



Laidlaw Scholars Undergraduate Leadership and Research Programme

Research Report

Climate Consciousness: Shaping Futures at U of T

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Introduction

Climate change is an urgent topic spurring dialogue around how to prepare, educate, and empower the generations that will bear the worst impacts. Youth worldwide experience and perceive this issue in dramatically different ways and how we all plan to respond to and tackle this reality remains overwhelmingly uncertain. Society needs accurate information and understanding in order to overcome this uncertainty and effectively formulate solutions (Boateng, 2015). In 2017, Times Higher Education found that 58% of students attend university to “continue [their] learning and development”; students expect their higher education experience to provide them with the knowledge and skills necessary to address pressing global issues. Given that climate change poses significant threats to survival and prosperity, our most trusted institutions of knowledge—educational institutions—must provide comprehensive and effective education on the physical phenomenon of climate change as well as the complex socio-economic, ethical, and policy dimensions of the problem. Failing to deliver an effective approach to education and empowerment around climate change means letting down both current and future generations of degree-earning young adults who recognize that climate change is going to shape and change their lives (Cho, 2023).

This research project aims to contribute to the improvement of climate education in a particular institution by assessing the baseline understanding and perceptions of climate change held by University of Toronto undergraduate students and how climate education influences their future plans. This paper presents findings from the research study, “*Climate Consciousness: Shaping Futures at UofT*”. This research sought to answer the following question: How does climate change awareness and educational experiences affect the career and life planning decisions of undergraduate students at the University of Toronto?

Significance of Research

Prior work in the field of climate change awareness has predominantly focused on a broad spectrum of demographics, often assessing the public's belief in climate change rather than its tangible impact on individual decisions and lifestyles. Such research has provided valuable insights into general trends and attitudes towards climate change but falls short of exploring the specific ways in which climate change awareness is shaping the future planning of young adults, particularly those in academic environments. Studies have frequently assessed the degree to which individuals accept the reality of climate change, with less emphasis on how this awareness translates into concrete changes in career choices, lifestyle decisions, and personal planning in a Western context.

This research aims to fill this gap by focusing specifically on undergraduate students at the University of Toronto (UofT). Understanding students' attitudes and knowledge about climate change is crucial for developing effective educational strategies. This research highlights the necessity for place-based studies, as attitudes and knowledge can vary significantly between institutions. By conducting surveys and interviews at UofT, this study aims to offer a detailed account of how climate change awareness influences students' planning and decision-making processes. This localized approach ensures that educational interventions can be more precisely aligned with the specific needs and perspectives of students, leading to more impactful and relevant climate education programs.

Defining the Problem

Many education models maintain outdated curricula surrounding climate topics that do not adequately address the evolving implications of this phenomenon. For instance, in Canadian

education systems, there is a significant gap in primary and secondary school climate change education; 8 of 13 provinces and territories regulate basic global warming lessons, less than 40% of provinces and territories address consumer education around climate friendly choices, and only four provinces discuss the implications of climate change for lifestyle factors such as transportation (Bieler et. al, 2017). While these are steps in the right direction, they fall short of what should be included in curricula, as psychological research has shown that humans can only fully develop behaviours and attitudes toward issues after receiving comprehensive and relevant information about them (Wright, 2004). The majority of students in the United States face a similar gap in climate education; prior to 2020, no state had a regulation or mandate to incorporate climate science or education, however this changed when New Jersey required climate change to be taught in all subjects beginning in kindergarten (Cho, 2023).

Essential topics to be considered for curriculums include the relationship between human activity and global warming (Boateng, 2015), how climate change is shaping various industries, implications for wildlife, as well as lifestyle impacts such as energy consumption, consumer choices, and geographical location. New Jersey's mandate of climate education across all subject areas enables students to be exposed to all of this and more; early grades can create artwork depicting different impacts of climate change, junior grade students can compare the environmental impacts of different technologies and resources, and secondary school students can complete research reports on climate justice topics (Cho, 2023). While these advancements are commendable, the momentum must continue at the postsecondary education level.

Universities play a crucial role in prompting critical thinking and preparing minds to address the problems facing present-day society (Solbrekke et.al, 2016). However, the integration of climate education into higher education curricula remains inconsistent, though

existing research has proposed frameworks for universities to mainstream climate education, ensuring that students across various disciplines—whether they are studying business, criminology, or pre-medicine—engage with climate topics as part of their core curriculum (Molthan-Hill et al., 2019). Despite recognition of the need for climate education in international policies, such as Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC), which "encourages people to take the lead and cooperate in creative climate change education and training" (UNFCCC, 1992), and Article 12 of the Paris Agreement, which calls for "enhancing climate change education, training, public awareness, public participation and public access to information" (UNFCCC, 2015), investment in climate education at the university level has not met the urgent demand. This is a result of challenging political landscapes, as well as inaccessibility to training and resources for educators (Will, 2023).

In Canada, it is crucial to recognize that climate education is relative to each province or territory's geography and political economy; given that the nation's ambitions, priorities, and resources vary greatly from region to region, investment in and focus of climate education differs substantially (Bieler et. al, 2017). This disparity creates inconsistent educational outcomes, as regions with more resources and political backing can offer more support for universities and educators to update climate curricula, while others lag behind due to limited support or differing priorities. Furthermore, although universities and school boards are not directly bound by party platforms, political and investor influence often prove difficult to avoid (Cho, 2023). A 2022 survey by the North American Association for Environmental Education found that only 21 percent of educators feel "very informed" about climate change, highlighting the gap between 86 percent of instructors supporting climate education and what they have the training and materials to teach in lecture (Cho, 2023; Will, 2023). Education center experts have recognized that

educators need better training, thorough guidelines, and instructional materials to teach climate change, all of which can be attained with improved support from districts, administrators, and investors (Cho, 2023).

