

University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

# Daily student struggles and perceived vulnerabilities at the UBC Vancouver campus during extreme weather events

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## ABSTRACT

The issue of climate change is becoming more prevalent due to its effects increasing in intensity as extreme weather events are on the rise and will continue to heavily impact the lives of future generations globally. This leads us to examine the understanding of climate change risks and vulnerabilities for human health on the University of British Columbia Vancouver campus to strengthen climate resilience through planning and policy initiatives. Previous literature noted climate change's influence is posing risks for transportation systems due to extreme weather events. Given that many UBC students rely on transportation infrastructures, we wished to examine students' experience with transportation to and from campus, as well as accessibility on the UBC Vancouver campus when an extreme weather event occurs. We conducted a survey and gathered personal accounts from Reddit to understand students perceived risks and vulnerabilities relating to extreme weather events when it comes to transportation and accessibility. This research found that UBC students reported inadequacy with UBC's current initiatives to aid student transportation and accessibility experience, calling for stricter guidelines and planning initiatives relating to extreme weather events.

## INTRODUCTION

As reviewed by Health Canada's Climate Report (2022), there has been a notable recognition of the stress placed upon Canadian citizens in the face of climate change. Extreme weather scenarios such as the recent November snowstorm onset have been evidenced to substantially degrade the mental well-being of individuals and can lead to disruptions in traffic and fractural injuries (p. 194). Overall, the report critically recognizes the heightened anxiety and problems people foster during and following the aftermath of sudden meteorological events. Specifically, eco-anxiety and eco-paralysis are of key concern regarding students at the University of British Columbia (UBC). Eco-paralysis refers to an innate feeling of hopelessness and inability to do anything in the face of 'wicked' ecological disturbance, whereas eco-anxiety refers to anxiety triggered by an awareness – and generally heavy bombardment – of ecological threats (p. 237). With there being an increase in drastic weather events at UBC, it is unclear to what extent students are affected by climate change. Additionally, there remains a vague understanding of the degree to which individuals on campus acknowledge the vulnerabilities and risks posed by environmental change.

A study conducted in Australia considered the uneven distribution of climate warming knowledge among university students, where self-related understanding was rated high among students, however, their actual knowledge regarding climate warming was low (Pfautsch & Gray, 2017). This study illuminates poor education regarding climate sciences and the understanding of climate change; and therefore, stresses the importance of educating the general population, especially students, on climate change. Looking further into Eastern Asia, a study in Taiwan assessed students' consciousness and behavioural outcomes regarding climate change from various Universities across the nation. It found that the majority of the student body reported being "somewhat concerned" (65%) and "very concerned" (28%), most of these concerns do not apply to their actions taken toward making environmental changes (Giusto et al.,

2023). Consequently, it was reported that more students have expressed a greater inclination toward making a stronger impact on the environment and its pressing issue of climate change (Di Giusto et al., 2023). Thus, our literature review chooses to focus on this gap in UBC research, aiming to center around the campus's perception of climatological risks and vulnerabilities associated with extreme weather events. We have decided to research the snowstorm event as it is more concurrent with recent times and so will be easier to recount for our respondents. To further narrow down our findings, we have chosen to focus on transportation to campus.

The following literature review is critical to our research, in that we will begin to recognize gaps in eco-anxiety knowledge, and subsequently document student well-being on campus and their overall perception of risks and vulnerabilities, such as disruptions to transportation. Our research then attempts to answer the following: How are students at the UBC Vancouver campus perceiving climate risks and vulnerabilities relating to extreme weather events in their daily lives? As we understand perceived climate change risks and vulnerabilities for human health relating to students' poor experience with extreme weather events on the University of British Columbia Vancouver campus, we call for action from UBC to strengthen climate resilience through planning and policy initiatives.

The literature review will then be followed up by a brief outline of our methodology. A major part of our research is to record the known risks and vulnerabilities apparent during exacerbated weather events. As such, we will survey the experiences of students during the 2022 snowstorm, and whether climatological anxiety as a concept is even recognized or known to affect UBC students. We aim to do this through non-proportional sampling methods such as surveys, semi-structured interviews, qualitative secondary data extracted from social media pages such as Reddit and quantitative data derived from past academic works.

## **LITERATURE REVIEW**

### *Climate Change and UBC Action Plan*

According to the UBC Action Plan, UBC declared a climate emergency and committed to accelerating contributions to reduce the university's greenhouse gas emissions and mitigate climate change (Campus and Community Planning, 2021, p. 1). The plan outlines specific goals and tactics to reach carbon neutrality by 2035, by reducing energy consumption, advancing sustainable transportation, decreasing waste, and incorporating sustainability into research and education. Its purpose is to create a sustainable future for UBC and support the worldwide effort to address climate change. However, continuous research is crucial to gain a more comprehensive understanding of the wide range of impacts that climate change presents, given that it is a complex and constantly changing issue. The shift from little indication of impact of human health in 2001 Climate Change's third assessment report (McCarthy et al., 2001), to a confident announcement in 2007 (Parry et al., 2007) that climate change contributes to the global burden of disease and premature deaths underscores the importance of ongoing research to better understand the full range of impacts of climate change.

Moss et al. (2010) emphasizes that the implications of climate change for the environment and society will depend not only on natural systems but also on human responses to

changes in technology, economics, lifestyle, and policy. This suggests that action plans, such as the UBC Action Plan, are important but may not be sufficient on their own to address the full range of impacts of climate change. Previous research has not fully explored the possibilities of climate change mitigation and adaptation, indicating a need for further research to develop more effective responses. Therefore, the UBC Action Plan is an example of an institution taking steps to address climate change, but ongoing research is necessary to evaluate the effectiveness of such plans and identify areas for improvement.

### *Risk of Extreme Weather Events*

With the frequency and intensity of extreme weather events exacerbated due to climate change, the risks to human health caused by extreme weather events are an important consideration in our study. Toloo et al. (2014) identified the impact of extreme weather events on both the physical and mental health of humans, noting that it “affect[s] people’s health and the health system directly and immediately” (p. 90). The literature also deconstructs the need for management strategies surrounding health risks during extreme weather events, determining the relationship between the extent of health impacts and community preparedness (Toloo et al., 2014). For the context of our study, analyzing the risk of extreme weather events to human health as well as the relationship between human health and preparedness is essential.

The Intergovernmental Panel on Climate Change's report "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation," serves as an educational resource that can be used to further understand the complications surrounding our environment and mitigating the extreme weather conditions that are slowly becoming more prominent. Highlighting topics surrounding the risk of extreme weather events, Field et al. provides considerable insight into the perceived risks and vulnerabilities caused by these events. In addition, the report also provides long term strategies that societies of different scales can implement such as the notion of subtle “incremental steps” complimented by “transformational changes” which serve as an efficient method towards minimizing weather extremes (Field et al., 2012). The occurrences of extreme weather events are becoming more frequent and are causing great levels of risk and overall damages towards not just our societies but also different ecological ecosystems - it is important that we carefully draw out efficient strategies that can be implemented towards a more sustainable future.

