual Learning Plan: Teachers must declare a professional goal each year (except the Teacher Performance Appraisal year) with strategies and a timeline. Some may use this course as part of their yearly goal if they want to focus on "Culturally Responsive Pedagogy", "Social Identities", "Indigenizing the Curriculum", etc.

***Personas***

*High Maintenance Learner – Eager*

Zarah is really excited for this opportunity. She teaches at a school with a larger population of indigenous students. She is eager to learn about indigenizing the curriculum so she can improve her students' experience. She has done some research on her own but felt overwhelmed and wasn't sure if she fully grasped it. She has many questions and wants to ensure she truly understands.

*High Maintenance Learner – Combative*

Steve believes that indigenizing the curriculum is the latest Liberal nonsense. He views science as the gold standard and believes it should remain separate from the rigorous scientific method. He is worried that

indigenizing the curriculum opens the gate for incorporating religion into the classroom. He views it as nothing more than a spiritual and cultural belief system. He is known for being boisterous and speaking his mind.
*Middle of the Road Learner – Optimistic*

Jerome is hoping to take away something valuable from this course. He has heard a lot about indigenizing the curriculum, but hasn't had much time to research it himself. He remembers being briefly introduced to indigenous knowledge in an ecology course in university, however it focused on scientifically confirming the knowledge. He actively participates and takes notes during the session.

*Middle of the Road Learner – Receptive*

Xavier is unsure about Indigenous knowledge and indigenizing the curriculum. Despite his hesitations, he is open to learning about these concepts and is comfortable stepping out of his comfort zone. He hopes to gain a better understanding of Indigenous knowledge and the importance of indigenizing the curriculum as he's heard a lot about inclusivity, social identities, and culturally responsive pedagogy lately. Although it feels like buzzwords being forced on him, Xavier sees merit in the concepts behind them.

*Low Maintenance Learner – Resistant*

Nina doesn't believe in indigenizing the curriculum and it makes her uncomfortable. She doesn't see why she should respect indigenous knowledge as much as she respects scientific knowledge. Science is rigorous and logical and any other method for constructing knowledge would be inferior. Nina feels pressure to keep these beliefs to herself as she teaches at a very liberal school.

*Low Maintenance Learner – Nervous*

Neil is excited to take this course and has set his Annual Learning Plan goal as working to create more inclusive classrooms. However, he feels uncomfortable asking questions, as he is anxious about saying something offensive or wrong.

***Constraints in the Learning Environment***

*Issues Affecting Learning*

Teacher's attitudes and belief systems may create tension during the course and time should be allotted to address them when needed. The topic of Indigenous knowledge and indigenizing the curriculum has the potential to be controversial and a heavy topic. The design of this course will need to take this into consideration. It is likely that learners will need extra support and resources for this topic.

*Issues Affecting the Application of Learning in the Work Environment*

Teacher's attitudes and belief systems may be too strong to be influenced by 30-minutes of instruction. Peer discussions may support or regress the progress made through this project. Similarly, their school's values and support/lack of support may also affect their progress.

Constraints on the Project

*Product Constraints*

Since the products of this project will be implemented throughout Ontario, the Ministry of Education, Ontario, will govern the product constraints. They have given permission to incorporate the University of Toronto and OISE logos.

- Editorial guidelines: provided by the Ministry of Education, Ontario
- Style guide: provided by the Ministry of Education, Ontario
- Dictionary: aligned with the Government of Canada
- "Extensions:" UNESCO's definition of Indigenous knowledge:

> "Local and indigenous knowledge refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings. For rural and indigenous peoples, local knowledge informs decision-making about fundamental aspects of day-to-day life.
>
> This knowledge is integral to a cultural complex that also encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality.
>
> These unique ways of knowing are important facets of the world's cultural diversity, and provide a foundation for locally-appropriate sustainable development."

- Design guidelines: provided by the Ministry of Education, Ontario; additional guidelines surrounding the inclusion of the University of Toronto and OISE logos
- Technical guidelines: None
- Templates: provided by the Ministry of Education, Ontario; additional guidelines surrounding the inclusion of the University of Toronto and OISE logos

*Project Constraints*

- Must-meet deadline: December 10, 2019 at 5:00 pm
- Not-to-exceed budget: $0
- Must-include staff: None

## Part 3: Requirements

### Objectives

#### *Business objective*

This course will be a component of a two-day training program designed to comply with regulations set by the Ontario government. The two-day course will enable Ontario high school biology teachers to indigenize their curriculum. This 30-minute course will begin by enabling the teachers to explain the importance of indigenizing their curriculum.

***Content Objectives***

End result: Teachers will be able to explain the importance of indigenizing the high school biology curriculum

1. Explain what indigenous knowledge is
    a. Define the term "Indigenous knowledge"
    b. Describe how indigenous knowledge has been accumulated
        i. Describe how knowledge is produced
            1. State that elders produce knowledge
            2. State that knowledge keepers produce knowledge
            3. State that observations are used
            4. State that experiments are used
            5. State that hypotheses are generated about changes in environment
            6. State that normative data is included with empirical data
        ii. Describe how knowledge is stored
            1. State stories as a storage method
            2. State ceremonies as a storage method
            3. State art as a storage method
            4. State written documents as a storage method
            5. State artefacts as a storage method
            6. State songs as a storage method
        iii. Describe how indigenous knowledge is transmitted
            1. State sharing circles as a method of knowledge sharing
            2. State participant observation as a method of knowledge sharing
            3. State modeling as a method of knowledge sharing
            4. State experiential learning as a method of knowledge sharing
            5. State ceremonies as a method of knowledge sharing
            6. State songs as a method of knowledge sharing
            7. State stories as a method of knowledge sharing
            8. State art as a method of knowledge sharing
            9. State artefacts as a method of knowledge sharing
            10. State meditation as a method of knowledge sharing
        iv. Describe who is responsible for transferring knowledge
            1. State that elders share knowledge
            2. State that knowledge keepers share knowledge
    c. Describe how Indigenous knowledge is subjective
        i. State that it links to culture
        ii. State that it links to nature
        iii. State that belief systems are incorporated
    d. Describe how indigenous knowledge is holistic
        i. State that subjects are not silo-ed
        ii. State that relationships are crucial

