

# **Investigating student exposure to Mi'kmaq Traditional Knowledge through Dalhousie University courses**

**Keywords:** Mi'kmaq, Indigenous Traditional Knowledge, Dalhousie University, Undergraduate students, Nova Scotia, Sustainability, Environmental Science

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## **Abstract**

The implementation of Indigenous Traditional Knowledge (TK) is important because it can improve social, economic, and environmental sustainability across the world (Spee et al., 2021) and can enhance student learning. In addition, education institutions in Canada have been called upon to meaningfully incorporate TK in their curricula, as per the Calls to Action from the Truth and Reconciliation Committee of Canada (2024). Dalhousie University is the largest university in Atlantic Canada and is located on the unceded and traditional territory of the Mi'kmaq. As such, the university has made efforts to include Mi'kmaq Traditional Knowledge (MTK) within its curricula as per their Indigenous Strategy (2018); however, there have been no formal investigations into student satisfaction with the level of MTK offered through course learning. This study investigated the extent of undergraduate student experience with MTK at Dalhousie University and attempted to determine common course pathways offering MTK, and possible barriers that limit students from exposure to MTK. Surveys were sent to undergraduate students in environmental-related programs, such as Oceanography and Biology, via social media, mass email, class advertisement, and QR code posters over a period of nine days. The survey received 49 responses, primarily from 3<sup>rd</sup> and 4<sup>th</sup> year Environmental Science and Marine Biology majors. Students commonly felt that their courses provided either no information on MTK or provided minimal in-depth discussion on the topic. The findings of our study indicate that Indigenous Studies-related courses, specific College of Sustainability courses, and Environmental Science courses instructed by Dr. Caroline Franklin received higher ratings in terms of the extent to which MTK was integrated into their curriculum. Based on our findings, we recommend including more guest lecturers of Indigenous descent, incorporate land-based learning, and, when possible, provide MTK at all stages of research, to help increase overall exposure to MTK in education at Dalhousie University.

## **Introduction**

### *Background*

Aboriginal groups, which include the Métis, Inuit and First Nations, in Canada have a long history of oppression from the Canadian government. Aboriginal communities have faced oppression through violence and assimilation, resulting in loss of language, culture, and history (Kim, 2015). The last residential school in Canada closed in 1996, only 28 years prior to the publication of this paper. These schools created a cycle of trauma that remains an active part of Indigenous communities' present-day way of life.

The Truth and Reconciliation Commission of Canada (TRCC) is meant to provide aid to individuals, families, and communities affected by residential schools and give them a space to share their stories with both Indigenous and non-Indigenous people of Canada (Crown Indigenous Relations and Northern Affairs Canada (CIRNAC), 2022). Since 2007, the government of Canada has agreed to work closely with the Aboriginal groups that reside within Canada to rebuild settler-Indigenous relationships and uphold Aboriginal treaty rights (CIRNAC, 2022). One of the results of the TRCC is requiring schools across Canada to teach about the oppression against Indigenous Peoples in Canadian history to create awareness around colonial-Indigenous relations and ensure systems of oppression do not continue to perpetuate harms against Indigenous Peoples. The continued impact of colonialism on Indigenous Peoples and Indigenous education has led to gaps forming within educational establishments across the country (Wotherspoon, 2014). For example, the colonists of Canada changed Aboriginal property rights in two ways: First, they rearranged Indigenous property rights to form regulatory gaps where voting, certainty of title, and misrepresentation of Aboriginal Peoples began (Schmidt, 2018). Secondly, they created the First Nations Property Initiative (Schmidt, 2018). Currently, Indigenous groups are currently underrepresented within Canadian education systems (Henry et al., 2017).

Indigenous advocates claim the Indigenous perspectives are being ignored or buried within higher education settings (Kim, 2015). Traditional Knowledge (TK) is Indigenous knowledge found through cultural traditions and has become steadily more popular within the sustainability field of study, specifically Indigenous knowledge of the earth and natural resources (Keats & Evans, 2020).

Colonialism in Canada can be described as the act of removal or marginalizing of Indigenous culture, identity, and community in society (Wotherspoon, 2014). There are discussions among Indigenous advocates and educators on whether some provinces' level of education on such Indigenous topics can lead to culture appropriation instead of creating a positive perception of Indigenous culture and history, which is one form of colonialism within educational settings in Canada (Kim, 2015). Indigenous advocates claim the Canadian government is slow to action in fixing the gaps in its education system which allows for colonialism to grow onto the next generations (The Canadian Press, 2014). Canadian universities, including Dalhousie University, have a responsibility within the TRCC to create a safe space for Indigenous learning and help remove any barriers that may impact indigenous teachings and research (Universities Canada, 2023).

Dalhousie University is the largest post-secondary institution in Atlantic Canada and ranked as 14<sup>th</sup> out of 31 Canadian universities for its impact as a research and educational institution (Times Higher Education, 2024). The university has enrollment of 16,859 undergraduate students in the 2023-2024 academic year with roughly 2,811 students with a declared major in environmental-related disciplines (Office of the Registrar, 2023). Dalhousie University is located on the traditional and unceded territory of Mi'kma'ki; hence, undergraduate students are provided opportunities to study and work with aspects of the environment that hold significance to Mi'kmaq. For example, Eelgrass (*Zostera spp.*) is a common research topic for marine sciences students that holds significance to the Mi'kmaq people as key habitat for food and ceremonial fish species (Denny et al., 2012); however, there are no assessments of the extent of undergraduate understanding on how TK applies to environmental matters, despite Auster-Weiss (2017) finding an increase in Dalhousie University student's perception of Indigenous People's culture and knowledge.

Our research topic focuses specifically on how well Dalhousie educates its students on Mi'kmaq culture and history in Nova Scotia, with a specific focus on Mi'kmaq TK (MTK), to determine what areas Dalhousie undergraduate education can improve. We aim to identify any knowledge gaps or barriers that could be connected to possible degree paths. This is an important topic as of 2013, Dalhousie University began acknowledging that the university resides is on the unceded Mi'kmaq territory, Mi'kma'ki, and thus created the Indigenous Studies program (Auster-Weiss, 2017). However, there have been minimal efforts to incorporate the Indigenous

perspectives in multiple degree paths (Auster-Weiss, 2017). We aim to see where potential steps to this problem can move forward and enhance Indigenous perspectives amongst the teachings at the university.