Furthermore, studies have shown the relevance of distance regarding perception of climate change, where low psychological distance signals a greater concern. Most envision global warming as an abstract concept that is physically distant from them, thus does not affect their personal lives and decreases their concern for extreme weather events (Weber, 2015). The occurrence of Hurricane Katrina showcased how climate change is in action and affects not just the lives of those distant from us. It was marked as one of the greatest extreme weather events in the United States and created unimaginable amounts of flooding, destroying most of the established infrastructure as a result of poor planning and denial regarding the catastrophic effects climate change can cause (Krane et al., 2007). The aftermath left a lasting impression on the nation and the rest of the world, signaling a global issue rather than a local one.

In November of 2022, the Greater Vancouver Area experienced higher levels of snow than usual, leaving several students at the UBC campus stranded as transport routes were not functioning. We wish to examine this extreme weather event to assess mitigation strategies implemented by the city of Vancouver (if any), how students and faculty related this event to climate change, and their perceptions of its effects on their daily lives in relation to this event.

### *Context of Transportation at UBC*

Considering that in 2019 transportation to the University of British Columbia equated to an average of 80,200 transit trips each weekday (Falkner, 2020, p. 17), and an average of 54,800 private vehicle trips per day (Falkner, 2020, p. 27), transportation proves to be an important risk to explore. Research has demonstrated that transportation is a major contributor to greenhouse gas emissions, resulting in transportation both contributing to climate change as well as producing risks to human health. (Champman, 2007; Jaroszweski et al., 2010). UBC has monitored travel patterns from campus since 1997 to help implement management strategies and sustainable transportation planning (University of British Columbia, 2021, p. ii). While in the context of the climate emergency, this research has helped to set transportation targets to reduce greenhouse gas emissions on UBC campus (University of British Columbia, 2021, p. ii), it fails to consider the risks associated with extreme weather as it relates to transportation on UBC campus. In the context of our study, this high volume of transportation networks to UBC poses many risks and vulnerabilities to human health on campus.

### *Transportation and Extreme Weather Events*

Literature has proven that climate change poses a significant risk to transportation, with changing climate, weather, and local environmental conditions having extreme impacts on transportation networks (Meyer & Weigel, 2010, p. 393). Miao et al. (2018) have recognized that extreme weather events, such as floods, heat waves, hurricanes and severe storms present serious challenges to public transit systems (p. 421). Evidence has indicated that extreme weather events disrupt and impair transit operations, cause serious safety threats, and damage important infrastructure that is essential for transit operations (Miao et al., 2018, p. 421). Considering these severe risks to transit operations because of climate change threatening the safety of people at UBC campus, this area of study is important for our research.

Recently, an extreme weather event has proven to cause major disruptions to transportation on the UBC campus. On November 29, 2022, a large snowstorm impacted many buses travelling to and from UBC resulting in hundreds of students being stranded on campus overnight (Shepert, 2022). Further studies have shown that in a climate emergency, extreme weather events could impact transportation infrastructures and urban mobility (Böcker et al., 2013; Ngo, 2019). However, research on the risk climate change has on transportation has overlooked the relationship between climate change, transportation, and the human health of people on university campuses. At great stake is both the physical and mental health of people at university campuses as climate change and extreme weather events place tremendous stress on transportation networks. Understanding both the perceived and anticipated risks to human health in relation to transportation and climate change at UBC is essential for advancing climate resiliency and planning on the university campus.

## *Accessibility of Transportation During the Climate Emergency*

During the major snowstorm in November 2022 accessibility to and from campus was perceived to be a major challenge, with transportation networks being increasingly inaccessible (Shepert, 2022). While UBC does currently have policies and preparations in place to ensure that transportation networks are accessible during extreme weather events, after what occurred during the snowstorm in November 2022 our study questions if these current procedures are enough. In the case of snowstorms, UBC prioritizes the accessibility of the highest-risk areas of campus first, including the bus loop, hospital, day-cares, and arterial roads (UBC Facilities, n.d.). In addition to this, the current UBC procedure for faculty and students accessing information on extreme weather events includes updates on the accessibility conditions of campus, as well as class and exam cancellations on the university's website (UBC Facilities, n.d.). Considering these procedures, as well as the vulnerabilities of transportation infrastructure of past extreme weather events will provide essential background information for understanding perceived risks to human health on campus.

In addition to understanding the effectiveness of current UBC policies and procedures on accessibility, transportation and extreme weather events, our study also considers existing research on the accessibility of transportation during extreme weather events. Chen et al. (2022), studied the spatial and temporal accessibility of public transit during extreme weather events in Nanjing, China and determined that residents preferred to travel by public transit during extreme events (p. 1). While the setting of this study is distant from the setting of our study, the results of the study are still useful as they provide insight into the behavioural patterns of people during extreme weather events as it relates to accessibility. Furthermore, literature has also explored the accessibility of road networks during extreme weather events. Zhu et al. (2020) studied the accessibility of road networks during a hurricane evacuation and found that road networks were not suitable for the high levels of congestion during evacuation (p. 8). For the context of our study, this research on road accessibility provides important insight into the flows of transportation during extreme weather events and how accessible it is for people to leave spaces during an extreme event. However, the literature does not consider how these struggles for accessibility during extreme weather events impact university campuses and the health of those on campus, as well as how the accessibility of transportation may continue to be impacted by climate change. Therefore, it is important that our study considers the perceived risk to the accessibility of transportation on UBC campus.

## **METHODS**

Our research used non-proportional sampling methods as it successfully contextualizes and verifies information so that accountability for climate change knowledge and action is demanded.

### *Survey*

We distributed a 3-part online survey to UBC students to acquire demographic-related information, gauge students' general understanding of the process and implications of climate change and understand students' personal experiences relating to the snowstorm. In the first part

of the survey, we asked demographic-related questions and asked questions relating to their day-to-day such as typical commute times, to understand our data pool and note any patterns. In the second part, we drew inspiration from Global Warming's Six Americas test where respondents were placed in categories depending on their perception of climate change: alarmed, concerned, cautious, disengaged, doubtful, and dismissive based on their answers (YPCCC, 2022). This study was effective in generating a general consensus of climate knowledge and perceived risks. We implemented a similar approach, where we categorized our respondents based on feelings towards climate change and attempted to identify patterns. To determine which category to place participants in, each response to the questions in this section of the survey was given a score from 0 to 6. From this, an overall score was given to each category (Table 1) and participants were given a total score based on their responses (Table 2).