iii. State that everything is interrelated and interdependent

2. Explain what scientific knowledge is
    a. Define the term "Scientific method"
    b. Explain what scientific knowledge is
        i. Describe how scientific knowledge has been accumulated
            1. Describe how scientific knowledge is produced
                a. State the scientific method as how knowledge is produced
                b. State scientists as who produces it
            2. State literature as how knowledge is stored
            3. Describe how knowledge is transmitted
                a. State literature as a way to share knowledge
                b. State formal education as a way to share knowledge
                c. State experiential learning as a way to share knowledge
                d. State videos as a way to share knowledge
                e. State stories as a way to share knowledge
            4. Describe who is responsible for transferring knowledge
                a. State professors as who is responsible for transferring knowledge
                b. State other professionals as who is responsible for transferring knowledge
                c. State colleges as where knowledge is transferred
                d. State universities as where knowledge is transferred
        ii. State that scientific knowledge is objective

3. Explain how indigenous knowledge has been stunted in Canada
    a. Describe the negative purposes of the Indian Act in relation to their knowledge
        i. State that it gave the government power to control who was indigenous
        ii. State that it gave the government power to control what land they could occupy
        iii. State that it gave the government power to control what resources they could access
        iv. State that it gave the government power to control how they would be educated
        v. State that it gave the government power to control their linguistic and cultural practices
    b. Describe the purposes of residential schools
        i. State that they removed their culture
        ii. State that they removed their language
        iii. State that they removed children from their parents
        iv. State that they removed children from their communities
        v. State that they impeded their knowledge
    c. Describe the effects of the Indian Act and residential schools
        i. State trauma as an effect
        ii. State impeding their knowledge as an effect
        iii. State impeding their culture as an effect
        iv. State reduced indigenous education as an effect

v. State language loss as an effect
vi. State land loss as an effect
vii. State identity loss as an effect
viii. State community loss as an effect
ix. State resource loss as an effect
x. State impeded cultural practices as an effect

4. Given an example, explain how indigenous knowledge has benefited Canadian science
    a. Given the example, identify the novel knowledge the indigenous community had
    b. Given the example, identify how the researchers used the knowledge
    c. Given the example, identify how the knowledge propelled their research forward

5. Given resources, explain the benefit of indigenizing the curriculum
    a. Given resources, describe how it helps Indigenous students
        i. State higher graduation rates as a benefit
        ii. State higher education levels as a benefit
        iii. State feeling respected as a benefit
        iv. State feeling more connected to the material as a benefit
        v. State more community-based instruction as a benefit
        vi. State more up-to-date materials as a benefit
        vii. State more hands-on and real-world experience as a benefit
        viii. State student well being as a benefit
        ix. State more experiential learning as a benefit
        x. State similarities between knowledge systems highlighted as a benefit
    b. Given resources, describe how it helps non-indigenous students
        i. State more community-based instruction as a benefit
        ii. State more up-to-date materials as a benefit
        iii. State more hands-on and real-world experience as a benefit
        iv. State student well being as a benefit
        v. State more experiential learning as a benefit
        vi. State greater connectedness to the environment as a benefit
        vii. State promotion of sustainability as a benefit
        viii. State similarities between knowledge systems highlighted as a benefit
        ix. State respect for indigenous knowledge as a benefit
        x. State removal of colonial narratives as a benefit
    c. Explain how true reconciliation requires an informed population
        i. Define the term “Reconciliation”
        ii. Describe education as the historical issue
            1. State that residential schools stripped children of their knowledge and culture
            2. State that public schools spread Eurocentric views

***Prerequisite objectives***

Learners should have already mastered how to:

1. Describe the scientific method
2. Keep an open mind when out of their comfort zone, with two reminders
3. Participate in a respectful conversation, with two reminders

**Evaluation**

This section contains evaluation tools that may be used to assess the extent to which this project has achieved its objectives. The first tool is a Level 1 questionnaire that assesses learners' satisfaction of/reaction to the session. The second tool is a collection of Level 2 questions that assesses learning for each objective.

***Level 1 (satisfaction)***

In a word, how would you describe this course? _____

Using a number, how would you describe this course?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Horrible | | Average | | Superb |

How comfortable did you feel explaining the importance of indigenizing high school biology curriculum before this course?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not Comfortable | | Somewhat Comfortable | | Extremely Comfortable |

How about after?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Not Comfortable | | Somewhat Comfortable | | Extremely Comfortable |

Would you take this course if it were not mandatory?

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Definitely Not | | Maybe | | Absolutely |

The best part of this course was …

_____
_____
_____

The one thing that could improve this course the most is …

_____
_____
_____

Adapted from Carliner (2015) *Training Design Basics.*

***Level 2 (learning)***

The following section provides 3 sample questions for each of the 6 main content objectives. Each question has expectations and/or an example response.