### *Project definition*

This research project aims to assess the incorporation of MTK within Dalhousie University undergraduate disciplines whose research and work is based heavily on understanding the environment. Incorporating MTK along with Western scientific perspectives can greatly enhance environmental-related research (Polfus et al., 2016; Tom et al., 2019). Additionally, the TRCC (2024) calls for Canadian educational institutions to address the historical and ongoing harms to Indigenous Peoples of Canada and to commit to reconciliatory actions. Although Dalhousie University has committed to meeting the Calls for Truth and Reconciliation within educational curricula and student services (Indigenous Strategy Committee, 2018), there remains little research evaluating how these commitments manifest in specific research disciplines (Auster-Weiss, 2017). This study aims to enhance understanding of the integration of MTK in environmental-related disciplines, such as environmental science and sustainability, through answering the following research question:

*To what extent do Dalhousie undergraduates in environmental science related disciplines have exposure of Mi'kmaq Traditional Knowledge from their courses, and do they have interest in improving this knowledge?*

In addressing this research question, this study aims to meet the following objectives:

1. Determine the extent that undergraduate students in environmental-related degree paths (e.g., environmental science, biology, marine biology, sustainability, etc.) have been provided opportunities to learn about MTK from their studies at Dalhousie University.
2. Identify courses offered through common environmental-related degree paths that incorporate MTK.
3. Assess student perceptions on the integration of MTK in their studies, with a focus on student educational satisfaction, student interest in MTK, and how student's value the integration of MTK.

4. Identify common barriers to accessing education on Mi'kmaq Traditional Knowledge at Dalhousie University.

### **Methods**

Data collection for this study was done through online student perception surveys, which were advertised online and on campus locations to obtain a sufficient sample size for statistical analysis. Student perception surveys are valuable tools for incorporating student-based feedback initiatives into teaching and are commonly used to identify desires and challenges faced by students in their learning (Finefter-Rosenbluh et al., 2021). When incorporated into formal institutional development goals, student perception surveys can meaningfully assist with improving school curricula. This study's ethics application was approved by the Department of Earth and Environmental Sciences at the beginning of March 2024, allowing for survey launch and data analysis to commence.

The survey used in this study posed questions to probe on whether undergraduate students in environmental-related studies have taken courses with material on Mi'kmaq Traditional Knowledge, their perceptions on these courses, and student desire to enhance their understanding of MTK (Appendix A). Environmental-related studies were determined through examining majors offered at each of Dalhousie University's campuses that included some aspect of integrated knowledge on studying nature and/or sustainability; including, but not limited to, human landscapes, sustainability, environmental processes, ecosystems, and biodiversity. To account for the interdisciplinary nature and flexibility of environmental studies, we encoded the declared degrees of respondents *a posteriori* to avoid limited categorization of how environmental studies can manifest across a wide variety of academic disciplines (Buszard & Kolb, 2011). The survey was designed and distributed through Opinio, a research survey platform provided by Dalhousie University, and was accessible using a QR code and website link provided on promotional posters and social media posts.

#### *Study Design*

A probabilistic, disproportional stratified sampling technique was used to assess the survey results. The desired confidence interval was 95% and marginal error 5%, thus the target sample

size was 339 students based on approximately 2,811 undergraduate students with declared majors in a priori identified environmental-related degrees (Office of the Registrar, 2023).

We advertised the survey across a variety of platforms in attempt to obtain a representative sample size. This included: (1) putting up posters/graphics (Appendix B) around the Studley and Sexton Campuses; (2) directly emailing professors to request them to advertise the study to students in environmental-related courses identified (Appendix D); (3) requesting undergraduate societies related to environmental studies to advertise the survey on their respective social media platforms (Appendix D).

The analysis and interpretation of survey results provided both quantitative and qualitative data through ordinal, nominal, and interval datatypes. Section 1 of the survey (Appendix A) provided quantitative ordinal data on diversity of the respondents' academic backgrounds. This information was used to evaluate differences in academic backgrounds in terms of perception of strength, value, and interests in integration of Mi'kmaq Traditional Knowledge in academic courses. Likert Scale questions in Section 2 (Appendix A) provided nominal and interval data to evaluate student perceptions based on their academic backgrounds. In addition, Section 2 (Appendix A) provided qualitative data regarding student's personal opinions on courses and a list of courses that have some level of integrating Mi'kmaq Traditional Knowledge. This qualitative data was encoded *a posteriori* using a coding tree method to identify common Dalhousie courses, common Traditional Knowledge topics, and further sorting these into more specified terms mentioned throughout student responses. Finally, Section 3 of the survey (Appendix A) provided nominal data on student perceptions of existing MTK education opportunities, barriers to these opportunities, and *a priori* encoded methods for improvement.

## **Results**

A total of 51 respondents completed the survey; however, two respondents were discarded as they failed to answer questions following the demographic section of the survey. Of the 49 retained respondents, 32.6% were from Nova Scotia, 63.4% from another Canadian province or territory, and 4% international students. Most of the respondents were completing a degree in Environmental Science (n = 24; Fig. 1) or Marine Biology (n = 9; Fig. 1); with 8.2% in their second year of study, 46.9% being in their third year, 34.7% being in their fourth year, and



10.2% in their fifth year or higher. No first-year respondents answered the survey. Forty-two respondents of the total 49 had taken some form of field courses throughout their degree path and 29 had or were completing certificates. For the 29 students completing a certificate, most were in Environmental Impact Assessment or Geographic Information Science (Fig. 2). Most of these students identified as having gained some form of exposure to MTK in their courses (Fig. 3).