<b>Perception of Climate Change</b>	<b>Score</b>
Alarmed	23-26
Concerned	18-22
Cautious	11-17
Disengaged	6-10
Doubtful	3-5
Dismissive	0-2

<i>How much do you care about climate change</i>	<i>Score</i>	<i>To what extent are you concerned about climate change?</i>	<i>Score</i>	<i>Does climate change affect you personally?</i>	<i>Score</i>	<i>How often do you think about climate change?</i>	<i>Score</i>	<i>Do you believe that climate change will create lasting effects for future generations?</i>	<i>Score</i>
A lot	5	Extremely concerned	5	Strongly agree	6	Daily	5	It will definitely create a lasting effect	5
A moderate amount	3	Very concerned	4	Agree	5	Once a week	4	It could create a lasting effect	3

A little	2	Concerned	3	Somewhat agree	4	Monthly	3	It will definitely not create a lasting effect	1
Not at all	0	Somewhat concerned	1	Neither agree or disagree	3	Every couple of months	2	I don't know	0
		Not concerned at all	0	Somewhat disagree	2	Yearly	1		
				Disagree	1				
				Strongly disagree	0				

We used Qualtrics to develop our survey which facilitated us to seamlessly implement the Likert scale, along with other combinations of closed and open-ended questions and text boxes. Finally, in the third part of the survey, we inquired about students' accounts of the snowstorm, where we investigated the perceived risks and vulnerabilities climate change has on their lives, especially when it comes to this extreme weather event. We asked questions such as how you would describe your experience of last coming to campus during the snowstorm and do you feel you are well-prepared for bad weather on campus. The survey was anonymous, thus ensuring confidentiality, and was less invasive. We did this in hopes of generating a greater data pool. We posted flyers all over campus to gain a greater diversity of respondents in terms of faculty. We also posted on personal social media accounts and on Facebook group pages to again reach as many respondents as we could. Finally, we asked friends if they were willing to take the survey as well.

### *Interviews*

The second method we planned on implementing is semi-structured interviews which allow it to be structured and organized, yet simultaneously allowed for the interviewee to take the lead and to flow more like a conversation. Our primary intention with these is to gain insight and a deep understanding of students' personal experiences with the snowstorm incident and perceived risks regarding climate change. In order to gain interview respondents, we included the option, in the end, to opt to participate in an interview over Zoom. We combined analytical and empirical questions such as information seeking, probing, and clarifying. Our main interview questions are bolded, and the follow-up questions are included to aid the interviewee in to respond the questions if necessary.



<b>Table 3: Interview Question</b>
1. Ice-breaker question(s): <b>Tell me a bit about yourself and your experience at UBC so far?</b>
What year are you in? What is your major? Have you been going to UBC all throughout your studies? What has your favourite course/discipline been so far? Do you live off campus? How far is your commute?
2. <b>Can you walk me through your experience of the snowstorm in November and how it impacted the tasks you set for that day? Now I was wondering if you'd be able to tell me a bit about how the snowstorm altered (or did not alter) your day.</b>
Do you typically leave the house? Did the snowstorm change this? How do you typically get to campus? What mode of transportation do you remember taking that day? Did you find it challenging to get to and from campus? If so, what were some of the challenges you faced?
3. <b>What three emotions come to mind when you think of the snowstorm in November? Can you elaborate on [emotion x]?</b>
If they are struggling, ask these follow-ups: Did it frustrate you? In what ways? Did it make you anxious or stress you out? How so? Were you scared? If yes, of what?
4. <b>Did you feel like UBC properly prepared students and faculty (if at all) for this event? Why or why not?</b>
What could they have done better?
5. <b>Did the current snowstorm(s) affect your studies at all? How so?</b>
Did it set you back at all? Do you worry about class cancellations often due to the weather? Why or why not?
5. <b>Did you feel that the snowstorm put you at risk or made you vulnerable at any point? Why or why not?</b>
6. <b>Do you feel that extreme weather events play a big role in your life? Do you ever think about them? Do they scare you?</b>
Do you feel as if climate change affects your daily life? Do you ever think about it? Do you consider yourself to be an environmentally conscious person? Do you find that your actions are affected as a result? Do you feel you could do more?
8. <b>How do you think the snowstorm in November impacted the decisions you will make moving forward?</b>
Did this event change your perception of climate change vulnerability? Would you now consider yourself to be an individual susceptible to vulnerabilities?
9. <b>Do you feel like extreme weather events, specifically the November snowstorm, have changed the way you move around campus? How so? How not?</b>
Does it make you walk slower? Do you have to leave earlier? Do you avoid certain areas around campus? Do you have to take longer routes to avoid these areas?

Unfortunately, only one person agreed to participate, however, was unresponsive, so we had to come up with an alternative plan.

*Reddit Posts*

We decided to look at Reddit posts at first to gain a general consensus regarding students' perceptions of the event. We considered the language they use to describe the experience, and its associated emotions, and categorized them as either positive or negative (See Figure 8 of the *Significance* section). Since our interviews fell through, we had to rely on Reddit to fulfill a greater role than intended, thus we used the site to build onto the gap the interviews were supposed to fill, which was to gain a better understanding of students' experiences regarding the snowstorm and their climate change perceptions. While this method is effective in gaining deeper insight into UBC students' experience, it is relevant to note its disadvantages. A drawback of this method is that we cannot ask follow-up questions about their experience, so this method is more limiting than we would have liked. Nonetheless, our survey included some text box questions which provided us with a foundational idea of where students stood regarding their experience with the snowstorm on campus.

## ANALYSIS

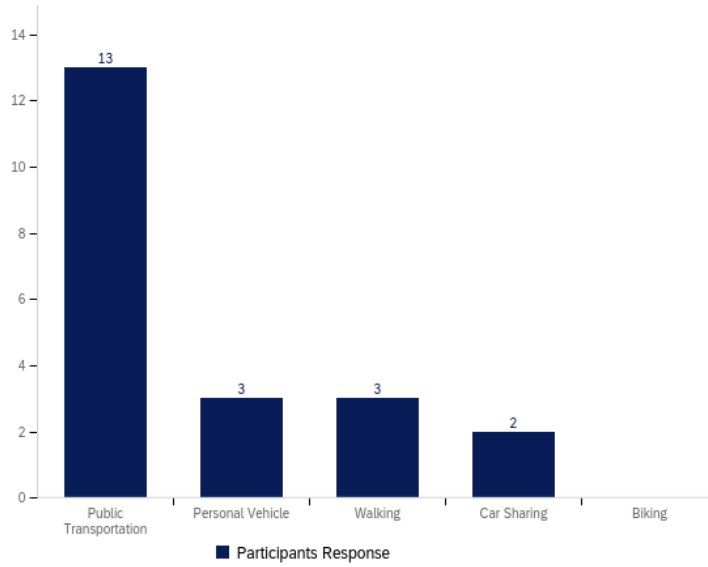
### *Demographics: Background Information*