The gaps and inconsistencies in climate education at the primary and secondary levels, as well as shortcomings in higher education curricula, highlight the critical need for a more impactful approach to holistically informing students about climate change. Building on this context, my research investigates how the quality and integration of climate education in university settings influence students' attitudes and behaviours toward climate action. The goal of this study is to determine the efficacy of supportive climate education for students, ensuring that it not only informs but also empowers them to make significant changes and incorporate climate literacy into their daily lives.

Methodology¹

The research study was conducted over a six-week period from June 17th, 2024, to July 26th, 2024, in Toronto, Canada, with the survey being deployed on July 1st, 2024. Ethical clearance was obtained from the University of Toronto Research Ethics Board, ensuring compliance with institutional requirements. Participants provided consent, and measures were taken to ensure anonymity and confidentiality.

Participants were recruited through outreach to University of Toronto committees, student groups, and unions, which promoted the survey via social media, newsletters, and email lists. Professors and instructors also helped distribute the survey link. To increase participation, a lottery for gift cards was offered, and a separate sign-up form for interviews was provided. A

¹ For a full description of the methodology used in this study see Appendix A. For survey questions and the interview script, please refer to Appendix C and Appendix D.

total of 155 students completed the survey, and four interviews were conducted, including targeted and volunteer participants.

The primary data collection method was a survey developed by the researcher, utilizing Qualtrics for its effectiveness and user-friendliness. The survey consisted of 30 questions divided into five categories, covering demographics, climate change awareness, lifestyle impacts, career and life planning, and perceptions of future impacts. Interviews provided qualitative insights into survey results, focusing on sources of climate concern, academic experiences, life planning, and the influence of positionality.

Survey data analysis was carried out using SPSS, where survey responses were re-coded into binary variables or assigned numeric values to facilitate the examination of patterns and associations. Descriptive and inferential statistical tests were undertaken to evaluate relationships between climate knowledge, experience in university, and life choices.

This study engaged 155 undergraduate students from the University of Toronto (n=155), with a distribution across various academic years: 34% were in their third year, 25% in their fifth year, 22% in their fourth year, and both first and fifth-year students each made up 9% of the sample. Students majoring in the social sciences were notably well-represented, reflecting a significant portion of the respondents' academic backgrounds.

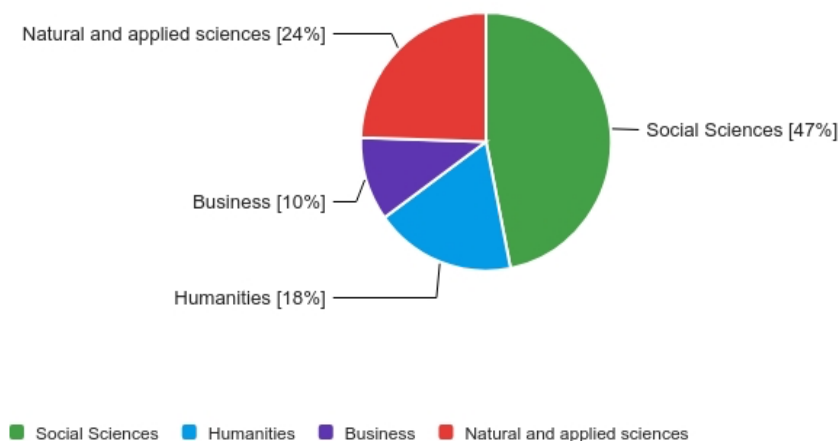


Figure 1: Distribution of Survey Participants by Academic Program

Four interviews were conducted with participants from Philosophy, English, Political Science, and Biological Sciences programs, ranging from second through fifth year. Interviews were recorded and played several times to derive textual data, themes, and quotes. Transcription was conducted using Dropbox and cross-checked by the primary investigator. The analysis process involved listening to the recordings, coding the text, identifying themes, reviewing relevant quotes, and finalizing the themes. The key findings were then organized based on themes that complimented survey data results.

To reiterate, the goal of this study is to assess if/how the extent and quality of students' exposure to climate change information influences students' current and anticipated actions and attitudes towards climate change, and life choices. I will first discuss the descriptive analysis of these independent and dependent variables, before turning to the relationships among them. The following discussion section presents key overarching themes that emerged from the analysis of both survey data and interviews.

Statistical Data Analysis and Results

Dependent Variables: Actions, Attitudes, and Plans

I expected to see that exposure to and perceptions of climate change would influence student's actions, attitudes and plans. To measure those outcomes, the survey included questions on lifestyle impact factors such as changes in childbearing decisions, home ownership plans, political associations, marriage choices, dietary habits, transportation preferences, financial planning, social interactions, academic trajectories, and religious practices. Additionally, the study examined changes in consumer choices, perceptions of environmental preservation, career path adjustments, interest and engagement in climate activism, and optimism about addressing climate change.

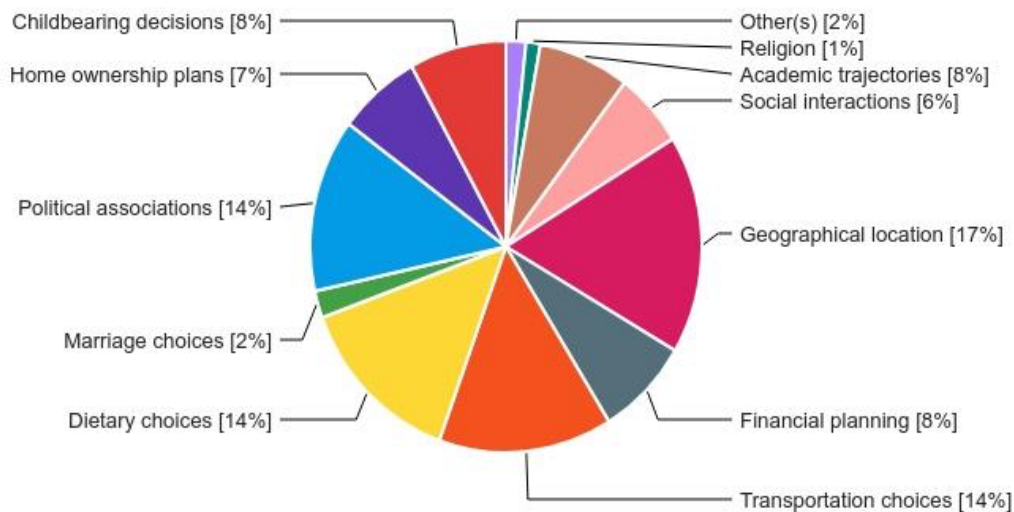


Figure 2: Relative Frequency of Lifestyle Factors and Decisions Impacted by Climate Change

