



# TLEF Project – Final Report

Report Completion Date: (2023/06/14)

## 1. PROJECT OVERVIEW

### 1.1. General Information

<b>Project Title:</b>	Decolonizing Engineering Curriculum and Culture: A Pilot Project		
<b>Principal Investigator:</b>	Pamela Wolf		
<b>Report Submitted By:</b>	Pamela Wolf & Debalina Saha		
<b>Project Initiation Date:</b>	Nov 14, 2019	<b>Project Completion Date:</b>	May 31, 2023
<b>Project Type:</b>	<input type="checkbox"/> Large Transformation <input checked="" type="checkbox"/> Small Innovation <input type="checkbox"/> UDL Fellows Program <input type="checkbox"/> Hybrid and Multi-access Course Redesign Project <input type="checkbox"/> Other: [please specify]		

### 1.2. Project Focus Areas – Please select all the areas that describe your project.

- Resource development (e.g., learning materials, media)
- Infrastructure development (e.g., management tools, repositories, learning spaces)
- Pedagogies for student learning and/or engagement (e.g., active learning)
- Innovative assessments (e.g., two-stage exams, student peer-assessment)
- Teaching roles and training (e.g., teaching practice development, TA roles)
- Curriculum (e.g., program development/implementation, learning communities)
- Student experience outside the classroom (e.g., wellbeing, social inclusion)
- Experiential and work-integrated learning (e.g., co-op, community service learning)
- Indigenous-focused curricula and ways of knowing
- Diversity and inclusion in teaching and learning contexts
- Open educational resources
- Other: [please specify]



**1.3. Final Project Summary** – *What did you do/change with this project? Explain how the project contributed toward the enhancement of teaching and learning for UBC students.*

Shortly after this project was approved in 2020, the pandemic became a global issue and dramatically altered the scope of this project. Faculty members were no longer able to participate in the “*Tahltan On-The-Land Experience*”. The initial plan involved faculty members traveling up to the Tahltan to participate in a variety of learning activities during the summer of 2020. The plan involved practicing animal tracking skills, fetching water, and sweat lodges led by Tahltan instructors who would share the cultural importance of each practice. Tahltan facilitated dialogue circles were also set up to provide an opportunity to synthesize Indigenous *ways of knowing* with Engineering knowledge.

Our primary goal was to facilitate synthesis of traditional knowledge with professional knowledge. The expectation was that faculty participating in the Tahltan experience and utilizing the decolonization curriculum would give workshops during departmental faculty meetings to initiate systems change for decolonization of culture and engineering curriculum.

To achieve this goal, team members collaborated with Curtis Rattray to develop decolonization curriculum centered around three competencies: i) dialogue and engagement including listening, ii) recognizing social context including understanding Indigenous values and ways of conducting business, iii) designing for communities including social context. This laddered curriculum consisted of lecture slides, modifiable assignments, and rubrics.

We also collaborated with Indigenous change-makers and professionals to create the “Reconciliation + Design” dialogue series. This facilitated dialogue series continues to serve as a powerful complement to the decolonization curriculum, providing an interdisciplinary conversation on how to reconcile engineering design with Indigenous perspectives. Students, faculty, and industry professionals globally participate in this four-part dialogue series every year. Participants practice authentic, experiential learning in small dialogue circles facilitated by students to weave Indigenous ways of knowing with our own as designers.

Additionally, team members developed a coaching program for faculty to implement decolonization curriculum successfully in their classrooms. The coaching program provided support for faculty to modify the curriculum to be woven into their existing courses. This program impacted 15 undergraduate courses across 6 different departments in Applied Science. These learning materials engage students to think critically about decolonization, reconciliation, and engineering.



**1.4. Team Members** – Please fill in the following table and include students, undergraduate and/or graduate, who participated in your project.

Name	Title/Affiliation	Responsibilities/Roles
Pamela Wolf	Assistant Professor of Teaching	Team leader, project founder
Debalina Saha	Administrative Support	Curriculum development and faculty coaching
Danilo Caron	PhD Candidate, EIT	Developing “Reconciliation + Design” dialogue series
James Shaw	Alumni	Curriculum development
Alex Gonzalez	Alumni	Curriculum development

**1.5. Courses Reached** – Please fill in the following table with past and current courses (e.g., HIST 101, 2017/2018) that have been reached by your project, including courses not included in your original proposal (you may adapt this section to the context of your project as necessary).