At the end of data collection, 33 people on the UBC campus consented to participate in the online survey, with 30 participants completing the entirety of the survey. The distribution of participants was limited with 30 of the participants declaring to be undergraduate students, 2 declaring to be graduate students, and receiving no data from Ph.D. candidates, professors, or campus staff. The demographics of participants varied considerably, with the respondents' background as follows: 46.88% from the Vancouver area, 53.13% from somewhere other than the Vancouver area, 56.25% currently residing on campus, and 43.75% residing off campus. The locations of participants who declared not to be from the Vancouver area were very diverse. These locations included Washington state, Singapore, California, Germany, the Netherlands, Japan, the United Kingdom, Northern Alberta, Manitoba, and Ontario. This diverse sample of responses ensured a dynamic assortment of perspectives as it pertains to Vancouver and the city's transportation systems. Further, a text-box question where respondents were asked to write in what faculty/major they are in, resulted in varied responses. Some of these included: commerce, the arts, geography, computer science, civil engineering, media studies, sociology, forestry, economics, business management, and math. Inquiring about participants' backgrounds, including, where they are from, whether they live on campus, and what faculty/major they are in at UBC provided a baseline context into the perception of participants on extreme weather events. For instance, participants from locations where extreme snowfall events are more common, such as Manitoba and Ontario, upon analysis were considered to have differing perspectives on the November snowstorm from those from the Vancouver area. In addition, participants that reside on campus were considered to have differing perspectives on mobility and transportation on campus during extreme weather events, then those that do not. Lastly, gaining insight into what faculty/major participants declared to be in provided preliminary context into their exposure to scholarship on climate change, presumably, students studying geography likely encounter academia on climate change in their studies, more than students studying business management.

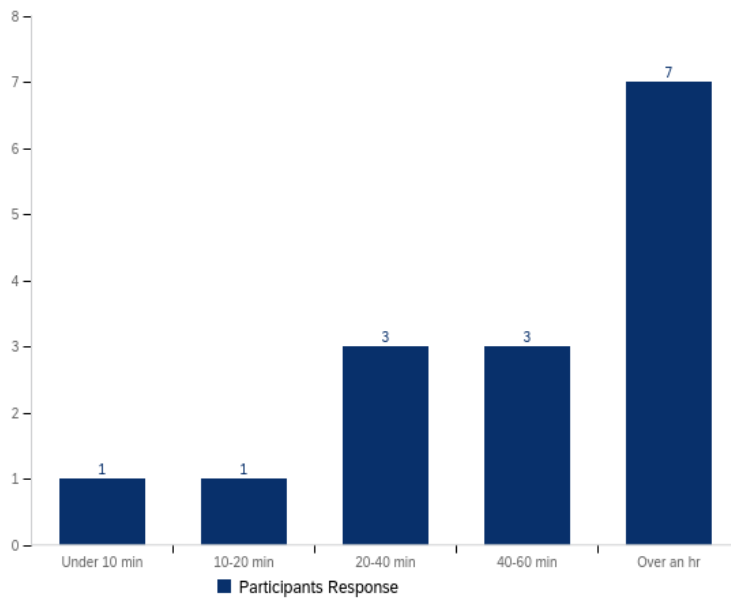
### *Demographics: Transportation Use*

The following questions of the survey recorded data on the use of transportation by participants. Considering students who live on campus and the nature of the questions, this portion of the survey was designed to not display for those who declared that they resided on campus. Although, due to a technical issue with the display logic of the survey, some participants who did declare that they lived on campus completed these questions. While this was not the intended outcome, the data provided did help with analyzing transportation use as it relates to mobility and safety on campus. Figure 1 illustrates the distribution of responses regarding the use of public transportation, personal vehicles, walking, car sharing, and biking to travel to or from campus. From this data, it is concluded that public transportation is the most widely used mode of transportation by UBC students (61.90%). Comparatively, Figure 2 shows the duration of time spent by participants travelling to and from campus. Most students spend 40 minutes or more travelling to or from campus (66.67%), with a large portion of these students spending over one hour travelling to or from campus (46.67%). This data gathered from Figures 1 and 2, indicating the high use and duration of public transportation by students provides insight into an area in which a large population of students potentially could be at risk and vulnerable to extreme weather events.

With data collected on the use of various modes of transportation by respondents, the next question inquired about the perception of safety regarding different modes of transportation during an extreme weather event (such as a snowstorm). This question of the survey employed a sliding scale, in which respondents choose on a scale of 1 to 10, how safe they perceived each mode of transportation to be. A technical issue did arise surrounding this question, in which participants reported not being able to use the slider and respond to the question. Despite this limitation, a sufficient amount of data for analysis was collected from this question. Figure 3 illustrates the mean value of responses regarding the safety of each mode of transportation. Most respondents did not rate any mode of transportation very high on the scale, in fact only a few included a rating above 6. In addition, on average, students felt safer using a personal vehicle or walking, both with a mean value of only 4.8. Despite the limiting technical issues of the survey, the overall results from the collected data of this section of the survey were sufficient to determine a perception of climate risk as it relates to transportation on campus. While students use public transportation to travel to or from campus the most and spend a considerable amount of time using it, they do not perceive it to be the safest mode of transportation during an extreme weather event.



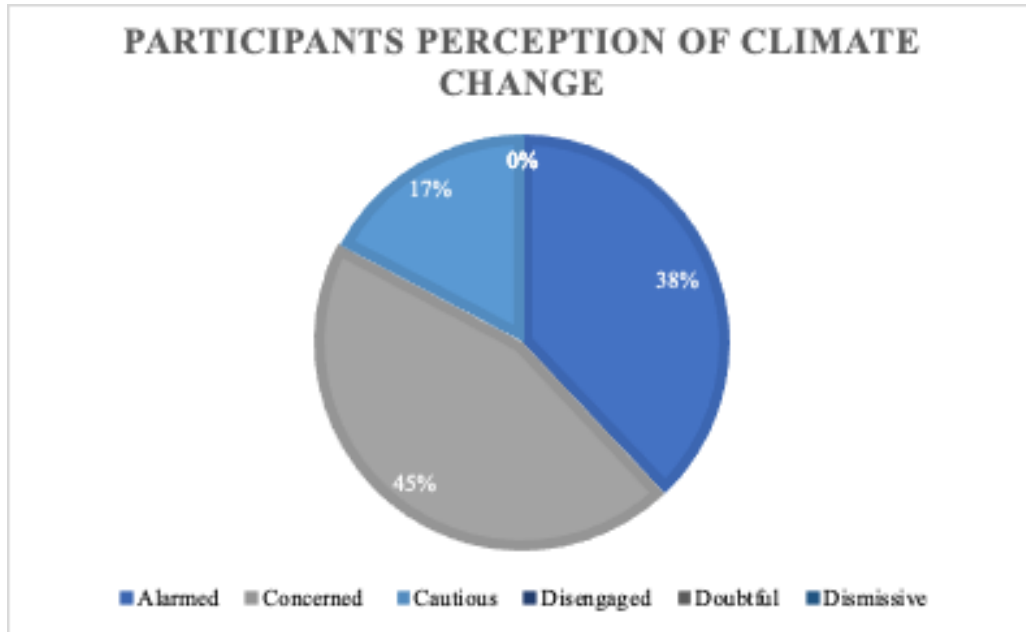
**Figure 1:** Which mode of transportation do you use the most to get to and from UBC campus?