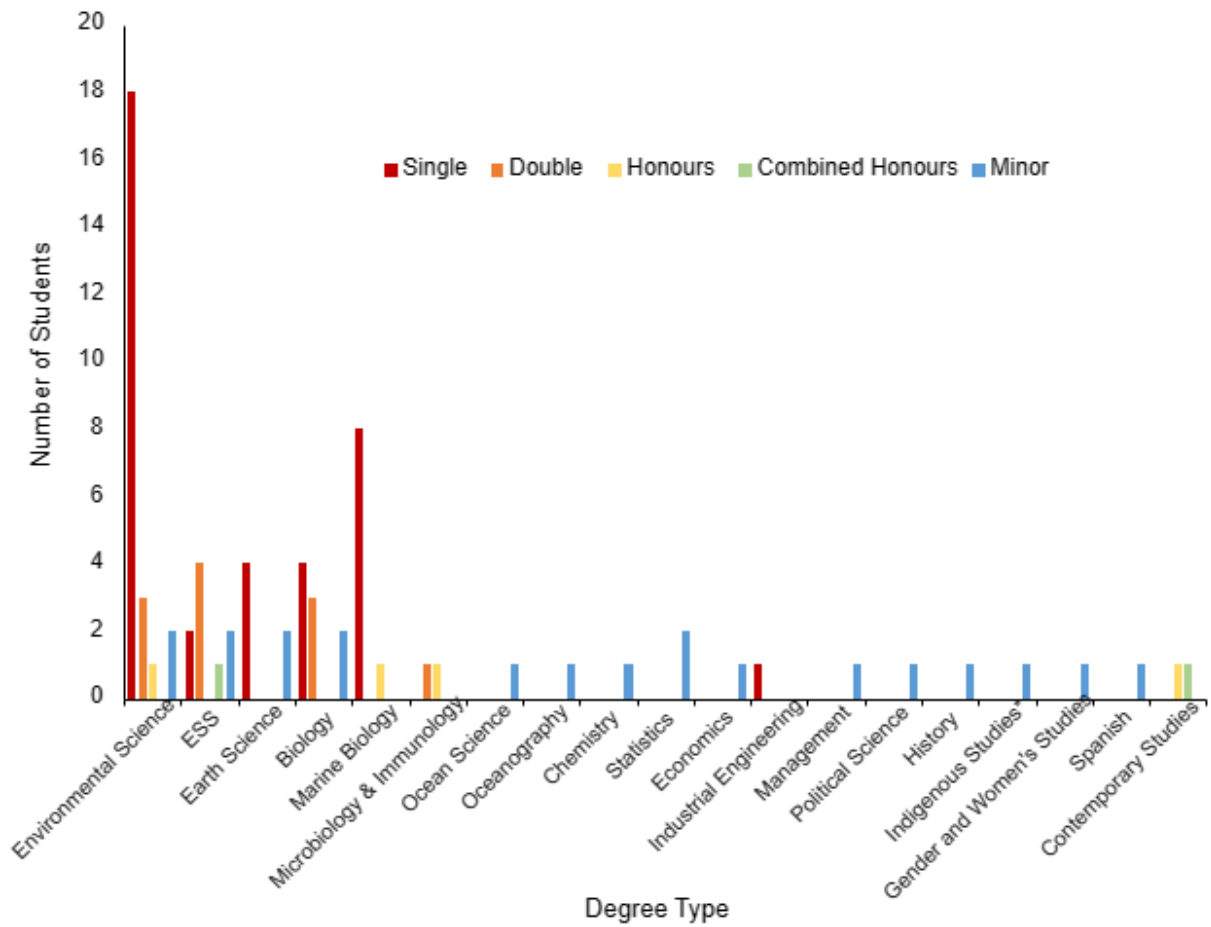


Figure 1: Number of student respondents and their corresponding degree type, including taking a single major, double major, honours, combined honours, or minor at Dalhousie University. Number of respondents was 50 with 31 students having combined degree types. Note the \* symbol denotes degree types that are only offered as minors.

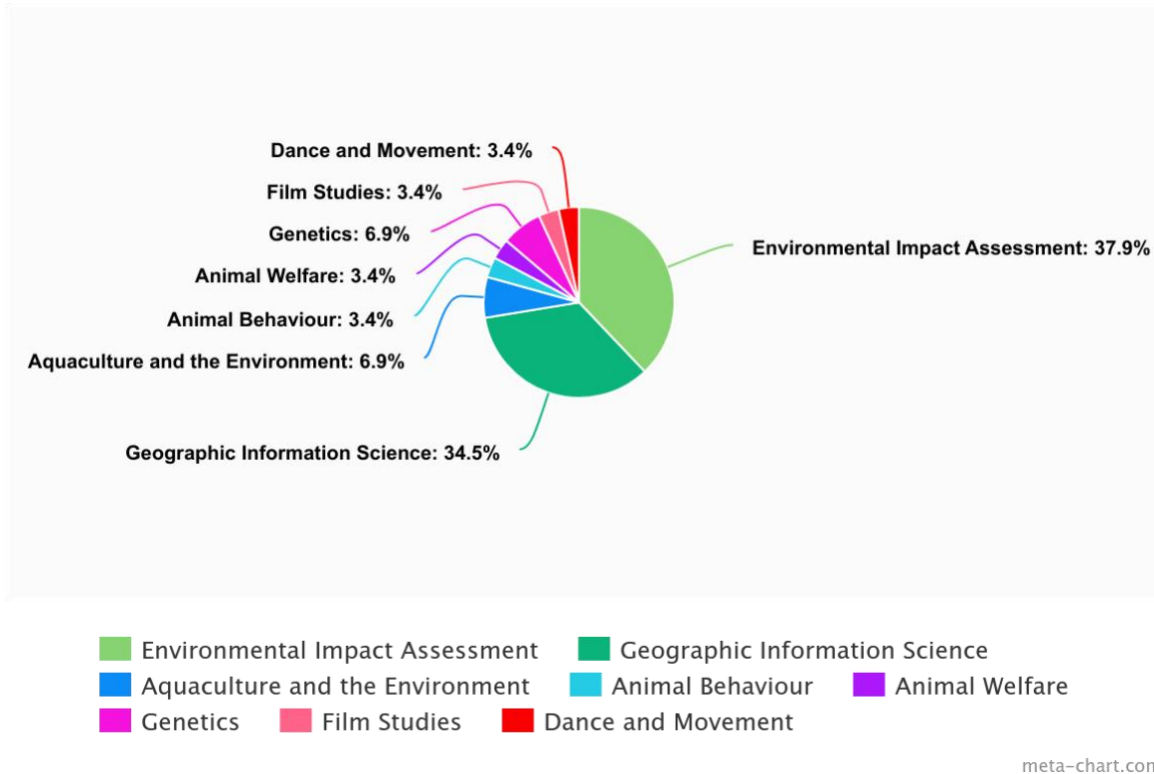


Figure 2: Percentage breakdown of Dalhousie University certificates being completed by 29 of 49 total respondents who indicated they were completing or had completed a certificate. Created on [www.metachart.com](http://www.metachart.com).

Of the 49 respondents, 36 students claimed to have taken courses with some form of Mi'kmaq Traditional Knowledge (Fig. 3). Of these respondents, 44.2% identified Biology, 23.2% identified Environmental Science, and 25.6% identified Sustainability as the primary degree paths for courses that exposed them to some form of MTK (Fig. 3). Respondents had primarily taken courses exposing them to MTK for their degree path (43.6% of 39 students), for personal interests (45.5%), or because they wanted to take a course from the professor teaching it (10.9%). Personal perceptions of satisfaction on the knowledge gained from these courses was varied.

