Perspectives on Climate Change Education and Actions from Environmentally Conscious Youth in British Columbia

Mark Frank

A Thesis submitted in partial fulfilment for the Degree of

Master's of Education

Faculty of Education, Lakehead University

September, 16th, 2022

Abstract

This thesis employs mixed methods consisting of an initial survey followed by a focus group looking into the views of youth aged 16-20 regarding climate change education. The guiding question of this research is: *What are the views of environmentally conscious youth in British Columbia on climate change education and action?* Participants included in this research study are currently in secondary school or had recently graduated from the province of British Columbia's K-12 system and are currently, or have recently been, involved in environmental organisations. This research employed the methodology of participatory action research with youth as co-researchers from the initial crafting of survey questions through to member checking findings in a focus group. Data were collected using a survey style Google Form which was distributed to environmental group leads around British Columbia and circulated through word of mouth at activist events such as the September, 24th, 2021 School Climate Strike hosted by Fridays4Future-BC. Data revealed youth are disheartened by the current state of climate change and would like climate change to be incorporated into K-12 schooling starting in elementary school with topics to be focused on the science behind climate change as well as solutions. Findings include youth perspectives on schooling and government that are relevant for educators and policymakers involved in climate change education and action. Areas to build on this research include broadening the participants to a general population as a comparison and to extend this research across Canada for interprovincial comparisons.

Keywords: climate change education, youth climate change activism, climate emergency, climate crisis, co-research, participatory action research, youth participatory action research, British Columbia, climate change curriculum.

Table of Contents

Chapter One: Introduction

This thesis documents the changes environmentally conscious youth see as imperative to address the climate emergency within the classroom and beyond. The largest stakeholders in the future are yet to be adequately consulted on what they believe should be done. Thus the guiding question of this research is: *What are the views of environmentally conscious youth in British Columbia on climate change education and action?* Youth as participants in an active society need to have their opinions moved from placards to policy. In order to properly answer this research question, there are multiple areas that inform this thesis. Background as to youths' emotional state, their belief in who the largest contributors to climate change are, and what barriers to progress they believe exist, are all necessary to inform policymakers and educators alike.

This thesis follows a sequential explanatory mixed method approach (Creswell & Creswell, 2018). The initial quantitative survey data were followed up with a focus group discussing findings from the survey. The survey was developed with participation from youth members of environmental groups. In this way, I used a bottom-up approach where youth are informing practitioners about areas they see necessary to their education. This thesis focuses on youth aged 16-20 who are currently in, or who have recently graduated from, secondary school in British Columbia, Canada. Ethics consideration limited the lower end of ages of participants to those 16 and over, and as this research was specifically focused on secondary school students the ceiling was set at 20 to include students who had recently graduated from BC secondary school. The youth age aligned with that of other researchers, (Collado et al., 2019; Ferragamo et al.,

2020) who similarly sought youth understanding of climate change and environmental behaviours.

It is vital that we understand the mindset, attitudes and aspirations of youth in order to improve current climate change education and to support students more comprehensively through this ecological and societal emergency. This research sought participants that were perceived to be environmentally conscious. To focus on individuals who are environmentally conscious, this research engaged youth associated with environmental organisations. Environmentally conscious youth, it is assumed by this researcher, hold a baseline understanding of climate change and therefore were selected to ensure a more focused understanding of climate change education rather than asking a general population that may hold varying levels of understanding on the current climate emergency. This information will help educators and adults understand the needed change perceived by youth engaged in environmentally motivated organizations or events in order to develop a curriculum that can be informed by environmentally conscious youth attempting to bring about change regarding the climate emergency.

Environmentally conscious individuals are considered citizens striving to make a difference in their lives and communities through actions and advocating policies that can bring about larger sustainable practices for society as a whole (Perera & Hewege, 2013). Youth who display environmentally conscious behaviour are those who actively make decisions to engage in actions that limit their personal impact on the environment (Perera & Hewege, 2013). This can include limiting consumption of plastic, volunteering time with clean up organisations, or organising protests and/or demonstrations against

policies that are perceived as environmentally destructive. Engaging these participants to discuss what needed change looks like is a valuable exercise as youth climate activists have shown bravery and leadership on local and global stages. Youth have been shown to be moral agents in the reframing of the climate emergency as a violation of rights (Boulianne et al., 2020) as they are the ones whose future will be shaped by life in a drastically changed climate reality (Han & Ahn, 2020). Engaging environmentally conscious youth generated responses that suggest policy that takes into account the particular nuances of education, and governments, to help bring about change.

While the idea that change is needed has been widely shared in the media (Han & Ahn, 2020), there is a debate as to what that change looks like (Bandura & Cherry, 2020; Cutter-Mackenzie, 2014; Morgan, 2020; Rousell & Cutter-Mackenzie-Knowles, 2020). It is important to survey and catalogue environmentally conscious youth voices, both as an historical record and a portfolio of opinions from which educators and academics can learn what youth value as important to shape the future they deserve. The importance of utilising these perspectives goes beyond informing adults, as youth have become a driving force for advocating for climate change policy in recent years (Han & Ahn, 2020).

Youth climate leaders such as Wikwemikong First Nation water protector Autumn Peltier (Johnson, 2017), the group of Canadian youth who attempted to sue the government for climate action (Hernandez, 2020), and the two Albertan youth, Océanne Kahanyshyn-Fontaine and Jaeda Cardinal D'Auteuil, who were selected as delegates to speak at COP 26 (Konguavi, 2021), highlight committed actions and show the range of

outspoken youth voices in the Canadian climate movement. Studies have shown the environmental perspectives of youth worldwide on the topic of climate change (Boeve-de Pauw & Van Petegem, 2010) and what motivates environmental activism in youth (Schmitt et al., 2019; Wallis & Loy, 2021); where my research differs is in establishing what that 'change,' as perceived by youth, should look like in BC. These findings are limited to BC specifically as I work with youth involved in this province and wish to use this as a starting place beyond moving to research in further areas. This thesis helps fill the gap in academic literature through its examination of what youth believe needs to happen to mitigate some of the worst possible outcomes of the climate emergency. It is hoped this research will be the foundation of a much broader study which will look across Canada and then potentially beyond to catalogue the perspectives of youth and the current youth-led climate movement for the academic canon.

It is important to note that participants' views may differ from what policy experts working in the field of climate change are calling for. While it is important to gather youth responses to inform educators, these views should be considered in conjunction with expert voices. Broadly, K-12 education can play a vital role in the fight against climate change worst case scenarios (McNeal, & Petcovic, 2019), but without consensus on the perceived needed response, it is hard to act in a meaningful way. While curriculum policy change takes years, from an education perspective tackling the climate emergency begins with moving beyond climate literacy and instead implementing a holistic view of climate change education, as a means to problem solve (Monroe, et al. 2019).

As a science department head with experience in multiple education systems from around the world, I have always been drawn to the impacts that education and specifically climate change education can have on engaging students. I have witnessed how teaching the science and solutions of climate change has the power to enable youth to care not just about learning but also about their place in a community. Since moving to British Columbia in 2018, I have been actively involved in multiple organisations calling for the curriculum to bring climate change understanding and solutions to K-12 schooling.

As a teacher, I have daily interactions with students who are seeking to make the world a better place through their educational pursuits. I began my teaching career in Nova Scotia where environmental issues focused on the ocean and depleting fish stocks. After teaching in NS, I moved to England for the formative portion of my career where climate change education was siloed in the science department's teaching of the greenhouse effect and specifically the importance of bees. Following my time abroad, I moved back to Canada but transitioned from the Atlantic to the Pacific, all the while growing my passion for the potential climate change education has to build student connections to their world and support in solution building.

I have witnessed how students are becoming increasingly aware of the importance of climate change education, and have become aware of my relational agency as an educator, both through teaching and learning from youth. It is my responsibility to help foster educational change to help students understand how to make the world a better place and, through listening to youth, I am able to prioritize what they see as important towards that end. As an educator and adult, I see it as my

duty to become an expert teacher in areas that students are most interested in and likewise that may be challenging or sensitive. As such topics require rigorous academic knowledge it is also important to be humble when times call for co-learning alongside my students. Focusing on the issues of climate change within the classroom, I can help students understand where solutions are possible while demanding change in areas currently lacking progress. As a way to demonstrate this relational agency, this study has been informed by youth participatory action research (Trott, 2019); multiple youth organisations have been consulted in the development of the aims, survey questions, and targeted outcomes of this research. The involvement of students is supported as an approach described by Damon (2004) as Positive Youth Development, which aims to have education utilize youth's potential rather than focus on mediating deficits. Furthermore, following the research of Allen et al., (2016) which concluded respect and trust are essential in building strong student teacher relationships; this research sees involving environmentally conscious youth in curriculum development as essential to providing agency in regard to the climate crisis.

The current climate emergency is of grave proportions and worsening at an alarmingly rapid rate (Masson-Delmotte et al., 2018; Roy et al., 2018). One of the common complaints from youth captured in the media is the failure of adults, governments and institutions to take climate change seriously and respond with sufficient speed (Canadian Press, 2021; Crawford et al., 2019; Uguen-Csenge, 2019). Although it is acknowledged these findings are from more than just what can be cited in the media.

I want teachers and policymakers to also be held accountable for their perceived inaction and I hope to set an example to gain the trust and respect of my youth participants. Through providing the curriculum recommendations of environmentally conscious BC youth and summarising their views regarding climate change and solutions it is ultimately hoped that climate change education in BC can be developed to a standard that will both support student understanding of the daunting issues facing them as well as hold clout with youth calling for action in the classroom. The society that we now find ourselves in threatens the lives and future of all living things on the planet and must be addressed with the urgency articulated by the word *emergency*. There has never been a greater necessity to 'act now,' as the future of our planet depends on it.

Chapter Two: Literature Review

As this thesis is focused on the specific context of secondary students in British Columbia, I present a look at the youth call for climate change education in BC and a description of the current curriculum in BC K-12 schooling. With the background established, the literature review describes broadly an understanding of current support for climate change education in Canada and globally. Lastly, as this thesis explores youth perspectives on needed change, the literature review lays out driving forces for pro-environmental behaviour and the call for student voice to be incorporated into decision making.

The overview of emerging best practices in climate change education and the driving forces for pro-environmental behaviour highlight why youth voice is needed in consultation. To better inform educators of their students' understanding, environmentally conscious youth voices can help to build climate change education, an area that is currently sparsely integrated into the BC curriculum. These sections build on an assumption that educators and the education system should reorient policy and practice to ensure that students are equipped with the knowledge and skills to graduate as climate aware citizens.

Education and Climate Change Education in British Columbia

Situating the current state of education in the provincial K-12 system in British Columbia, the most westerly and mountainous province in Canada, requires a look at multiple areas. An overview of the province's population and recreational activities allows readers to understand BC's connection to nature both intrinsically and economically. A background in the recent changes to provincial education shows a

missed opportunity in addressing what is unarguably the most pressing emergency of our time. Furthermore, waiting for an update to guiding documents is a hindrance to more rapid progress to/for CCE. As an educator working in BC, looking through the descriptions of the courses that detail climate change and or the environmental impacts of humans shows the lack of robust climate change education. These shortcomings suggest the need for curriculum change.

BC is home to roughly five million people (BC Government, 2021) and some of Canada's most sought after outdoor recreational activities. BC offers a wide variety of natural pastimes, from snow sports, mountaineering and camping, to sailing, diving, and surfing. I personally moved here from London, England seeking this connection to an outdoor lifestyle and have been steeped in its opportunities since arriving in 2018.

BC is divided into public school districts with additional students in independent schools. The vast majority of these schools follow BC's redesigned curriculum which was introduced to the province in 2016 and implemented in 2018 (New West School District, 2022). The new curriculum was designed to be more open-ended and competency-based, getting students away from content-heavy learning (New West School District, 2022). With the introduction of the new curriculum, BC removed subject specific provincial exams (City News, 2016) found elsewhere in the country and instead opted for a literacy and numeracy assessment that helps to gauge students' performance against ministerial standards, but does not affect a student's grade.

At a glance, the BC curriculum contains only a single course with some mention of climate change, and a handful which mention human impact on the environment, namely Human Geography 12 and Environmental Science 11/12. The only course to

directly mention climate change is Science 7, which has a unit based around "evidence of climate change and the recent impacts of humans" (BC Government, n.d.).

While the BC Ministry of Education is seeking to further design and build out the current climate change curriculum, they believe "British Columbia's redesigned curriculum offers a strong foundation for climate change education" (BC Government, 2021). As someone familiar with the BC curriculum I have observed that the prescribed content offered is far from focused; however, if a teacher understands how to make links to the big ideas overarching the Ministry guidelines there are many possibilities for climate change education. I have situated myself as a supporter for a more robust climate change curriculum and while I acknowledge the BC curriculum has the opportunity to embed climate change into teaching and learning, the onus is currently on the teacher rather than prescribed by policy documents.

As a result of this inadequacy, a student-led and maintained organisation, Climate Education Reform BC [CERBC], has emerged to pressure the government into updating curriculum documents with a more explicit understanding of, and solutions-based education dealing with, climate change. CERBC is a student-run organisation seeking "to see the effective implementation of climate change education that fully addresses the complexities of this topic and prepares students to fight climate change" (CERBC, n.d.). CERBC began in 2020 and with support from educators and professionals, created a draft list of demands for the Ministry of Education to update the BC curriculum.

A look at CERBC's needs provides a detailed list of what this youth group in BC would like to see in terms of climate change education in the province. CERBC put forth

a call to the Ministry of Education to declare a climate emergency and the

implementation of "school infrastructure in alignment with transitioning towards a 95%

reduction in greenhouse gas emissions by 2030" (CERBC, 2021). Furthermore, CERBC

is calling for the creation of a youth advisory committee to "ensure youth voices are

consistently heard" (CERBC, 2021). When detailing specifics about what should be

done in the classroom they are calling for "a revision of the K-12 curriculum to

implement comprehensive intersectional, interdisciplinary, and action-oriented climate

education across subjects" (CERBC, 2021), and the resources for supporting teachers

to achieve such change. I support CERBC's goals and intend this thesis to as well. To

monitor changes and progress they desire the formation of a committee to review

current climate change education in the province, with a further committee established

to follow along with the implementation process for climate change education within the

province (CERBC, 2021).

It was at their first series of wisdom circles in the fall of 2020 that I became aware

of CERBC and their efforts. The students have since met with the Ministry to present

their desired changes to the curriculum, and although their opinions were heard, they

were not heeded (CERBC, n.d.). CERBC has gained the support of the BC Teachers'

Federation, among other environmental organisations in BC, and continues to gain

support through grassroots campaigning for their cause.

Through correspondence with the Ministry of Education, I have been able to gain

insight into the complexities of updating the curriculum, and while those at the Ministry

are sympathetic towards the goal, the administrative system has not moved fast enough

for the CERBC demands for climate change education to enter the curriculum. With the

curriculum documents having been updated in 2018, Ministry of Education representatives have noted changing the entire curriculum will be difficult as a generation of students has yet to go through the new system to assess its effectiveness (Ministry of Education, personal communication, June 21, 2021). While arguably this is a short-sighted view from the Ministry, they "are currently planning a number of actions to help support teachers in furthering climate change education in B.C. schools" (BC Government, 2021, para 10).

BC has pivoted its education system away from explicit content descriptors towards competency-based approaches, which can be seen as a forward-thinking, novel approach to learning (UNESCO, 2022), but without clearly addressing the most pressing issue of our time any novel approach falls flat. Of the groups calling for reform, none have currently added to the academic canon through publishing research and while many are publishing information on their websites, I intend to publish in the peer-reviewed literature.

Background on Climate Urgency

A look at the history of climate change explains why it is imperative this topic be covered in all classrooms. Through reviewing gaps in climate change policy and climate change education policy, a rationale for youth-led activism around improving climate change education can be understood. Since this thesis explores youth demands for climate change education, it is important to look at the history of climate change and how it has come to be perceived by youth.

It was not until the 1970s that greenhouse gases and the greenhouse effect were fully understood by scientists and recognized as a troubling scientific occurrence (Le

Treut et al., 2007). The first alarm of human induced climate change accumulated after 120 years of weather and climate science from nations cooperatively studying the global patterns of Earth's dynamic systems. While from the 1970s until recently there had been debate about the reality of human induced climate change, scientific consensus unequivocally agrees on the causes of climate change (Powell, 2011).

The causes of climate change have taken decades to understand. By the 1970s, building on science from the 1800s, the greenhouse effect from the trapping and reflection of solar radiation became the first universally agreed phenomenon that would later be associated with climate change (Bressler, & Shaviv, 2015). While the greenhouse effect has been incorporated into science lessons globally, in the 50 years since, scientists have identified a myriad of climate disrupted phenomena attributed to humans which remain dangerously absent from our curriculum (Monroe et al., 2019). Youth in British Columbia have recognized this gap in the curriculum and have begun calling for reform (see Climate Education Reform British Columbia [CERBC], n.d.).

The climate change crisis has been acknowledged for decades with an urgency that has been growing steadily but has not yet presented itself in a global governing system necessary to bring about needed action (Rousell & Cutter-Mackenzie-Knowles, 2020). The call for solutions to real problems is what saw millions of youth marching in 2019 (Boulianne et al., 2020) and what inspires the CERBC youth to call for change to the British Columbia K-12 education system. With the added urgency of an economic recovery following the global Covid-19 Pandemic, educators and citizens alike must hold politicians in power to account for a just and green recovery that will build hope and stability for future generations (Carney, 2021).

With every passing year, the window to mitigate climate change worst-case scenarios becomes drastically shortened. Catastrophic events are devastating the globe at unprecedented rates, with increased tropical storms, droughts, floods, food insecurity and rising sea levels affecting the most vulnerable members of our society daily (Roy et al., 2018). At the time of writing, over the last year, BC has seen a heat dome effect which took the lives of hundreds of humans and millions of animals in Western Canada (Ghoussoub, 2021; Yurk, 2021), deadly forest fires have burnt with unprecedented voracity (Kotyk, 2021), and drought followed by mudslides and flooding has decimated many agricultural areas in BC (BC Government, 2021). Experts have decreed that if the planet warms by more than 1.5°C, the consequences will be catastrophic and the deadline of our ability to mitigate that risk is rapidly approaching (Masson-Delmotte, 2018). As youth arguably will have the longest lifetime affected by continually worsening climate emergencies it is appropriate to consult them regarding their views on mitigating climate change worst case scenarios (Cutter-Mackenzie, 2014).

The global youth climate movement was started in 2018 by Greta Thunberg and gained global attention through the organisations that took up the cause, led by Fridays for Future also known as the Schools Strike 4 Climate. This movement created robust, unavoidable media attention around youth calling for change within education and political systems (Boulianne et al., 2020; Uguen-Csenge, 2019). Over the last several decades there has been a gap between the severity of climate impacts and the lack of societal response; the youth climate movement is a youth-led response that poignantly articulated this gap (Boulianne et al., 2020).

Climate Change's Place in Education

This section starts with explaining how climate change education is currently sidelined and then establishes a place for climate change in education to be integrated into formal education systems. This is followed by a discussion on limitations of current education models along with researched based best practices. Research has identified emerging climate change education best practices which has led various groups (NGOs, educators, researchers, and youth activists) to advocate for improving climate change education policy and practices in schools. Lastly, this section argues the importance of embracing youth perspectives and building intergenerational relationships in order to create a curriculum that aligns with the existential reality that young people are living with.

Climate change education has been made mandatory and foundational in some global districts, such as Italy (International Bureau of Education, 2020), but more often it is siloed in the science classroom and focuses on outdated issues (Monroe et al. 2019). UNESCO has recently pushed for climate change education to be foundational by 2025 in order to use education as a tool in the fight against climate change (Azoulay, 2021). However, with districts and school boards slow to revamp curriculum, this may be delayed long beyond the short window described by the IPCC to mitigate climate change worst case scenarios (Masson-Delmotte et al., 2018). If humanity wants to limit warming to1.5 degrees, global GHG emissions must peak before 2025 at the latest and be on a reduction trajectory by 2030 (Masson-Delmotte et al., 2021). If education is to support the stated goals of reducing the impact of climate change then the curriculum

must be emboldened with the knowledge necessary to allow students to contribute to solutions.