**Figure 2:** How long does it take for you to typically get to and from campus/class?



<b>1</b>	3	4	3	4	5	19	<b>Concerned</b>
<b>2</b>	4	3	4	4	5	21	<b>Concerned</b>
<b>3</b>	3	4	4	5	5	21	<b>Concerned</b>
<b>4</b>	5	5	5	5	5	25	<b>Alarmed</b>
<b>5</b>	5	4	6	4	5	25	<b>Alarmed</b>
<b>6</b>	5	4	5	5	5	24	<b>Alarmed</b>
<b>7</b>	3	5	6	5	5	24	<b>Alarmed</b>
<b>8</b>	3	4	4	4	5	20	<b>Concerned</b>
<b>9</b>	2	1	3	2	5	13	<b>Cautious</b>
<b>10</b>	3	3	5	2	5	18	<b>Concerned</b>
<b>11</b>	5	4	4	5	3	21	<b>Concerned</b>
<b>12</b>	3	4	4	4	5	20	<b>Concerned</b>
<b>13</b>	3	4	5	4	5	21	<b>Concerned</b>
<b>14</b>	5	4	5	4	5	23	<b>Alarmed</b>
<b>15</b>	3	3	4	2	3	15	<b>Cautious</b>
<b>16</b>	3	4	6	3	5	21	<b>Concerned</b>
<b>17</b>	5	4	5	5	5	24	<b>Alarmed</b>
<b>18</b>	5	5	4	5	5	24	<b>Alarmed</b>
<b>19</b>	5	5	6	5	5	26	<b>Alarmed</b>
<b>20</b>	3	4	5	4	5	21	<b>Concerned</b>
<b>21</b>	5	5	6	5	5	26	<b>Alarmed</b>
<b>22</b>	3	4	5	3	1	16	<b>Cautious</b>
<b>23</b>	3	4	5	4	3	19	<b>Concerned</b>
<b>24</b>	5	4	5	4	5	23	<b>Alarmed</b>
<b>25</b>	5	4	4	4	5	22	<b>Concerned</b>
<b>26</b>	3	4	5	5	5	22	<b>Concerned</b>
<b>27</b>	2	3	4	3	4	17	<b>Cautious</b>
<b>28</b>	5	3	4	4	5	16	<b>Cautious</b>
<b>29</b>	5	5	6	3	5	24	<b>Alarmed</b>



**Figure 4:** Participants Perception of Climate Change

#### *Personal Experiences with Extreme Weather Events*

Data collection of the last portion of the survey was focused on personal experiences with extreme weather events of respondents on UBC campus. The results show that the majority of respondents have endured an extreme weather event while on campus (80%) and the majority of those that have, have experienced being stuck on campus longer than intended/overnight due to extreme weather (54%). It is also important to note that most students reported recently having a class or exam cancellation (77%) and feel that they do not have adequate access to information regarding weather conditions/class cancellations on campus (53.33%). These results illustrate that extreme weather events have interfered not only with students' interactions on campus but also with their learning experience.

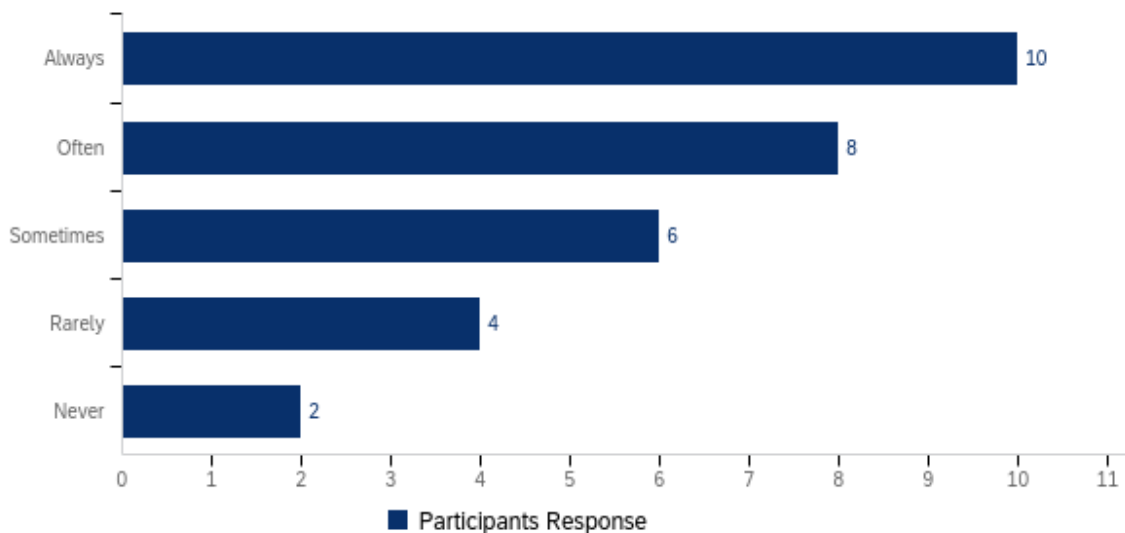
The majority of respondents reported feeling anxious or worried about travelling to and from campus during extreme weather events (Figure 5), as well as feeling unsafe walking/moving around on campus during extreme weather (Figure 6). These results are of great concern as it indicates that there is a significant risk of the decline of students' mental health and physical health when the weather is bad, and they are required to be on campus. Furthermore, most students felt that they have not received any guidance from UBC regarding maintaining physical and mental health during extreme weather events (80%). This indicates a possible disparity in initiatives by UBC to aid students' experience on campus during an extreme weather event, which as a result has infringed on the health of students.