Final Outcome	
Course	Academic Year
MTRL 280	2020/2021, 2021/2022
MTRL 466/467	2020/2021, 2021/2022
MECH 2	2020/2021
CIVL 203	2020/2021, 2021/2022
CIVL 201	2020/2021, 2021/2022
CIVL 300	2021/2022
CIVL 320	2020/2021
CIVL 204	2021/2022
MANU 378	2021/2022
MANU 430	2021/2022
ENVE 201	2021/2022, 2022/2023
ENVE 301	2021/2022, 2022/2023
BMEG 357	2021/2022, 2022/2023
BMEG 457	2021/2022, 2022/2023
BMEG 455	2021/2022, 2022/2023

Initial Plan	
Course Code	Academic Year
CIVL 203**	2020/2021 - Ongoing
CIVL 300*	2021/2022 - Ongoing
MECH 223**	2020/2021 - Ongoing
MECH 325*	2021/2022 - Ongoing
MECH 328*	2021/2022 - Ongoing
MINE 291**	2020/2021 - Ongoing
MINE 455*	2021/2022 - Ongoing
MINE 491*	2021/2022 - Ongoing



We had successful collaborations across 6 different engineering departments at UBC including: Materials, Mechanical, Civil, Environmental, Manufacturing, and Biomedical engineering. This is double the expected engagement (Mining, Civil and Mechanical) proposed in the initial pilot. Our transformational coaching program facilitated growth and created brave spaces to discuss decolonization in an engineering context and deconstruct fear associated with engaging Indigenization in engineering classrooms.

**2. OUTPUTS AND/OR PRODUCTS**

**2.1. Please list project outputs and/or products (e.g., resources, infrastructure, new courses/programs). Indicate a URL, if applicable.**

Output(s)/Product(s):	URL (if applicable):
OER: Open educational resource [separate grant]	<a href="https://pressbooks.bccampus.ca/decolonizingengineering/part/main-body/">https://pressbooks.bccampus.ca/decolonizingengineering/part/main-body/</a>
“Reconciliation + Design” Dialogue Series [current grant]	<a href="https://apsc.ubc.ca/EDI.I/reconciliation-design-dialogue-series">https://apsc.ubc.ca/EDI.I/reconciliation-design-dialogue-series</a>
Faculty Coaching Program [current grant]	

**2.2. Item(s) Not Met – Please list intended project outputs and/or products that were not completed and the reason(s) for this.**

Item(s) Not Met:	Reason:
“Tahltan On-The-Land Experience” Land based learning with TWILD involving sustainable fishing practices, animal tracking, water fetching, sweathouses and facilitated dialogue with Tahltan community members.	As mentioned in section 1.3, COVID altered the scope of the project. Due to strict safety and travel restrictions faculty were unable to travel up to the Tahltan nation to participate in the land-based learning experience.

**3. PROJECT IMPACT**

**3.1. Project Impact Areas – Please select all the areas where your project made an impact.**

- Student learning and knowledge
- Student engagement and attitudes
- Instructional team-satisfaction
- Teaching practices



Student wellbeing, social inclusion

Awareness and capacity around strategic areas (Indigenous, equity and diversity)

Unit operations and processes

Other: [please specify]

**3.2. Please provide details on each of the impact areas you selected in 3.1. – For example, explain in which ways your teaching practices changed; how student wellbeing was impacted; how students wellbeing benefited from your project, etc.**

Project Impact Area	Outcome
<p><b>Awareness and capacity around strategic areas (Indigenous, equity, and diversity)</b></p>	<p>Students were introduced to decolonization curriculum and developed mastery of the following competencies: i) dialogue and engagement including listening, ii) recognizing social context including understanding Indigenous values and ways of conducting business, iii) designing for communities including social context.</p> <p>Students and faculty also participated in the “Reconciliation + Design” Dialogue series where Indigenous change-makers and professionals discussed their experiences, knowledge, and ways of knowing. Small dialogue circles created space for participants to discuss equity, diversity, positionality and ways to engage in reconciliation.</p> <p>The transformational coaching program encouraged faculty to reflect and deconstruct colonial hierarchies within their own classrooms and start brand new departmental committees centered around equity, diversity and inclusion of students. Faculty members also became more involved with implementing the Indigenous Strategic Plan (ISP) across applied science (APSC).</p> <p>part of this program became more involved with the Indigenous Strategic Plan (ISP initiate new departmental EDI (Equity, Diversity and Inclusion) committees and become more involved with the Indigenous Strategic Plan (ISP) at UBC.</p>

**How do you know that the impacts listed in 3.1/3.2 occurred?** – Describe how you evaluated changes/impacts (e.g., collected survey data, conducted focus groups/interviews, learning analytics, etc.) and what was learned about your project from the evaluation. You are encouraged to include graphical representations of data and/or scenarios or quotes to represent and illustrate key themes.