Some of the rationale put forward as to why climate change education has not found its way into classrooms falls on both lack of government recommendations and teachers who self-report inadequate knowledge, something CERBC has called to be addressed through Ministry-provided professional development (CERBC, 2021). Wynes and Nicholas (2017) found that the government recommendations for increasing climate change knowledge in Canadian classrooms are not enough to build a robust curriculum rooted in solutions and instead continue to focus on causes, such as the greenhouse effect. A study by Teach the Future UK (2020) found that 70% of teachers in their survey did not have adequate knowledge to deliver climate change education. This compares to 55% of Canadian teachers who feel knowledgeable as reported by Field et al. (2019). These findings by Field et al. (2019) are important as almost half of student participants reported that their primary source of climate change education is teachers.

Research has shown that place-based experience (McNeal & Petcovic, 2019, Monroe et al., 2017) can provide a tangible, locally-relevant experience through which students are better able to access and understand climate change concepts. Some ways to provide nature-based experiences focused on learning about climate change are: field trips to nature sites, walking around school grounds, or learning the names of local birds in surrounding areas. This means getting students out of the classroom and into the field through connections with local organisations which are already making a difference. A hands-on example is described by Hallar et al. (2011), using a place-based curriculum through which students come to understand climate change and its impacts.

Students travel to a climate data laboratory to discover the various layers of atmosphere as experienced by a mountain through weather stations. The hands-on learning approach allows them to learn about how climate data are collected and how to interpret them from real climate scientists.

Bridging the gap between the scientific understanding of climate change and what most students learn through media and the classroom can be done by providing students with access to nature through field trips, overnight experiences, or the exploration of nature beyond the school grounds. Some literature describes the best way to cushion the rational anxiety experienced from the overwhelming destruction of the natural world as best done through a position of hope and wonder towards the beauty of nature (Climate Reality Project, 2018; Hargis & McKenzie, 2020; O'Brien, 2008). This claim is flawed from my perspective as the more I understand the beauty of nature, the more I experience a deep emotional regret at its destruction. While this is a positive and remarkable way for teachers to aid their students' connection to the natural world, some argue it is not sufficiently educational as it shields students from the reality of the current environmental emergency (Nazir et al., 2011; Shelby & Kagawa 2010; Wynes & Nicholas, 2017). While recent research in climate change education has outlined the importance of creating space for students to process complex emotions before focusing on hopeful solutions (Ray, 2020), it also requires the teaching of solutions to climate change issues in the form of practical immediate action in order to come full circle and aid the planet. Experts have called for climate change knowledge to be meshed with action in order to build agency for youth seeking to make a difference in their world (Kwauk & Casey, 2021). High rates of climate anxiety among young people

are showing up as public understanding and climate impacts mount (Ray, 2020). If

climate anxiety is to be alleviated, youth need to have some control over how their world

is being shaped (Ray, 2020).

Research has also shown that while knowledge is half the battle, too much

knowledge can have the opposite effect if not tied to success and hope (Dijkstra &

Goedhart, 2012). With the understanding that knowledge is not the whole answer, and

climate change literacy, while important, is not a determinant of learners adopting

pro-climate actions (Busch et al., 2019; McNeal & Petcovic, 2019; Monroe et al., 2019),

it should be noted that many teachers are still falling into the trap of surface-level

content delivery without addressing the whole picture necessary to tackle the climate

emergency (Shaw et al., 2020).

Climate change education literature abounds with examples of successful

experiential, hands-on learning that has empowered youth to engage with political and

governing structures to make change in and beyond their own communities. Bandura

and Cherry (2020) describe how "Felix Finkbeiner, an 11-year old German boy founded

Plant for the Planet" (p. 948), a campaign to plant trees that has successfully added

millions of trees to local and international projects, and how "three 9-year-olds spoke out

at their town meeting in Lexington, Massachusetts, to persuade their town council to

vote to overturn a law that prohibited solar panels on town buildings" (p. 948). They also

discuss how 9-year-old Milo Cress presented his "*Be Straw Free* campaign to the

National Restaurant Association, governors, and even lawmakers in Washington" (p.

949). Cherry's website (https://www.youngvoicesfortheplanet.com/) features successful

examples of youth inciting change and curriculum ideas to help teachers inspire students to make meaningful changes in their own communities.

Beyond these examples are the Climate Change + Me curriculum, designed in part with the New South Wales state government of Australia, in collaboration with youth connections to their own vision for a climate curriculum in public schools (Cutter-Mackenzie & Rousell, 2019). More examples are broadly described by Lawler and Patel (2012) who synthesized five Asian national UNICEF reviews advancing child-led climate change adaptation.

Climate change education has yet to emerge outside of the science classroom with the focus it deserves (Monroe et al. 2017). There are extensive studies that describe the ways for knowledge delivery about climate change scientific principles (Hargis & McKenzie, 2020; McNeal & Petcovic 2019; Monroe et al., 2017; Rousell & Cutter-Mackenzie-Knowles, 2020), and studies that articulate how to foster students' empathy towards nature to build connections (Arnold et al., 2009; Buttigieg & Pave, 2013; O'Brien, 2008; Tanner, 1980), and while these are starting points for climate change education in formal K-12 education these practices are still not universally employed in K-12. The literature at times identifies that emerging best practices for climate chage education are also consensus based best practices for teaching in general and thus are not limited to climate change education. Most call for a widespread interdisciplinary approach to provide students with the understanding that climate change is not just a science issue but also a social, economic, and cultural issue (Busch et al., 2019; Cutter-Mackenzie & Rousell, 2019; Feierabend & Eilks, 2011; Gvishiani et al., 1977; Hallar et al., 2011; Hargis, 2020; Holland, 2020; Jorgenson et al., 2019; Le

Treut et a.l, 2007; McNeal & Petcovic, 2019; Shaw et al., 2020; Wynes & Nicholas, 2017).

As climate change upends society, climate change education must be infused across all subjects in a holistic and interdisciplinary way (Kwauk, & Casey, 2021). The Intergovernmental Panel on Climate Change [IPCC], an organisation tasked with assessing the current scientific research reporting the effects of climate change (IPCC, 2017), has published multiple reports outlining the drastic need for near total societal change in order to combat climate change. With each subsequent publication of IPCC reports the drastic effects of climate change become more dire and the opportunity to mitigate the extreme risks associated with it shrink (Masson-Delmotte, 2018). The IPCC summarized the near unanimous scientific consensus in 2007 with the fourth assessment report [AR4] and Le Treut et al. (2007) noted how the expected tidal wave of progress following previous reports has been slow-paced. Nazir et al. (2011) described the wide range of Canadian provincial interpretations to the UNESCO Decade of Education for Sustainable Development and highlighted the varying ways that ministries of education have approached education associated with climate change. In order to effect change through education, ministries must work in a coordinated effort to go beyond small pockets of success in various Canadian provinces and regions.

Climate change education is not always the direct language used in curriculum documents, with many using terms such as environmental education, or education for sustainable development. However, Jorgenson et al. (2019) note that the "existing frameworks for EE [environmental education] offer insufficient guidelines for how to prepare students for the rapidly changing realities of climate change and the renewable

energy transition" (p. 160). In the 1980s and 1990s ecofeminism and recognition of environmental racism emerged following an intersectional understanding of the structures that oppress the natural world (Gaard & Gruen, 1993). Climate change has laid bare the disparate treatment of all inhabitants of Earth, both human and non-human alike. Education limited to teaching how environmental systems work without seeking to repair them is not thinking big picture enough. Jorgenson et al. (2019) describe how local actions to tackle problems in environmental education do not help to solve systemic issues which caused them in the first place. They note: "these focal areas inspire limited connection to the macro-level transformation of energy systems that is occurring, particularly when they remain disconnected from collective actions and innovations in the public sphere" (p. 164).

For students to experience and understand their locality with a view to contribute to a livable future they must be aware of how their climate is changing. Yet this model is not explicitly prescribed in British Columbia's curricula with documents only vaguely requesting students' "experience and interpret the local environment" (BC Government, n.d.). Jorgenson et al., recommend "that environmental educators and researchers reconceptualize children and youth as actors and innovators within a much broader social network" (2019, p. 166). Helping youth establish and make connections to others making changes in their community, province, country, or across the globe can activate one of the highest levels of teaching and learning for environmentally conscious youth.

Adding climate change content into existing formal education can help form a consensus based best practice for educators in all subjects (Monroe, et al. 2019). In summary reports on how to effectively teach climate change concepts (Hargis &

McKenzie, 2020; McNeal & Petcovic, 2019; Rousell & Cutter-Mackenzie-Knowles, 2020), there is overlap with research based teaching best practices for Indigenous students (Battiste, 2013; Cajete, 2010; Goulet & Goulet, 2014), dyslexic and students with learning differences (Gillingham & Stillman, 1946), and other more general populations of students (Deloris, 1996). Therefore the consensus based best practice is often presented as the same by all of the above-mentioned authors. Cooperative, interdisciplinary, participatory, place-based, experiential, and teaching through hope are all promoted as a universal equation for effective teaching. The difference from standard K-12 education and the next step to climate change education sees a curriculum that focuses on solutions and fosters climate active citizens (Wynes, & Nicholas, 2017).

As a prerequisite of active citizenry, students and educators must engage with activism if they want to push governments to create policy that will limit unmitigated climate impacts (Von Storch et al., 2021). Fortunately, researchers and educators have been synthesising how best to engage youth in environmental activism and solution building since the 1980s (Tanner, 1980; Weick, 1984). The tools and methods exist to encourage students to get involved in climate solutions and actions. As climate change will have profound impacts on all sectors and industries, and will implicate quality of life for young people, classrooms need to be bolstered with lessons incorporating aspects of climate change to create students engaged as active citizens beyond the classroom.

Youth perspectives are needed for future-proofing, and Indigenous knowledge is needed (Nakashima et al., 2018), not just in remote areas but also urban centres, utilising the breadth of knowledge that has been accumulated by those with the most intimate understanding of place (Malena-Chan, 2019). Complex historical injustices

such as the "debt-for-nature swaps, whereby Third World nations can exchange a portion of their natural resources to pay a percentage of their national debt" (Gaard & Gruen, 1993, p. 241) explain why the demand for expert consultation and more understanding is so high amongst individual citizens and classroom teachers (Field et al., 2019).

Jorgenson et al. (2019) recommend that environmental education "adopt a vision and strategy on climate change and energy education that more explicitly addresses the role of collective action, multifactor networks, and sociotechnical innovation in shaping energy transition processes" (p. 167). On a local scale in British Columbia, educators can choose to teach about the complex relationships and importance of old growth conservation as it applies to the environment and climate change in areas where logging is a primary industry (Morgan, 2020). This enables students and youth to explore their world around them in a proactive way that can help with issues such as the lack of legislation. According to Dhillon and Young (2010):

> Introducing legislation and creating regulatory bodies, such as the US Environmental Protection Agency, have institutionalized environmental justice within the American federal governance system. Canadian legislation that deals directly with the inequalities created by environmental injustice is for the most part non-existent. (p. 23)

Students want to be more involved but educators need to give them the tools to act, not just the inspiration to enjoy nature.

Analysing these examples of best practices in climate change education shows models exist for curriculum development that can aid BC educators and policymakers in

revamping the provincial curriculum. Youth voice and understanding is an impactful tool in creating youth agency towards needed change; this thesis adds to literature that supports a curriculum informed by the perspective of youth in BC.

Youth Calls for Climate Change Education

As youth have called for their voice to be heard (Morgan, 2020) it follows that the academic canon should seek to establish what that voice is saying (Cutter-Mackenzie, 2014). To amplify the youth voice is one thing, but to simultaneously inform policy experts as to what youth voices as a diverse collective are saying in regards to the climate emergency is the crux of this thesis. As noted earlier, youth will be the most affected by a changing world and thus their opinions matter. Youth constitutes a time of changing responsibilities, transition, and psycho-social development that further justifies the importance of cataloguing their voices in this research and beyond.

Following a look at the varied range of age utilized by similar climate change researchers with youth participants, such as Dodson and Papoutsaki (2017) using the age of 16-34, Ferragamo et al. (2020) referencing those in high school as youth, or Lee et al. (2020) using the age range of 8-19 this research sought participants from those between the ages of 16-20 as an appropriate age range. This research acknowledges that "youth" is not a homogeneous term and that there is a wide range of voices under the umbrella of youth.

It is necessary to look at what youth perspectives on needed change currently exist and how they can inform this thesis. Educators hold a position of authority that can shape the future as directed from ministries of education; however, in order to build understanding of ideas yet to be incorporated into the curriculum, educators must take

into consideration the perspectives that environmentally conscious youth currently have. Building on global literature of youth voice in Australia, South East Asia, and the United Kingdom (Lawler & Patel, 2012; Rousell & Cutter-Mackenzie-Knowles, 2020; Trott, 2019), this research specifically aims to describe youth perspectives within the province of British Columbia, Canada.

There is a wide range of literature associated with youth and climate change, but the literature discussing climate change education within BC is sparse. Morgan (2020) describes discussions with youth in Northern BC and captures their desire to have their voice heard on issues of mining, resource extraction and all environmental issues, but their work was limited to youth in and around Prince George. Their participants expressed the importance of being consulted in regards to their future. My work takes youth voice on issues pertaining to their future seriously and builds on youth perspectives in BC.

Increasingly, there is a call for climate change to become foundational to curriculum documents, as well as to establish it as the basis for all subjects with an interdisciplinary approach (Wynes & Nicholas, 2017, 2019). With the disparities within Canadian curriculum documents, and the examples of provinces adopting varying language around climate change and climate change mitigation strategies (Wynes & Nicholas, 2019), it is no wonder that students, parents and teachers all call for more climate change knowledge in the classroom (Field et al., 2019). While the Canadian government has declared a Climate Emergency, this does little for education, which is under provincial jurisdiction (Nazir et al., 2011).

A Canada-wide study by Field et al. (2019) surveyed parents, teachers, and students about climate change and their views on including climate change related learning in the classroom. They found that the majority of participants believe more should be done to educate people about climate change and importantly a majority of participants agreed that it was the duty of schools to teach about climate change. Within BC, a study by Morgan (2020) identified students as concerned about climate change-causing industry in the region of Northern British Columbia and articulated that students were keen to learn how education could train them to build greener industries in the future. Likewise, Shaw et al. (2020) carried out Alberta-based research on the effective methods identified by youth for climate change education and found that of the students who partook in the sessions, the majority of them were keen to learn about climate change through connections to the energy sector and their local environment. The students from each study reported wanting to know more.

When focusing on student perspectives nationally, Field et al. (2019) found that students believed schools should be doing more to teach about climate change in all provinces, which is unsurprising as Wynes and Nicholas (2019) found that climate change was vastly underrepresented in curriculum and textbooks in all provinces. Shaw et al. (2020) described a narrative approach to teaching Albertan youth about climate change with many of their principles articulated in this thesis' discussion of the best practices in climate change education section. They found that students were eager to learn about energy and the connections to climate change but their attitudes to hope were expressed as alarmed and they were certain that the environment would continue to worsen over the coming decade. These Canadian examples all show an alarm from

students at the rate of climate change and a demand for more to be done in the classroom.

There are few pathways for enhancing youth calls to action around not only climate change education, but also towards having a voice in their own and peers' educational development (Elmore et al., 2019; Gale & Edenborough, 2021). As noted by Elmore et al. (2019), "researchers who study youth development often have goals that are well-aligned with those of communities and youth-serving practitioners, yet practical advice on how to capitalize on this alignment is lacking" (p. 1). Seeking to capture or document youth perspectives requires youth consultation in order not to lose their voice in the process (Duggan, 2021). This construction of youth perspectives in the academic world will allow youth advocating for change to have their voice amplified by research, while academics frame youth perspectives in a critical way. In order to achieve these aims, I have endeavoured to construct this research authentically, employing participatory methods with youth.

Globally, the momentum for climate action is gaining headway, as represented by the Paris Agreement, Article 12 (Paris Agreement, 2015) and the recent UNESCO declaration on the need for environmental education as a core curriculum component by 2025 (Azoulay, 2021). Several countries and regions have adopted climate change curriculum to promote a holistic understanding of the catastrophe both globally and locally (UNESCO, 2020). However, youth are not receiving an education adequate to allow them to contribute to solutions in spite of adults' assumptions that they are (Corner et al., 2014). In the UK, Corner et al. (2014) noted it was assumed that youth are knowledgeable about climate change but their study found youth were apathetic and

required better communication from policy makers and educators on climate change if real progress is to be made.

Jaskulsky and Besel (2013) found that youth wanted governments to provide incentives for environmental stewardship. Wallis and Loy's (2021) survey highlighted youth participants' feelings of rage towards current government environmental protection standards. Amnesty International (2019), Ferragamo et al. (2020), Field et al. (2019) and Morgan (2020), all demonstrate youth are concerned about climate change in general. Findings from these surveys show the global concern for climate change and a call for more to be done by all involved, from governments to citizens, a finding hardly shocking given the numbers of youth who turned out to climate marches since 2018 (Boulianne et al., 2020). The angst and frustration of youth involved in environmental activism have been well documented in the media (Canadian Press, 2021; Crawford et al., 2019). Han and Ahn (2020) collected youth narratives demanding change following the peak of the 2018 and 2019 student climate marches. These narratives provide ample evidence of students demanding change to multiple systems.

These recent surveys that focused on youth and their perspectives on climate change have documented youths' views on the need for change but have not adequately outlined what that change might be in a coherent vision. Researchers and participants provide thoughts about what *has* happened, but there is not a clear focus on how to use mitigation strategies to help prevent what *could* happen as a result of climate change. A demographic worth focusing on is individuals who identify as pro-environmentally minded, or further still, activists, as they may possess particular knowledge regarding solutions. None of the studies described involved samples of

youth identifying as environmentally minded or as climate activists. My research helps

to fill this gap, providing a resource for academics, policymakers and educators.

The demand is clear: students marched in the millions for climate action

(Boulianne et al., 2020) before the pandemic removed their ability to publicly gather, and

activism has been happening online ever since (Von Storch et al., 2021). It is evident

that the single units in some science programs are not enough to provide students with

a solid understanding of the climate change crisis they are unwillingly taking part in. The

baseline understanding provided by environmentally conscious youth that this thesis

captures should be utilized by policy experts to help build a robust curriculum suitable

for all youth in BC.

Engaging Learners in Pro-Environmental Behaviour

As teachers and educators, we must make the extra effort in an emergency

situation to become the experts our students deserve through modelling and

demonstrating what we expect of the youth who will one day replace us. Literature

around understanding the driving forces of pro-environmental behaviour has been

around for decades with Tanner's research into significant life experiences of individuals

noting "If then a major goal of EE [environmental education] is the production of an

active and informed citizenry, environmental educators should know the kinds of

learning experiences which promote such persons" (p. 20).

Buttigieg & Pace (2013) demonstrated the link between positive experiences with nature

in youth, role models in the environmental sphere, and means to effect change in their

local biosphere. In their 2013 study, *Positive Youth Action Towards Climate Change*,

Buttigieg and Pace investigate what motivates young people to become active in

conservation, political protests, or environmental organisations pushing for climate change reform. While their study is limited in scope, with only three participants from the European island nation of Malta, the findings confirm much of what other scholars (Arnold et al., 2009; Chawla, 1999) describe as necessary components of an individuals' lived experience that predate widespread climate activism.

Looking specifically at Canada, Schmitt et al. (2019) extend the understanding of what forms pro-environmental behaviour. They look at the starting point of environmental activism and build on existing literature, exploring how to build pro-environmental behaviours in youth. Based on the strategies put forward by Schmitt et al. (2019), understanding the diverse perspectives of learners is central to engaging them in pro-environmental behaviour.