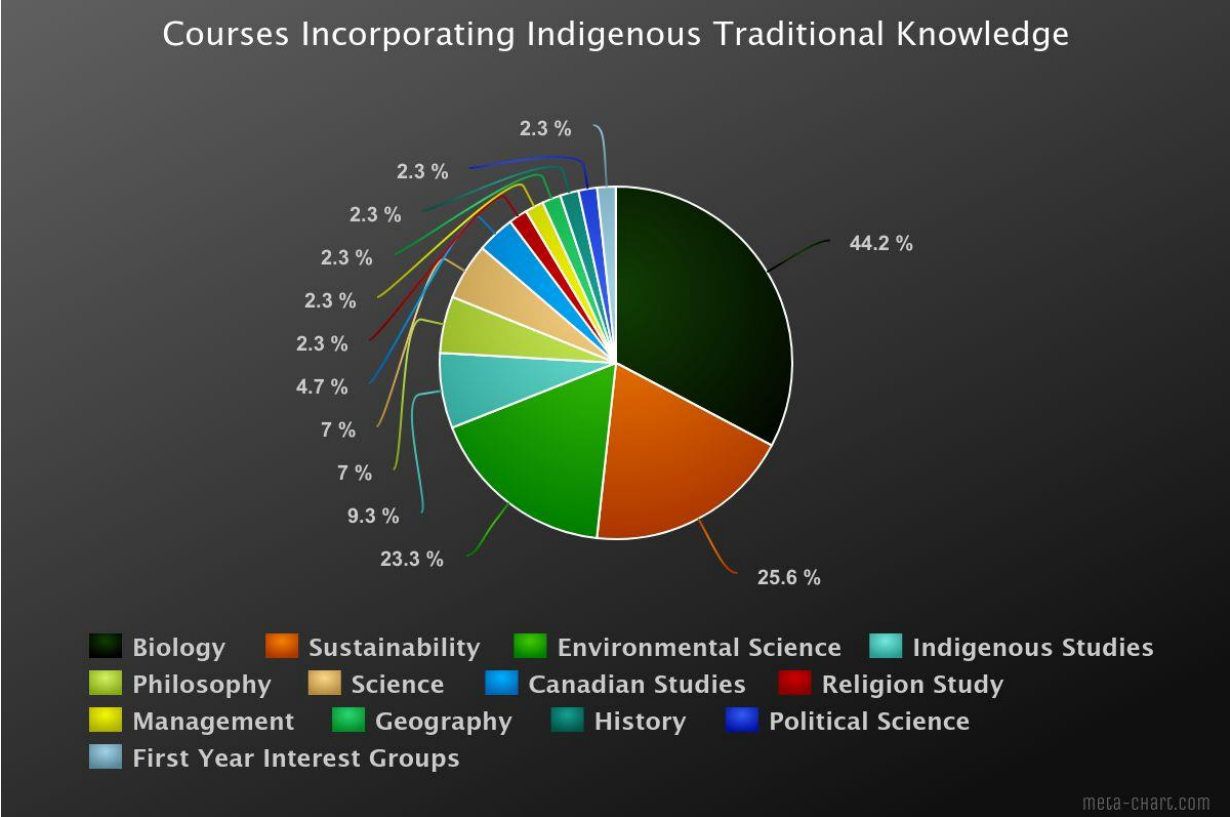


Figure 3: Percentage breakdown of courses that incorporated Mi'kmaq Traditional Knowledge to some degree. Created on [www.metachart.com](http://www.metachart.com).

Thirty-five students elaborated on their experiences to being exposed to MTK in their courses. The level of satisfaction of this exposure varied greatly, with most students identified as feeling somewhat unsatisfied with the level of exposure (Table 1). The level of exposure that was gained also resulted in varied perceptions from the 35 respondents: 62.9% of students agreed that the exposure they gained would help them in future studies or careers in their field (Table 2), but perceptions on how this knowledge had altered their views of the world were spread amongst respondents (Table 3). Results of the integration of MTK were also highly varied (Fig. 4).

Table 1: Ratings of the 35 students on their belief that the courses they had taken meaningfully incorporated Mi'kmaq Traditional Knowledge into learning outcomes (Appendix A: Question 12).

Level of Agreement	Response Number	Percentage of Total Responses
1 (Strongly Disagree)	7	20%
2	10	28.6%
3	7	20%
4	8	22.9%
5 (Strongly Agree)	3	8.6%

Table 2: Ratings of the 35 students to how they perceived Mi’kmaq Traditional Knowledge aiding them in future studies or careers, based on their exposure to Mi’kmaq Traditional Knowledge from Dalhousie University courses (Appendix A: Question 11).

Level of Agreement	Response Number	Percentage of Total Responses
1 (Strongly Disagree)	2	5.7%
2	3	8.6%
3	10	28.6%
4	12	34.3%
5 (Strongly Agree)	8	22.9%

Table 3: Ratings of the 35 students to how they perceived that exposure to Mi’kmaq Traditional Knowledge influenced their perception of the natural world based on their exposure to Mi’kmaq Traditional Knowledge from Dalhousie University courses (Appendix A: Question 10).

Level of Agreement	Response Number	Percentage of Total Responses
1 (Strongly Disagree)	1	2.9%
2	8	22.9%
3	11	31.4%
4	12	34.3%
5 (Strongly Agree)	3	8.6%

Students who elaborated on their ratings had a range of reasonings for their satisfaction with the exposure to MTK they had gained from courses. We encoded these responses *a posteriori* using common themes across the responses (Figs. 4 & 5). Students identified Mi’kmaq Traditional Knowledge as important to learn because of its importance to conducting scientific pursuits ethically and because it enhanced their understanding of the natural world (Fig. 4). Respondents identified a need for improvement in how in-depth courses taught on Mi’kmaq Traditional Knowledge and a need for less Eurocentric focus on the subject (Fig. 4).