*Explain What Indigenous Knowledge is*

1. Explain how indigenous knowledge is accumulated.

   Feedback:

   Example response: Elders and Knowledge Keepers use observations and experiments to generate information. They monitor their environment and create hypotheses surrounding changes. They incorporate both empirical and normative data into their knowledge and adapt it based on changes to both. They record their knowledge in a variety of ways, adding to the accumulated knowledge of their ancestors. They share their knowledge with the community through sharing circles, participant observation, modelling, experiential learning, ceremonies, and more.

2. What causes knowledge to be being indigenous?

   Feedback:

   Learners should cover the two main points of this definition (bolded below):

   "Local and indigenous knowledge refers to **the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings**. For rural and indigenous peoples, local knowledge informs decision-making about fundamental aspects of day-to-day life.

   This knowledge **is integral to a cultural complex that also encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality**.

   These unique ways of knowing are important facets of the world's cultural diversity, and provide a foundation for locally-appropriate sustainable development."

   (UNESCO, n.d.).

3. Read the scenario below. After reading, explain what information is needed to determine whether the knowledge gained would be considered indigenous.

   A person wants to know more about black bears. They travel to a remote location that a community of black bears inhabits. To fully understand the community, the person observes the black bears for 2 years. Through this experience they collect new information about how black bears behave and interact with each other and the environment.

   Feedback:

The answer should include information regarding why and how the observations were conducted. This includes hypotheses and the contextual information surrounding them. It should also question who the person is and their role within the community.

*Explain What Scientific Knowledge is*

1. Explain how scientific knowledge is accumulated.

   Feedback

   An excellent response should include:
   - The scientific method
   - Literature
   - Universities/Colleges
   - Professors/professionals

   For example: Scientific knowledge is accumulated through the use of the scientific method to conduct studies surrounding a phenomenon. Professionals conduct these studies and publish their results in different forms of literature. The literature is dispersed through education from professors or other professionals in Universities and Colleges.

2. What causes knowledge to be being scientific?

   Feedback:

   An excellent response should state the scientific method.

   For example: scientific knowledge is information gathered by professionals through the scientific method.

3. Read the scenario below. After reading, explain what information is needed to determine whether the knowledge gained would be considered scientific.

   A person wants to know more about black bears. They travel to a remote location that a community of black bears inhabits. To fully understand the community, the person observes the black bears for 2 years. Through this experience they collect new information about how black bears behave and interact with each other and the environment.

   Feedback:

   The answer should include information regarding why and how the observations were conducted. This includes research question(s), study design, and methods of data collection and analysis. It should also question who the person is and their background knowledge.

*Distinguish between scientific and indigenous knowledge*

1. Which one of the following differentiates scientific and indigenous knowledge?
    a. Indigenous knowledge is holistic
    b. Indigenous knowledge is historic
    c. Scientific knowledge is written
    d. Scientific knowledge is robust

    Feedback:

    a. Correct, indigenous knowledge is holistic
    b. Not correct, indigenous knowledge is also contemporary
    c. Not correct, indigenous knowledge can also written, though it can be transmitted through storytelling, art, dance, ceremonies, etc.
    d. Not correct, indigenous knowledge is also robust as it has been built based on survival with the land

*Explain how indigenous knowledge has been stunted in Canada*

1. Explain how indigenous knowledge has been stunted in Canada.

    Feedback:

    Example response: The government of Canada forced many communities to sign the Indian Act, which, among many things, gave the government the power to decide who was indigenous and control what land they could occupy, what resources they could access, their linguistic and cultural practices, and how they would be educated. The removal of their land and access to resources impeded their ability to expand their knowledge of those environments. Years later, the government funded residential schools that tore indigenous children from their families and communities, and forced them to assimilate into Euro-Canadian culture. It was a cultural genocide that aimed to eradicate indigenous culture including their languages, knowledge, and traditions. Indigenous communities are still recovering and many of their languages are on the verge of extinction.

2. Explain how residential schools have affected the indigenous communities across Canada in terms of indigenous knowledge and continue to do so.

    Feedback:

    Example response: The residential schools inflicted mass trauma on indigenous children in order to extinguish their culture and languages and, as a result, their knowledge. Grave abuses took place at the schools and communities are still recovering from them. Communities were prevented from educating generations of children and many languages are on the verge of extinction.

3. Explain how the Government of Canada has stunted indigenous knowledge.

   Feedback:

   Example response: The government of Canada forced many communities to sign the Indian Act, which, among many things, gave the government the power to decide who was indigenous and control what land they could occupy, what resources they could access, control their linguistic and cultural practices, and how they would be educated. The removal of their land and access to resources impeded their ability to expand their knowledge of those environments. Years later, the government funded residential schools that tore indigenous children from their families and communities and forced them to assimilate into Euro-Canadian culture. It was a cultural genocide that aimed to eradicate indigenous culture including their languages, knowledge, and traditions. Indigenous communities are still recovering and many of their languages are on the verge of extinction.

*Given an Example, Explain How Indigenous Knowledge Has Benefited Canadian Science*

1. The scenario below combines information from an article that covered an interview with one of the researchers, Megan Adams, and the abstract of the published study. The information from the article helps complement the abstract with more background information. After reading this scenario, explain how indigenous knowledge benefited the researchers.

   Article:

   "The community wanted to know more about the bears' diets and how that knowledge could inform its harvesting practices. 'If bears don't get enough food, not only do people have to see bears—who they care about—suffer, they also face increased bear-human conflict,' Adams says. 'This is about food security for you and food security for bears.'