This knowledge should be used to help educators build hope among all youth, but more specifically an understanding of pro-environmental influences should help create solution-oriented youth who are working towards climate change action in their communities and abroad. Engaging environmentally conscious youth in the discussion is a first step for educators to help promote and build on what is already an established understanding of problems and solutions. Adults cannot look to youth to fix problems that have long been understood and left to fester. Youth must see adults as action-oriented themselves if they are to join in the call for change in regard to systems currently working against the Earth's climate stability.

The Need for Youth Voice

The final section of this review catalogues the demand for youth voices to be included in academic discussions. Youth have helped to shape and reframe the climate

change movement through their presence at major conferences and in the streets. Adult

educators and experts who wish to support the inclusion of youth voices must be

informed as to how to properly build up and amplify youth demands without shirking

their own responsibility to actively address climate change. Youth voices should not be

included so that adults can step aside; adults must be there to step up as leaders and

provide examples for youth to model change-making behaviours and actions.

It is noted that the current education and government systems of power are not

working and youth advocacy has called for change both in BC and globally (Han & Ahn,

2020; Morgan, 2020); the specifics of what that change looks like, how that change

might come about, and what future is imagined by youth calling for change within BC, is

not found in the literature. This research gives climate change education and climate

change mitigation strategies a youth voice. As a researcher seeking to amplify youth

voice, I am emulating what Hammersley (2004) calls a model for transformation:

> While they want research to serve action of some kind, they also usually want to
>
> transform the conventional ways in which such action has previously been
>
> carried out; and often the role envisaged for research is not just to serve as a
>
> source of valuable knowledge but also as model for this transformation. (p. 175)

The needed addition of youth voices on climate change to build a robust

curriculum can only be understood after looking at current climate change education. As

it has been established that youth will be disproportionately affected by climate change

it is important to also note that within youth communities there are vocal advocates

putting forward solutions to be implemented immediately (Peltier, 2019). Youth are

under-served by an education system that does not teach them the causes of, effects

of, and solutions to, climate change (Wynes, & Nicholas, 2017). I believe if education

systems are to incorporate climate change into their policy documents they should listen

to youth and build from a knowledge base youth are currently constructing on their own.

"It is this active engagement in local community, as in their school curriculum, that

allows children and youth to imagine and co-create preferred futures" (Field, 2017, pp.

1-2).

Researchers Han and Ahn (2020) have asked where are the youth voices in

research and literature that articulate their input, hopes, and desires for what their future

should look like? In Cutter-Mackenzie's (2014) article, 'Where are young people in

environmental education research?,' she points out that if the field is specifically

designed around aiming for better education for young people, educators should be

seeking their support as experts in their own world. This echoes the UN Convention on

the Rights of the Child, a 1989 General Assembly ratified document, which specifically

states in Article 12:

> States Parties shall assure to the child who is capable of forming his or her own
>
> views the right to express those views freely in all matters affecting the child, the
>
> views of the child being given due weight in accordance with the age and
>
> maturity of the child. (1989)

In 1992 at the Earth Summit in Rio, 12 year-old Severn Cullis-Suzuki spoke

impassionedly to leaders regarding the same need for urgency youth would rally behind

some 26 years later with the massive climate strikes of 2018-2019. Moreover, Han and

Ahn (2020), through their analysis of influential narratives of youth in the 2018-2019

Climate Strikes, found that the youth themselves are calling for their voice to be

"engaged in the design of adaptation plans" (p. 11). Furthermore, they found that students and youth were aware of their limitations for making change in that "youth activists recognized the practical limitations of their roles as immediate game changers and urged the antagonists [Governments/Fossil Fuel Corporations/Industry] to become better informed about recent climate science and take action" (p. 12). Han and Ahn (2020) conclude their research into the narratives of youth climate activists with this compelling assertion: "it is crucial to cultivate young people's climate-related knowledge and their resilience and capacity to address climate change in various mitigation and adaptation arenas" (p. 17).

Closer to home, examples are scarcer within the literature. The previously introduced article by Morgan (2020) on engaging BC youth in resource extraction industry plans for Northern BC reveals calls for youth voice on the more regional and provincial level. Youth were engaged in a series of day-long conferences to assess their opinions about the possibility of consultation with government and extractive industries in a program called "Inheritors of the Future" (Morgan, 2020, p. 447). Here youth expressed "the desire to work collectively against social and environmental injustices" (p. 457). These examples highlight the need for, and demand for consultation with youth in Canada towards, "action-oriented and accountable responses to the climate crises" (p. 445).

Moving forward from the 2019 peak of youth climate activism, educators must be careful to build on the momentum of pre-pandemic youth efforts and help to ensure that momentum is not permanently derailed by the Covid-19 pandemic (Von Sorch et al., 2021). There should be an ongoing active movement behind the scenes and screens

ready to accelerate into the streets and houses of legislation when pandemic measures are over. Youth need educators who can support their desire for immediate knowledge for needed change. Responding to the youth marches, the UN set up the Youth Climate Summit which had its first meeting in September 2019 (Han & Ahn, 2020, p. 6). Out of the summit youth participants created the Youth Climate Declaration, (UNICEF, 2021) which called on world leaders to place children and young people at the heart of their decision making in regards to climate change actions. The first commitment of the declaration, signed by multiple nations, was "advocating for global recognition and fulfilment of children's inalienable right to a healthy environment" (UNICEF, 2019). Yet what was put forward in the youth climate summit, and committed to by the signatories of the Youth Climate Declaration, has not been endorsed here in Canada as indicated by our absence from the list of country signatories (UNICEF, 2019).

As a response from a teaching and classroom perspective, educators must not forget the fervour of the youth climate strikes when dealing with post-pandemic teaching and learning. We must seize the opportunity to rebuild and provide students with the knowledge and skills they seek to be contributing members of a new green economy (Shaw et al., 2020).

Summary

This literature review has shown that youth voices have not been adequately acknowledged in response to the ongoing climate crisis. This thesis seeks to amplify youth voices in BC and help experts and educators understand further ways to help support youth through the climate change emergency. Following the 2018-2019 youth climate strikes, the message is clear that youth voice should be an asset utilized in

addressing the problem: "They brought the likely unpleasant future into the present and personalized the adverse consequences of that future" (Bandura & Cherry, 2020, p. 946).

This research follows the recommendations from Jorgenson et al. (2020) "that environmental educators and researchers conceptualize children and youth as actors and innovators within a much broader social network" (p. 166) and "that environmental educators and researchers focus on developing new narratives and guiding visions to support students' long-term engagement with energy systems and transitions" (p. 167). Through doing so, I heed Han and Ahn's (2020) assertion "that it is crucial to cultivate young people's climate-related knowledge and their resilience and capacity to address climate change in various mitigation and adaptation arenas" (p. 17). Furthermore, my research uses the power and moral imperative noted by Bandura and Cherry (2020) that "youth are especially effective messengers for they will bear the brunt of climate change disruption" (p. 946).

The moral imperative is apparent for teachers to educate youth while waiting for provincial governments to update the curriculum. Educators must learn from teachers globally who are already following guidelines to teach their students actions that impact climate change's roots and effects (Monroe et al., 2019). As the impetus is on teachers to inspire and support change within the lives of their students, adopting researched based best practices and joining networks of support can help to transplant successful models from schools elsewhere. This in turn calls for a new breed of engaged, politically motivated and radical educators who can act as leaders in the field. This will require teachers acting within their professional realm to utilize all of their social capital to

provide students with the future they are demanding now, before that future becomes worst case scenarios etched in stone.

This research is not a new advancement within the climate change educational sphere, but it is at the forefront of enabling solution building in cooperation with those who will be most adversely affected within BC. It is clear from Lawler and Patel's (2012) research that children have not been as central as they should have been to decision making:

> The perspectives of children and youth should be integral to this process, focusing not only on the differential impacts that climate change is having on them and the additional economic burden it levies on future generations, but also the contribution children can make in managing the changes and the threats. The environmental and community awareness they build as children will be the essential building blocks they work with to protect future societies when they become adults. (p. 135)

It is abundantly clear that educators should do everything in their power to play an integral part in educating youth as the climate crisis is correctly framed as an "issue of generational injustice, as children and young people are currently inheriting social and ecological problems which they have had very little part in creating" (Cutter-Mackenzie & Rousell, 2019, p. 90).

My contribution to the academic literature addresses the gap that exists in British Columbia, Canada, and focuses on the nuances prescribed by Han and Ahn, (2020) when they suggest that "future studies could examine the various local sub-narratives that have underpinned such global-scale climate movements and metanarratives" (p.

18). I used a 'bottom-up approach' acquiring BC youth perspectives which counters the 'top-down approaches' currently failing to meet the demands of children calling for more solutions in the curriculum. This must start with including climate change education as a beginning to problem solving. As Cutter-Mackenzie and Rousell say in their 2019 paper, "voices on environmental issues have often been taken for granted" and I address that by documenting BC youth perspectives and contributing to published research in this area.

Chapter Three: Methodology

Research Design Overview

This thesis follows a mixed-methods research design (Creswell & Creswell, 2018) consisting of a quantitative survey followed by a focus group consisting of members who had completed the survey. The research is informed by critical realism (Pavarini et al., 2019) which acknowledges the ontological reality of climate change. The survey was developed in consultation with youth and is comprised of three sections: youths' perspectives on climate change education, the role of government and corporate actors, and youths' visions for change-making. The survey was followed by a qualitative focus group to ask youth clarifying questions about responses in the survey.

An explanatory sequential mixed methods (Creswell & Creswell, 2018) design was justified as this research adds youth voice on climate change to the literature which requires the validation of results through youth participatory action (Elmore et al., 2019). The follow-up focus group provided a deeper understanding of the findings and helped the results authentically speak for environmentally engaged youth in BC. The focus group also created new data that was analysed and contributed to the research questions.

Research Question

The guiding question of this research is: *What are the views of environmentally conscious youth in British Columbia on climate change education and action?*

Theoretical Framework

This work derives its epistemological philosophy from critical realism. Critical realism is the belief that a researcher constructs a narrative about a group rather than

discovers truth (Cruickshank, 2003). Critical realism also implies that the social origin of the researcher will influence the researcher (Cruickshank, 2003), and as such I acknowledge my background and involvement in a push for climate change education throughout this thesis. I do not declare to be impartial as a researcher, but hope that the youth voice is captured truthfully and can be amplified by this work. The approach that the structures have allowed for climate change to emerge have been (and continue to be) influenced by the unintended effects of societies (Gorski, 2013). This thesis utilizes critical realism in research that is attempting to describe diverse perspectives reflecting different peoples' lived experiences (Joseph, 2001). In doing so this research acknowledges the underlying mechanisms that have created and could further impact climate change as rooted in scientific understanding. By collecting and adding the perspective of environmentally conscious BC youth, critical realism is used to acknowledge mechanisms that underlie the formation of these ideas and attempt to reveal them clearly for the academic canon. Each perspective brings its own understanding and together they build a larger picture of what change looks like to youth in BC.

Participatory Action Research

This thesis utilized participatory action research [PAR] (Elliott, 2013) with youth as the participants and their actions seeking to change the structures that currently govern climate change education in BC formal K-12 schooling. Specifically, this research aims to support a current active push in BC to reform the curriculum with climate change to be interdisciplinary in K-12 formal education (CERBC, 2021). Youth have been involved from the start of this research and have been consulted throughout

to ensure the youth participants' lived experience is accurately interpreted by the

researcher. With the philosophy of critical realism, it is understood that only youth can

confirm and build on their own grouped perspectives, justifying the data check in the

form of a focus group to ensure that the youth view is represented as accurately as

possible. By incorporating youth opinion before, during and after data collection, I strove

to comprehensively include them and avoid any misrepresentation or tokenistic

inclusion (Carter 2009).

This research has been developed with the express intention of adding academic

support to the CERBC drive to change BC K-12 curriculum and I personally have met

with Ministry representatives to discuss the incorporation of climate change into existing

curriculum. In consultation with youth groups around the province, and drawing from

Morgan's (2020) work, which advocates for genuine youth consultation on issues that

affect them, this research hopes to use the youth collective voice as a starting point to

promote climate change education both in and out of BC classrooms.

Following the assertion of Elliott (2013), this research is positioned as a political

stance rather than data as simply information. Furthermore, this research aims to build

a level of trust amongst youth, a group who have been traditionally excluded from the

conversation (Duggan, 2021; Trott, 2019), by adding authentic youth perspectives on

issues of climate change and climate change education to a body of literature that is

increasingly calling for youth perspectives (Cutter-Mackenzie, 2014; Cutter-Mackenzie

& Rousell, 2019; Field, 2017; Lawler & Patel, 2012; Schreiner et al., 2005; Trott, 2019).

Following Trott's (2019) suggestion that "in order to encourage children's constructive

climate change engagement, methods are needed that empower children's agency and

facilitate their active participation" (p. 43), this research seeks to capture an understanding of the current views youth maintain within climate change education and beyond to help facilitate needed change.

Following consultation with youth environmental groups and extensive iterations of survey design, I believe this research can be described as being inspired by but does not fully meet the definition of youth participatory action research (yPAR) (Trott, 2019). While this research can be said to have been created for and with youth it was not under their direction and instead the analysis and construction of interpretations were primarily carried out by myself the researcher.

My early searches identified a clear gap in academic literature, specifically in the inclusion of BC youth voice towards needed change. After speaking with youth-led organisations, they were supportive of the need to have their voice expressed in the academic canon. Pavarini et al. (2019) note issues in using youth as 'expert consultants' but by selecting participants who were already actively engaged in climate change education activism, I found a demographic of young experts in their field. In order to push their own goal of furthering climate change education in BC, the CERBC participants were well versed in issues on both a local and global scale.

A process of iterative design is advocated by yPAR and co-researcher academics (Hammersley, 2004; Pavarini et al, 2019; Trott, 2019). An example of youth participation was around wording choice in regards to *climate change*, *climate emergency*, or *climate crisis*. While research has shown that the preferred term for the widest audience is climate change (Jaskulsky & Besel, 2013), and this thesis has acknowledged that the terms are distinct, youth preferred to go with *climate crisis* when naming the second

section, "Youth perspectives on the climate crisis," rather than *climate change* or *climate emergency* as they believed crisis was the most accurate term to capture their motivating stance.

Following yPAR, this research built on the principles of co-research where "it is vital for the integrity of a study designed with co-research in mind that participant and researcher are both heading for the same trajectory and respectful of each others' desire for outcomes" (Elmore et al., 2019, p. 3). Prior to working together, our approaches and ideal outcomes were discussed to ensure that we had mutually aligned goals. Youth in CERBC, and Odyssey, an outdoor experiential education cohort of grade 11s, all confirmed that this research was necessary and desirable, and agreed that the method of a follow-up focus group would yield the best results. Youth were excited not only to be able to have a say in the final interpretation of the data but also to use it in their own campaigns.

Researcher Positionality

I bring to this research my own perspectives and beliefs that have informed and shaped the research. First, I am a teacher that advocates for climate change education and seeks to support youth who are advocating for the same outcome. Second, I volunteer with non-profit organisations that are engaged in climate change education advocacy and climate action. As a teacher I believe it is imperative that youth perspectives are included in decisions that affect their learning and growth.

Beyond the requirements for graduation, this research lies at the heart of my belief in the potential for climate change education to make the future a better place for everyone. I acknowledge what Martin et al. (2019) advocate, that "co-researching

means that youth participants are involved throughout the research process as investigators and together co-construct the findings and implications based on the data collected" (p. 303). With that in mind, I designed the study to incorporate youth at every stage. The concept of this thesis arose from discussions with youth from CERBC, the issues they saw around inadequate climate change education in BC's formal education and how representation in academia could promote their cause. From these initial conversations I sought to put my efforts towards helping their cause by researching climate change education in BC. Ahead of a meeting with the BC Ministry of Education, I met with youth to help them brainstorm how to raise issues around climate change education. We discussed questions and from there four more rounds of survey iterations were carried out with CERBC, over Zoom, and the Odyssey youth in person.

The background research, synthesis and collection of data were done by me with youth input in the design and distribution of collection methods. Youth were aware of the level of their engagement and acknowledged the data were important in seeking representation of their thoughts, beliefs and ideas.

Viewing youth as humans with agency, rather than "citizens in becoming" (Trott, 2019, p. 54), this research allows youth to advocate for themselves. Youth voice has been amplified in recent years calling for change from governments (Han & Ahn, 2020). As Trott (2019) professes, "to avoid grave consequences, nothing less than fundamental transformation in the functioning of human societies is now required." It becomes imperative that "children's agentic participation is both a crucial feature of—and pathway towards—a sustainable future" (p. 59). As noted by Martin et al.

(2019), "The experiences of vulnerable populations have largely been interpreted through the researchers' perspective, voice and analysis" (p. 297).

I provided my interpretation of the survey data to the focus group participants and recorded the discussion to allow me to reference materials when writing up the focus group elaborations section. However, I did not follow up with a member-check of the focus group elaborations as I was limited by time constraints. The written interpretations of the discussion are therefore my interpretations alone. In this regard I strove for yPAR but fell short of emulating what Martin et al. (2019) described in their study where "youth had authority in the data collection and analysis process, and together they co-created space to authentically represent their experiences within education research" (p. 302).

The point by Duggen (2021) that "co-production is a necessary process for renegotiating and re-imagining the relationships between academia, the public, and knowledge production" (p. 356), inspired me to included youth help to develop the survey tool, and the inclusion of a focus group. Thus, it is the aim that this research represents participants' views and not my own.

Research Design

This section of the thesis will outline the mixed-methods research design (Creswell & Creswell, 2018) consisting of a quantitative survey followed by a qualitative focus group consisting of members who had completed the survey.

Development of Survey Tool with Youth

The survey was designed in consultation with students in the experiential outdoor cohort, Odyssey, at my school and youth members of CERBC. Students in Odyssey are aged 16 to 18 and experience a semester of place-based experiential education with

inquiry based projects taught from outdoor classrooms. As they are a grade 11 cohort,

the 2020 graduates, and the 2021 graduates participated in the consultation for the

survey. The original CERBC youth I worked with similarly originated from a cohort of

experiential place-based education taught to students aged 17 and 18 in grades 11 and

12. The organisation has since emerged to include students from grades 10 and now

includes students from around the province.

The original pilot survey was held with the Odyssey youth on Earth Day, April 22,

2021 and was subsequently developed with youth in Odyssey and CERBC through five

iterations. In June and July 2021, I used an online Google form and in-person

discussions to gather feedback and review the survey questions, content and style. This

iterative survey design was identified as an effective way to engage youth when dealing

with student designed surveys (Carter, 2009; Hill, 2006), as youth need time to think

about how best to frame questions when working with adult researchers.

Both the CERBC and Odyssey youth contributed to the language and questions

that were included in the final version of the survey submitted for ethics review.

Students were consulted on the duration of the survey and question format, and the

purpose of the survey and its value in a thesis were discussed.

This collaborative process, involving youth in the research from the outset,

allowed survey questionnaires to be crafted with questions worded with

age-appropriateness in mind. Working with a group of youth helped ensure the

language was accessible and that the research centred on the aim of furthering climate

change education in BC. This research specifically sought participants who are currently

students or who had recently graduated from secondary schools in BC to ensure the

data was localized in BC. Data collection relied upon engaged members of the environmental community to spread the survey and reached the target participants for feedback from July 2021 to January 2022. Youth environmental leaders were instrumental in their willingness to help distribute the initial survey to youth members around the province.