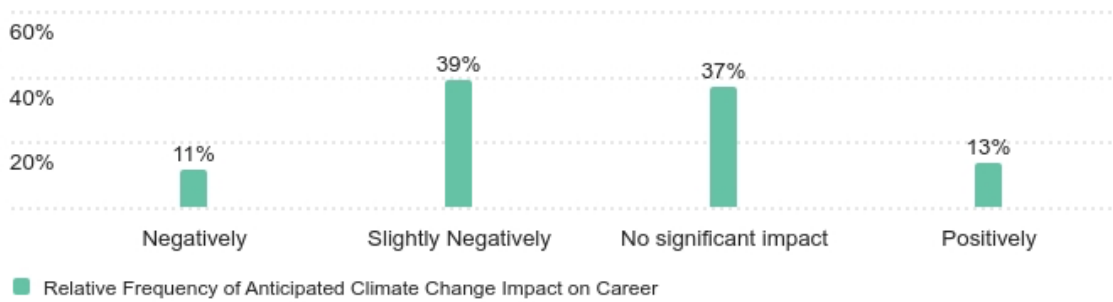


Figure 3: Anticipated Climate Change Effects of Students Careers

Survey results indicated that the most significantly impacted lifestyle factors were geographical location (17%), transportation choices (14%), dietary choices (14%), and political associations (14%) [Figure 2]. Additionally, 50% of the sample reported anticipating that climate change will negatively impacting their career paths [Figure 3]. Furthermore, 38% of respondents indicated that climate change has affected their consumer choices. However, interviewees highlighted a key challenge to adapting consumer choices to be climate-conscious: uncertainty about which eco-friendly brands are trustworthy and legitimate. Despite an increased concern for nature and the environment, with 76% agreeing that climate change has altered their views on environmental preservation, there remains a gap between this awareness and actionable behaviour; 38% of respondents expressed a willingness to engage in climate activism, yet just 7% regularly participate in climate-oriented volunteering or engagement. Nevertheless, the majority of students remain somewhat optimistic about effectively combating climate change, with 52% expressing hope for meaningful progress.

Independent Variables: Exposure to and Perception of Climate Change

The five independent variables sought to measure participant exposure to and perceptions of climate change: the number of post-secondary courses discussing climate change, program of study, exposure to climate change in the high school curriculum, personal rating of climate change understanding, and perception of whether undergraduate education provided sufficient understanding of climate change.

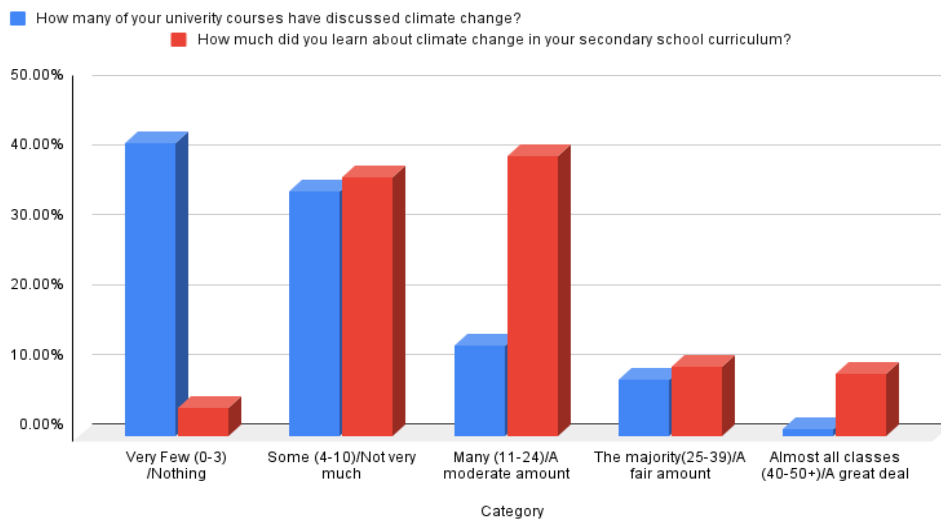


Figure 4: Comparison of Exposure to Climate Education in University versus Secondary School

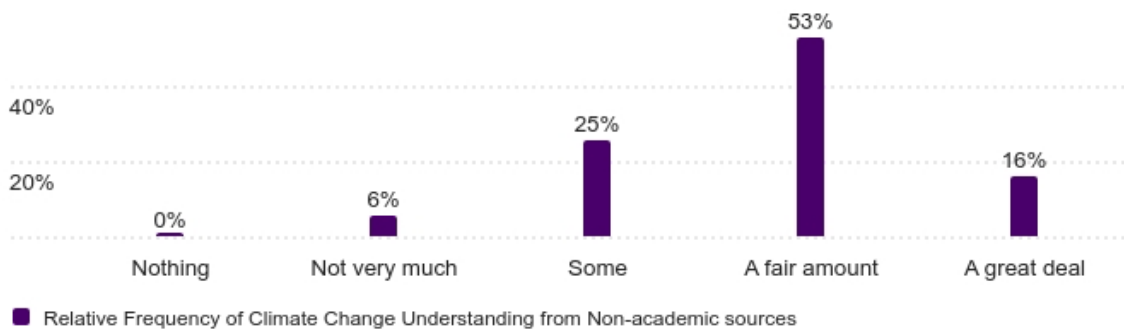


Figure 5: of Climate Change Understanding provided by Non-academic Sources

Exposure to climate education at the secondary and university levels was assessed to identify how and how much exposure might influence students' actions and climate consciousness. Program of study was included to determine how different academic disciplines, with varying levels of climate-related content, might influence climate change engagement and perceptions. Ratings of climate change understanding and adequacy of undergraduate education were evaluated to gauge students' self-assessed understanding of climate change and the perceived effectiveness of their educational experiences.