   As she researched, Adams checked in with elders and community members. They directed her collaborative work with the nation. But the community wasn't simply in search of information out of a sense of objectivity, in the tradition of Western science. The goal of community members was to establish an evidentiary basis, parallel to their own traditional knowledge, to stop the grizzly bear trophy hunt, and they saw Adams's research as a means to that end.

   'Western science was one of many tools they were using to stop the hunt,' Adams says. …

   The work Adams has done with First Nations along the central coast has also combined traditional knowledge from the community with modern scientific approaches. Using local knowledge has helped them establish shifts in the bears' habitats dating back well into the past, further than science alone would allow. It has led to renewed understanding of the multifaceted, deep interactions between bears and salmon, involving the communities at every stage.

   'When we started that habitat work, the province didn't believe the Kitasoo [Kitasoo/Xaixais First Nation] were seeing grizzly bears on islands,' Adams says. People who had spent their entire lives in close contact with grizzly and black bears would be told the obvious by a provincial scientist: that black bears, too, can look brown. Backing up what was already well known by the local First Nations with knowledge that was more palatable to government employees was one part of building the case for that knowledge to be accepted by the government."

Abstract:

"Range shifts among wildlife can occur rapidly and impose cascading ecological, economic, and cultural consequences. However, occurrence data used to define distributional limits derived from scientific approaches are often outdated for wide ranging and elusive species, especially in remote environments. Accordingly, our aim was to amalgamate indigenous and western scientific evidence of grizzly bear (Ursus arctos horribilis) records and detail a potential range shift on the central coast of British Columbia, Canada. In addition, we test the hypothesis that data from each method yield similar results, as well as illustrate the complementary nature of this coupled approach. Combining information from traditional and local ecological knowledge (TEK/LEK) interviews with remote camera, genetic, and hunting data revealed that grizzly bears are now present on 10 islands outside their current management boundary. LEK interview data suggested this expansion has accelerated over the last 10 years. Both approaches provided complementary details and primarily affirmed one another: all islands with scientific evidence for occupation had consistent TEK/LEK evidence. Moreover, our complementary methods approach enabled a more spatially and temporally detailed account than either method would have afforded alone. In many cases, knowledge already held by local indigenous people could provide timely and inexpensive data about changing ecological processes. However, verifying the accuracy of scientific and experiential knowledge by pairing sources at the same spatial scale allows for increased confidence and detail. A similarly coupled approach may be useful across taxa in many regions."

References:

Thompson, J. (2019, August 13). Indigenous knowledge and the future of science. The Walrus. Retrieved from https://thewalrus.ca

Adams, M. S., Artelle, K. A., Paquet, P., Grant, L. V., & Darimont, C. T. (2014). Indigenous knowledge and science unite to reveal spatial and temporal dimensions of distributional shift in wildlife of conservation concern. *PloS one, 9*(7). https://doi.org/10.1371/journal.pone.0101595

Feedback:

Their answer should cover the following:

- Identify the novel knowledge the indigenous community had
- Identify how the researchers used the knowledge
- Identify how the knowledge propelled their research forward

For example: The indigenous community had novel knowledge of the grizzly bear's range on the central coast of British Columbia. The bears are elusive and wide-ranging, and scientific information is often out of date. The researchers used the indigenous knowledge to guide their investigation of grizzly bears' range using scientific tools. They discovered complementary evidence of the grizzly bears' range in this area, increasing scientific knowledge of the population. In addition, the scientific backing helped provincial scientist accept the indigenous knowledge. This will likely contribute to better protections for the grizzly bear population.

2. The scenario below is the conclusion of a study published in 2007. After reading this scenario, explain how indigenous knowledge benefited the researchers.

"This paper documents a meeting of scientists and representatives of an aboriginal community for the purpose of direct information exchange and communication. Traditional knowledge as a source of local-scale expertise about the regional landscape and climate systems is especially valuable. The elders of the community have in-depth knowledge of the lake and land resources and the way these are linked to climatic phenomena. A number of interesting points raised in these discussions suggest research hypotheses that could be investigated jointly, using both scientific techniques and traditional knowledge.

A major goal of the meeting was to communicate the principal MAGS research findings of interest to the community, those concerning climate and water resource phenomena. Scientific knowledge was not generally seen as supplanting traditional knowledge, but rather as a useful source of additional information that complements traditional empirical information and can be applied within a traditional moral and ethical framework. During the meeting, a participant expressed the view that the community knowledge system continuously incorporates new information from scientific and other sources to build upon its traditional foundations. This underscores the importance of making research results accessible through appropriate publication and direct dialogue between scientific and traditional knowledge keepers.

Discussions about the physical environment proved to be an effective vehicle through which to conduct knowledge exchange. Both parties acknowledged an initial lack of familiarity with each other's knowledge base. The meeting demonstrated the value of direct dialogue in providing scientists with an appreciation of the richness and importance of traditional knowledge and in providing community members with an understanding of the scope, relevance, and reliability of scientific studies. All participants were pleased with the cordial and open nature of the information exchange. The consensus was that the Deline meeting had enhanced the potential for traditional knowledge to help direct and validate scientific investigations and for scientific knowledge to be used in conjunction with traditional knowledge to guide community decision making. The outcome of this direct dialogue leads us to recommend strongly that such opportunities continue to be pursued."

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Woo, M. K., Modeste, P., Martz, L., Blondin, J., Kotchtubajda, B., Tutcho, D., Gyakum, J., Takazo, A., Spence, C., Tutcho, J., Di Cenzo, P., Kenny, G., Stone., J., Neyelle, I., Baptiste, G., Modeste, M., Kenny, B., & Modeste, W. (2007). Science meets traditional knowledge: water and climate in the Sahtu (Great Bear Lake) region, Northwest Territories, Canada. *Arctic, 60*(1), 37-46.