Youth were consulted on the phrasing and questions within the survey through a democratic process using a Google form which collected their feedback. These points were discussed during subsequent meetings chaired by me and the survey was subsequently refined. Youth were given a long list of questions with some being written by youth and some by myself with support from academics. Youth then whittled down questions based on their comprehension and the subjects which they felt would capture interesting views. An example of a question added entirely by a youth is question five in the first section: "In school, if you could decide what topics, concepts or aspects of climate change you would like to learn about, what would those be?" The focus group guide consisted of 11 questions (See Appendix C).

Following youth feedback regarding length and attention span, the final survey took 15 minutes to complete. The survey had three sections consisting of a mix of Likert-scale questions, checkbox responses and short answer questions, followed by a demographic section. The variety of question types was suggested by youth in order to maintain the attention of participants who they felt may rush through the survey.

Data Collection

The survey was open from July 18th, 2021 until January 1st, 2022 (see Appendix A for full list of questions). The survey was followed by a voluntary focus group

consisting of a 45-minute Zoom session with four participants organized through a convenience sample (for semi-structured focus group guide, see Appendix C).

Recruitment

Participants were recruited through those involved in environmental organisations and from word-of-mouth method of peer-to-peer forwarding the survey (Creswell & Creswell, 2018). The student group, CERBC, offered their aid in the distribution to youth organisations around the province through sharing with their emailing list. Likewise, other environmental organisations, Be the Change Earth Alliance, and Sustainabiliteens also supported the distribution of the survey to environmental organisations in an effort to widen the net of participants. BeTheChange has already established an extensive network of environmental "change makers" and are in collaboration with CERBC providing support in their push for change.

Through the West Coast Climate Action Network (WE-CAN), I accessed the contact information of 208 environmental organisations in BC. I targeted the 30 that were likely to have youth members and found that multiple youth were members of two or more organisations. Similarly, I received responses from multiple organisations telling me they had no youth members. This lack of youth members is supported by statistics from 2016 which shows only 6% of youth who actively volunteer in Canada, volunteer with environmental organisations (Alrifai, et al., 2021).

Although there is a gap in representation with not all school districts being represented, there was a concentrated effort to reach out to environmental groups from across the province with over 30 groups approached via email, Facebook, and during in-person climate rallies located in Vancouver hosted by BC Fridays4Future. A number

of organisations did not reply to multiple emails indicating that they are not actively

engaged in correspondence. Multiple university organisations were also approached,

however the number of recent BC grads forming members may have been small as

many groups who responded positively to distributing the survey did not feature in the

results.

Survey responses were anonymized to protect confidentiality. It was thus

impossible to select focus group participants based on individual responses.

Semi-structured interview questions and focus groups are justified based on Hill's

(2006) suggestion that students and youth prefer focus groups when dealing with

researchers to allow for a more comfortable situation where peers outnumber

academics.

The focus group interview was conducted with individuals who filled out the initial

survey and indicated their willingness to receive more information about a follow-up

focus group on a separate Google form linked at the end of the survey. This was done

to ensure privacy and consistency in result interpretations. The focus group participants

were selected based on convenience timing and willingness to participate in the

follow-up focus group. The selection process was inclusive of all willing participants and

utilized a Lettucemeet.com scheduling tool to ensure the maximum number of

participants were able to attend. In the end there were several back and forth emails

regarding scheduling with participants who could then not make it with every effort

made to accommodate as many participants as possible. Six participants from the initial

survey indicated they would be willing to meet for the focus group, five of the six

responded to arranging a time to meet with ultimately four participating and attending

the focus group. Participants in the focus group were from undisclosed locations around BC meeting on Zoom video chat. The focus group was recorded for transcript purposes, however the video was not saved for privacy concerns. The focus group consisted of one session lasting approximately 45 minutes with a 37 minute recorded portion following the reading of the informed consent form.

Participants and Representation

In total there were 28 participants aged 16 to 20, the majority of whom identified as female (63%). Data were collected from eight provincial school districts representing New Westminster, Vancouver, Okanagan Skaha, Burnaby, Surrey, Greater Victoria, Richmond, and Vernon. Participants came from a diverse range of regional areas across BC; the lower mainland, Vancouver Island, and the interior. Of those contacted, participants came from a total of 12 environmental organisations including Climate Education Reform BC, Sustainabiliteens, Climate Justice UBC, Odyssey, Roots and Shoots, Wildoutside, Wildlife Rescue BC, YouthToSea, Ocean Wise, Watershed Watchers, First Things First Okanagan, and the BC Greens Youth Council.

Data Analysis

In the initial quantitative phase of the study (see survey questions in Appendix A), closed questions were analysed with descriptive statistics based on simple counts of responses (Creswell & Creswell, 2018). The three survey sections complement youth perspectives and offer a glimpse into their perspectives on education, government, and corporate actors and a vision for change-making within these spheres. Data gathered through short answers was analysed through thematic coding (Creswell & Creswell,

2018) based on keywords and phrases. For full reporting of thematically coded results, see Appendix B. As the aim is to support climate change curriculum, these questions help to form a baseline of youth ideas in order to inform curriculum experts and teachers.

Following the initial survey results, a virtual focus group was used to provide a richer understanding of the data and to elaborate on survey responses. Focus group participants were shown visualized data from a narrower set of questions than the full initial survey (see Appendix C: Focus Group Guiding Questions). This was done to help elaborate on questions that would have otherwise made the survey too long and cumbersome to fill out and thus would have limited accurate data by deterring participants (Creswell & Creswell, 2018). This step was also important for asking clarifying questions about youth responses in the survey.

Questions were presented on a screen and read aloud to the participants and the results were displayed visually. For elaboration from survey questions more nuanced follow ups were asked, such as for the survey question, "At what grade do you think climate change education should begin", I asked the focus group to clarify with the following question: "Referencing question 3, the grade level for the introduction of climate change education, what do you envision early grades learning about in regards to the climate change emergency?" Participants were encouraged to expand on results from selected questions rather than individual responses. These questions were void of examples for the focus group with the intention that they would be elaborated on. This also allowed for the survey to be completed in approximately 15 minutes. This section is reported in Chapter Four, under the Findings section, titled 'Focus group elaborations.'

Trustworthiness

As a way to provide trustworthiness in the findings, I have triangulated my data in the discussion section where possible with surveys and interviews that sought similar questions from a comparable demographic (Merriam & Tisdell, 2016). Where survey instruments, questions and responses differ, I have attempted to provide clarity in its interpretation or how the aim of the researcher contributes to this data.

Data collection was conducted to support aims put forward by youth through co-research, and through yPAR, the initial survey tool was created and piloted by youth. I have acknowledged where possible my motives, and alignment with the youth participants views and have attempted to address possible concerns regarding confirmation bias (Merriam & Tisdell, 2016). This being said, the final interpretation was done by me following a focus group with youth.

The employment of a focus group was in itself an effort to provide trustworthiness by confirming data from the initial survey and, while new data were created, allowing the focus group to confirm survey data increases confidence (Creswell & Creswell, 2018). I am confident that an appropriate representation of my target demographic was invited to participate. This specifically included youth actively involved in environmental organisations in BC aged 16-20 who have attended, or are actively attending, BC schools.

Limitations

I endeavoured to authentically capture youth voice and to not homogenize findings to fit a select aim unassociated with those it wished to represent. That being said the data are limited to only 28 participants which provide a diversity of youth voices

but are impossible to capture a valid representation of all youth who would fit the criteria for this research. The sample size means the findings are not generalizable to all environmentally conscious youth in BC. Demographics are further discussed in Chapter Four.

Summary

As this research aims to bolster a call for climate change education**,** it is designed with youth in mind, and with youth input. As a result of youth support from the inception, there is clarity in the ultimate goal of facilitating climate change education curriculum being adopted into the BC curriculum. It is the view of this researcher and the youth who helped craft this research that until there is a robust and prescribed inclusion of climate change into curriculum documents in BC, youth will continue to be underserved by their education. It is hoped that from the inception of this thesis every step has been taken to maintain the integrity of data collection and interpretation so that youth views speak for themselves. My role as an educator and an individual actively involved in climate change education and climate change education reform has helped to shape the ideas which created this thesis, but the data collected remain the views of youth. Lastly, it should be noted that my views, the majority of the time, aligned with those of the youth participants.

Chapter Four: Findings

Introduction

In this chapter, findings from the survey will be presented. The first section will introduce youth participants and provide a summary of the three sections of the survey. Next, a summary of results from the focus group are presented. The quotes used throughout this section have not been edited for spelling or grammar in an effort to maintain the authenticity of the youth who articulated them. A full coding of the themes from the written responses by frequency, broken down for each question, can be found in Appendix B.

Findings

The survey is divided into three sections focused on climate change education, youth perspectives on the climate crisis, and youth vision for change. The overall themes were linked by youth views and feelings towards the future in regards to climate change education and what youth see as the barriers to climate change solutions. The survey tool is provided in Appendix A. This chapter presents a summary of the results most relevant to the research question. A total of n=28 participants responded to every multiple choice question represented in the figures below.

Section One - Climate Change Education

This section describes youth participants' views on current climate change education practice and specifically outlines: 1) youths' perspective on the level of priority climate change education should have; 2) youths' perspective on the grade that climate change education should begin; 3) youths' perspective on the level of priority climate

change education currently receives; 4) what youth view should be the goal of climate change education.

The majority of youth participants strongly agreed (86%) that "climate change education should be a priority for schooling" with the remaining 14% agreeing with the statement (Figure 1).

Figure 1

Results from the question "Climate change education should be a priority for schooling."
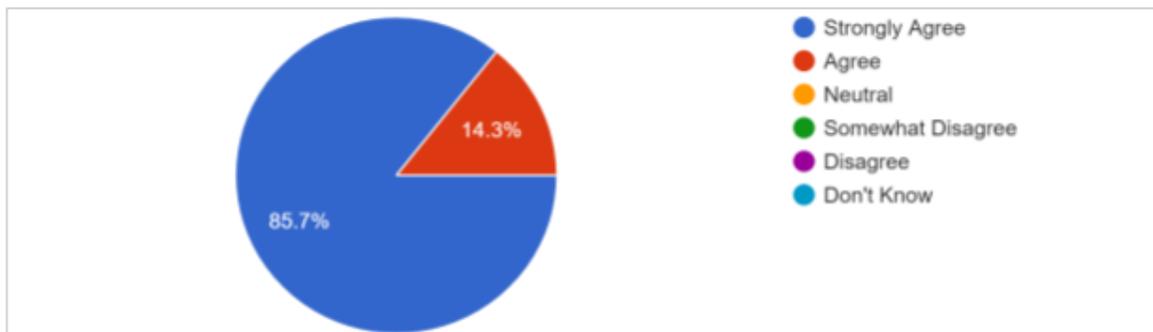
When asked "at what age climate change education should begin," youth participants indicated kindergarten (45%) with an overall 100% of responses indicating that climate change education should begin in elementary school (K-6) (Figure 2).

Figure 2

Responses to the question "At what grade do you think climate change education should begin?"
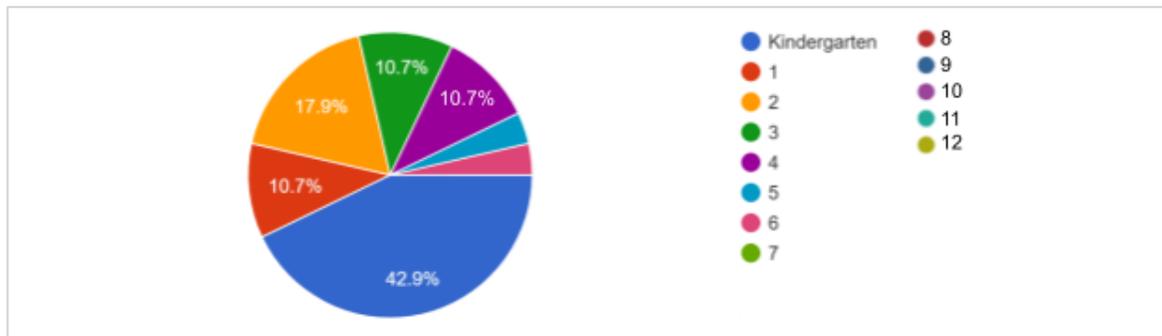
It is clear from the responses that climate change is not perceived as a priority in schooling with over half of participants (56%) reporting strongly disagree or disagree with the opening question asking if climate change is a priority within their schools (Figure 3).

Figure 3

Responses to the question "Climate change education is currently a priority within my school."
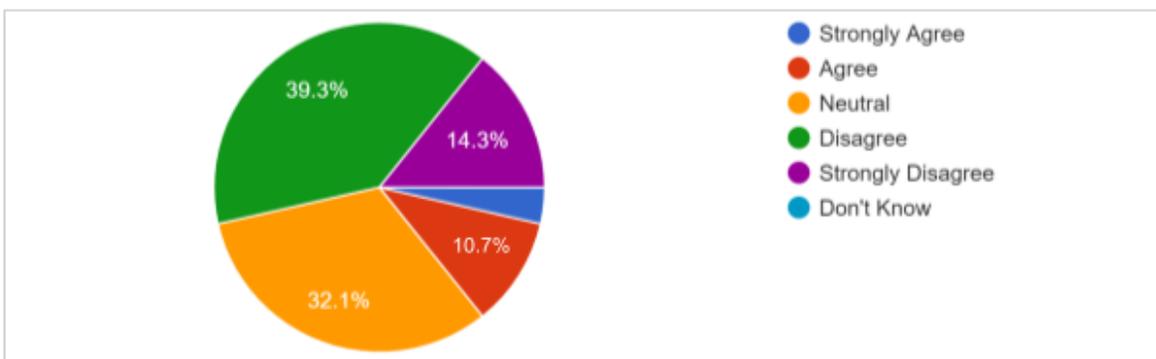
When asked to choose all that apply to the question "what should be the goal of climate change education?", "teaching climate change environmental impacts" (n=26) and "teaching solutions to climate change problems" (n=26) were chosen most often (Figure 4). Additionally, "teaching the connections of climate change issues" (n=21) and "teaching about environmental racism" (n=21) were the second most frequently chosen

with "teaching about future jobs in the sustainable economy" (n=18) and the "science of

Earth's climate" (n=15) also chosen often by participants (Figure 4). The remaining

options receiving only one selected response each were written in the "other" category

and included responses such as "taking action together" "teaching about hope" and

"opportunities to address inequality" (Figure 4).

Figure 4

Results from the question "What should be the goal of climate change education?"
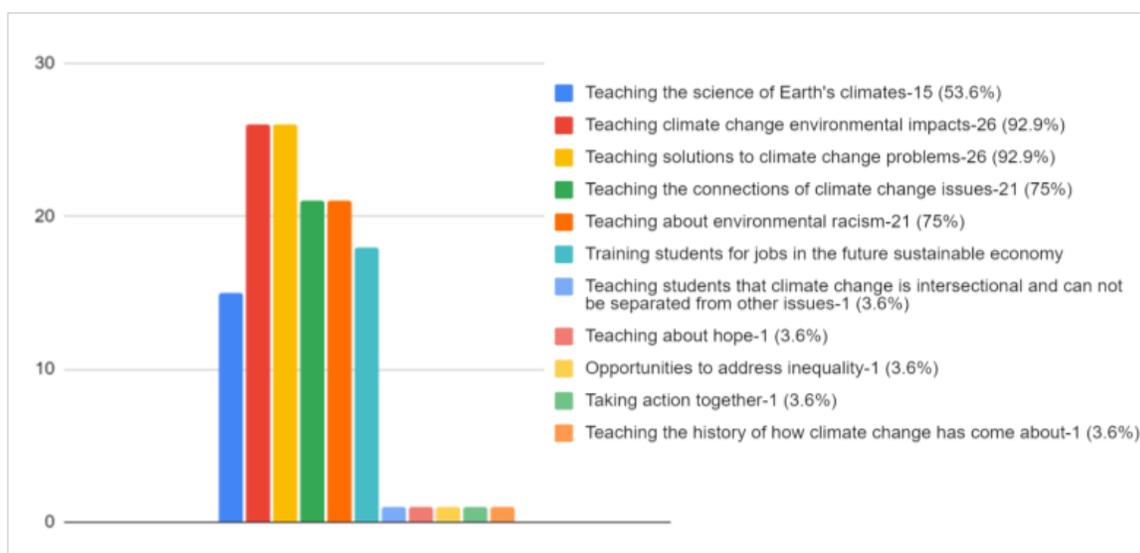
Note. Respondents could write their own 'Other' response and click its box as indicated

by the responses with "3.6%."

When asked the open text question, "In school, if you could decide what topics,

concepts or aspects of climate change you would like to learn about, what would those

be?" participants indicated they were most keen to learn: solutions (n=17), climate

justice (n=7), and intersectionality (n=7) (See Appendix B for list of fully coded

responses). Intersectionality could be described further as the unequal impacts of

climate change and how they disproportionately affect specific groups. An example of a response to the open text question coded with "biodiversity," "conservation," "impacts" and "solutions" can be seen below:

Learn about biodeversity, instilling a love of the earth in children from a young age and a mission to protect and conserve the environment, learn about the impacts human activity have on the globe, learn about green solutions.

These responses indicate that youth survey participants are keen to learn more than the simple science of climate change and want to understand how they can make a difference.

Section Two - Youth Perspective on the Climate Crisis

The second section of the survey gathered perspectives on the climate crisis through asking questions that sought to capture an understanding of who youth hold responsible for the current state of the climate, a timeline for solutions, and what they see as barriers to implementing solutions. More specifically, this section asked youth their perspectives on the role of governments and corporations in regards to opportunities within the climate crisis. This section also reports youth hopefulness towards solutions being put in place within their lifetimes.

When answering the question, "What timeframe do you believe is needed for global governments and corporations to adopt measures to address the climate emergency?" youth indicated that the timeframe for action is immediate (93%). When answering the question "What timeframe do you believe is achievable for global governments and corporations to adopt measures to address the climate emergency?"

youth participants indicated that a timeframe of five years (44%) or 10 years (33%) is

achievable to adopt measures to address the climate emergency.

When asked "What in your opinion is the largest contributor to the climate

emergency?" youth responded with corporations (43%) and capitalism (25%) as the two

largest categories with a myriad of other responses such as colonialism, previous

generations, and governments making up other responses (Figure 5). This aligns with

questions of trust which overwhelmingly responded to corporations as the least

trustworthy when asked about the trustworthiness of the federal government, provincial

government of British Columbia, and corporations. While the participants trust none of

the choices to address the climate emergency, they ranked corporations the least, the

federal government second, and the BC government first, despite the BC government

Figure 5

Results from the question "What in your opinion is the largest contributor to the climate
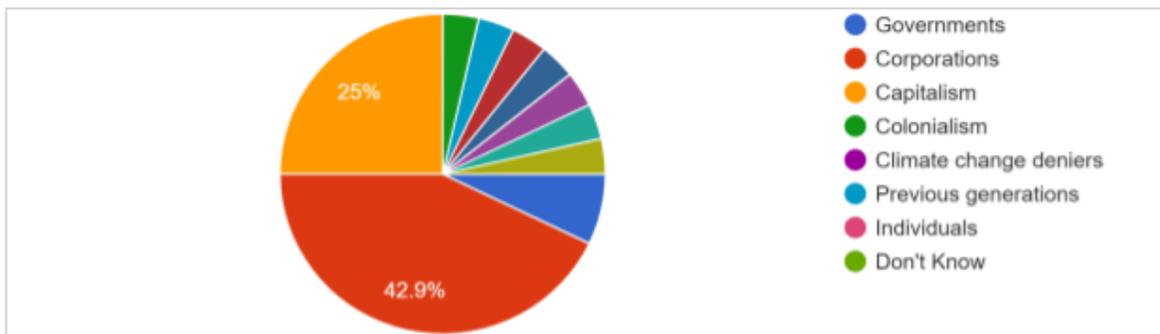
emergency?