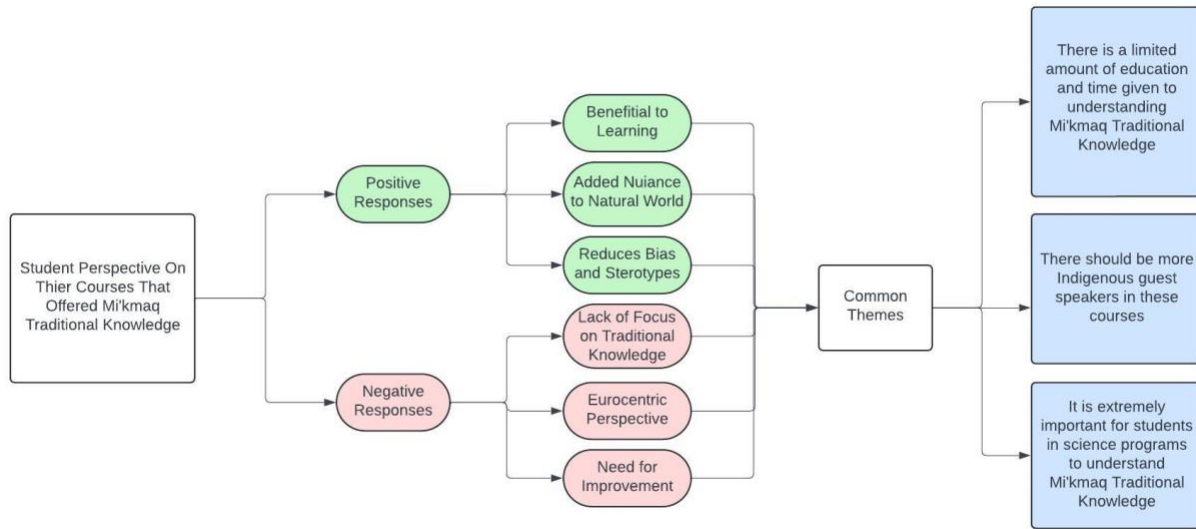


Figure 4: *A posteriori* encoded themes from optional short-answer questions asking for elaboration on student perceptions of exposure to Mi'kmaq Traditional Knowledge from 27 of the 35 respondents who identified as having taken courses with Mi'kmaq Traditional Knowledge at Dalhousie University.

Although 30.5% of the 35 respondents somewhat agreed that the courses they had taken meaningfully integrated MTK into course content (Table 4), 70% of the 27 respondents who elaborated on their ratings had a negative perception of the matter in which MTK was taught (Fig. 5). Of these students with negative perceptions, 28% specified that Biology (BIOL) 2060 Introductory Ecology was a course that needed improvement on meaningfully incorporated MTK (Fig. 5). Furthermore, many students with positive experiences were not confident with their ability to criticize the level of exposure they had received due to a general lack of exposure overall.

Table 4: Ratings of the 35 students to satisfaction of exposure to Mi’kmaq Traditional Knowledge based on their exposure to Mi’kmaq Traditional Knowledge from Dalhousie University courses (Appendix A: Question 9).

Level of Agreement	Response Number	Percentage of Total Responses
1 (Strongly Disagree)	1	1.7%
2	6	10.2%
3	4	6.8%
4	18	30.5%
5 (Strongly Agree)	6	10.2%

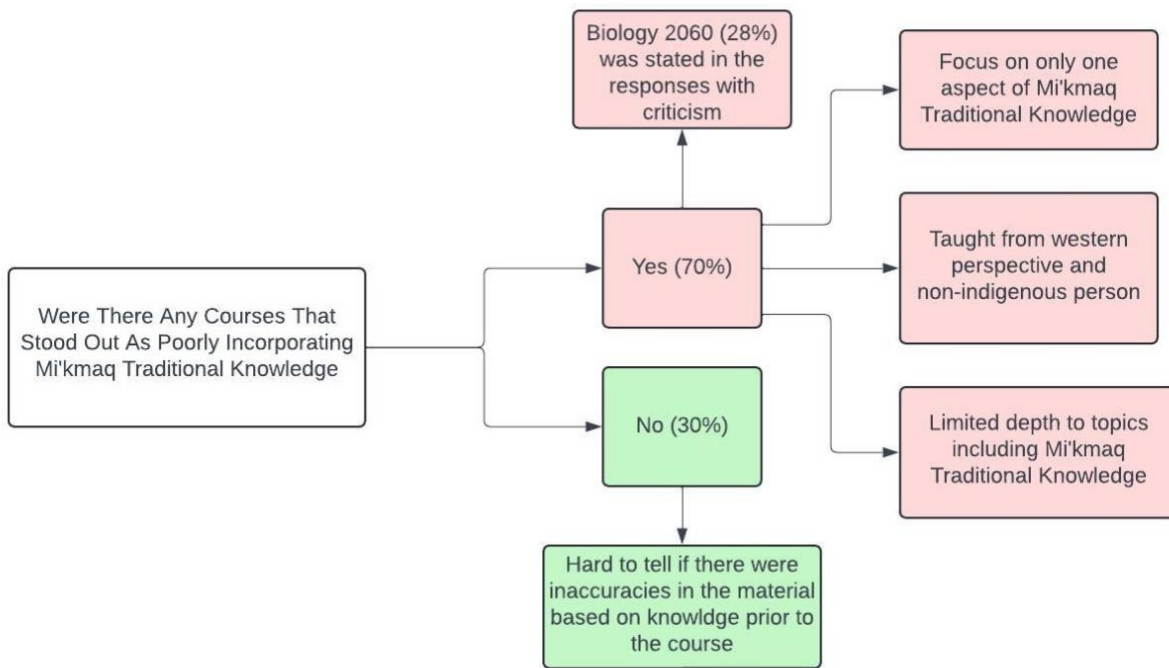


Figure 5: Critiques from 27 of the 35 students who elaborated on their responses to how they perceived their exposure to Mi’kmaq Traditional Knowledge from Dalhousie University courses.

Student respondents were highly interested in expanding their understanding of MTK (Highly Interested Students = 28, n = 45, Appendix A: Question 16). Many students identified as being aware of Dalhousie University’s minor and certificate in Indigenous Studies (83% of 45 respondents) despite their being only one respondent who identified that they were completing

this minor (Fig. 1). The largest barrier to taking courses incorporating MTK was conflicts with courses required for student’s degree paths, closely followed by being unaware of courses teaching on MTK (Fig. 6). Overall, students desired to have more course content on MTK incorporated within required degree path courses and to have more instructors or guest lecturers teaching on this topic (Fig. 7).

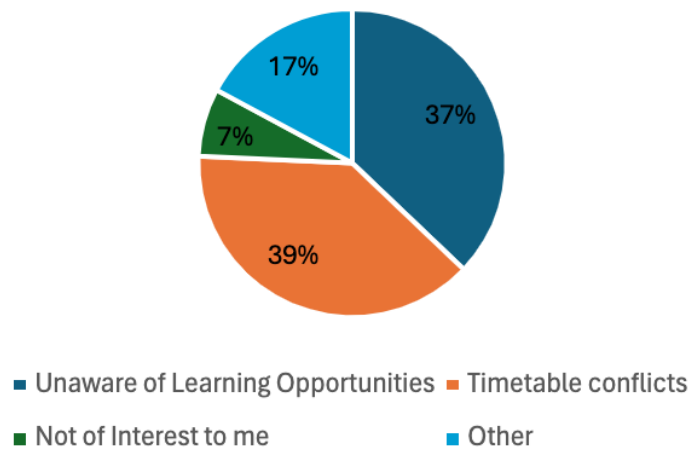


Figure 6: Major barriers identified by student respondents preventing them from taking Dalhousie University courses that are on or incorporate Mi’kmaq Traditional Knowledge. Common themes of other barriers that students mentioned include; students prioritizing their degree, costs (time/money), and personal concerns.