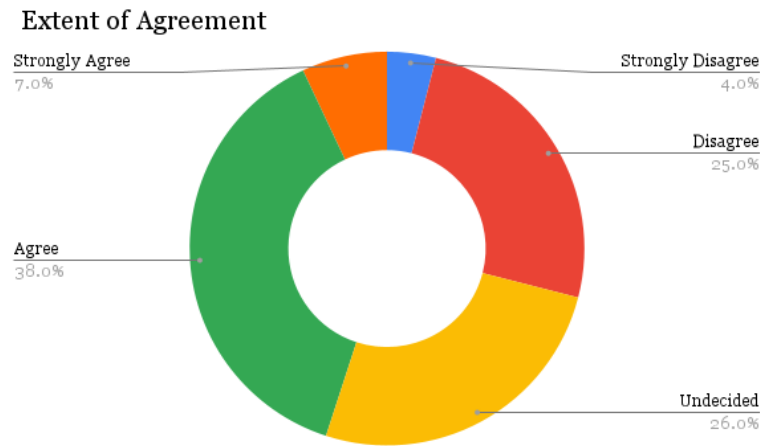


Figure 6: Student Agreement on the Adequacy of Undergraduate Education for Understanding Climate Change

Survey results revealed that 40% of respondents encountered a “moderate amount” of climate change topics in their secondary education [Figure 4]. However, at the university level, 42% of participants reported that only 0-3 of their courses covered climate change [Figure 4]. Despite this, 38% of students felt their undergraduate education sufficiently addressed climate change and its implications, yet 53% still considered their understanding of climate change to be only “fair” [Figure 5]. These descriptive results suggest a potential gap between the perceived and actual exposure to climate education.

Relationships Between Knowledge/Exposure and Choices/Plans²

A combination of statistical tests were conducted to examine the relationships between climate change knowledge, exposure, and students' choices and plans. Chi-square tests were used to analyze associations between categorical variables, while regression analyses assessed the impact of multiple independent variables on changes in lifestyle choices, the most prominent are discussed here.

Students' optimism for tackling climate change is related to their program of study

This relationship indicates that students majoring in programs with more exposure to climate topics, such as Environmental Science or Climatology, generally report higher levels of optimism compared to those in programs less focused on climate issues, such as Business or Engineering. Optimism in this context refers to students' positive outlook on their ability to tackle climate change challenges. This suggests that students in fields of study with more climate-related discussions and content tend to have a more optimistic outlook on climate change solutions.

Number of courses taken addressing climate change is related to engagement in climate activities

This analysis explored how the number of courses students have taken that address climate change correlates with their engagement in climate-related activities. Engagement in climate activities includes involvement in projects, volunteer work, and activism related to environmental and sustainability issues. The results revealed that students who take courses that have mentioned or addressed climate topics are more actively involved in such activities. This suggests that increased exposure to climate change education through formal coursework

² For detailed statistical charts from SPSS, please refer to Appendix B.

increases students' motivation to take action and participate in climate-related activities outside the classroom.

Non-academic Understanding of Climate Change is related to engagement in climate activities

This relationship assessed students' engagement in climate-related activities in relation to their understanding of climate change from non-academic sources. Non-academic understanding includes knowledge gained from social media, family, peers, or personal research rather than formal education. The findings show that students who acquire significant climate knowledge through these informal channels are also more likely to engage in climate-related activities. This indicates that informal learning sources contribute significantly to students' active involvement in climate action, complementing their formal education.

Number of courses taken addressing climate change is related to Lifestyle Choices

This regression analysis encompassed lifestyle choices related to diet, home ownership, and career paths, which proved to be influenced by climate change education. The analysis reveals a positive correlation, indicating that students who take more courses with climate-related topics are more likely to adjust their lifestyle choices to be more climate-conscious. This demonstrated that climate change education can have a direct impact on student's personal decisions and behaviours related to sustainability.

Non-academic Understanding of Climate Change is related to Lifestyle Choices

Finally, this regression analysis investigated how non-academic understanding of climate change affects students' lifestyle choices. Non-academic understanding includes knowledge acquired outside of formal coursework, such as from media or community discussions. The results indicate that students with a strong non-academic grasp of climate change are also more likely to make climate-conscious lifestyle changes and decisions. This highlights that informal

climate knowledge, when attained from credible sources, can significantly influence personal decisions and behaviours, paralleling the effects of formal educational experiences.

Discussion

One of the major findings from this study was many students' disappointment in the climate education they receive. In interviews, participants described dissatisfaction with the applicability and content of their education regarding climate change. One student revealed "I haven't been taught about the implications [of climate change]; I only understand the basics... so I can't really picture how it'll impact me". This sentiment highlights a perceived inadequacy in the depth of climate change education, echoed by another student's frustration regarding course content: "What I hear in one course is being said in another, like they're using the same textbook". These experiences resonate with Boateng's (2015) analysis of climate curricula in Ghanaian universities, which identified an insufficient coverage of climate topics across STEM and architecture disciplines. Boateng (2015) found that if students do not learn about lifestyle impacts and implications of climate change, they are less likely to address or be concerned with "the required behaviours that may reduce the effects of climate change" (Boateng, 2015, pg. 105). This conclusion complements survey data, which revealed a strong association between students' optimism for tackling climate change and their program of study. The low level of optimism reported by 28% of respondents and varying levels of climate education exposure support Boateng's assertion that without a thorough understanding of climate change, it is more difficult for students to remain optimistic about solving or pursuing the problem.