Feedback:

Their answer should cover the following:

- Identify the novel knowledge the indigenous community had
- Identify how the researchers used the knowledge
- Identify how the knowledge propelled their research forward

For example: Indigenous people have great and detailed knowledge of climate variability and change in their communities. Through an open knowledge-exchange, the indigenous knowledge identified interesting research hypotheses that the scientists could pursue jointly. The collaboration also opened avenues for future work together, providing more in depth research opportunities.

3. The scenario below is the abstract and partial conclusion of a study published in 2019. After reading this scenario, explain how indigenous knowledge benefited the researchers.

Abstract:

"Traditional Knowledge has the potential to increase our understanding of many kinds of ecological phenomenon including floods. This article offers insights into the nature of spring flooding and its impacts in the southwestern James Bay region of northern Ontario, Canada from the perspectives of residents of Kashechewan First Nation. This article highlights the important contribution of Kashechewan First Nation's traditional knowledge to understanding and reducing disaster risks in this flood-prone region. Through a collaboration with Kashechewan First Nation, traditional knowledge was documented in 2016 during 17 in-depth interviews, participatory flood mapping workshops, on-site walks, and photography. The results of this study show that spring flooding has occurred seasonally over many generations in the region and has not increased significantly over time. However, the timing and extent of spring flooding has changed in recent years with warming temperatures in the region (i.e., earlier spring, snowmelt, and rapid runoff) and impacts are exacerbated by landscape and resource developments (e.g., inadequate infrastructure, substandard ring-shaped dyke wall, and downriver winter ice road) which have increased the frequency and scale of spring ice breakup and ice jams. These ecological changes have created the increased risk of flooding for the community of Kashechewan. The methodological approach which used participatory techniques may be useful for ongoing flood monitoring and disaster risk reduction activities in southwestern James Bay and elsewhere among the Canadian Indigenous communities."

Partial Conclusion:

"… this study also has identified areas for further research. There is a need to investigate the breakup ice jam phenomenon occurring in the South Channel of the Albany River that influences the flooding risk in Kashechewan while researching with the Fort Albany First Nation using flood mapping and other participatory techniques. Another area of collaboration for future research with Indigenous communities of the region is the reduced span and safety level of winter ice road because of warming temperatures using the mapping and other participatory techniques. Studying the impacts of increased flood risk and recurring evacuation every year on traditional hunting and harvesting during spring is also a potential area for research."

References:

Khalafzai, M. A. K., McGee, T. K., & Parlee, B. (2019). Flooding in the James Bay region of Northern Ontario, Canada: Learning from traditional knowledge of Kashechewan First Nation. *International Journal of Disaster Risk Reduction, 36*. https://doi.org/10.1016/j.ijdrr.2019.101100

Feedback:

Their answer should cover the following:

- Identify the novel knowledge the indigenous community had
- Identify how the researchers used the knowledge
- Identify how the knowledge propelled their research forward

For example: Indigenous people have great and detailed knowledge of ecological phenomenon in their environment. Their knowledge allowed for identification of subtle changes and cause and effect relationships that statistical analysis could not pick up. Their knowledge also identified a new phenomenon of ice jams that scientists could investigate further. The collaboration also opened avenues for future work together, providing more in depth research opportunities.

*Explain the Benefit of Indigenizing the Curriculum*

1. Explain what benefits indigenizing the curriculum would have for indigenous students.

   Feedback:

   Answers should highlight the following:

   - Less than half of on-reserve students graduate high school, and majority attend provincial schools
   - 84-92% off-reserve have a high school diploma
   - Indigenous students are overrepresented in apprenticeships or trade certificates and college diplomas
   - Indigenous students are underrepresented in university degrees
   - Indigenous students are underrepresented in natural and biological sciences careers
   - Indigenous students are underrepresented in high school science classes
   - Indigenous students crave respect from teachers
   - Indigenous students crave more hands-on, practical, real-world activities
   - Indigenous students crave community-based instruction
   - Indigenous students crave up-to-date materials and resources

2. Explain what benefits indigenizing the curriculum would have for non-indigenous students.

   Feedback:

   Answers should highlight the following:

   - Indigenous methods are holistic, incorporating student well being
   - Indigenous methods are more experiential
   - Indigenous methods connect students to the community and contemporary issues
   - Indigenous methods create greater connectedness to the environment
   - Indigenous methods promote sustainability, a current issue
   - Creates awareness and respect for indigenous knowledge, needed for future careers
   - True reconciliation demands a change in education

- Indigenizing the curriculum helps remove colonial narratives that effect other students

3. Explain what benefits indigenizing the curriculum would have for your students.

   Feedback:

   Their answer depends on the demographics of their students and should incorporate a mix of the above. I.e., it should highlight some of the following:
   - Less than half of on-reserve students graduate high school, and majority attend provincial schools
   - 84-92% off-reserve have a high school diploma
   - Indigenous students are overrepresented in apprenticeships or trade certificates and college diplomas
   - Indigenous students are underrepresented in university degrees
   - Indigenous students are underrepresented in natural and biological sciences careers
   - Indigenous students are underrepresented in high school science classes
   - Indigenous students crave respect from teachers
   - Indigenous students crave more hands-on, practical, real-world activities
   - Indigenous students crave community-based instruction
   - Indigenous students crave up-to-date materials and resources
   - Indigenous methods are holistic, incorporating student well being
   - Indigenous methods are more experiential
   - Indigenous methods connect students to the community and contemporary issues
   - Indigenous methods create greater connectedness to the environment
   - Indigenous methods promote sustainability, a current issue
   - Creates awareness and respect for indigenous knowledge, needed for future careers
   - True reconciliation demands a change in education
   - Indigenizing the curriculum helps remove colonial narratives that effect other students