When asked to describe their experiences of coming to campus during the recent snowstorm in November, many participants expressed having similar experiences. Despite responses ranging from expressing their experience in one or three words to detailed personal

testimonies, the overall consensus was that coming to campus during the snowstorm was difficult, unsafe, and very stressful. Interestingly, the word difficult was used many times by students, indicating a possible lack of sufficient preparations by UBC to make students' ability to get to campus during an extreme weather event simple. One student really emphasized this, stating “It was very difficult! There were barely any buses that were working and [the] commute was extremely difficult”. Many students also reported having to make difficult decisions surrounding the risk to personal health and education, by deciding not to attempt getting to campus during the snowstorm. One more detailed and extreme experience a participant described involved staying on campus overnight. They stated that:

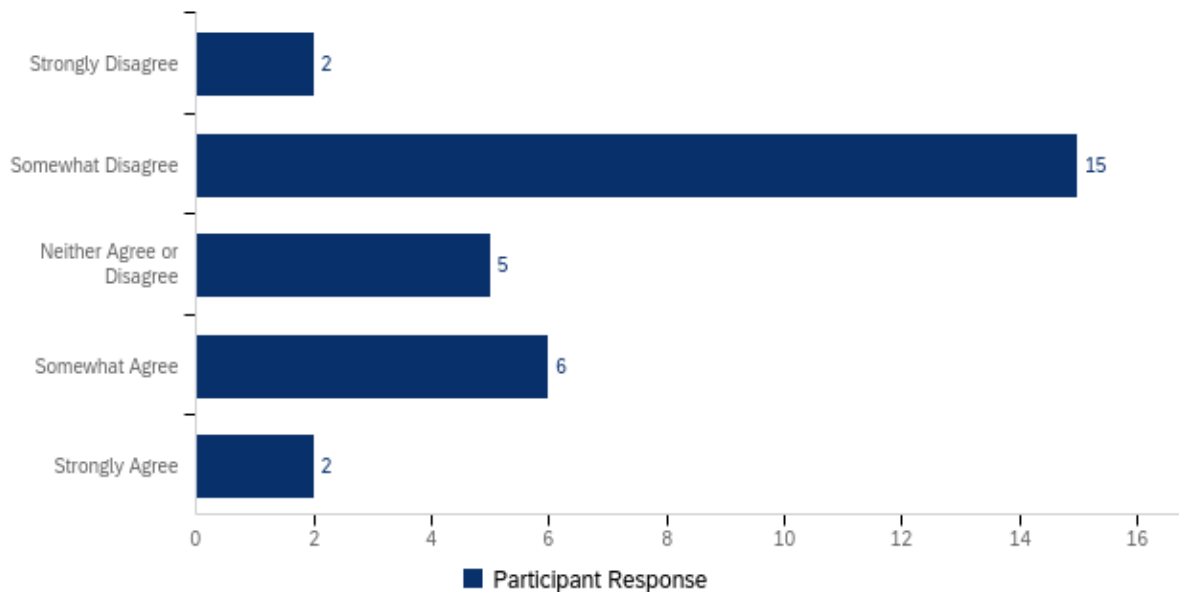
*I waited outside for the bus for two hours. There were a bunch of other students there. Then this guy from the Nest said they were opening up the Nest all night for us because the R4 buses were stuck and couldn't get up the hill. So, then I slept on top of the Egg all night. It was an adventure.*

This testimony gives insight into the consequences of students not being able to leave campus due to an extreme weather event. Overall, the results from these personal testimonies illustrate a significant risk to the physical and mental health of students when they are required to be on campus during an extreme weather event.



**Figure 5:** Do you ever feel anxious or worried about getting to/from campus when the weather is bad?





**Figure 6:** Do you feel safe walking/moving around on campus during extreme weather events/bad weather?

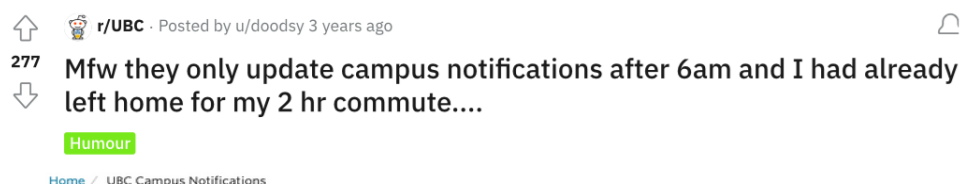
## SIGNIFICANCE

From our collected data pool, it is crucial to highlight that most students believe they are unprepared for extreme weather events. Uncertainty around risk and future vulnerabilities, paired with a mixture of caution and concerned, climate awareness all indicates towards a growing number of students on the UBC Campus who feel they are inadequately prepared for abrupt environmental changes. The problems students experienced, drawing from our main evaluative findings, were [1] delayed public transportation, [2] snow blockages, and [3] silence from UBC concerning updates and notifications.

As shown by our survey, most respondents required an hour of commute by public transport to get to campus. Students displayed heavy reliability on public transportation networks in Vancouver and prevalent large scales of student mobility. As a result, it can be advised that the lack of updates and cancellation notices UBC disseminates should be critically evaluated when assessing ways in which student vulnerabilities on campus can be decreased. As UBC recognizes the ongoing onset of climate change and its impact on the Vancouver campus, UBC'S silence not only shows a lack of preparation by the university surrounding climate change but stands out as a problem concerning all students at the UBC campus. As can be indicated by 53.13% of students coming from outside the Vancouver area, and 46.88% being from Vancouver. Overall, omission of concise decision-making and early updates poses a moderate risk of vulnerability for students who must prepare an hour or more in advance for commuting.

As is indicated in Figure 7, the UBC campus notifications website updates around 6:00 AM. This has now been observed to be inefficient for students who possess large scales of mobility. Thus, updates only support students who either live close to, or are on campus. This creates an underlying bias within the UBC statement in that it “prioritizes accessibility in high-risk areas” (UBC Facilities, n.d.). Paradoxically, this accessibility only benefits near and on-

campus students, who do not require extra time to commute to UBC. Therefore, their notification times can remain more flexible. To further draw out the importance of transparency needed between UBC and its student body, complaints on the inefficiency of UBC updates has been a major topic unresolved for years, as can be further highlighted by Figure 7, showcasing how urgent appeals by students to increase notification efficiency has displayed ongoing neglect for 3 years.



## UBC CAMPUS NOTIFICATIONS

### Weather Advisory

Dec. 21, 2022 – 5:50 p.m. PST

All exams scheduled for Thursday Dec. 22 on the UBC Point Grey campus will proceed as scheduled. Campus remains open and operations continue as normal.

For information on transit, visit [Translink Alerts & Advisories](#).

Please note the campus is NOT closed.

Dress for the conditions with appropriate footwear.

UBC Point Grey snow and ice removal priority maps are here: <https://facilities.ubc.ca/services/ice-prevention-and-snow-removal>.