Figure 6

Respond to the following statement: "I trust in the _____ to address

the climate emergency.
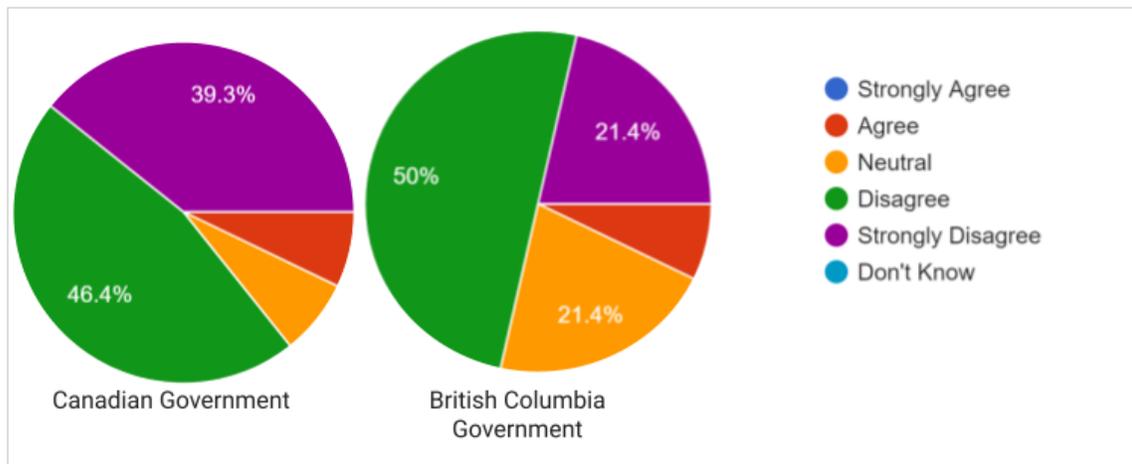
Figure 7

Responses to "I trust Corporations to address the climate emergency."
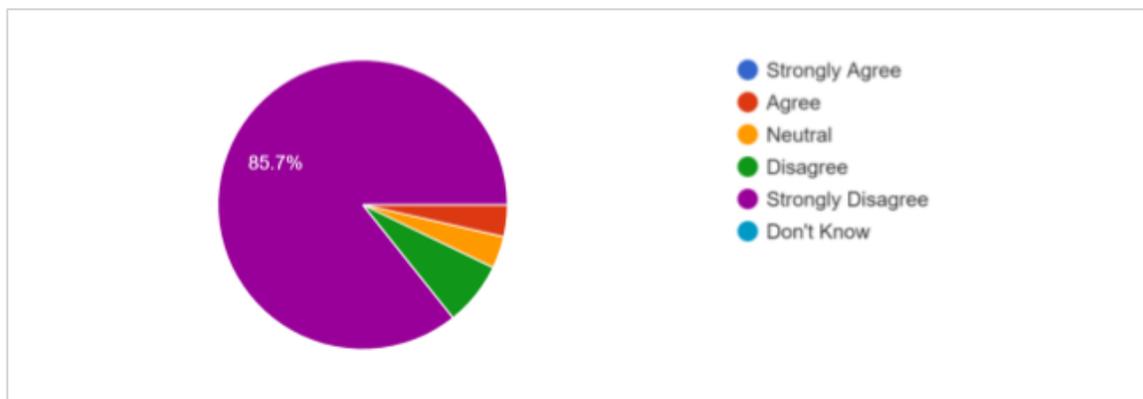
still receiving 71% of participants disagreeing or strongly disagreeing that they trust the BC government to address the climate emergency (Figure 6 and Figure 7). Furthermore, youth participants ranked corporations first in response to, "Who should bear the financial burden of the climate emergency," followed by governments second (Figure 8).

Figure 8

Responses to "Who should bear the financial burden of the climate emergency?"
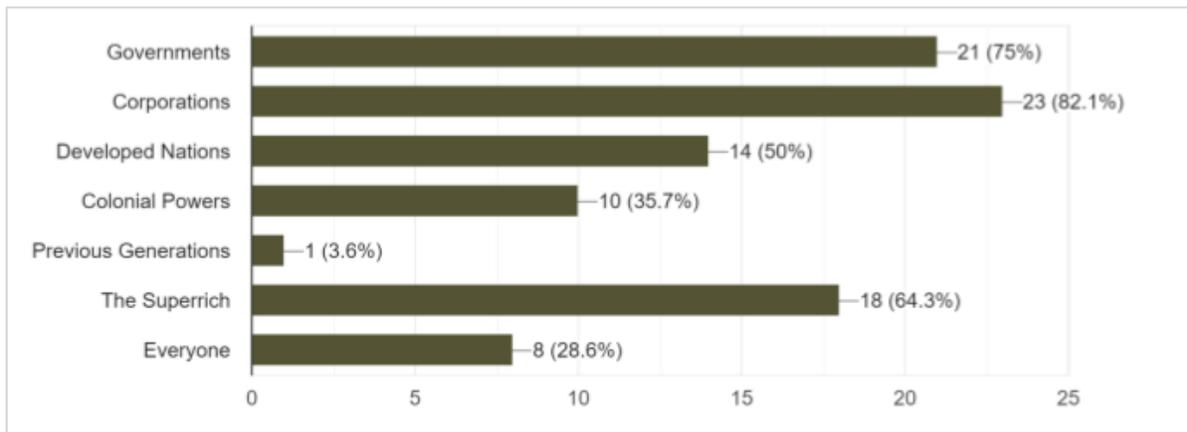
Figure 9

Responses to the statement, "I am hopeful solutions can be put in place for my lifetime to mitigate the climate emergency."
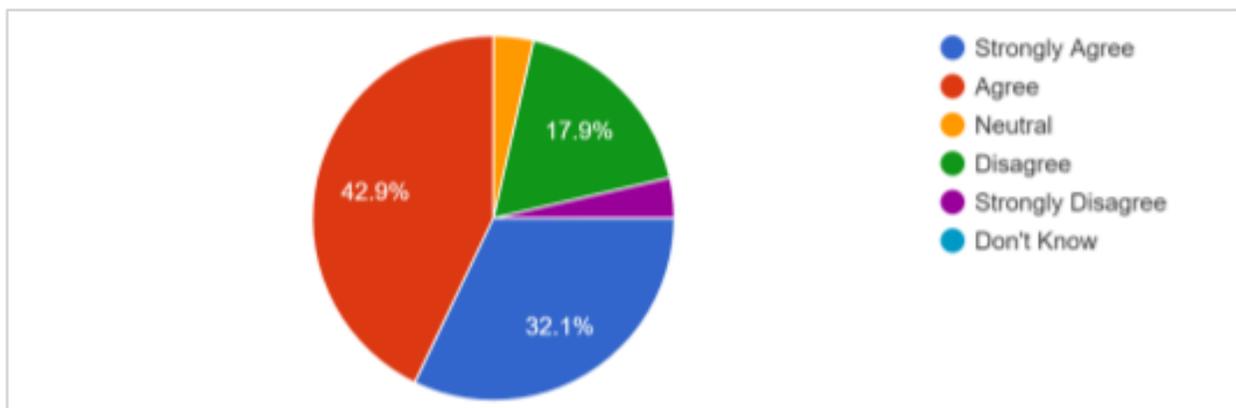
Despite a lack of trust in those who they believe should bear the financial burden, youth participants agree (43%) or strongly agree (32%) with the question "I am hopeful solutions can be put in place for my lifetime to mitigate the climate emergency" (Figure 9).

Furthermore, 93% see the climate emergency as an opportunity for society to address historical injustices such as racism and gender and social inequality. Along with this lack of trust and hopefulness, youth believe that Indigenous stewardship (89%

strongly agree, or agree), and education (100% strongly agree, or agree) are essential in the fight against the climate emergency worst case scenarios. When asked their views towards economics as a road to climate solutions, youth also (89%) agree or strongly agree that money should be used as a tool to mitigate the climate emergency through means such as fossil fuel divestment.

Through all of this hope and mistrust, participants highlight "government's inaction over the good of the community" and "politicians not picking up their feed[t] because [of] their worry about electability" as some of the main barriers to implementing solutions. From the responses to the open text question, "What do you see as the biggest barrier to implementing climate change solutions?" governments were described 12 times as the biggest barrier, and corporations six times (See full thematic coding in Appendix B). Further examples of what youth see as a barrier are exemplified by the responses "capitalism and incentives," "governments not doing anything," "corporations and older generations," and simple responses such as "capitalism," and "the economy." One of the most concise responses as to barriers can be described as "a lack of political will and public awareness of how to address the issue." One participant described urgency as the largest issue explaining how "a lack of urgency from the government and therefore general public," is the biggest barrier to change. All of these findings highlight corporate interests as the main barrier which in turn points to political and economic systems as the largest hold up in climate change solutions.

Section Three - Vision for Change

This section of the survey varied from the first three in that it allowed for open-ended responses rather than a selection of multiple choices. The aim was to dive

deeper into the views of environmentally conscious youth and their vision for change.

Full thematic coding can be seen in Appendix B. In summary of responses, clear

themes became apparent; the following is a summary of the responses and themes

from section three.

The most needed solutions described by participants when asked an open-ended

question, "What policies would you like to see implemented to help address the climate

emergency?" saw regulations (such as a carbon tax, banning fossil fuel subsidies,

subsidising renewables or fishing regulations) mentioned 23 times, followed by climate

change education, mentioned five times.

When asked "What do you see as Canada's role in helping developing nations

fight against the climate emergency?" participants described the role of Canada as

changing its extractive industry support and in doing so leading by example (mentioned

in 11 responses). Participants equally noted financial support (mentioned in 11

responses) that can demonstrate the possibilities of reinvesting in clean energy to make

the transition to a sustainable future. Responses included: "Canada should lead by

example", "Paying our fair share to support historically exploited nations", and "thinking

more about forestry and pipelines as well as being an example (hopefully) for

Indigenous reconciliation."

When asked "what do you see as the role of youth in the climate emergency?"

participants noted they see the role of youth as mainly that of advocacy (mentioned in

15 responses) and to educate oneself (mentioned in 11 responses). Less so,

participants described the role of youth as holding the current generation in power

accountable (mentioned in four responses) by acts that aim "to inspire the older

generation to act." One participant noted: "we shouldn't have to be responsible for leading the climate movement." This lack of desire to be in charge is highlighted by the fact that only two responses suggested the role of youth in the climate emergency was to lead.

From the question, "Broadly speaking, what signs do you see that society is making progress on the climate emergency?" Participants see awareness around climate change through increased media attention (8 responses) as a sign progress is being made but some responses also noted "disappointingly few, [signs]" and "not a lot," when asked what progress they see. In order to make progress participants believe government action (mentioned in 10 responses) is needed before progress can be achieved. Government action was suggested by responses such as "add more taxes to product[s] that directly affect climate change" or simply, "government needs to do more." Other than the previously mentioned government action responses for "what do you believe needs to happen to make progress on the climate emergency?" answers were varied. Four suggested switching to renewables, three noted climate change education, with a further three who noted reducing fossil fuel use as being needed. One participant disheartedly wrote, "honestly, I don't think a lot of people will support progress until the point that climate change directly impacts their lives."

When given the open-ended question which asked participants to "Identify any specifics you believe need to happen to see progress on the climate emergency", participants suggested banning fossil fuel subsidies in 13 responses, banning fossil fuels outright in three responses, or subsidising renewables, mentioned in seven responses. One participant suggested "more regulations and legal punishments." An

elaboration in one response decreed greenwashing as an activity that must be dismantled:

>We will not see progress until we stop thinking that fossil fuel companies will help the transition. They're always greenwashing everything. We need to dissolve them. And no more constructing or investing in any fossil fuel projects starting immediately. (Survey participant)

Lastly, in this section I will describe the thematic coding around participants' emotional state. When asked, "What word best describes your emotional state around the climate crisis?" and given the options of emotions seen in Figure 10, and the option to write in their own feelings, the majority of youth indicated negative emotions (70%). Such emotional states included anxious (n=4), disheartened (n=5), pessimistic (n=1), rage (n=1), hopeless (n=1), sad (n=1), depressed (n=1), and resigned (n=1) (Figure 10). Difficult to categorize amongst the responses was one participant who wrote in the answer "all of the above" which could indicate both positive and negative emotions. Of the positive emotional states the most frequent was motivated (15%, n=4) followed by hopeful (11%, n=3).

Figure 10

Participant's emotional state around the climate crisis
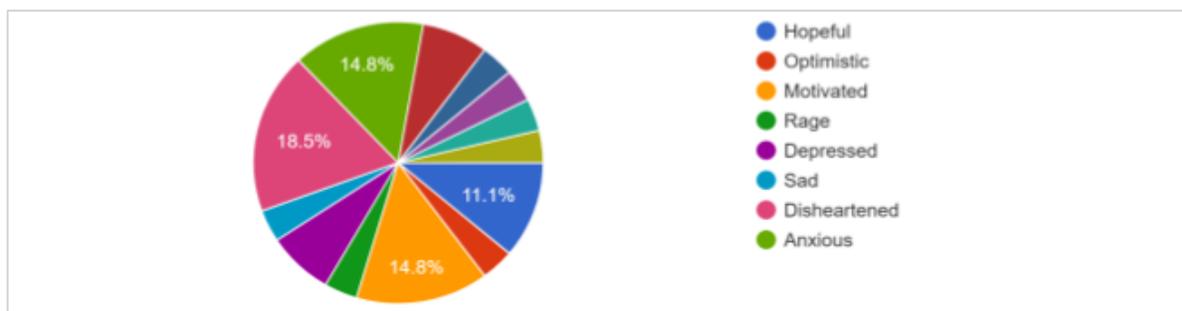
Focus Group Elaborations

In order to include youth perspective in the analysis, youth were invited to review the survey results and discuss interpretations of the data. This confirmation may not be necessary in some other research as argued by Thomas (2017) who describes how follow-up focus groups may provide little to enhance findings; nevertheless, this particular research benefited from questions that were specifically designed to be elaborated upon by the youth focus group participants. The focus group elaborations provide more detailed perspectives of youth than the survey tool captured. The data collected from the focus group were analysed and are described in addition to the questions which prompted the new data.

In the focus group, youth were presented with a summary of the survey results. Ideas presented to the focus group were a succinct selection of questions from the first two sections and word visualisations of responses to illustrate the third section. A purposeful summary of the results for the focus group was designed to lead a discussion that dug deeper into responses. As this research seeks to support youth in BC pushing for curriculum reform, the focus group began with the background behind the actions driving this research. This opening and transparent approach supports the thesis methodology of participatory action research (Elliott, 2013).

At times when data were presented there were long pauses from participants before individuals would speak. To encourage engagement, I offered prompts such as, "what do you think of this?," or "do you have anything to add to the data?" in the most neutral way possible to encourage the group to speak.

Focus Group Participants' Interpretation of the Data. In this section I present a summary of the focus group participants' interpretations of the data and their answers to further questions. As no demographic data were collected on the participants, I am unable to report on any identifying factors regarding the participants beyond that they had also completed the initial survey. To differentiate between quotes used, I have provided the four members with the pseudonyms North, South, East, and West. Quotes are used as key highlights from the session with words taken directly from the transcribed video of the focus group. In reporting quotes grammar is intact and may appear inaccurate due to participants stumbling to find the right words, however, every effort has been made to capture the essence of the focus group statements. The transcript was not reviewed by participants for accuracy.

Participants were first presented with survey demographic data and participant numbers to provide context. Following this, I first asked them to elaborate on what areas climate change education should focus on within the classroom.

When discussing the response that climate change education should be introduced in elementary school, focus group participants put forward ideas or conceptualizations of schooling where a love of nature is taught first and the harsh aspects of climate change are eventually introduced to older students. Focus group participants believe that students have the capacity to learn about the effects of climate change early on if the "really scary parts of climate change" (South) are avoided. Focus group participants believe that the social impacts of climate change are too much for young people, but the science of "what is climate and really basic things are good to start as early as possible" (South). Building on this, another focus group participant

believed that "it's really important to start establishing place-based learning and also just like a connection to the outdoors" (West). This was elaborated on to include a strong connection and appreciation for the outdoors as important to develop in K-6 education. The benefit of an appreciation of the outdoors was understood by the focus group participants and is confirmed by experts, such as McNeal and Petcovic (2019), Monroe et al. (2019) and O'Brien (2008), who have written extensively describing best practices in climate change education.

When pressed about at what age students should start learning the deeply negative impacts of climate change, the focus group participants all agreed that around grades five, six, and seven would be the optimal grades to start. One participant summed up the delicate balance by saying, "you want to find that fine line between you tell them too much and then it's too scary, and you tell them too little that then they don't take it seriously" (East). The participants vocalised the clear idea that youth should be learning for future jobs that are yet to exist and as such education should be forward-thinking and address the climate emergency by teaching students "more of a baseline level of education around climate change and awareness of our environment…before we step into industry and our future jobs" (South).

The main ideas discussed from section two addressed the time gap between what participants noted is needed and what is achievable, what could be done to build trust in governments/corporations, and the overwhelming response linking corporations and capitalism and underlying causes of the climate emergency. When discussing the gap between what participants noted is needed, one participant answered, "I'm just not giving up on trying to sway government and corporation opinions" (North).

The conversation then went to how change could be effected in governments and participants were less confident change could ever take place under the current political system. When discussing how to move progress on climate action, North stated: "I do believe that activism, and especially youth activism, is the way to go to kind of accelerate the process." It was noted that to build trust, parties that take the environment seriously would need to be in power but participants also noted this was unlikely to ever happen until youth and people educated today step into those roles. This hope in youth filling roles for the future was tethered by the fact that with that timeframe change would be far too late. Participants wanted to see proportional representation and lowering the voting age to promote the future they want to see. When discussing youth action, North described "using youth as the vessel that will push for climate action."

Participants were calm throughout the discussion but at times became frustrated when trying to articulate elaborations; for instance, discussing government inaction brought about clear annoyance at the lack of progress. Overall, participants agreed on the statements that other youth shared throughout the focus group and supported each others' ideas by elaborating when others stumbled with articulating their thoughts. There were some instances of strong emotional responses during discussions that held back participants from fully expressing with words how they felt but their emotional state was supported by the group to enable participants to be comfortable before moving on. Participants could always deconstruct and articulate their ideas when they gathered their thoughts.

Summary

A look at the findings from the initial survey shows youth participants do not believe climate change education is a priority in their schooling with a clear desire from participants to have climate change education included from an early age. Focus group participants elaborated on the demands being made of the federal and provincial government by pointing out that the entire political system needs to change if true success is to be achieved. Initial survey results were confirmed by the focus group participants and youth participants seemed to agree with elaborations put forward by other youth. Youth participants are keen for change regarding the role of governments and will continue to push for it. Youth believe change within formal education has the potential to shift government action so long as enough people receive climate change education to help build an understanding of what is required to make progress. I believe that these findings show the need for educators and policy experts to build a climate change curriculum that addresses the gaps that young people have identified.

Chapter Five: Discussion

Introduction

This chapter will discuss the findings presented in Chapter Four to contextualize

them in relation to current literature on youth perspectives on climate change education.

This chapter begins with key findings from the research that help answer my research

question. The discussion then dives into what I believe educators and policymakers

should take away from this research. I look at suggested curriculum changes and

lessons which can be incorporated with or without curriculum policy change in the

existing K-12 BC context. Lastly, this chapter concludes by examining how to make this

research more impactful in BC and beyond. This discussion of the youth participants'

impressions as detailed in chapter four will allow readers to progress as educators or

policymakers with supporting evidence from the literature to further the aim of this

thesis.

Key Findings

This section situates the key findings from the study against the extant literature.

Stand out impressions from the data provide further insight by comparing results from

the initial survey sections covering climate change education and views on what needs

to be done regarding the climate emergency in supporting literature. When attempting to

find trends amongst participants based on age, school districts, gender, or those who

identified as racailzed or FNMI I was unable to find any significant data that would signal

any group out for particular mention beyond those who had an affiliation with particular

environmental groups Oceanwise and Youth2Sea constantly mentioning ocean

conservation or ocean plastic more regularly than respondents from other groups.