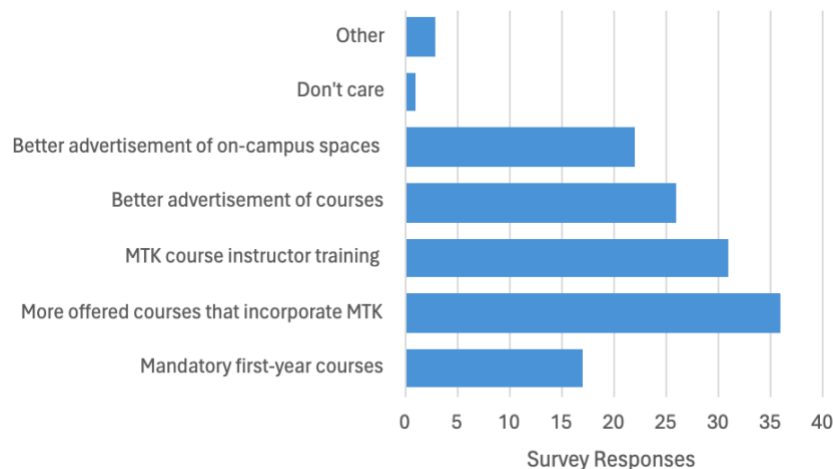


Figure 7: Methods for improving the incorporating of Mi'kmaq Traditional Knowledge (MTK) in Dalhousie University courses identified by student respondents. Respondents had option to select multiple answers. Common themes of other improvements include; introduction of guest lecturers of Mi'kmaq descent and implementing a mandatory upper-year course.

## Discussion

### *Key Findings*

The results of the study indicate that 73% of students have taken a course that exposed them to MTK and valued this exposure as integral to their perception of the world they live in (Table 2) and the advancement of their learning (Table 3). However, 49% were dissatisfied with the level of exposure they received from their courses and 23% felt neither satisfied nor dissatisfied (Figs. 4 & 5). These students were mostly from Environmental Science, Marine Biology, or Sustainability (Fig. 1) and mainly identified courses within the Biology, Sustainability, and Environmental Science degree path as those that had exposed them to Mi'kmaq Traditional Knowledge (Fig. 3). Primarily, students noted the following courses: Biology (BIOL) 2060 Introductory Ecology, first-year Sustainability (SUST 1000 and SUST 1001), and Environmental Science (ENVS) 3200 Introduction to Environmental Law.

Approximately 48% of students noted that BIOL 2060 was their main sources of exposure; however, of these, 28% noted that the course did not meaningfully incorporate Mi'kmaq Traditional Knowledge and instead touched lightly on a limited number of concepts like Two-Eyed Seeing (Fig. 5). Many students also noted that they felt their exposure was mostly through a Eurocentric or policy perspective (Figs. 4 & 5), suggesting that these topics are not



taught in matters that help them feel like they are learning a balance perspective of approaching natural science with Indigenous and Western foundation of knowledge.

When asked about possible barriers or limitations that prevented students from possible exposure to or Indigenous courses, students identified lack of advertisement, time conflicts, cost of courses, and prioritizing degree were the main issues (Fig. 6). Some students were not aware of Indigenous courses or certificate until the later years of study in which case they likely have less flexibility in their course schedule to take these courses. Indeed, our results indicate that students seem to preference certificates that suit their major or would have been heavily advertised them through their major, as seen with 37.9% students having a certificate in Environmental Impact Assessment and 34.5% in Geographic Information Sciences (Fig. 2). These most common certificate programs are comprised of courses taught mainly through Environmental Science, which was our largest survey response major group (Fig. 1). These support our barriers and limitations findings that suggest that students do not commonly branch out to courses and certificate options beyond their primary subjects.

It is also possible that since many of the respondents were in their later years of study, they were affected by the end of the COVID-19 pandemic during their university education. Online classes and limited exposure to the campus impacted students' awareness to alternative courses beyond their main requirements (Pokhrel & Chhetri, 2021). Further research could help determine how younger study years perspective might differ from those impacted by the pandemic and may help identify if advertisement was lacking in terms of promoting Indigenous course and certificate.

Some students also noted that they felt uncomfortable partaking in courses heavily focused on Mi'kmaq teachings as non-Indigenous students themselves. Some respondents identified feeling as though they were taking away an opportunity from Indigenous students (Fig. 6, "Other"). This may be reflective of increasing awareness on colonizer-colonial relationships and ignorance in education in Canada (Schaepli, 2018). Feelings on "taking learning opportunities away" as students of colonial backgrounds is also indicative of an ongoing need to holistically incorporate Indigenous teachings from Indigenous educators at various educational levels in Canada (Kim, 2015). Students feeling uncomfortable pursuing these teachings in an educational setting may point to a lack of these educational resources being available in the first place.

Extent of exposure to Mi'kmaw Traditional Knowledge appears to depend on both the instructor's knowledge and interest (Fig. 4), suggesting students taking the same course yet taught by different instructors could have varying levels of exposure. Further research assessing student perceptions of specific Dalhousie University courses with altered instructors may lend further insight to this finding. Participants indicated numerous courses focusing on one subject of Mi'kmaq Traditional Knowledge, Two-Eyed Seeing, historical events defining Mi'kma'ki (e.g., the Marshall Decision), and Mi'kmaq place and animal names. There appears to be gaps in students' knowledge on the topic based on their satisfaction with their exposure to MTK, as there were varied opinions on the meaningful incorporation of MTK (Table 1) and the satisfaction of MTK exposure (Table 4). Based on these findings, this study suggests instructors of these courses to all receive the same level of education on the subject to minimize the gaps. Guest lectures were another possible solution to minimize gaps and increase positive exposure to Indigenous Traditional Knowledge (Fig. 7), as some students were concerned with how Eurocentric many of courses seem to present Indigenous topics.

Overall, student's responses indicated they feel that Dalhousie could improve instructor and student education on Mi'kmaq Traditional Knowledge and introduce the subject from a Mi'kmaq/Indigenous perspective, such as from Indigenous guest lecture or hiring of more Indigenous instructors (Fig. 7). These findings agree with the recommendations of Cote-Meek (2020), who examined Indigenous teachings in academia and recommends that Indigenous teachings should be an integral component of how courses and degree paths are structured in education, and not merely a component of courses themselves.