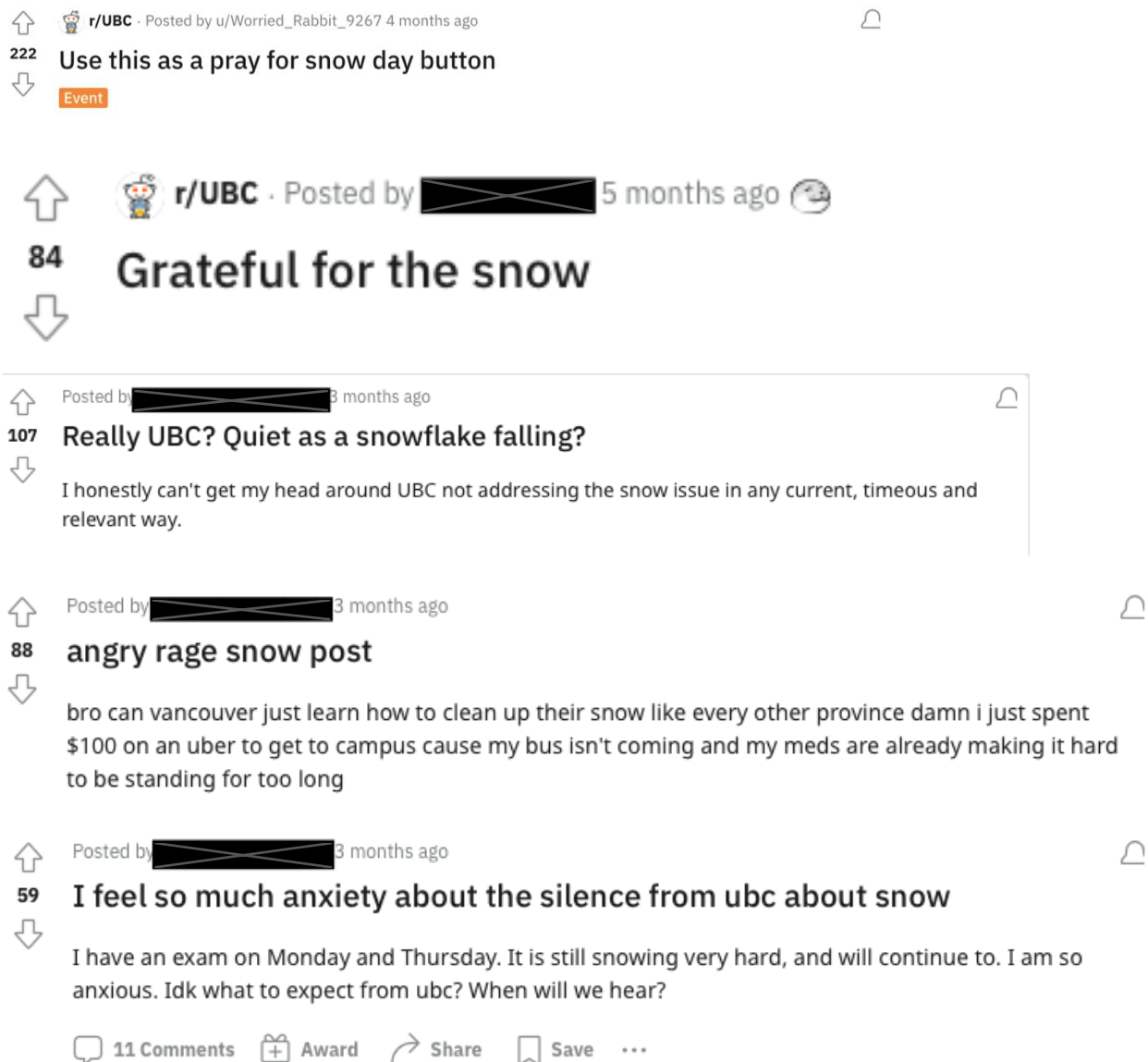
Please sign up for the UBC Safe Vancouver app at <https://srs.ubc.ca/ubcsafe>.

#### QUICKLINKS

- [UBC Emergency Procedures and Information](#)
- [Emergency Numbers](#)

**Figure 7:** Top screenshot sourced from *Reddit*, displays the ongoing years since initial complaint, upvoted by 276 students. Bottom screenshot sourced from *UBC Campus Notifications*, showcases earliest time of update during the 2022 snowstorm.

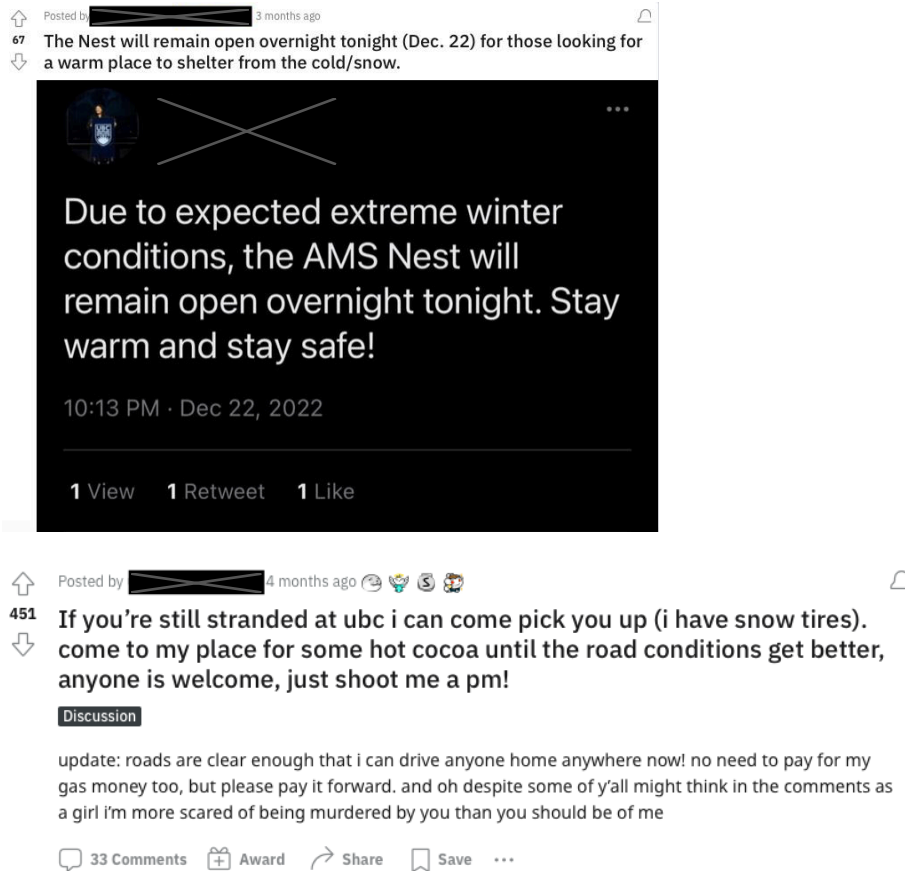
Lastly, as can be observed by Figure 8, Reddit Posts presented two extreme variations in emotions, from negative to positive. The raw, informal language used by students to voice concerns and excitement about the snow is significant not only to this research but to UBC's collective. Whilst the site ultimately portrays two binaries of emotion, mainly gratefulness or discontent, strong emotion is significant to UBC as a body to help realize the extreme emotions of students, surrounding UBC policies outside of a formal, classroom setting. In consequence, their opinions may be skewed by the classroom atmosphere and peer pressure.



**Figure 8:** Sourced from *Reddit*, November to January 2022. The top two screenshots show high enthusiasm for snow, whilst the bottom three screenshots show exasperation and disbelief towards UBC’s silence.