Youth Role in Climate Change Action

The responses provide a clear indication that the youth in this research project and involved in climate change action want those in charge to exercise their power for the betterment of the planet. According to the short answer initial survey question, "What do you see as the role of youth in the climate emergency?", youth responded their role was first as advocates (mentioned in 15 responses) and last as leaders (mentioned in two responses). This is echoed in responses to the question, "What is the role of youth in connection with what you see needs to happen?" Youth participants see their role as primarily to advocate (mentioned in eight responses) rather than to lead or personally effect change in society, which would assume youth would have to step into leadership roles.

Youth participants indicated they do not want to shoulder responsibility for change but rather want those in power to take immediate action. The desire to hold those in power accountable is highlighted by CERBC's demand of the Ministry of Education that a youth council and advisory board be set up to ensure climate change education is implemented in BC (CERBC, 2021). This has been highlighted by talks from youth climate activist Greta Thunberg, when she delivered the UN address shaming world leaders for taking away her childhood (Thunberg, 2019) and is echoed by the Canadian youth who tried to sue the government into acting on climate change for taking away their right to a future (Canadian Press, 2021). Researchers Han and Ahn (2020) described youth climate marches as reframing the climate emergency as one of generational inequality, although Udas (2021) found that while youth play an

important role in advocacy, "attempts to engage youth in climate action without considering their psychosocial well being, may overburden them" (p. 1).

Youth in this research see governments as culpable for the world they have had a greater hand in creating and mentioned them the most (in 12 responses) when asked, "What do you see as the biggest barrier to implementing climate change solutions?" Participants from the focus group expressed how they saw the government as more to blame because they had the ability to create regulations to tether corporations with East articulating "repercussions would need to happen, they would need to be held accountable" in response to my question "How could we encourage corporations to adopt the measures to address the climate change?"

Tanner (2010) found that using a youth narrative to explain climate change disasters shifts the focus to the moral imperative rather than as an issue of fixing the planet. This focus uses the intergenerational divide to compel adults to action. While youth marched in the hundreds of thousands during the 2018/2019 pre-Covid student strikes (Boulianne et al., 2020), they were not calling for governments to topple, or for direct actions, they were calling on adult leaders to take charge and implement solutions. As youth are unable to create change through their financial power or civic voting, they need to do so through advocacy and protests (Leahy, 2021). These calls for change and action are supported by the responses in this research, which finds youth calling for government action and corporate accountability.

Youth Views on Climate Change Education

Youth participants do not see climate change education as being prioritized in schools. This research found only 14% agree or strongly agree that "climate change

education is currently a priority within school." This perceived lack of priority is

supported by the Canada-wide State of Youth report which noted that "although some

teachers or schools cover climate change, it is often old information that does not

accurately portray the urgency and the different facets of the crisis, and it is often taught

in a rushed manner" (Alrifai et al., 2021, p. 31).

As Nazir et al. (2011) have shown with their research into the disparities between

provincial education systems, as I work and live in BC it is important to focus specifically

on the interpretations of BC youth and the education system within this province;

however, as there is limited academic research into the perspectives of BC youth, a

wider look at youth views of climate change education is necessary. This could include

conducting the same initial survey with a general population of students beyond the

focus of environmentally conscious youth involved with established organizations or

events. CERBC has been active for the last two years presenting ideas to districts and

the Ministry of Education that aim to promote and bolster climate change education, but

while their calls are supported by academics their calls are not reflected in policy or their

lived experiences.

In this research, 100% of participants agree or strongly agree that "climate

change education should be a priority for schooling." Field, et al. (2019) found that 62%

of Canadian students in grade 7 - 12 and 64% of students in BC think that formal

education should be doing more to teach about climate change (pp. 91-92). Participants

in the current study see it as important to educate themselves to be better equipped to

handle an ever-changing future. When asked, "What do you see as the role of youth in

the climate emergency?" participants mentioned 'educate self' (n=11) second after the

top coded response of 'advocacy' (n=15). Shaw et al. (2020) found that "given a lack of adequate education, students tend to fill their knowledge gap with erroneous narratives" (p. 8), which supports the incorporation of better climate change education in the classroom. In this research, 100% of participants agree or strongly agree that "climate change education should be a priority for schooling." Field, et al. (2019) found that 62% of Canadian students in grade 7 - 12 and 64% of students in BC think that formal education should be doing more to teach about climate change (p. 91-92).

When asked, "In school, if you could decide what topics, concepts or aspects of climate change you would like to learn about, what would those be?" participants identified teaching solutions (n=17) and climate justice (n=7) tied with intersectionality (n=7) as the most important things to learn in the classroom. This resonates with Morgan (2020) whose research found that youth participants wanted to be consulted about local resource extractive projects and to have solutions to the environmental impact of resource extraction taught in the classroom. CERBC has also called for the implementation of curriculum that, among other things, includes "mitigation strategies and solutions (real world exemplars, etc.)" (CERBC, 2021). As a department head of science, I believe these complex issues need to be taught by confident educators or, if the expertise is not possessed by the classroom teacher, through co-learning, a process that sees students and teachers seeking knowledge together.

Youth Emotions around Climate Change

The negative emotions named by participants in this research, with 70% responding with a negative emotion when asked, "What word best describes your emotional state around the climate crisis?" support Shaw et al.'s (2020) finding that saw

50% of youth participants indicate they believed "Alberta's environment would continue to worsen…" (p. 11). Similarly, working with rural BC youth, Udas et al. (2021) through an arts based study, found that only 18% of participants displayed hopeful perspectives for nature and the future with the rest raising concerns (p. 9). More broadly, after surveying 10,000 youth worldwide, Hickman et al. (2021) found that "participants across all countries were worried about climate change" (p. 863) with a staggering 76% answering yes to the statement, "the future is frightening" (p. 868).

Shaw et al.'s (2020) description of youth emotional states also resonate. They reported that 55% of their youth participants are alarmed and 35% are concerned (p. 11) when it comes to climate change. The findings from the current research line up with Hickman et al. (2021) which saw only 31% respond "yes" to a (yes, no, or prefer not to say) multiple choice question asking if they were optimistic in regard to climate change. Hickman et al. (2021) surveyed the general population, whereas this research focused on students who have an in-depth understanding of climate change.

As a comparison with environmentally conscious youth in a study of 3,154 Fridays4Future protestors, De Moor et al. (2020) found that youth were more worried, fearful, angry, frustrated, anxious, and hopeless when compared to adults, and the only emotional state youth indicated they experienced less than adults was "powerless" (p. 20). Beyond this, De Moor et al. (2020) found that 82% (24% indicating very much, 30% quite and 28% somewhat) of their youth participants indicated that they "feel hopeful about policies being able to address climate change" (p. 22). The survey also found that 88% of youth (23% very much, 38% quite, 27% somewhat) responded positively to the follow-up statement, "Even if things look bleak, I do not lose hope" (p. 22). While the

comparison is not direct, it does show a similar population's emotional state regarding climate change and mitigation policies.

I make the assumption that hopefulness and optimism are similar emotional states that do not necessarily require positive emotions regarding the present state of the world. This negative emotional state coupled with hope among my participants is similar to De Moor et al.'s (2020) findings but not to those of Hickman et al. (2021). Hickman et al.'s data may be the result of surveying a general population while De Moor et al. (2020) surveyed environmentally conscious youth involved with Fridays4Future. This informed awareness and passionate interest in climate change is supported by Stevenson et al.'s (2013) findings that showed increased knowledge was associated with increased acceptance of scientific solutions.

McDonald-Harker's (2022) study researched a tendency to show how people develop pro-environmental attitudes following local natural disasters and disaster recovery. This resonates with a response from this research to the question, "Broadly speaking, what do you believe needs to happen to make progress on the climate emergency?" where one participant wrote: "Honestly, I don't think a lot of people will support progress until the point that climate change directly impacts their lives." An interesting observation considering that BC experienced unprecedented climate-related disasters in 2021 while this survey was taking place. This relates to McDonald-Harker's (2022) research into the Alberta floods of 2013 and post-disaster views of young people where negative views can be shifted into pro-environmental views if ways to get involved with climate change mitigation action are provided. As BC has experienced wave after wave of crisis over the last few years, McDonald-Harker's (2022) views that

disaster recovery needs to focus on the advocacy of children to form resilience is relevant.

Hope does not need to be coupled with the gravity of the climate crisis to motivate people to act, but personal experience can shift youth perspective to pro-environmental concern for their local community. As an educator, I believe people should be seeking solutions to the crisis because it is the moral imperative to fix a broken world. The fact that the current survey's participants maintained hope in the face of adversity is a positive result that I believe needs to be shared with educators and policymakers.

Youth Trust in Government

The lack of trust in the federal government found in this research is supported by Field et al.'s (2019) report, which listed governments as one of the least trusted sources (23%) of climate change information. While this question refers to trust in action rather than trust to produce information, both show a similar lack of confidence associated with the government and climate change. Field (2021) produced versions with the same questions for different provinces, and BC participants likewise ranked government as the least trustworthy source of information (18%). A marketing and research poll by Ipsos taken around the 2019 Canadian federal election found that of the 25% of participants who noted climate change as their top priority in the upcoming election, 46% of those participants were "concerned about the fact that the federal government is not doing enough to combat climate change" (Ipsos, 2019, para 5). Again while these questions are not drawing on the same data, they are evidence of a lack of faith in governments towards climate action.

According to a survey conducted by Hickman et al. (2021), youth participants'
"anxiety and distress were correlated with perceived inadequate government response
and feelings of betrayal" (p. 863). When asked for agreement with the statement,
"governments can be relied on to solve our environmental problems," De Moor et al.
(2020) found that participants overwhelmingly responded "not very much" or "not at all."

Youth Views on Solutions

Participants overwhelmingly believed that action needed to be taken immediately
(92%) when addressing climate change, when pressed for what would be an achievable
time frame for measures, the most selected response was five years (43%) followed by
10 years (36%). This falls directly in line with the UN Secretary General's statement on
August 9th, 2021 which called for immediate action with fossil fuels being phased out in
a decade by G20 countries and by 2040 for all other nations (UN, 2021). These youth
are aware of the urgency and the timeframe in which strong measures must be
implemented.

Lee et al. (2020) looked at global data around youth perceptions of climate
change and while they determined youth held widely varying beliefs about climate
change causes and solutions, the most reported solution was planting trees. Youth
participants in this thesis only noted a ban on logging, or reforestation three times when
asked, "What policies would you like to see implemented to help address the climate
emergency?" In contrast to Lee et al.'s (2020) data, this thesis found forestry solutions
as one of the least described solutions likely because this study's participants were
environmentally conscious youth, nevertheless this was surprising to me given the
prominence of BC's forestry industry.

Focusing on rural BC, Udas et al. (2021) found that participants proposed solutions that were associated with "less consumeristic behaviors" (p. 11) and "the need to have a critical analysis on the reasons for climate change and claimed solutions" (p. 12). Morgan (2020) found that rural BC youth were interested in a seat at the table with regards to extractive industry expansion and sought for their voice to be incorporated in decision-making.

From this research when asked to elaborate on specific areas for the Canadian government to improve its climate change strategies, the most common response involved banning fossil fuel subsidies (mentioned 13 times) followed by subsidising renewables (mentioned seven times). This is loosely supported by the findings of De Moor et al. (2020) whose participants disagreed with the statement, "supporting climate change must be primarily accomplished through voluntary lifestyle changes by individuals" (p. 29). I interpret the data to indicate a policy direction for education to focus on helping students explore systemic changes to the energy sector including explaining subsidies in general and how current and historic governments in BC and Canada decide to spread financial support throughout the energy sector.

When discussing the support participants from this research see solutions to climate change can present to correct environmental racism and colonial injustice I found that this support is echoed by the Climate Reality Project, a global environmental organisation headed by former US Vice President Al Gore which states "To build a winning coalition and beat the climate crisis, we need to understand and respond to how social inequities intersect with our movement" (Climate Reality Project, 2021). Furthermore, in a January 2022 article posted on the BBC, Williams wrote that climate

change solutions must be done according to an inclusive transition to ensure racialized

individuals are not unduly affected by solutions to climate change. While these

examples are not academic survey tools involving youth they do align with the current

understanding expressed by the participants in this research.

Summary

The findings reveal that while participants do not trust in governments as

changemakers, both provincially and federally, they do see government policy as the

most effective means to achieve success. Youth want Canada to lead by example, not

to tell other countries what to do but to step up and show the world what an energy-rich

country is capable of achieving if the country turns to innovation to drive climate

solutions. Responses show a faith in the power of government regulations to provide

progress yet the results speak to the emotional responses associated with youth and

climate change. Youth have negative emotions about the world of climate change and

are also hopeful that something can be done in their lifetime. Youth want the

government to act, they do not want to have to grow up and lead the solution

implementation needed for progress, and they wish to be educated in order to fit into a

green society adults in power should be helping to create. This thesis aims to provide

positive hope towards the change needed and to be a step towards positive advances

for those participants feeling emotions such as rage, anxiousness, and disheartenment.

Chapter Six: Conclusion

I began this thesis looking to contribute to climate change education in a way that moves beyond teaching simply the causes and effects of atmospheric events. The gravity of climate change has affected everyone on the globe and as a teacher, I see my role as advocating for knowledge to be part of the solution. My aim when I started was to help give voice to the many youth whom I have worked with throughout the years who have been passionate and knowledgeable about the imperative of change. The youth who participated in this thesis were articulate, knowledgeable, and informed as to what solutions are necessary to make progress in the climate emergency.

The vastness of climate change is often beyond what a general audience comprehends, yet the youth I have worked with understand the nuances and complexities and are working to undo historic wrongs. While many participants believe that the underpinning systems linked to our current western economic model must change before real progress is possible, they remain hopeful that such a monumental shift is achievable. This is not to say that they are naive as to the complexity of the issue, but youth are prepared to make the efforts needed. As youth look to their educators for leadership and educators in turn look to policymakers, it is clear that there is a needed cooperation from all parties to come together and address the gaps in education.

As an educator who works with youth calling for systemic change to address the climate emergency, it is important that their views can permeate the classroom and inform education. It is essential that educators take it upon themselves to become co-learners with their students and challenge the role of the teacher as an expert in the

classroom. It is my hope that this research will play an important role in aiding teachers to become the experts that their students need.

Throughout the process of this thesis, both in the planning stages and the data gathering stage, I have been consistently impressed by the youth involved with environmental organisations and the push for climate change education in BC. As an educator and a father, I feel compelled to help work towards solution-orientated curriculum to be incorporated into the curriculum so that future generations can problem solve and resolve the mistakes of the past.

What Educators and Policymakers Should Take Away From This

The implications of this research for educators are different from policymakers. For educators, my interpretations of the findings from this research help build the case for the need for schools to focus teaching on ensuring students have opportunities to improve their climate understanding, solution building, and anxiety reduction. For policymakers, this section will touch on key areas youth are keen to learn about, and the next section will discuss suggested curriculum changes in more detail and ways to integrate climate change education into the BC curriculum. As there is currently no climate change content outside of grade 7 science, and grade 11 Earth science, which explicitly requires teaching about the human impact on the environment (BC Government, n.d.), teachers should take the information from this research as a way to inform their lessons to best support all students.

Youth participants are keen for students to be taught solutions and understand that climate change is an issue that demands immediate action. This would imply that, although this research demographic is from environmentally conscious organisations,

some youth no longer need convincing that climate change is an existential emergency and want the knowledge needed to help. These youth hold a baseline of understanding gleaned from media and social networks that has primed them to demand that education teach them beyond basic climate change literacy. Youth participants want to be taught solutions and educators should provide these, or co-learn with students, where issues exist locally so youth can get involved. Educators teaching climate science without linking climate change problems to solutions are missing an opportunity to inspire youth and contribute to a needed network of change. Furthermore, youth want an understanding that will help them enter future green industries and shape green economies that do not yet exist. Youth have indicated that they rely on self-education around these topics which would imply the education system is failing to provide them with adequate learning needed for a drastically climate-altered future.

While there are arguments for climate change education to be a stand alone course (Monroe et al., 2019) experts have suggested, a cross curricular design or an interdisciplinary approach (McNeal & Petcovic, 2019; Monroe et al., 2019) are key to teaching climate change education to ensure climate change is embedded in all subjects as its vastness perminates all areas of learning. This should inspire all educators to seek the personal knowledge needed to best support their students. As educators encourage their students to approach learning as a lifelong process, so too should educators seek the knowledge necessary to support their students regardless of the pressing changes to society or the environment.

Suggested Curriculum Changes

As a teacher in BC, this degree has given me invaluable insight into how to improve and enhance the current curriculum. A look at how the BC curriculum is organized shows multiple opportunities for the integration of climate change into curriculum policy documents. While I believe total change to the BC curriculum is unlikely, small changes to wording, or incorporation of a few key ideas can have wide-reaching impacts. Beyond wide changes, it is also important to look at nuanced changes youth participants revealed as important to a complete understanding of climate change globally and at home in BC. I suggest that policy experts do not have to rewrite the entirety of recently updated documents to meet the current calls for climate change to be integrated into the curriculum.

The BC curriculum is divided into equally weighted content areas and competencies. Content is the traditional understanding of topics such as conservation of energy, body systems, or the pH scale, while competencies are the application of skills such as inquiry, communication, and analysing (BC Government, n.d.). Connecting the content and competencies for each K-12 course are three to four unique umbrella concepts known as the big ideas (BC Government, n.d.). An example of a big idea for science 10 is that "Energy is conserved, and its transformation can affect living things and the environment" (BC Government, n.d.). Altering or remapping the BC big ideas to include the integration of the IPCC cause and effects of climate change (Masson-Delmotte et al., 2018), could meet the UNESCO calls for sustainability to become foundational by 2025 (Azoulay, 2021), as well as to achieve the often

referenced best practices in teaching and learning as recommended by many (McNeal & Petcovic, 2019; Monroe et al., 2019; Wynes & Nicholas, 2017).

The BC curriculum has been recently updated and as a result there is very little support for large scale restructuring of the curriculum. The small addition of a big idea or curricular competency could be all that is needed to have curriculum policy encourage educators across the province to develop a cause, effect, and solution approach to climate change teaching and learning within their classrooms. This goes beyond the science curriculum and should be applied to all subjects' curriculum documents. Support for interdisciplinary teaching of climate change is abundant (e.g., McNeal & Petcovic, 2019; Monroe et al. 2019) and calls for the integration of interdisciplinary climate change education is the fourth need stated by CERBC (2021). Climate change could and should be the backbone of the K-12 education system rather than a small part of it.

From the big ideas that link learning throughout courses to the curriculum competencies, there are ample opportunities for policy experts to add language that creates good climate change education. Going further than the addition of umbrella big ideas or nuanced core competencies, students could benefit from a curriculum that teaches the economic principles that underlie climate change mitigation and adaptation policies. BC is a vast province with many remote areas; therefore, teaching these ideas from a perspective of local places can have the added benefit of educating the next generation to help with the transition to a green economy.

Conclusion

The passion of the youth involved in this research drives my commitment to this cause and provides me with unending hope for the future. Little in the data surprised me as to where the youth participants would fall, and I believe to draw from a larger sample would only further bolster the results. I have been unreservedly impressed by the commitment, articulacy and intent of the youth I have worked with, more so than many of the adults working in the same field.

It is clear that the youth participants understand the climate emergency as an immediate threat that will take government regulation of corporate and individual consumption before progress can be made. Youth have indicated a myriad of emotional states around the current crisis but overall are hopeful that solutions can be found within their lifetime. Youth see their role not as leaders in innovation or ideas but as a group that must hold adults accountable to make the changes necessary in the present so that a sustainable society can be achieved. Participants understand that climate change solutions will take time to implement but demand that they start immediately. Youth are motivated and the participants are clear in describing actions that align with what academics are heralding in order to make progress.