On the other hand, many survey respondents expressed that their undergraduate degree has equipped them with a sufficient understanding of climate change [Figure 6], despite most

students reporting only seeing climate change in 0-3 courses [Figure 4]. This indicates that effectiveness or appeal of climate education is not solely dependent on the number of courses but rather on how deeply and comprehensively climate change topics are embedded within curricula. High-impact, well-designed courses that integrate climate change into core subjects provide students with a sufficient foundation, as demonstrated by the statistically significant relationship between number of courses taken addressing climate change and engagement in climate conscious behaviour and activities. In support of this, an interviewee shared that they completed a research paper on the ethics of water shortage solutions due to climate change. They noted that this focused project was particularly valuable, as it provided them with a new perspective on the implications of resource deficits and inspired them to incorporate practical actions into their daily life and long-term planning. This experience alludes that fewer, but well-integrated courses or projects can profoundly impact students' understanding and application of climate change knowledge.

Nevertheless, course content and projects are not the only way for knowledge to be relayed and received. Devine-Wright et al. (2004) conducted a study on informal education factors influencing children's understanding of climate-related topics, which found that children exposed to informal educational environments exhibit a deeper understanding of climate issues and a stronger sense of personal efficacy (Devine-Wright et al, 2004). This study revealed that children in education settings characterized by cooperative and participatory learning experiences demonstrate higher levels of environmental concern and a greater belief in their ability to contribute meaningfully to climate action compared to their peers in traditional learning environments. Essentially, Devine-Wright et. al (2004) illustrated the crucial role of informal learning sources—such as family and peer interactions—in shaping environmental awareness.

This compliments the relationships revealed by this study's survey data, indicating that personal understanding of climate change knowledge from non-academic sources impacts career and life planning around considering climate change. This suggests that a personal understanding of climate change developed outside of academia, through peers, media, or other sources of socialization, does indeed shape undergraduate students' climate-related perceptions and trajectories.

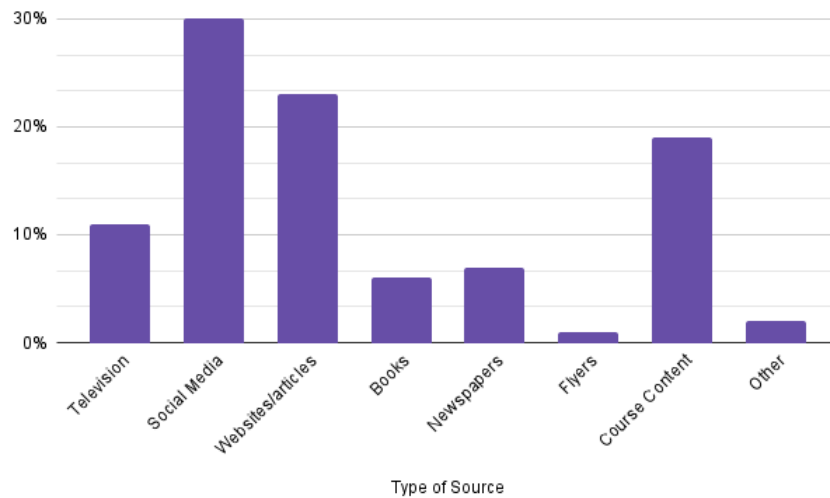


Figure 7: Sources of Climate Change Information for UofT Undergraduate Students

Survey data indicated that the top three major sources of information for undergraduate students are social media (30%), online websites and articles (23%), and course content (19%) [Figure 7]. Interview participants confirmed that social media was their primary exposure to climate news, events, and movements. However, despite the prominence of social media and online sources, the credibility and impact of these informal channels present a complex picture (Clarke-Crespo et. al, 2021). Studies on sources of climate change information demonstrate that while high-profile entities such as The Intergovernmental Panel on Climate Change and NASA are trusted sources of climate information, informal sources such as family, friends, and local

media receive lower levels of acceptance and credibility (Clarke-Crespo et. al, 2021). This divergence underscores a critical point: although social media and online platforms are significant for disseminating climate information, they are not always perceived as reliable or authoritative, affecting how students engage with and act upon climate-related information they encounter through these informal channels.

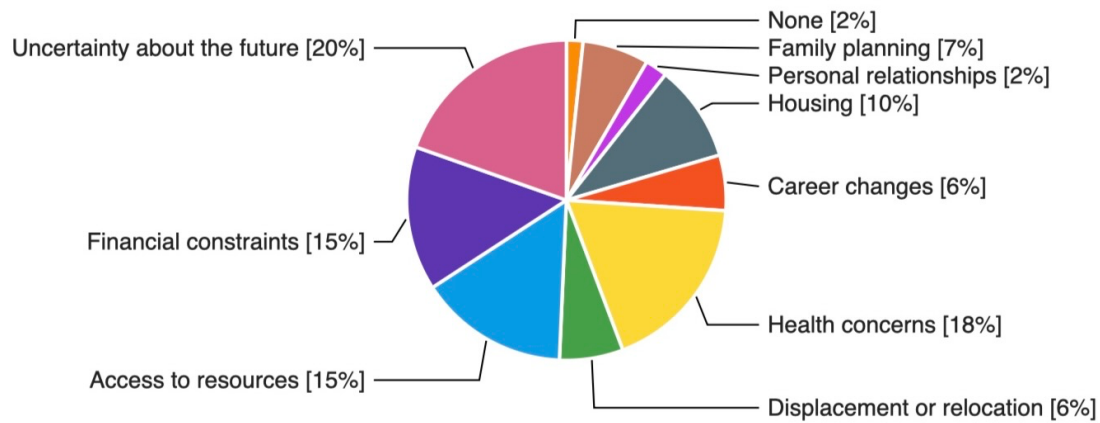


Figure 8: Challenges and Obstacles for UofT Undergraduate Students as a Result of Climate Change

Data analysis presented that knowledge from academic and non-traditional sources significantly impacts lifestyle factors and choices. Irrespective of program, level of study, or exposure to climate change information, all students revealed that climate change has impacted at least one aspect of their lives [Figure 2]. Although, what causes students to be less willing to adopt or pursue changes may come from negative emotions about climate change, such as fear and sadness (Pfautsch & Gray, 2017). Pfautsch & Gray (2017) contend that university curricula should invest in psychological research on the impact of climate change on human wellbeing to cultivate positive attitudes among students. They suggest that such an approach would encourage students to engage more actively in climate action, rather than being paralyzed by fear about the

future (Pfautsch & Gray, 2017). Australian undergraduate students in Pfautsch & Gray's study (2017) reported feelings of uncertainty, a trend seen in survey results [Figure 8] and expressed by interviewees' concerns about the challenge of making a difference when the risks of climate change are perceived as distant or ambiguous: "...[being uncertain of] when this will be dangerous for me is what makes me second guess the difference I actually make". The results of this study support this perspective.