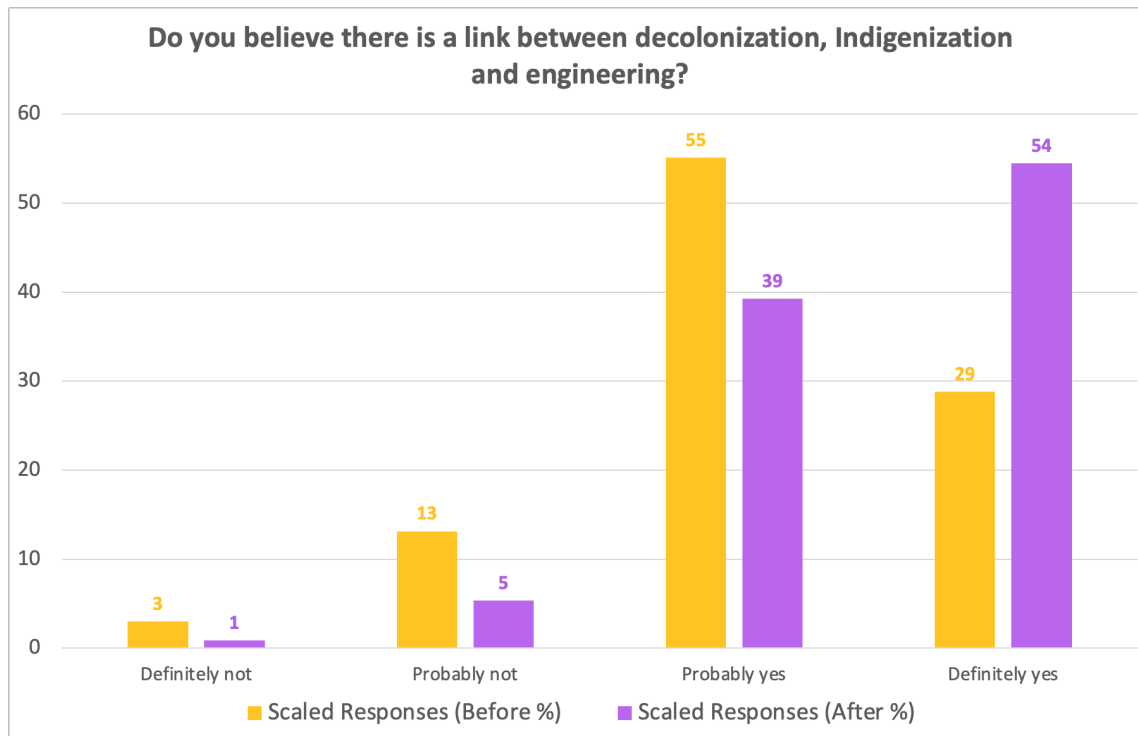


Figure 1. “Decolonization Curriculum Data” Survey 2020 – 2023

Reconciliation in engineering is a new area of research and education. This survey question was designed to evaluate the willingness and ability of students to synthesize decolonization within their engineering classrooms. Figure 1 shows that more students were interested in the intersection of decolonization and engineering.