These were just a few of several posts pertaining to the snowstorm. While some students seemed to be happy about the snowfall, the vast majority of posts expressed discontent with the lack of preparation from UBC and their silence with the snowstorm event. Additionally, students presented anxiousness regarding whether they will take their exam, showcasing how the extreme weather event was inhibiting students' learning experience. Students' worry should be related to preparing for their exams, not planning for UBC's potential downfall in looking out for the student population's risk and vulnerabilities during extreme weather events. This calls for UBC

to take greater initiative in prevention and planning strategies to assure students are not at risk during extreme weather events.



**Figure 9:** Sourced from *Reddit*, December to January 2022. These screenshots show the UBC community coming together at a time of need.

We were delighted to see the UBC community coming together to minimize the risk and vulnerabilities students are experiencing as they commute due to the lack of preparation on UBC's part for planning extreme weather events. The student in the first tweet was attempting to advertise the AMS Nest being available for the students that were stuck on campus. In addition, someone went even far as opening their homes to strangers and putting themselves at risk, as they offered to drive to and from campus, highlighting inadequacies in UBC planning for extreme weather.

## FUTURE DIRECTIONS

Our goal, through providing this research to UBC's organizational collective, is to aim towards a future where students face low-risk, stress-free environments. Altogether, to substantially decrease vulnerability surrounding sudden weather onsets at the Vancouver UBC campus. Through our collaboration with SEEDS, we can aim to investigate flexibilities around snow weather updates: We propose that decisions be made the night before, so that students can

prepare appropriately for their commute journey, well in advance. Eco-anxiety brought about through notifications too close to their commute times is one issue we would like to abolish by pushing notifications times to the day before. This “early warning” approach should be further established within UBC bus disruption notices and snow removal updates. Providing this additional information on the UBC Campus Notifications website would substantially benefit students in the long term, increasing risk perception without perpetuating a sense of climate uncertainty.

Additionally, we encourage UBC to take further priority of its students who live farther off campus and to further recognize that its student body is not representative of its main campus, but its student populations far outside its imagined institutional boundaries.

Subsequently, resource accessibility is an additional top priority as students feel they do not have access to information and advice surrounding extreme weather. Providing a website dedicated to dealing with heavy snow for instance, or recommending safe pathways around campus would directly benefit not only international, but local students and their mobility around campus.

With the consideration of short-term implementations, a physical approach which could prove helpful is to evaluate spaces around the UBC campus and to analyze versatility within UBC infrastructure and design; Study rooms which can be converted into make-shift overnight emergency shelters through providing cheap, but effective and space-efficient fixtures such as corner sofas or the availability of folding camping cots (accessible by asking for permission or providing students with a password for easy and appropriate access), would further give students a place of refuge if they find themselves stuck on campus overnight. Limitations to this approach, however, include the misuse of provided resources, though this is still an approach to be considered as UBC currently has no shelters dedicated to climate emergencies. Especially with the prevalence of student refuge from heavy climate-induced snowstorm events.

## **CONCLUSION**

### *Data Interpretation*

Looking at the set of data we compiled, we can gain deeper insight into how the recent snowstorm influenced the student body of UBC. Not only were there consistent reports from students who stated that they felt unsafe and had less security during an extreme weather event. In addition, these events have also taken a strong physical and mental toll on the well-being of students who do have to undergo these extreme weather events. Putting the attention towards UBC, being the institute, we all attend and for some, particularly the international students, this campus is where we often call home. It is important that UBC can establish that trust and security for us students and even serve as a shoulder we can lean on at times. However, the approaches UBC has been taking regarding these extreme weather events have made it hard for students to feel the genuineness and consideration surrounding their safety whenever an extreme climate event was to happen. There have been times when classes were not classes or were

moved online last minute - which only made it more inconvenient for those who need to make their way onto campus, particularly those who have over an hour commute or need to rely on public transportation which even at times can be unreliable due to the weather events. Overall, as students, we do understand that it is hard to go about being able to find immediate solutions to these ongoing issues and that this is a learning process that even UBC is trying to learn how to solve. However, we also do believe as the student body, that it is important to look to work together in tandem to come out with a more efficient and effective solution

### *Limitations*

Whilst undergoing this experiment we were met with a few obstacles and road bumps that served as limitations for us but as mentioned, this is a learning experience for us all and in order to improve and maximize this experience, we need to be able to not only acknowledge our limitations but also capitalize on them and find out a proper solution in order to avoid these issues in the future. The first one being that there were technical inconveniences that we faced in the Qualtrics survey, specifically a problem with the slider bar being inconsistent with the mobile version of Qualtrics. In the future, it is necessary that we include a test-run stage on the possible general devices (Windows, Android, MacBook, iPad, iPhone) prior to releasing the survey to the general public in order to mitigate these technical difficulties from coming up and to ensure consistency and success when others begin to fill out the survey on their own device. Another inconvenience that we faced is that we had a lack of interviewees. Although all participants gave extremely considerable and useful insight into our research topic, very few of them wanted to take it to the next level of commitment and get in on an interview. Having these interviews would have been able to bolster our current data as well as possibly gain further insight into other related topics of focus. Lastly, we feel that this research topic is too specific as it focuses primarily on the most recent snowstorm. In turn, this limits the potential sample size of individuals willing to participate in our survey as it may only be applied to those who were in Vancouver or on campus during the time of this event. All in all, we would say that we are happy that we faced some road bumps because if we were to conduct another research experiment, we would feel confident in our ability to obtain the most effective data whilst having a smooth process to it.

### *Takeaways*

In addition to the lessons learnt from the limitations we faced, there are other general takeaways we can gather from this experiment as a student body. The first one is that anxiety and a strong level of concern are present when looking at climate change and extreme weather events. This is something that UBC should take note of as there is a perceived risk to human health on the UBC campus. Thus, we need to increase community and student partnership and disseminate ideas on future ways UBC can plan to ensure we can provide a safe and open space for every individual.

Focusing on the recent snowstorm, we stress incentives by UBC to act towards improving their logistical infrastructure to ensure security and consistency towards their offered methods of transportation. The majority of those who participated in our survey stated that the most recent snowstorm was “difficult” on them and provided several inconveniences in navigating their way in getting to and from campus.

Lastly, as aforementioned, we as students do understand that there are policies, rules, and regulations that UBC must follow as an academic institute when it comes to planning policies surrounding extreme weather events. However, as the student body, greater levels of transparency and improved communication as transparency would greatly increase knowledge as to how best prepare. There are students who live an hour away, who have settled in Vancouver for the first time, and who are experiencing snow for the first time - and so overall, we stress that UBC should take all these things into consideration, to ensure the high levels of security and safety. With all things considered, we are hopeful that UBC will take the necessary steps to mitigate the concern as well as improve its approach surrounding extreme weather events.

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