Finally, the regression analysis reveals an important correlation between lifestyle planning and changes in exposure to and knowledge of climate change topics. This association clarifies how understanding of climate change has a significant impact on students' choices and behaviours across various aspects of their lives, from major decisions to daily habits. The data shows that students who receive frequent or effective climate change education are more likely to incorporate climate considerations into their daily and long-term decision-making processes. Therefore, exposure to climate change knowledge results in more proactive and informed decision making. Bear in mind, that while these findings indicated students who are well-versed in climate change are more likely to make thoughtful decisions about their lifestyles, this change is not always straightforward or immediate. Other research has also shown the complexity of the interaction between knowledge, perception, and action (Clarke-Crespo et. al, 2021; Pfautsch & Gray, 2017; Wright, 2004). While increased exposure to climate change information generally enhances students' willingness to make lifestyle changes, the relationship is not straightforward; the type, frequency, and level of exposure, as well as emotional responses to climate change play a crucial role in shaping students' choices and actions.

Conclusion

In conclusion, while increased exposure to climate change education influences students' decision-making and consideration of climate change, it is essential for education to move beyond surface-level engagement. Effective climate education must integrate climate topics into core curricula in a meaningful way, linking broad scientific concepts to practical applications and directions to ensure content is both engaging and relevant to students' personal, academic, and professional lives.

Future efforts can focus on improving curriculum quality by expanding the scope of climate topics and ensuring they are connected to real-world scenarios. These improvements should prioritize several key areas to enhance climate education's effectiveness. First, improving the quality of climate change curricula is essential. This involves expanding the depth and breadth of climate topics covered, ensuring that content is integrated across various disciplines, and connecting it to real-world scenarios. Second, leveraging informal educational sources responsibly can complement formal education. This study showed that social media, online platforms, and peer interactions significantly influence students' climate change perceptions. To assist students in distinguishing credible information from misinformation, educators and institutions can support students' exposure by guiding them in critical assessment of these sources. Finally, policy changes are crucial for these improvements. Institutions and governments must invest in training and supporting educators by providing resources that enhance climate education and address its emotional impact on students.

Future research can explore the effectiveness of various educational approaches at all levels of schooling, how positionality impacts perceptions and reactions, and strategies for supporting students' emotional resilience and mentalities when considering major changes.

Investigating different educational methodologies will help identify the most effective ways to integrate climate change into curricula, ensuring that students gain practical, actionable knowledge starting in younger grades. Understanding the role of positionality—such as background, identity, and personal experiences—can shed light on how these factors influence students' perceptions and responses to climate change, allowing for more personalized and effective educational strategies. By focusing on these areas, students can be better supported and prepared to address climate challenges and make informed, impactful decisions for a sustainable future.

Limitations

This study has several limitations to be considered when interpreting the results. First, the study's focus on undergraduate students at the University of Toronto limits the findings' applicability to other educational institutions or demographic groups. Different universities and regions likely employ different approaches to climate change education, influencing students' perceptions, decisions, and behaviours. Second, relying on self-reported data from surveys and interviews introduces biases given that participants' educational experiences or climate-related perceptions may not always be accurately represented. In addition, the study's cross-sectional design does not account for changes in students' attitudes and behaviours over time, which could be significant given the dynamic nature of climate change and its implications. Furthermore, volunteer bias is a notable limitation, as participants who chose to take part in the study may have had stronger pre-existing interests or concerns about climate change, potentially skewing the findings toward more engaged or informed perspectives. Finally, this study did not account for demographic factors such as race, economic status, gender, and other socioeconomic variables that can influence students' experiences and responses to all forms of education. The

omission of these demographic details contributes to a limited understanding of how various populations are affected by and interact with climate change education.

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Appendix A

Detailed Methodology

Research Period

This research study occurred in a six-week time period, beginning June 17th, 2024, and ending July 26th, 2024. All research was carried out in Toronto, Canada. The survey for this project deployed on July 1st, 2024.

Ethical Considerations

The Primary Investigator obtained ethical clearance from the University of Toronto Research Ethics Board to ensure that all institutional ethical requirements were met where the study was conducted. Throughout the research process, the researcher obtained all participants' consent, followed voluntary participation procedures, and ensured anonymity and confidentiality for all participants.

Recruitment and Distribution

The primary method of distribution was through outreach to University of Toronto committees, student groups, and unions. These organizations were optimal sources for outreach given their following or members being the target population of this study; various organizations promoted and shared the link to this survey on their social media platforms, newsletters, and email lists. Professors, instructors, and faculties teaching courses in the 2024 Summer Semester were also contacted to share the survey link with students taking their courses.

To increase participation in this study, the survey was incentivized. Participants interested in entering a lottery for a gift card completed a separate Google form available after completing the survey. Additionally, a Google form for interview sign-ups was provided for respondents interested in participating in an interview. Contact information was collected only

from students who completed either of the two forms, ensuring it remained separate from the survey data. Only survey participation resulted in an entry into the gift card lottery; interviewees did not receive additional entries or incentives. A total of ten gift cards to the University of Toronto bookstore were available, and winners were chosen through a random drawing.