We were able to conclude to draw future recommendations of actions from respondent's satisfaction with MTK exposure and recommendations for improvement. The five most frequent responses include: (1) increasing participants of lower years, perhaps through offering more 1<sup>st</sup> and 2<sup>nd</sup> year courses with MTK content; (2) focusing on Indigenous Studies as many participants indicated a lack in knowledge on MTK in general; (3) broadening the offering of MTK through a greater number and diversity of degree paths; (4) investigate perspectives of instructors on teaching MTK; and (5) increase incorporating Indigenous guest lecturers.

### *Limitations*

This study has several limitations that constrain the applicability and conclusions obtained from the results. These limitations include:

1. A 2-week data collection time with the goal of achieving a sufficient sample size of 339 respondents to accurately represent the population of Dalhousie University students within natural sciences disciplines (e.g., ocean sciences, biology, environmental science, etc.). Considering this, we were only able to gather 49 survey responses within the 2-week period which reduces the accuracy when generalizing our interpretations. Of these 49 respondents, roughly 45 fully completed all necessary components of the survey. This may be due to students feeling uncomfortable with the specificity of questions being asked or with the survey length despite the researcher's best efforts to communicate these aspects of the survey in the consent form and advertisement poster. We acknowledge that students also had the ability to opt out at any time and thus our final number of respondents likely reflects that some students opted out after answering the first few sections of the survey.
2. Within the first week of releasing our survey, it was discovered that there was a major issue where questions that were meant to be non-optional for students to skip were made optional. Most of these skipped short answer questions were created with the intent of gathering crucial explanations of participants previous responses and for this reason, the survey had to temporarily close and be updated to make these questions non-optional. This also required an updated poster with a new QR code and re-advertising the survey asking respondents to fill out the survey again due to the error. This further reduced the data collection period to roughly 9 days and resulted in discarding 22 of the original completed responses. A more thorough testing period of the survey by the research team would eliminate this issue.
3. Some coding responses lacked the important context despite best efforts to specify the need for detailed answers from the respondents. For example, in questions that asked which classes the participants may have acquired MTK, many of the respondents only gave the course number but left out the course name (i.e., 3500 instead of ENV5 3500). Participants also referenced previous questions and courses as they elaborated on their previous answers, but due to the anonymous nature of the survey it was impossible to deduct what they were elaborating on unless they specifically repeated the name of the

course. We suggest that future research phrase questions to ask for participants to be as specific as possible, or to gather this information in another method that avoids this limitation altogether.

4. This research received no respondents in their 1<sup>st</sup> year of study and very few students in 2<sup>nd</sup> year; thus, the results of this study are skewed to upper year students' perspectives. With the absence of these students' perspectives in our survey results, our ability to make accurate generalizations on the entire natural science population is reduced. We acknowledge that this may be due to this study being distributed as part of an upper-year course at Dalhousie University, which may have implicitly increased the likelihood of upper-year students' participation over those of lower-years. Lower years may also be less inclined to answer because they do not have experience taking this course or similar ones. Thus, there is less understanding of the importance of answering these types of surveys and helping student researchers.
5. Many students that answered the survey were from Environmental Science, hence skewing our results to favour the perspective of Environmental Science students. Results and recommendations from this research thus have greater applicability to the Environmental Science degree path at Dalhousie University.

### **Conclusion**

The aim of the research was to assess the extent of exposure to Mi'kmaq Traditional Knowledge in undergraduate students in the Environmental Science related degree paths and determine any limitations or barriers preventing exposure. Analysis of responses indicated majority of participants have taken courses that incorporated Mi'kmaq Traditional Knowledge; however, many respondents felt that most of their courses lacked depth when teaching about Traditional Knowledge. Students who elaborated on their responses indicated that topics on Mi'kmaq and living in Mi'kma'ki were focused on policy rather than Traditional Knowledge and felt uncomfortable with the exposure being mainly from a Eurocentric perspective from non-indigenous instructors. Participants were given an option to provide suggestions to increase positive exposure to Traditional Knowledge at Dalhousie. Some suggestions were the introduction of mandatory online courses (like the 1<sup>st</sup> year Academic Integrity module), increasing Mi'kmaw guest lectures in courses that discuss Mi'kmaq Traditional Knowledge, and

improving advertisement on courses that teach Mi'kmaq Traditional Knowledge. The results of this study may help support the development or improvement of courses at Dalhousie University that incorporate Mi'kmaq Traditional Knowledge. This study may also be used to support future research on the Mi'kmaq and Indigenous Traditional Knowledge by and can help gain an understanding on how Dalhousie can improve both student experiences and increase positive Indigenous exposure in courses.

#### *Recommendations for future research and action*

We were able to conclude that there are common themes and main points from our research that indicate future recommendations of actions. The five most frequent responses include: (1) increasing participants of lower years, (2) focusing on Indigenous studies as many participants indicated a lack in knowledge, (3) broadening the populations of degree paths, (4) investigate perspectives of instructors, and (5) begin incorporating Indigenous guest lectures.

The two most common responses that imply recommendations for action are to incorporate Indigenous guest lectures and to have more in depth teaching of Indigenous knowledge. Participants noted that course teachings from non-Indigenous professors does not alter their perspectives of the environment. However, other students responded with the university implementing Indigenous guest speakers as a solution to closing the gap of Eurocentric views and opens the path for genuine Indigenous perspectives. Majority of students concluded that there is an insufficient amount of Indigenous knowledge taught at Dalhousie University. Since there are suggestions to include an Indigenous guest speaker to help teach and deepen their knowledge, a positive learning relationship can be built. This positive learning leads to reciprocity from students and further relationship building, which are crucial components to success (Flavell et al., 2023). Increasing the incorporation of Indigenous-based learning may ultimately help students and educators become more informed treaty participants and neighbours on Indigenous lands.

## **Acknowledgments**

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# Appendices

## **Appendix A: Survey Questions**

1. Do you consent to complete this survey?
2. Are you an undergraduate student at Dalhousie University (this includes Studley, Carleton, and Sexton Campuses) in an environmental-related field of study (this includes environmental science, biology, marine biology, earth science, sustainability, ocean science, or any other study that gives you the opportunity to study the natural world)?

### **Section 1**

3. What is your year of study?
4. What is your degree, including major, minor, and any certificates?
5. Which of the following best describes you as a student at Dalhousie University? (From Nova Scotia, out of province, international, or other)
6. Have you taken, or do you plan on taking, any field courses offered by Dalhousie University? Field courses are academic courses that involve hands-on, practical experiences outside the traditional indoor classroom setting.