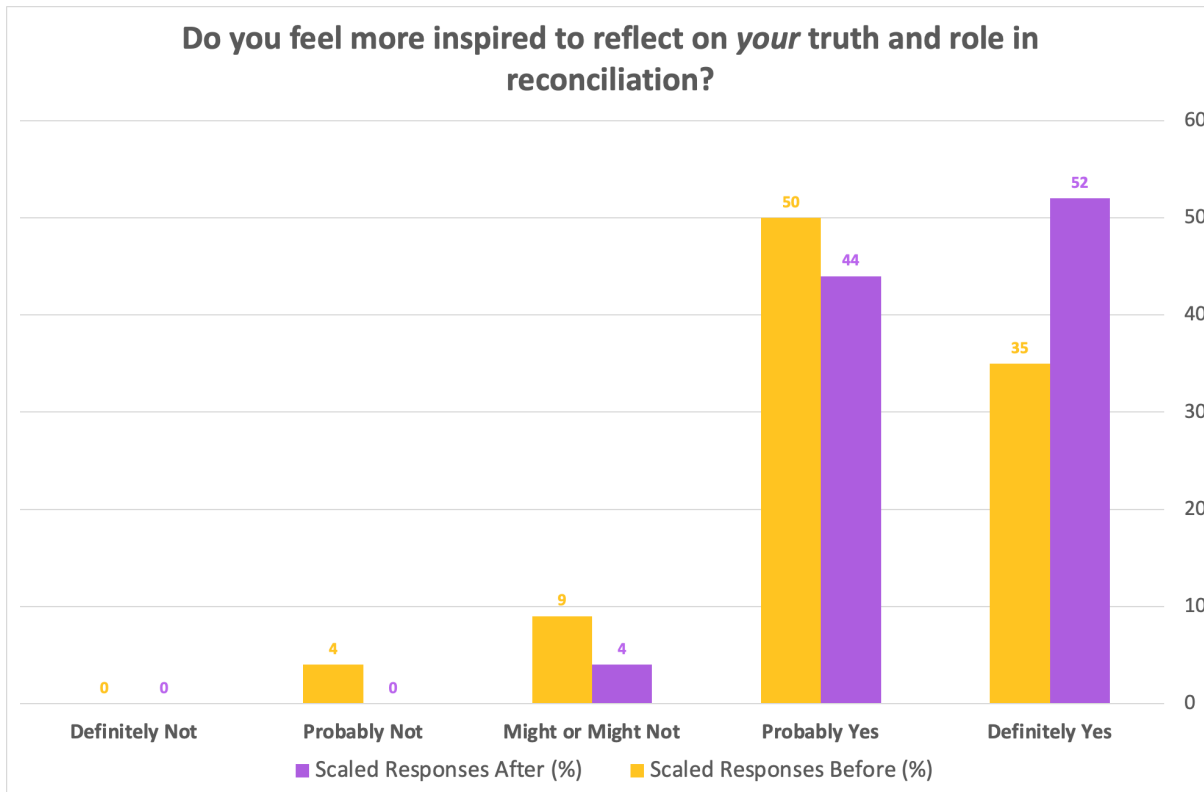


Figure 2. "Reconciliation + Design" Survey Data 2022

Figure 2 shows that participants felt more inspired to reflect on their role in reconciliation. This is shown by the 17% increase of comfort from 35% to 52% in the “definitely yes” category and a 6% increase from 44% to 50% in the “probably yes” category.

This dialogue series reduced the barriers of funding and accessibility for students and faculty to engage with Indigenized engineering curriculum. It also promoted relationship building and teamwork within students and faculty.

**4. TEACHING PRACTICES** – Please indicate if **your** teaching practices or those of **others** have changed as a result of your project. If so, in what ways. Do you see these changes as sustainable over time? Why or why not?

The decolonization curriculum, reconciliation dialogue series and faculty coaching program facilitated transformation. The collaborative nature of this project created a safe space for both students and faculty to reflect their positionality and role in truth and reconciliation.



Faculty members were given the opportunity to discuss their personal journeys with decolonization and find active ways to decolonize existing courses they teach. The coaching program provided personalized best practices for each faculty member to minimize stigma and anxiety associated with discussing decolonization and Indigeneity in classrooms.

Undergraduate courses across CIVL, ENVE, MTRL, MECH, BMEG, and MANU created space for dialogue and engagement for difficult discussions around engineering design projects and Indigenous ways of knowing. Faculty members involved with this pilot continue to practice and start new initiatives to further decolonize their departments.

**5. PROJECT SUSTAINMENT** – *Please describe the sustainment strategy for the project components. How will this be sustained and potentially expanded (e.g., over the next five years). What challenges do you foresee for project sustainment?*

After the success of incorporating decolonization curriculum in 15 different undergraduate engineering courses, it was published as an open educational resource (OER) and is currently in use across Canada. The OER was developed and published using a separate grant.

**6. DISSEMINATION** – *Please provide a list of scholarly activities (e.g., publications, presentations, invited talks, etc.) in which you or anyone from your team have shared information regarding this project. Be sure to include author names, presentation title, date, and presentation forum (e.g., journal, conference name, event). These will be included on the TLEF scholarly output page.*

1. Wolf, P. & Saha, D. (July 20, 2023) Enabling System Level Indigenization of Engineering Curriculum [Talk]. CEEA-ACEG (Canadian Engineering Education Association 2023 National Conference), Kelowna, BC.
2. Wolf, P., Reconciliation + Design Curriculum and Dialogue in Technical Courses (2022) ASEE (American Society for Engineering Education) Zone 4 (Alaska, Idaho, Montana, Oregon, Washington, and Western Canada) Conference [Workshop], Vancouver, BC.
3. Wolf, Pamela; Gonzalez, Alex; Rattray, Curtis; Saha, Debalina; Shaw, James; Martinussen, Nika; and Harris, Ben Editors: Erin Fields and Clair Swanson (May 1, 2022) Decolonizing the Engineering Curriculum <https://pressbooks.bccampus.ca/decolonizingengineering/> BC Campus
4. Wolf, Pamela; Martinussen, Nika: Report on Truth and Reconciliation in Engineering Education published in April, 2022 and supported by Engineers Canada. This report interviewed Indigenous engineers across every institution in Canada (2022).
5. Wolf, P. & Saha, D. (July 7, 2021) Decolonizing Engineering Courses [Workshop], (Canadian Engineering Education Association National Conference), Winnipeg, MB.