## Appendix

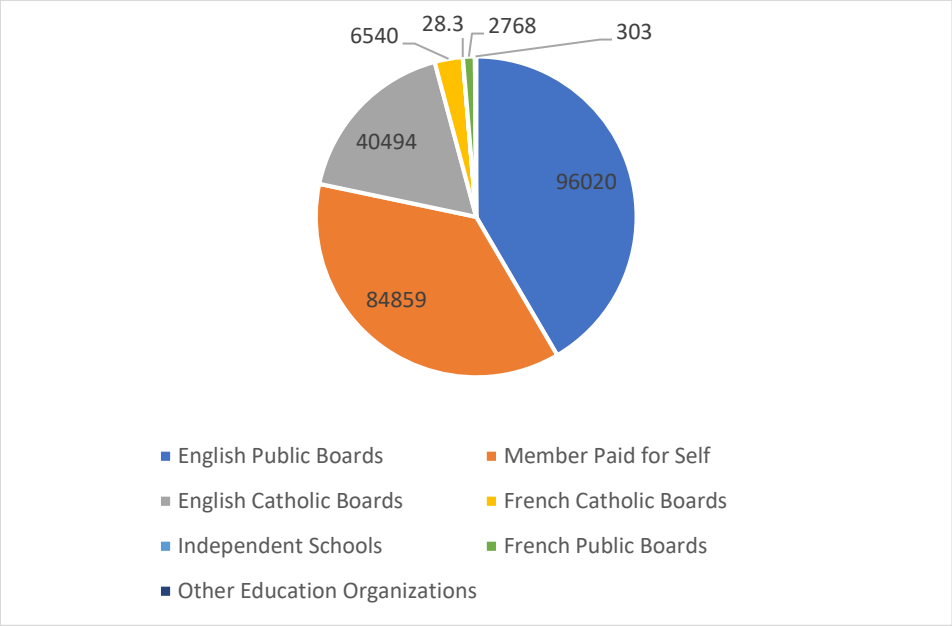


Figure 1: Number of Ontario College of Teachers members in 2018, by payment source.

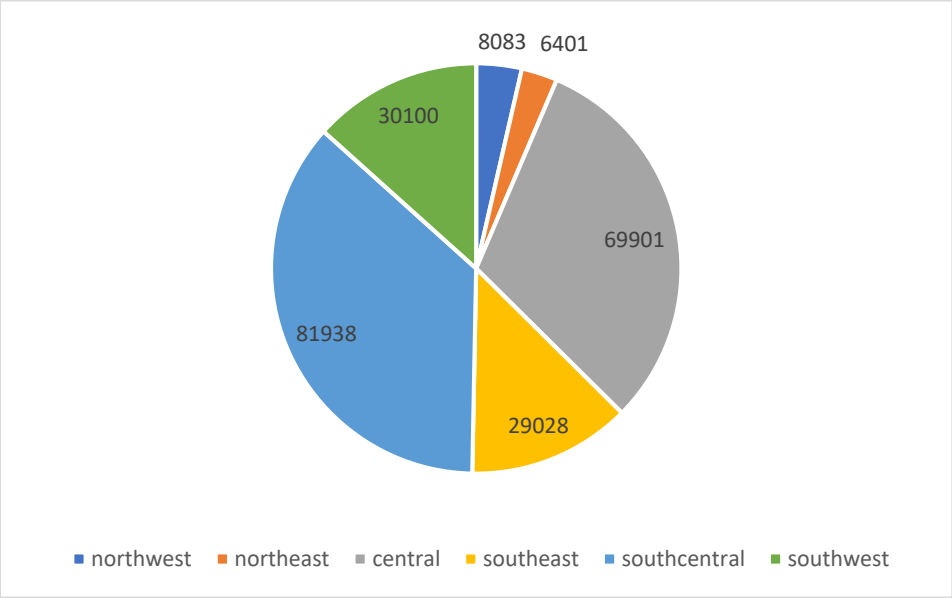


Figure 2: Number of Ontario College of Teachers members in 2018, by geographic distribution.

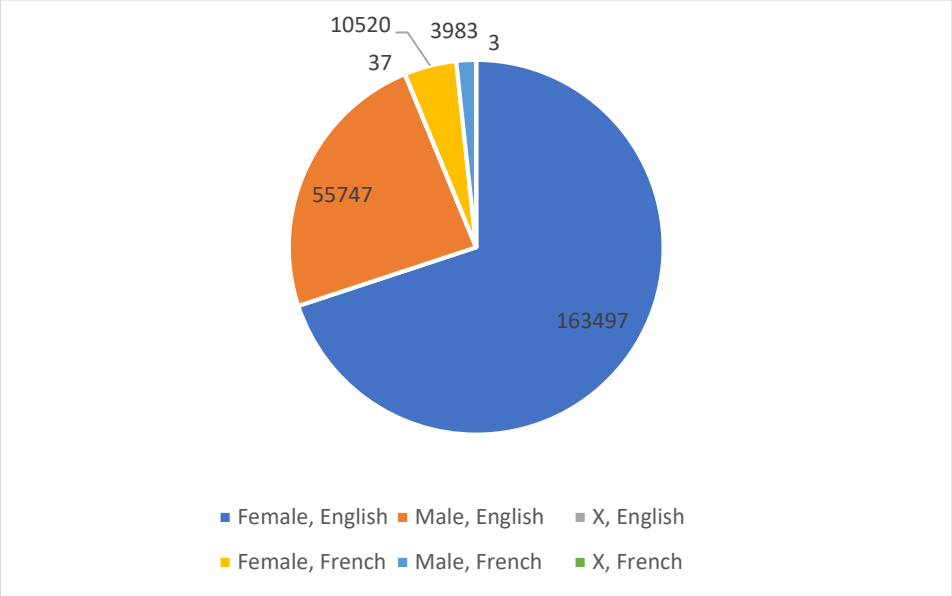


Figure 3: Number of Ontario College of Teachers members in 2018, by gender and language (X represents people identifying as Trans, Non-Binary, Two-Spirited, or Binary and those who did not share their gender identity).