Population and Sample Size

The reference population of this study is students enrolled in an undergraduate degree program at the University of Toronto for the 2024-2025 academic year. This includes all three University of Toronto campuses: University of St. George (UTSG), University of Toronto Mississauga (UTM), and University of Toronto Scarborough (UTSC) and encompasses students of all years across all programs and disciplines.

The sample included 155 survey respondents, and four interviewees. Two of the four interviewees were targeted; to obtain variety in responses, perspectives of students from different programs, years of study, and campuses was sought. The other two interviews were not targeted; the participants expressed willingness to participate in an interview after completing the survey.

Survey Design

The Primary Investigator developed and deployed a survey as the primary research methodology. A survey was created and used for its efficiency and effectiveness in gathering data that requires self-reflection and personal insights from a large and diverse targeted population (Regmi et al., 2016). The survey was developed through extensive collaboration among the researchers to produce a comprehensive and reliable instrument, ensuring the questions, responses, and design captured the necessary data for the study. The Primary Investigator generated the question formatting, possible responses, and survey structure, which

were then reviewed by the research advisor for validity and utility. Question design and structure was compared against other resources for insight and relevance to the field.

The survey was built and distributed using Qualtrics for its user-friendliness and accessibility, consisting of 30 questions that determine the extent to which climate change has shaped personal, academic, and professional pursuits, as well as questions assessing respondents' exposure to climate change information at the high school and university level, concern about climate change, and overall impressions of climate change. Data collection also encompassed information pertaining to participants' academic pursuits at the University of Toronto, such as their major, department, academic programs, and participation in extracurricular activities. For readability and overall flow, the survey was divided into five categories: "Demographics", "Climate Change Awareness, Knowledge, and Observations", "Climate Change Lifestyle Impacts", "Climate Change Career and Life Planning Impacts", and "Perceived Future of Climate Change Impacts", each with multiple choice, predetermined responses, and likert scale questions.

Interview Design and Approach

Interviews were crucial to this study due to their ability to provide context and prevent speculation about survey results in data analysis. Given that all participants will inherently experience and process climate change differently, interviews provided invaluable depth to these research findings. All interviews were conducted virtually at a date and time that was convenient for the participants. After obtaining consent at the beginning of each interview, all interviewees expressed willingness to have their voices recorded for analysis.

The flow and structure of the interviews were based on four major areas where elaboration of survey responses and themes was sought, drawing from preliminary results. These

areas of interest were: sources of climate change concern and awareness, climate change in academic experiences, climate change as a factor in life planning, and the impact of positionality on climate change perceptions and experiences.

Appendix B

Statistical Charts from Data Analysis by SPSS

Students' optimism for tackling climate change is related to their program of study:

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.537	.017
	Cramer's V	.310	.017
N of Valid Cases		70	

Number of courses taken addressing climate change is related to engagement in climate activities:

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.604	.001
	Cramer's V	.302	.001
N of Valid Cases		106	

Non-academic Understanding of Climate Change is related to engagement in climate activities:

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.522	.004
	Cramer's V	.302	.004
N of Valid Cases		106	

Regression Analysis:

- Number of courses taken addressing climate change is related to Lifestyle Choices
- Non-academic Understanding of Climate Change is related to Lifestyle Choices

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.001	1.088		1.840	.071
	CourseGroup1	.539	.224	.320	2.402	.020
	PCCK	.561	.249	.276	2.259	.028

a. Dependent Variable: Lifestyle_Impact_Score

*Number of courses taken addressing climate change is denoted as “CourseGroup1”.

*Non-academic understanding of climate change is denoted as “PCCK”.

Appendix C

Survey Questions

Demographics

Q1 What year of your undergraduate degree are you currently in?

- First year
- Second year

- Third year
- Fourth year
- Fifth year or more

Q2 In which programs are you currently enrolled in for your undergraduate degree (specialist, major, or minor)? Mark all that apply

- Natural and applied sciences (e.g. biology, chemistry, computer science, engineering, geology, mathematics, physics, medicine)
- Business (e.g. accounting, economics, finance, management, marketing)
- Humanities (e.g. art, history, languages, literature, music, philosophy, religion, theater)
- Social Science (e.g. anthropology, education, geography, law, political science, psychology, sociology)

Q3 What are your plans after graduation?

- Grad School (Professional - e.g. law, medical, MBA)
- Grad School (Academic)
- Work
- Undecided

Climate Change Knowledge, Awareness, and Observations

Q4 How much would you say you know about how climate change works (causes and effects)?

- Nothing
- Not very much
- Some
- A fair amount
- A great deal

Q5 How much would you say you know about climate-related politics, policies, regulations, and mandates?

- Nothing
- Not very much
- A moderate amount
- A fair amount
- A great deal

Q6 How much did you learn about climate change in your secondary school (high school) curriculum?

- Nothing
- Not very much
- A moderate amount
- A fair amount
- A great deal

Q7 How many of your university courses have discussed climate change?

- Very Few (0-3)
- Some (4-10)
- Many (11-24)
- The majority of my classes have discussed climate change (25-40)
- Almost all of my classes have incorporated or discussed climate change in one way or another (40-50+)

Q8 How do you typically consume information about climate change topics? (Select up to 2)

- Television
- Social media
- Online websites/articles
- Books
- Newspapers
- Flyers
- From course content (e.g. in lectures)
- Other
- I do not typically consume knowledge about climate change topics.

Q9 Please indicate the extent to which you engage with climate change-related discussions or activities outside of academic settings (e.g. volunteering, activism, personal research)?

- Never
- Rarely
- Occasionally
- Frequently

- Regularly

Q10 Have you observed a shift or change in your peers' lifestyles as a result of climate change?

- Not at all
- Minimally
- Definitely

Q11 Could you imagine yourself participating in a climate action activity or movement (e.g. joining a climate organization or participating in a peaceful protest)?

- Definitely not
- Probably not
- Probably yes
- Definitely yes
- I already have/do.

Q12 Has climate change increased your concern for the preservation of nature and the environment?