I hope this research will be a resource that can be presented to policymakers, demonstrating that a call for climate change in the curriculum is supported by academics and current BC youth. The summary of responses can help promote climate change education, and I am happy to conclude that the data support this aim. I have pride in the outcomes and the students who contributed to this work. It is with that in

mind that I will continue to work towards curriculum reform until BC sets the example

youth are calling on by building a provincial curriculum around climate change solutions.

References

Allen, M. L., Rosas-lee, M., Ortega, L., Hang, M., Pergament, S., & Pratt, R. (2016).

They Just Respect You for Who You Are: Contributors to Educator Positive Youth

Development Promotion for Somali, Latino, and Hmong Students. Journal of

Primary Prevention. 37(1), 71–86.

http://dx.doi.org.ezproxy.lakeheadu.ca/10.1007/s10935-015-0415-2

Alrifai, J.J. Behn-Tsakoza, T. Burgesson, A. Bradshaw, J. Bhangu, M. Daigle, A.

Grossman, K. Keith, J.L. Khela, S. Livingston, G. Newman, K. Robinson, C.

(2021) *State of Youth Report: for youth, with youth, by youth.* Government of

Canada.

https://www.canada.ca/en/canadian-heritage/campaigns/state-youth/report.html#

a7a

Amnesty International. (2019, December 9). Climate change ranks highest as vital issue

of our time - Generation Z survey.

https://www.amnesty.ca/news/climate-change-ranks-highest-vital-issue-our-time-

generation-z-survey#:~:text=Among

Arneth, A., F. Denton, F. Agus, A. Elbehri, K. Erb, B. Osman Elasha, M. Rahimi, M.

Rounsevell, A. Spence, R. Valentini, (2019) Framing and Context. In: Climate

Change and Land. *IPCC Special Report*.

Arnold, H. E., Cohen, F. G., & Warner, A. (2009). Youth and environmental action:

Perspectives of young environmental leaders on their formative influences.

Journal of Environmental Education, 40(3), 27ñ36. DOI:

10.3200/JOEE.40.3.27-36.

Azoulay, A. (2021, May 20). UNESCO urges making environmental education a core

curriculum component in all countries by 2025. UNESCO.

https://en.unesco.org/news/unesco-urges-making-environmental-education-core-

curriculum-component-all-countries-2025

Bandura, A., & Cherry, L. (2020). Enlisting the Power of Youth for Climate Change. *The

American Psychologist*, *75*(7), 945–951. https://doi.org/10.1037/amp0000512

Battiste, M., (2013). *Decolonizing Education: Nourishing the Learning Spirit.* UBC Press.

BC Government. (2021, July 09). *Provincial drought, water scarcity conditions.*

gov.BC.ca. https://news.gov.bc.ca/releases/2021FLNRO0054-001346

BC Government. (2021, July 01). P*opulation Estimates.* gov.BC.ca.

https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/

population/population-estimates

BC Government. (2021, December 10) *K-12 Climate Change Education in B.C*.

gov.BC.ca.

https://www2.gov.bc.ca/gov/content/education-training/k-12/administration/progra

m-management/climatechangeeducation#ClimateCurriculum

BC Government. (n.d.) *BC's New Curriculum.* gov.BC.ca. https://curriculum.gov.bc.ca/

BC Ministry of Education (2017) *Student Statistics - 2016/17 Province - Public and

Independent Schools Combined.* sd43.bc.ca.

https://www.sd43.bc.ca/FESL/Documents/Province%202016-2017%20six%20ye

ar%20completion.pdf

Boeve-de Pauw, J., & Van Petegem, P. (2010). A cross-national perspective on youth

environmental attitudes. *The Environmentalist*, *30*(2), 133–144.

https://doi.org/10.1007/s10669-009-9253-1

Boulianne, S., Lalancette, M., & Ilkiw, D. (2020). "School Strike 4 Climate": Social Media

and the International Youth Protest on Climate Change. *Media and*

Communication, *8*(2S1), 208–218. https://doi.org/10.17645/mac.v8i2.2768

Bressler, S., & Shaviv, G. (2015). Modeling the radiation field in the Greenhouse effect –

history and evolution. Astronomical Review, *11*(3–4), 41–63.

https://doi.org/10.1080/21672857.2015.1085161

Buttigieg, K., & Pace, P. (2013). Positive Youth Action Towards Climate Change. *Journal*

of Teacher Education for Sustainability, *15*(1), 15–47.

https://doi.org/10.2478/jtes-2013-0002

Busch, K., Ardoin, N., Gruehn, D., & Stevenson, K. (2019). Exploring a theoretical

model of climate change action for youth. *International Journal of Science*

Education, *41*(17), 2389–2409.

Cajete, G. (2010). Contemporary Indigenous education: A nature-centered American

Indian philosophy for a 21st century world. *Futures: the Journal of Policy,*

Planning and Futures Studies, *42*(10), 1126–1132.

Canadian Press, Staff (2021, May 04). Group of Canadian youth fighting climate change

take case to Federal Court of Appeal.

https://bc.ctvnews.ca/group-of-canadian-youth-fighting-climate-change-take-case

-to-federal-court-of-appeal-1.5413944

Canadian Press, The (2020, November 24). Young people taking climate change

lawsuit to Federal Court of Appeal. CBC News.

https://www.cbc.ca/news/canada/british-columbia/bc-youth-climate-change-lawsu

it-appeal-1.5814872

Carney, M. (2021). *Value(s): Building a better world for all.* Penguin Random House

Canada.

Carter B. (2009). Tick box for child? The ethical positioning of children as vulnerable,

researchers as barbarians and reviewers as overly cautious." *International*

Journal of Nurse Studies; *46*(6):858-864.

CERBC (n.d.) Climate Education Reform British Columbia.

https://www.climateeducationreformbc.ca/

CERBC (2021) Reform to Transform; Our Needs. *Climate Education Reform British*

Columbia. https://www.climateeducationreformbc.ca/our-needs

Chawla, L. (1999). Life paths into effective environmental action. *The Journal of*

Environmental Education, *31*(1), 15-26.

City News (2016) Provincial exams scrapped as part of BC new curriculum. City News

Everywhere.

https://vancouver.citynews.ca/2016/05/26/provincial-exams-scrapped-bc-school/

Climate Reality Project. (2021) *Environmental Racism: What it is and how you can fight*

it. Climate Reality Project.

https://www.climaterealityproject.org/blog/environmental-racism-what-it-and-how-

you-can-fight-it

Collado, S., Staats, H., & Sancho, P. (2019). Normative influences on adolescents'

self-reported pro-environmental behaviors: The role of parents and friends.

Environment and Behavior, *51*, 288–314.

https://doi.org/10.1177/0013916517744591

Corner, A. R., O., Pellisier, A., (2014) "How do young people engage with climate

change? Towards more effective communication with 18-25 year olds", COiN:

Climate Outreach & Information Network.

https://climateaccess.org/system/files/COIN_Young%20Voices.pdf

Cullis-Suzuki, S. (1992) Speech at UN Conference on Environment and Development.

[Video] American Rhetoric.

https://www.americanrhetoric.com/speeches/severnsuzukiunearthsummit.htm

Cutter-Mackenzie, A. (2014). Where Are Children and Young People in Environmental

Education Research? *Australian Journal of Environmental Education*, *30*(1),

103–105. https://doi.org/10.1017/aee.2014.32

Cutter-Mackenzie, A., and D. Rousell. (2019). "Education for What? Shaping the Field

of Climate Change Education with Children and Young People as

co-Researchers." *Children's Geographies 17*(1): 90–104. doi:10.1080/

14733285.2018.1467556

Crawford, T., England, N., & Saltman, J. (2019, September 28). *Massive crowds call for

action during Global Climate Strike in Vancouver.* Vancouver Sun.

https://vancouversun.com/news/local-news/live-vancouver-demonstrators-join-mil

lions-around-the-world-to-demand-climate-action

Creswell, J. W. & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed method approaches* (5th Ed). Sage Publication Inc.

Cruickshank, J. (2003). *Critical realism: the difference in makes*. Routledge.

Damon, W. (2004). What is positive youth development? The Annals of the American Academy of political and social science, 591(1), 13-24.

De Moor, J., Uba, K., Wahlstr¨om, M., Wennerhag, M., & De Vydt, M. (2020). *Protest for a future II: Composition, mobilization and motives of the participants in Fridays for Future climate protests on 20-27 September, 2019, in 19 cities around the world*. Protest Institute. https://protestinstitut.eu/wp-content/uploads/2020/02/Protest-for-a-Future-II-2020 -02-24.pdf.

Deloris, J. (1996) Learning: the treasure within; report to the UNESCO of the International Commission on Education for the Twenty-first Century. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000109590

Dhillon, C., & Young, M. (2010). Environmental racism and first nations: A call for socially just public policy development. *Canadian Journal of Humanities and Social Sciences*, *1*(1), 23-37.

Dijkstra, E. M., and Goedhart, M. J. (2012). Development and Validation of the ACSI: Measuring Students' Science Attitudes, Pro Environmental Behaviour, Climate Change Attitudes and Knowledge. *Environmental Education Research 18*(6): 733–749.

Dodson, G., & Papoutsaki, E. (2017). Youth-led activism and political engagement in New Zealand: A survey of Generation Zero. *Communication Research and Practice*, *3*(2), 194–211. https://doi.org/10.1080/22041451.2016.1228994

Duggan, J. (2021). The co-productive imagination: a creative, speculative and eventful approach to co-producing research. *International Journal of Social Research Methodology*, *24*(3), 355–367. https://doi.org/10.1080/13645579.2020.1799638

Elliott, P. (2013). *Participatory action research challenges, complications, and opportunities.* Centre for the Study of Co-operatives. University of Saskatchewan.

Elmore, K., Sumner, R., Tifft, M., Forstrom, M., & Burrow, A. (2019). Building collaborative youth development research-practice partnerships through Cooperative Extension. *Children and Youth Services Review*, 105, 104413–. https://doi.org/10.1016/j.childyouth.2019.104413

Feierabend, T., & Eilks, I. (2011). Innovating science teaching by participatory action research - reflections from an interdisciplinary project of curriculum innovation on teaching about climate change. *CEPS Journal*, 1(1), 93–112.

Ferragamo, M., Larson, M., Brown, P., & McClenachan, L. (2020). Youth perceptions of climate change and climate action in Waterville, Maine - *The Maine Journal of Conservation and Sustainability*. https://umaine.edu/spire/2020/04/03/ferragamo/

Field, E. (2017). Climate Change: Imagining, negotiating, and co-creating future(s) with children and youth. *Curriculum Perspectives*, *37*(1), 83- 89. DOI: 10.1007/s41297-017-0013-y

Field, E., Schwartzberg, P., Berger, P. & Gawron, S. (2019). Climate Change Education in the Canadian Classroom: Perspectives, teaching practice, and possibilities.

EdCan Network Magazine.

https://www.edcan.ca/articles/climate-change-education-canada/

Field, E., Schwartzberg, P., Stevens, J. & Frank, M. (2021). Focus on British Columbia

Regional Report: Canada, Climate Change and Education: Opportunities for

Public and Formal Education. *Learning for a Sustainable Future*.

Gale, F., & Edenborough, M. (2021). Promoting youth-directed social change: engaging

transformational critical practice. *Social Work Education*, *40*(1), 58–79.

https://doi.org/10.1080/02615479.2020.1779209

Ghoussoub, M. (2021, July 07). *Hundreds died during B.C.'s heat dome. Who is

responsible for deaths caused by extreme heat?* CBC News.

https://www.cbc.ca/news/canada/british-columbia/heat-death-accountability-1.60

93966

Gillingham, A. & Stillman, B. W. (1946) Remedial Training for Children with Specific

Disability in Reading, Spelling, and Penmanship. Sackett & Wilhelms

lithographing Corporation.

Gorski, P. S. (2013). What is Critical Realism? And Why Should You Care?

Contemporary Sociology, *42*(5), 658–670. SAGE Publications.

https://doi.org/10.1177/0094306113499533

Goulet, G. & Goulet, K. (2014). *Teaching Each Other: Nehinuw Concepts and

Indigenous Pedagogies*. UBC Press.

Greenwood, D. (2012). Doing and learning action research in the neo-liberal world of

contemporary higher education. *Action Research*, *10*(2), 115–132.

https://doi.org/10.1177/1476750312443573

Gvishiani, Dr. D.M., (1977) Intergovernmental Conference on Environmental Education.

https://unesdoc.unesco.org/ark:/48223/pf0000032763

Halder, P., Prokop, P., Chang, C., Usak, M., Pietarinen, J., Havu-Nuutinen, S.,

Pelkonen, P., Cakir, M. (2012). International Survey on Bioenergy Knowledge,

Perceptions, and Attitudes Among Young Citizens. *Bioenergy Research*, *5*(1),

247–261. https://doi.org/10.1007/s12155-011-9121-y

Hallar, A., McCubbin, I. B., & Wright, J. M. (2011). CHANGE: A Place-Based Curriculum

for Understanding Climate Change at Storm Peak Laboratory, Colorado. *Bulletin

of the American Meteorological Society*, 92(7), 909–918.

Hammersley, M. (2004). Action research: a contradiction in terms? *Oxford Review of

Education*, *30*(2), 165–181. https://doi.org/10.1080/0305498042000215502

Han, H., & Ahn, S. (2020). Youth Mobilization to Stop Global Climate Change:

Narratives and Impact. *Sustainability*, *12*(10), 4127–.

https://doi.org/10.3390/su12104127

Hargis, Kr. & McKenzie, M. (2020). Responding to Climate Change Education: A Primer

for K-12 Education. *The Sustainability and Education Policy Network*, Saskatoon,

Canada.

Hernandez, J. (2020, September 30). *Ottawa argues youth-led climate change lawsuit

too broad to be tried in court.* CBC News.

https://www.cbc.ca/news/canada/british-columbia/climate-change-lawsuit-1.5744

518

Hill, M. (2006). Children's Voices on Ways of Having a Voice: Children's and Young

    People's Perspectives on Methods used in Research and Consultation.

    Childhood 13(1): 69–89.

Holland, C. (2020). The Implementation of the Next Generation Science Standards and

    the Tumultuous Fight to Implement Climate Change Awareness in Science

    Curricula. *Brock Education*, *29*(1), 35–35.

International Bureau of Education. (2020) *Is Italy the first country to require climate*

    change education in all schools? International Bureau of Education.

    http://www.ibe.unesco.org/en/news/italy-first-country-require-climate-change-edu

    cation-all-schools

IPCC (2017, September 21st) IPCC Statement: Clarifying the role of the IPCC in the

    context of 1.5°C. IPCC.ch.

    https://www.ipcc.ch/2017/09/21/ipcc-statement-clarifying-the-role-of-the-ipcc-in-th

    e-context-of-1-5oc/#:~:text=The%20IPCC's%20mandate%20is%20to,options%2

    0for%20responding%20to%20it.

Ipsos, (2019) Healthcare (35%), Cost of Living (27%, Climate Change (25%) Top Voter

    Issues as Campaign Season Kicks off.

    https://www.ipsos.com/en-ca/news-polls/Healthcare-Cost-of-Living-Climate-Chan

    ge-Top-Voter-Issues

Johnson, R. (2017, December 14). *13-year-old Anishinaabe girl to address the United*

    Nations. CBC News.

    https://www.cbc.ca/news/indigenous/autumn-peltier-anishinaabe-water-advocate-

    un-1.4448454

Jaskulsky, L. & Besel, R. (2013). Words that (don't) matter: An exploratory study of four

    climate change names in environmental discourse. *Applied Environmental*

    Education & Communication 12(1): 38–45.

Jorgenson, S., Stephens, J., & White, B. (2019). Environmental education in transition:

    A critical review of recent research on climate change and energy education. *The*

    Journal of Environmental Education, *50*(3), 160–171.

Joseph, J. (2001). Critical Realism: Essential Readings Margaret Archer, Roy Bhaskar,

    Andrew Collier, Tony Lawson and Alan Norrie (editors) London and New York:

    Routledge, 1998. *Historical Materialism : Research in Critical Marxist Theory*,

    8(1), 507–517. https://doi.org/10.1163/1569206X-00801024

Lawler, J., and M. Patel. (2012). Exploring Children's Vulnerability to Climate Change

    and their Role in Advancing Climate Change Adaptation in East Asia and the

    Pacific. *Environmental Development* 3: 123–136.

Konguavi, T. (2021, November 01). 'An incredible honour': 2 Edmonton youth heading to

    COP26 climate summit | CBC News.

    https://www.cbc.ca/news/canada/edmonton/edmonton-youth-cop26-1.6232373

Kotyk, A. (2021, September 06). B.C. wildfires: Out-of-control blazes down to 16;

    Canadian Armed Forces deployment ends.

    https://bc.ctvnews.ca/b-c-wildfires-out-of-control-blazes-down-to-16-canadian-ar

    med-forces-deployment-ends-1.5574967

Le Treut, H., R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson

    M. Prather, A. (2007) *Historical Overview of Climate Change.* Cambridge

    University Press.

Lee, K., Gjersoe, N., O'Neill, S., & Barnett, J. (2020). Youth perceptions of climate

change: A narrative synthesis. *WIRES Climate change* Vol. 11, Issue 3.

https://onlinelibrary.wiley.com/doi/full/10.1002/wcc.641

Leahy, S. (2021, December 08) Small but growing number of Canadian universities

divesting from fossil fuels. *University Affairs.*

https://www.universityaffairs.ca/news/news-article/small-but-growing-number-of-c

anadian-universities-divesting-from-fossil-fuels/

McNeal, P. M., & Petcovic, H. L., (2019). Sound practices in climate change

education. *Science Scope*, *42*(6), 104–107.

Malena-Chan, R. (2019) Making climate change meaningful: narrative dissonance and

the gap between knowledge and action [Master's thesis]. Saskatoon (SK):

University of Saskatchewan.

Martin, S., Burbach, J., Benitez, L., & Ramiz, I. (2019). Participatory action research and

co-researching as a tool for situating youth knowledge at the centre of research.

London Review of Education, *17*(3), 297–. https://doi.org/10.18546/LRE.17.3.05

Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani,

W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen,

X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)

(2018) Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC

Special Report on the impacts of global warming of 1.5°C above pre-industrial

levels and related global greenhouse gas emission pathways, in the context of

strengthening the global response to the threat of climate change, sustainable

development, and efforts to eradicate poverty*. IPCC.

Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, (2021) *IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge University Press.

Merriam, S. B., Tisdell, E. J. (2016) *Qualitative Research; A guide to Design and Implementation.* Jossey-Bass.

McDonald-Harker, C. Haney, T. (2022) "We Need to Do Something About This": Children and Youth's Post-Disaster Views on Climate Change and Environmental Crisis. Sociological Inquiry, *92*(1). DOI: 10.1111/soin.12381

Monroe, M., Plate, R., Oxarart, A., Bowers, A., & Chaves, W. (2019). Identifying effective climate change education strategies: a systematic review of the research. *Environmental Education Research*, 25(6), 791–812. https://doi.org/10.1080/13504622.2017.1360842

Morgan, V. (2020). Why would they care?: Youth, resource extraction, and climate change in northern British Columbia, Canada. *The Canadian Geographer*, 64(3), 445–460. https://doi.org/10.1111/cag.12605

Nakashima, D., Krupnik, I., & Rubis, J. (2018). *Indigenous knowledge for climate change assessment and adaptation.* Cambridge University Press.

Nazir, J., Pedretti, E., Wallace, J., Montemurro, D., and Inwood, H. (2011). Reflections on the Canadian Experience with Education for Climate Change and Sustainable Development. *Canadian Journal of Science, Mathematics and Technology Education* 11 (4): 365–380.

New West School District (2022) *BC's Redesigned Curriculum.* Newwestschools.ca

https://newwestschools.ca/about-us/learner-success/bcs-redesigned-curriculum/

O'Brien, C. (2008). Sustainable Happiness: How Happiness Studies Can Contribute to a

More Sustainable Future. *Canadian Psychology*. *49*(4), 289-295.