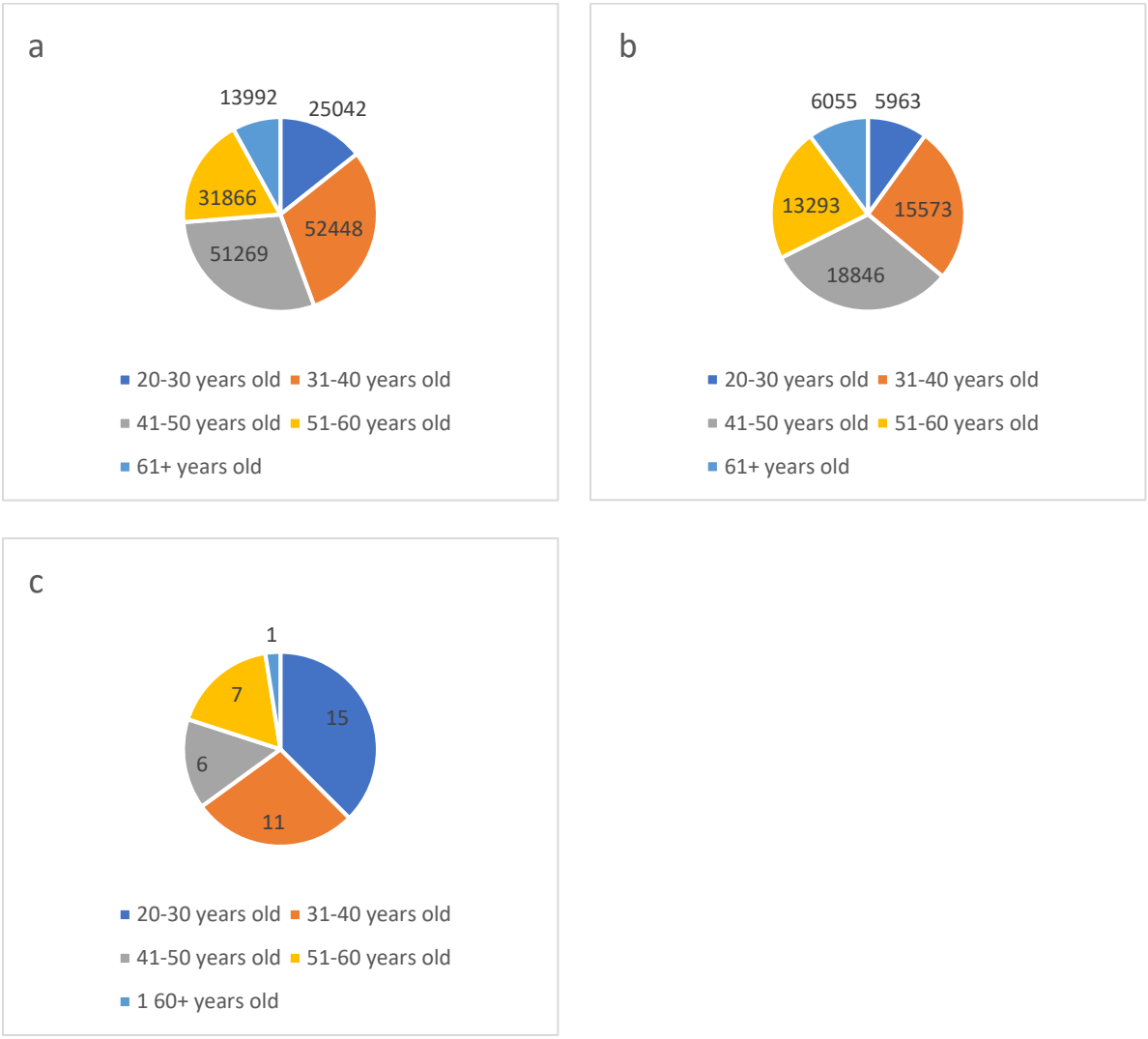


Figure 4: Number of Ontario College of Teachers members in 2018, by age ranges, for a) female, b) male, and c) X (X represents people identifying as Trans, Non-Binary, Two-Spirited, or Binary and those who did not share their gender identity).