- Not at all
- Minimally
- Definitely

Q13 How do you perceive the role of climate change in the decline of wildlife populations and habitats around you?

- Climate change has not played a role
- Climate change has played a minor role
- Climate change has played a moderate role
- Climate change has played significant role
- Climate change is the primary cause

Climate Change Lifestyle Impacts

Q14 To what extent is climate change impacting your day-to-day lifestyle and activities?

- Not at all
- Not very much

- Some
- A fair amount
- A great deal

Q15 How frequently do you incorporate sustainability practices into your daily life as a student (e.g., energy conservation, waste reduction, recycling)?

- Never
- Rarely
- Occasionally
- Frequently
- Regularly

Q16 Have you experienced any challenges or obstacles to sustainable practices in your personal or professional life?

- No, not at all
- Yes, occasionally
- Yes, frequently

Q17 How interested are you in incorporating more sustainable or climate-friendly practices in your lifestyle?

- Not at all interested
- Somewhat interested
- Very interested

Q18 To what extent has concern about climate change impacted your consumer choices?

- Not at all
- Not very much
- Some
- A fair amount
- A great deal

Q19 In what ways, if any, has your awareness of climate change influenced your travel habits or transportation choices? (Select up to 2)

- Increased my use of public transportation
- Encouraged carpooling or ridesharing
- Influenced my choice of vehicle (e.g. electric or hybrid)
- Prompted me to travel less frequently

- Prompted me to limit or discontinue travel by plane
- Climate change has not influenced my travel habits

Q20 In what ways, if any, has your awareness of climate change influenced your energy consumption habits or choices? (Select up to 2)

- Opting for renewable energy sources (e.g., solar, wind)
- Using energy-efficient appliances and devices
- Implementing energy-saving practices at home (e.g., turning off lights, using energy-saving bulbs)
- Participating in energy conservation programs or initiatives
- Engaging in personal or community-based energy reduction efforts
- Climate change has not influenced my energy consumption habits.

Q21 In what ways, if any, has your awareness of climate change influenced your food waste or consumption habits? (Select up to 2)

- Purchasing only what is needed to minimize food waste
- Choosing locally sourced or sustainable food options
- Composting food scraps
- Choosing products with minimal packaging
- Meal planning to minimize leftovers
- Climate change has not influenced my food waste or consumption habits.

Climate Change Career and Life Planning Impacts

Q22 Please select the lifestyle factors below (if any) that you feel climate change has impacted, shaped, or changed. Mark all that apply

- Childbearing decisions
- Home ownership plans
- Political associations
- Marriage choices
- Dietary choices
- Transportation choices
- Financial planning

- Geographical location (e.g. where you choose to/would like to live)
- Social interactions
- Academic trajectories (e.g. decision to pursue more education)
- Religion
- Other(s)
- None

Q23 What challenges, if any, do you face in life-planning as a result of climate change? Mark all that apply

- Uncertainty about the future
- Financial constraints related to sustainable living
- Limited access to resources or opportunities that are climate conscious
- Displacement or relocation due to climate-related events
- Health concerns related to climate change impacts
- Changes in career prospects or opportunities due to climate change
- Challenges in finding sustainable housing or living arrangements
- Personal relationship decisions due to climate change concerns
- Family planning decisions due to climate concerns
- Other(s)
- None

Q24 Please select the factors below (if any) that you consider important for your future career/workplace. Mark all that apply

- Earning potential
- Ethical reputation
- Helping others
- Leadership opportunities
- Job Security and growth
- Collaboration
- Flexibility to be creative
- Workload
- Exciting work environment
- Addressing social issues
- Applying your undergraduate degree

Unsure

Q25 How do you anticipate climate change having an impact on your future career opportunities?

- Negatively
- Slightly Negatively
- No significant impact
- Positively

Q26 How much have you considered concerns about climate change in thinking about your career?

- It has not influenced my career decisions at all.
- It has sparked some concern, but is not a significant factor.
- It has influenced my career path slightly.
- It has played a moderate role in shaping my career decisions.
- Climate change has been a significant factor in determining my career path.
- Climate change considerations have completely guided my career choices.

Perceived Future of Climate Change Impacts

Q27 Please indicate the extent to which you agree or disagree with the following statement: “Current undergraduate students will experience negative impacts from climate change in their lifetime.”

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

Q28 Please indicate the extent to which you agree or disagree with the following statement: “My undergraduate education has equipped me with a sufficient understanding of climate change and its implications.”

- Strongly Disagree
- Disagree
- Undecided

- Agree
- Strongly Agree

Q29 How optimistic are you about the future prospects of effectively combating climate change?

- Not optimistic at all
- Somewhat optimistic
- Very optimistic
- Extremely optimistic

Q30 Please indicate the extent to which you agree or disagree with the following statement: “My generation will be able to tackle and mitigate climate change.”

- Strongly Disagree
- Disagree
- Undecided
- Agree
- Strongly Agree

Appendix D

Interview Script

1. Knowledge and Sources:

- How would you describe your current level of knowledge about climate change?
 - Where has this understanding come from?
 - Do you feel that your positionality or identities impact your understanding and perceptions of climate change?

2. Integration of Climate Change into Academic Experience:

- Can you discuss how climate change topics have been integrated into your academic journey so far? Have you encountered them in your curriculum or sought them out independently?

- What memorable courses, projects, or experiences related to climate change have you had, and how have they influenced your perspective on the issue?
- Do you feel that your academic experience offered enough coverage of climate change? Is there anything you wish had been included?

3. Current Actions and Lifestyle Choices:

- How has your awareness of climate change influenced your lifestyle choices or personal actions?
- Are there specific changes you have made or are considering making in your life due to your understanding of climate change?

4. Future Plans and Career Considerations:

- How does your awareness of climate change shape your current career aspirations or future plans?
- Are there ways in which you anticipate climate change impacting your chosen field or industry?

5. Broader Observations and Attitudes:

- Have you noticed any changes in attitudes toward climate change among your peers?
 - How do you think these attitudes have evolved?