### **Section 2**

7. Please list any courses you have taken during your undergraduate degree at Dalhousie University that included any teaching on Mi'kmaq Traditional Knowledge. The Assembly of Nova Scotia Mi'kmaq Chiefs defines Mi'kmaq Traditional Knowledge as any collection of understanding and experiences of Mi'kmaq connections and relationships with aspects of the natural environment. Examples of Traditional Knowledge could include Mi'kmaq names of animal species, a case study on Mi'kmaq ecosystem management on a river, etc. (Professor name, the year the course was taken, or topic is acceptable if you can't remember the course code or name of the course).
8. Why did you take the courses you listed?
9. To what extent do you agree with the following statement: I believe these courses meaningfully integrated Mi'kmaq Traditional Knowledge into their learning outcomes
10. To what extent do you agree with the following statement: The exposure to Mi'kmaq Traditional Knowledge that I received from these courses has significantly changed my perception of the natural world

11. To what extent do you agree with the following statement: I believe the understanding of Mi'kmaq Traditional Knowledge I gained from these courses will be valuable for future studies or careers in my field of interest
12. To what extent do you agree with the following statement: I am satisfied with the exposure on Mi'kmaq Traditional Knowledge that I received from these courses
13. If possible, please expand on your reasoning for your ratings in the previous questions?
14. From the list of courses, were there any that stood out as strongly incorporating Mi'kmaq Traditional Knowledge? Please be specific about which courses.
15. From the list of courses, were there any that stood out as poorly incorporating Mi'kmaq Traditional Knowledge? Please be specific about which courses.
16. On a scale from 1-5 (5 being the highest interest), how interested are you in expanding your understanding of Mi'kmaq Traditional Knowledge?


### **Section 3**

17. Were you aware of any of the following Indigenous Studies degree specializations offered at Dalhousie University? Check all that apply.
18. Are there any barriers preventing you from learning more about Mi'kmaq Traditional Knowledge through the opportunities offered at Dalhousie University? Check all that apply.
19. How would you like to see Mi'kmaq Traditional Knowledge incorporated into learning at Dalhousie University? Check all that apply.

Appendix B: Survey Poster

**STUDENT PERCEPTIONS ON TEACHING OF MI'KMAQ TRADITIONAL KNOWLEDGE AT DAL**


**WHO IS NEEDED?**  
You! We are looking for Undergraduate students at Dalhousie that are in ENVS, Biology, Marine Bio, Oceanography, or related programs!



**PURPOSE**

To investigate student exposure to Mi'kmaq Traditional Knowledge!

This research has been approved by Dalhousie's department of Earth and Environmental Science.




**SURVEY**

We ask you to take 15-20 minutes of your time to fill out this survey anonymously!




**QR CODE**




**DALHOUSIE UNIVERSITY**

CONTACT INFORMATION  
LEAD RESEARCHER  
MEREDITH  
EMAIL: MR840321@DAL.CA



<https://surveys.dal.ca/opinion/s?s=76165>



Appendix B.1: Poster distributed with QR code and link to fill out survey, including basic information about the purpose, time length, and researchers involved in the study.

## **Appendix C: Dalhousie Consent Form**

You are invited to take part in a research study being conducted by, Faith, Meredith, Sasha, Nathaniel, and Cliff, undergraduate students in Environmental Science and Sustainability at Dalhousie University. The purpose of this research is to assess student perceptions on the integration of Mi'kmaq Traditional Knowledge in environmental and sustainability-related courses offered at Dalhousie University.

If you choose to participate in this research, you will be asked to answer 19 questions in an anonymous online survey. The survey should take approximately 15-20 minutes.

Your participation in this research is entirely voluntary. You do not have to answer questions that you do not want to answer (by selecting prefer not to answer), and you are welcome to stop the survey at any time if you no longer wish to participate. All you need to do is close your browser. We will not include any incomplete surveys in our analyses. If you do complete your survey and you change your mind later, we will not be able to remove the information you provided as we will not know which response is yours.

Your responses to the survey will be anonymous. This means that there are no questions in the survey that ask for identifying details such as your name or email address. All responses will be saved on a secure Dalhousie server. Only Faith, Meredith, Sasha, Cliff, and Nathaniel will have access to the survey results.

We will describe and share general findings of this research in an ENVS/ SUST 3502 presentation and final report. If you wish to receive the final report, you will have the option to be redirected to a separate, non-anonymous survey to provide your email. As this is a separate survey, we will have no way to trace your email to your responses. We will destroy all data from this survey 1 month after completing the report.

The risks of this survey include possible discomfort. Your participation in this survey is voluntary and you may choose to opt out of this survey at any time.

If you experience any discomfort related to your participation in this survey, we invite you to seek assistance at any of the following resources:

- The Dalhousie University Indigenous Student Centre ([isc@dal.ca](mailto:isc@dal.ca))
- Dalhousie University mental health services ([https://www.dal.ca/campus\\_life/health-and-wellness/my-health/mental-health.html](https://www.dal.ca/campus_life/health-and-wellness/my-health/mental-health.html))
- Good2Talk for free Nova Scotia university student counseling services over text message (text

GOOD2TALKNS or 686869) or phone (1-833-292-3698)

- Nova Scotia Health mental health and addictions services for First Nations

(<https://mha.nshealth.ca/en/services/first-nations-services>)

- Union of Nova Scotia Mi'kmaq Mental Wellness Team (<https://www.unsm.org/dept/mental-wellness>)

- Canadian Mental Health Association services for Indigenous health and safety

(<https://novascotia.cmha.ca/cast-program/indigenous-health-safety/indigenous-health-mental-health-resources/>)

There will be no direct benefit to you in participating in this research. The research, however, might contribute to new knowledge on Indigenous education and knowledge on Dalhousie's campus and in classrooms. If you would like to see how your information is used, please feel free to visit my website (<https://www.dal.ca/faculty/science/earth-environmental-sciences/research/publications-and-theses/past-envs-3502-projects.html>) after April 8th, 2024.

You should discuss any questions you have about this study with Meredith Mooney. Please ask as many questions as you like before or after participating. The contact information is [Mooneymeredith@dal.ca](mailto:Mooneymeredith@dal.ca)

## **Appendix D: Email Template**

Hi Dr. XXXX,

I hope you are well. Would you mind sharing this survey for my ENV3502 group research project in the COURSE CODE Brightspace? For a bit of context, we're trying to gain an understanding of how well environmental-related courses incorporate Mi'kmaq Traditional Knowledge into their learning outcomes, and what are students' perceptions about learning more about Mi'kmaq Traditional Knowledge.

Here is the web link to the survey: <https://surveys.dal.ca/opinio/s?s=76165>

I have also attached our research survey poster.

Thank you,

RESEARCHER NAME

RESEARCHER B00#