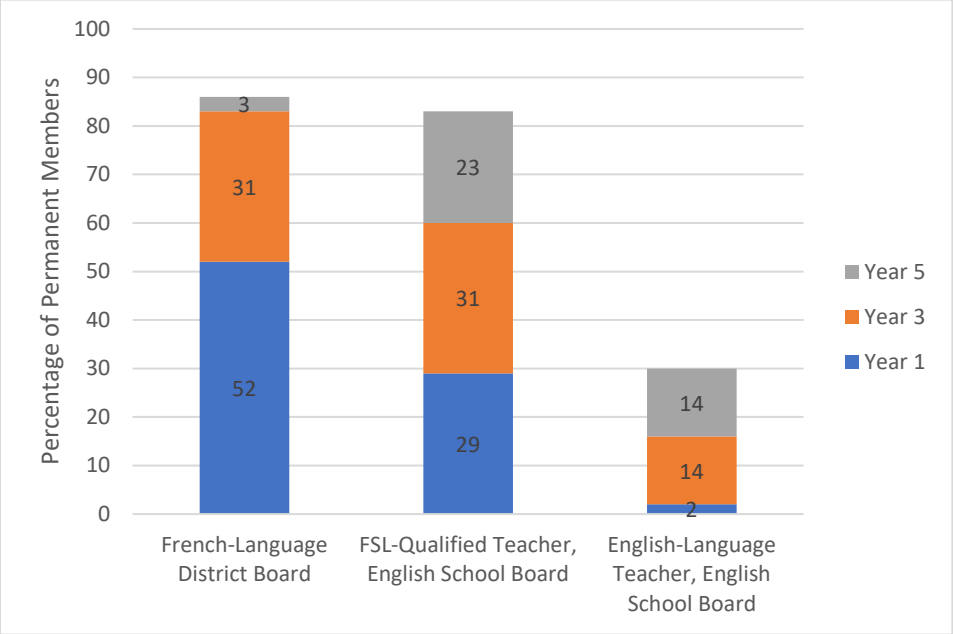


Figure 5: Cumulative percentage of permeant Ontario College of Teachers memberships in 2018, divided by language, board, and the number of years as a member.

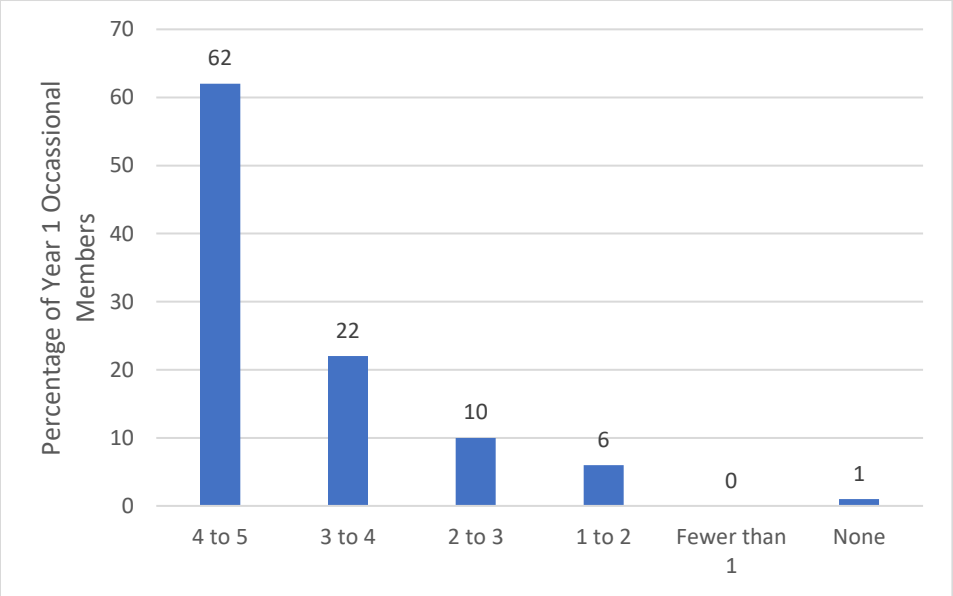


Figure 6: Percentage of occasional Ontario College of Teachers members in 2018, divided by the number of days worked per week.

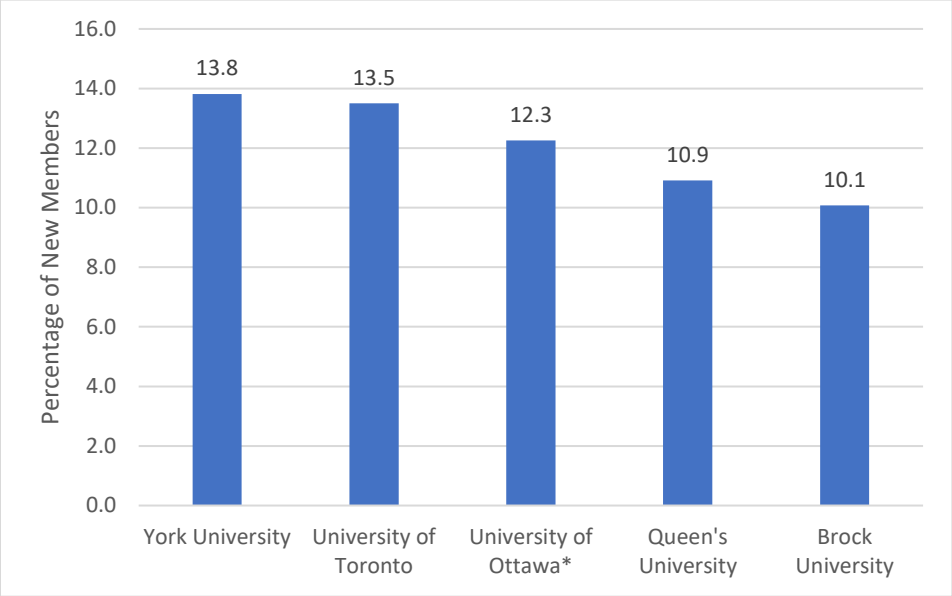


Figure 7: Top five institutions with the highest percentage of new Ontario College of Teachers members in 2018 (*combined both English and French departments).

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