Paris Agreement (2015) UN Treaty. United Nations.

https://unfccc.int/sites/default/files/english_paris_agreement.pdf

Pavarini, G., Lorimer, J., Manzini, A., Goundrey-Smith, E., & Singh, I. (2019).

Co-producing research with youth: The NeurOx young people's advisory group

model. *Health Expectations*, *22*(4), 743–751. https://doi.org/10.1111/hex.12911

Perera, L., & Hewege, C. (2013) Climate change risk perceptions and environmentally

conscious behaviour among young environmentalists in Australia. *Young*

Consumers Vol. 14 No. 2. pp. 139-154.

Powell, J. (2011). The Inquisition of Climate Science. New York Chichester, West

Sussex: Columbia University Press.

https://doi-org.ezproxy.lakeheadu.ca/10.7312/powe15718

Ray, S. J. (2020). *A Field Guide to Climate Anxiety: How to Keep Your Cool on a*

Warming Planet. University of California Press.

Rousell, D., & Cutter-Mackenzie-Knowles, A. (2020). A systematic review of climate

change education: giving children and young people a "voice" and a "hand" in

redressing climate change. *Children's Geographies,* 18(2), 191–208.

https://doi.org/10.1080/14733285.2019.1614532

Roy, J., P. Tschakert, H. Waisman, S. Abdul Halim, P. Antwi-Agyei, P. Dasgupta, B.

Hayward, M. Kanninen, D. Liverman, C. Okereke, P.F. Pinho, K. Riahi, and A.G.

Suarez Rodriguez, (2018) *2018: Sustainable Development, Poverty Eradication and Reducing Inequalities. In: Global Warming of 1.5°C.* IPCC Special Report.

Schmitt, M., Mackay, C., Droogendyk, L., & Payne, D. (2019). What predicts environmental activism? The roles of identification with nature and politicized environmental identity. *Journal of Environmental Psychology*, 61, 20–29. https://doi.org/10.1016/j.jenvp.2018.11.003

Selby, D., and F. Kagawa (2010). Runaway Climate Change as Challenge to the 'Closing Circle' of Education for Sustainable Development. *Journal of Education for Sustainable Development, 1*, 37–50.

Shaw, C., Bennett, A. and Wang, S. (2020) Youth Narrative and Voice: Principles for Effective Climate, Energy and Environmental Education in Alberta. *Oxford: Climate Outreach*.

Smart, A. (2022, January 02). *BC Farmers 'white-knuckling' their way through extreme cold after floods, heat dome.* CTV News. https://bc.ctvnews.ca/b-c-farmers-white-knuckling-their-way-through-extreme-cold-after-floods-heat-dome-1.5725759

Stevenson, K. T. Peterson, M. N. Bondell, H. D. Moore, S. E. Carrier, S. J. (2013) Overcoming skepticism with education: interacting influences of worldview and climate change knowledge on perceived climate change risk among adolescents. *Climate change, 126*, 293-304

Tanner, T. (1980). Significant life experiences: A new research area for environmental education. *The Journal of Environmental Education*, *11*(4), 20-24.

Teach the future UK (January, 2022) Teach the Future Research. Teachthefuture.uk

https://www.teachthefuture.uk/research

Thomas, D. (2017). Feedback from research participants: are member checks useful in

qualitative research? *Qualitative Research in Psychology*, *14*(1), 23–41.

https://doi.org/10.1080/14780887.2016.1219435

Trott, C. (2019). Reshaping our world: Collaborating with children for community-based

climate change action. *Action Research*, *17*(1), 42–62.

https://doi.org/10.1177/1476750319829209

Udas, P.B. Fournier, B. Christianson, T. Desbien, S (2021) What Can We Learn from

Rural Youth in British Columbia, Canada? Environmental and Climate

Change-Issues and Solutions. *Sustainability*. *13*, 13562.

Uguen-Csenge, E. (2019, September 26). Here's why Vancouver teens are staging a

climate strike. CBC News.

https://www.cbc.ca/news/canada/british-columbia/vancouver-climate-strike-global
-thunberg-protest-1.5297743

UN. (2021, August 9th) Secretary-General's statement on the IPCC Working Group 1

Report on the Physical Science Basis of the Sixth Assessment. UN.org.

https://www.un.org/sg/en/content/secretary-generals-statement-the-ipcc-working-
group-1-report-the-physical-science-basis-of-the-sixth-assessment

UN. (1989) *Convention on the rights of the child* Treaty no. 27531. *United Nations

Treaty Series*, 1577, pp. 3-178.

https://treaties.un.org/doc/Treaties/1990/09/19900902%2003-14%20AM/Ch_IV_1
1p.pdf

UNESCO. (2020, August 26) Is Italy the first country to require Climate Change

Education in all schools? IBE.UNESCO.org.

http://www.ibe.unesco.org/en/news/italy-first-country-require-climate-change-edu

cation-all-schools#:~:text=On%20November%205%2C%202019%2C%20Italian,

work%20against%20it%20through%20sustainability.

UNESCO. (2022) Competency-based approaches. IBE.UBESCO.org

http://www.ibe.unesco.org/en/topics/competency-based-approaches#:~:text=The

%20concept%20of%20competency%20is,fields%20of%20activity%20%5B%E2

%80%A6%5D

UNICEF. (2019) Declaration on Children, Youth and Climate Action. Unicef.org

https://www.unicef.org/environment-and-climate-change/climate-declaration#sign

atories

UNICEF. (2021, October 21) Youth Climate Declaration adopted at the Youth Climate

Summit. Unicef.org

https://www.unicef.org/eca/press-releases/youth-climate-declaration-adopted-you

th-climate-summit

Von Storch, L., Ley, L., & Sun, J. (2021). New climate change activism: before and after

the Covid-19 pandemic. *Social Anthropology*.

https://doi.org/10.1111/1469-8676.13005

Wallis, H., & Loy, L. (2021). What drives pro-environmental activism of young people? A

survey study on the Fridays For Future movement. *Journal of Environmental

Psychology*, *74*, 101581–. https://doi.org/10.1016/j.jenvp.2021.101581

Weick, K. (1984). Small wins: Redefining the scale of social problems. *The American Psychologist*, *39*(1), 40–49. https://doi.org/10.1037/0003-066X.39.1.40

Williams, J. (2022, January 26th) Why climate change is inherently racist. BBC. https://www.bbc.com/future/article/20220125-why-climate-change-is-inherently-racist

Wynes, S., & Nicholas, K. (2017). The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environmental Research Letters*, 12(7), 74024–. https://doi.org/10.1088/1748-9326/aa7541

Yurk, V. (2021, July 15). Pacific Northwest Heat Wave Killed More Than One Billion Sea Creatures. *Scientific American*. https://www.scientificamerican.com/article/pacific-northwest-heat-wave-killed-more-than-1-billion-sea-creatures/

Appendix A: Survey Questions

Perspective on Climate Change Education, Solutions, and A Vision for Change from Environmentally Conscious Youth in British Columbia

Survey Questions

This survey hopes to answer the question "What do youth in British Columbia making demands of schooling, governments, and corporations present as a vision for change in the fight against the climate crisis?"

There will be an opportunity to learn more about participating in a focus group at the end of the survey.

1) **To what school district in BC do you most associate your education? (List will be provided to participants)**

2) **How old are you?**
   a. 16
   b. 17
   c. 18
   d. 19
   e. 20

3) **Are you affiliated with any environmental group in BC? If so, please list which group(s).**

<mark>Section 1: Climate Change Education</mark>

1) **Please respond to the following statement: "**Climate change education is currently a high priority within your school.**"**
   ▪ Strongly Agree
   ▪ Agree
   ▪ Neutral
   ▪ Disagree
   ▪ Strongly Disagree
   ▪ Don't Know

2) **Please respond to the following statement:** **"**Climate change education must be a high priority for schooling.**"**

- Strongly Agree

- Agree

- Neutral

- Disagree

- Strongly Disagree

- Don't Know

3) **At what grade do you think climate change education should begin?**

- Primary	- 5	- 10
- 1	- 6	- 11
- 2	- 7	- 12
- 3	- 8	
- 4	- 9	

4) **What should be the goal of climate change education?** (Click all that apply)

- Teaching the science of Earth's climates

- Teaching climate change environmental impacts

- Teaching solutions to climate change problems

- Teaching the connections of climate change issues

- Teaching about environmental racism

- Training students for jobs in a future sustainable economy

- Other_____

5) In school, if you could decide what topics, concepts or aspects of climate change you would like to learn about, what would those be?

Section 2: Youth Perspective on the climate emergency

1) **What timeframe do you believe is needed for global governments and corporations to adopt measures to address the climate emergency?** *(ie Policy and Actions, Net negative, non-polluting)*

  - Immediately

  - 5 Years

  - 10 Years

  - 2050

  - 2100

  - Other_____

2) **What timeframe do you believe is achievable for global governments and corporations to adopt measures to address the climate emergency?** *(i.e. Policy and Actions, Net negative, non-polluting)*

  - Immediately

  - 5 Years

  - 10 Years

  - 2050

  - 2100

  - Other_____

3) **Please respond to the following statement: "I trust in the Canadian government to address the climate emergency."**

  - Strongly Agree

  - Agree

  - Neutral

  - Disagree

  - Strongly Disagree

  - Don't Know

4) **Please respond to the following statement: "I trust in the British Columbian government to address the climate emergency."**

- Strongly Agree

- Agree

- Neutral

- Disagree

- Strongly Disagree

- Don't Know

5) **Please respond to the following statement: "I trust corporations to address the climate emergency."**

- Strongly Agree

- Agree

- Neutral

- Disagree

- Strongly Disagree

- Don't Know

6) **What in your opinion is the largest contributor to the climate emergency?**

- Governments

- Corporations

- Capitalism

- Colonialism

- Climate change deniers

- Previous generations

- Individuals

- Other_____

7) **Who should bear the financial burden of the climate emergency?** (Check all that apply)

- Governments

- Corporations

- Developed nations

- Colonial powers

- Previous generations

- The Superrich

- Everyone

- Other_____

8) **Please respond to the following statement: "Money should be used as a tool to mitigate the climate emergency worst case scenarios."** *(ie financial institutions divest from fossil fuels, pension funds, big banks, investment firms)*

- Strongly Agree

- Agree

- Neutral

- Disagree

- Strongly Disagree

- Don't Know

9) **Please respond to the following statement: "Education is essential to mitigate the climate emergency worst case scenarios."**

- Strongly Agree

- Agree

- Neutral

- Disagree

- Strongly Disagree

- Don't Know

10) **Please respond to the following statement: "Indigenous stewardship is essential to mitigate the climate emergency worst case scenarios."**

- Strongly Agree

- Agree

- Neutral

- Disagree

- Strongly Disagree

- Don't Know

11) **Please respond to the following statement: "The climate emergency presents an opportunity for society to address historical injustices"** (such as racism, gender inequality, social inequity).

- Strongly Agree

- Agree

- Neutral

- Disagree

- Strongly Disagree

- Don't Know

12) **Please respond to the following statement: "I am hopeful solutions can be put in place in my lifetime to mitigate the climate emergency."**

- Strongly Agree

- Agree

- Neither Agree nor disagree

- Disagree

- Strongly Disagree

- Don't Know

13) **What do you see as the biggest barrier to implementing climate change solutions?**

Section 3: Vision for Change

1) **What policies would you like to see implemented to address the climate emergency?**

2) **What do you see as Canada's role in helping developing nations fight against the climate emergency?**

3) **What do you see as the role of youth in the climate emergency?**

4) **Broadly speaking, what signs do you see that society is making progress on the climate emergency?**

5) **Broadly speaking, what do you believe needs to happen to make progress on the climate emergency?**

6) **Identify any specifics you believe need to happen to see progress on the climate emergency?** *(Banning fossil fuel subsidies, taxing long haul flights, Capital Gains taxes aimed at previous generations)*

7) **What is the role of youth in connection with what you see needs to happen?**

8) **How would you describe your emotional state around the climate emergency?**
   a. **Hopeful**
   b. **Optimistic**
   c. **Motivated**
   d. **Rage**
   e. **Depressed**
   f. **Sad**
   g. **Disheartened**
   h. **Anxious**
   i. **Other_____**

Demographic Data Questions:

Please take a moment to fill out the demographic portion of the survey to ensure that diverse voices are heard on this important issue.

1) **To which gender identity do you most identify?**
   a. **Female**
   b. **Male**
   c. **Genderqueer/Non-Binary**

      d. **Prefer not to disclose**
      e. **I don't identify as any of the above listed options**

2) **Do you identify as a racialized person? If so please self-identify.**

3) **Are you associated with any First Nations, Indigenous, Inuit or Metis groups in BC? If so please identify?**

==Follow up Qualitative focus group discussion==.

In order to discuss further the results of the survey a series of focus groups will be held. If you are interested in learning more about participating in a focus group (interview discussion with several youth participants and me, the researcher) please click the following link to provide your email so that your responses to this survey remain anonymous. This data will not be associated with your results from the survey nor will it be used to identify your views or opinions during the focus group sessions. LINK

Separate Google form

Follow-up Focus Group

For more information about participating in a focus group, please leave your name and email address and we will send you an information letter with details. If you are interested, please respond to our email and we will send you some dates/times to link into a focus group held on Zoom.

Thank you again for participating in our research study!

Please provide your name_____

Please provide your email address_____

Appendix B: Thematic Coding of Open Ended Questions

Section 1 - Question #5 In school, if you could decide what topics, concepts or aspects of climate change you would like to learn about, what would those be?

Solutions (17)
Biodiversity (1)
Conservation (1)
Impact (1)
Causes (2)
Climate Justice (7)
Intersectionality (7)
Indigenous Sovereignty (1)
Urgency (1)
Green Jobs (2)
Issues (4)

Section 2 - Question #13 - What do you see as the biggest barrier to implementing climate change solutions?

Governments (12)
Capitalism (5)
Public Awareness (5)
Corporations (6)
No response (2)

Section 3 - Question #1 - What policies would you like to see implemented to help address the climate emergency?

Ban single use plastic (4)
Logging (3)
Stop pipelines (2)
Climate education (5)
Indigenous stewardship (4)

Regulations (ie Carbon tax, Banning fossil fuels, fishing regulations, subsidising renewables) (23)
No Response (3)
Other (Transit, Nuclear, Electrification) (3)

Question #2 - What do you see as Canada's role in helping developing nations fight against the climate emergency?

Financial Support (11)
Lead by example (11)
Indigenous reconciliation (1)
No response (3)
International Coordination (1)
Supporting climate refugees (3)

Question #3 - What do you see as the role of youth in the climate emergency?

Lead (2)
Hold accountable (4)
Educate self (11)
Advocacy (15)
No response (1)

Question #4 - Broadly speaking, what signs do you see that society is making progress on the climate emergency?

Activism (3)
Community unity (3)
Automobile electrification (1)
Adoption of sustainability (4)

Not a lot (1)
Increased media attention (8)
Increased education (2)
Improved environmental standards
Vegetarian, and vegan options (1)
Less climate deniers (1)

Question #5 - Broadly speaking, what do you believe needs to happen to make progress on the climate emergency?

Reduce fossil fuel use (3)
Climate change education (3)
Government action (10)
Switch to renewables (4)
Promote plant based diets (1)
Don't know (1)
Indigenous stewardship of land and resources (2)
Carbon sequestration (1)
Equitable Solutions (Just transition) (1)
Apply current known solutions (1)
Activism (1)
People need to be directly affected (1)
Treat it like an emergency (1)
Put the planet first (1)

Question #6 - Identify any specifics you believe need to happen to see progress on the climate emergency? (Banning fossil fuel subsidies, taxing long haul flights, Capital Gains taxes aimed at previous generations)

Banning fossil fuel subsidies (13)
Banning fossil fuels (3)
Government regulations on fisheries (2)

Subsidize renewables (7)
Wealth tax (5)
Carbon tax (4)
Climate change education (2)
Plastic tax (1)
Reduce meat consumption
Plant trees (1)
Climate activism (1)
Promoting Indigenous Stewardship (1)
Encourage circular economy (1)

Question #7 - What is the role of youth in connection with what you see needs to happen?

Advocacy (8)
Innovate (2)
Vote (2)
Seek positions of influence (1)
Holding others accountable (1)
Train for green economy (1)
Personal actions (1)
Inspire (1)

8)   What word best describes your emotional state around the climate crisis?

Negative (19)
Positive (8)

Appendix C: Focus Group Guiding Questions

Perspective on Climate Change Education, Solutions, and A Vision for Change from Environmentally Conscious Youth in British Columbia

Focus Group Questions; Semi-structured open-ended interview protocol

Preamble: Thank you for your participation in this focus group. Before we begin please provide consent to be involved in the focus group, if you consent to be recorded, and if you understand that your information from the focus groups cannot be withdrawn please write your name in the private chat for the researcher to record.

You are free to leave the Zoom meeting anytime by clicking LEAVE in Zoom. I would ask that participants keep the discussion confidential but remember I can't guarantee this due to the group nature of focus groups.

Referencing Section 1: Climate Change Education

1) **The first two questions in the survey reference that climate change education, is a high priority in schooling, or must be a high priority in schooling, what do you see as areas that are currently setting positive examples in your school or community?**

2) **What do you believe must be done to further climate change education?**

3) **Referencing question 3 the grade level for the introduction of climate change education, what do you envision early grades learning about in regards to the climate change emergency?**

Referencing Section 2: Youth Perspective on the climate emergency

1) **Referencing the gap between what participants noted is needed and what is achievable in adopting measures to address the climate emergency, how do you think we could accelerate progress?**

2) **Referencing trust in governments both federally and provincially, what could be done to increase trust?**

3) **Corporations is a broad term, how could corporations be encouraged to adopt measures to address the climate emergency?**

4) **How does capitalism contribute to the climate change emergency?**

Referencing Section 3: Vision for Change

1) **What do you see as the role of youth in the climate emergency?**

2) **Broadly speaking, what do you believe needs to happen to make progress on the climate emergency?**

3) **Identify any specifics you believe need to happen to see progress on the climate emergency?** *(Banning fossil fuel subsidies, taxing long haul flights, Capital Gains taxes aimed at previous generations)*

4) **What is the role of youth in connection with what you see needs to happen?**

Appendix D: Information Letter and Forward Emails

Subject: Youth Climate Action Voice Survey

Dear Prospective Participants,

I am a teacher in Vancouver and am currently completing my Masters of Education at Lakehead University focusing on Climate Change Education. I am looking to compile responses to a survey on youth vision for change in regard to the climate emergency, education, and environmental perspectives in BC. The survey takes approximately 15 minutes and is open to youth aged 16-20 in BC. The survey is completely anonymous. Organizations who send this opportunity to their youth members can be recognized in the research thesis. Please advise if you've forwarded to your membership and if you'd like to be recognized in my thesis by emailing me at mfrank1@lakeheadu.ca.

While youth perspectives have been widely shared in the media, there is a notable absence in current academic literature. It is important to survey and catalogue youth voices, both as a historical record and a portfolio of opinions from which educators and academics can learn to listen. Other studies have shown the environmental perspectives of youth worldwide on the topic of climate change and what motivates environmental activism in youth, but this study specifically hopes to establish what 'change,' as perceived by youth, looks like in BC.

More information is found in the information letter attached which contains a link to the study.

Thank you for your time,

Mark Frank   Dr. Ellen Field
(Graduate Student)   (Thesis Supervisor)

Mfrank1@lakeheadu.ca   Ellen.Field@lakeheadu.ca
778-772-6063

Please distribute to your youth members using the text below:

Hello.

Lakehead University in Ontario is conducting a study to seek information from youth involved in climate change action. Please find below a link to a survey which will take about 15 minutes to complete. Our organization is not involved in this study, and we will not be aware of your participation or not. The study is anonymous and voluntary. More information is found at the link. If you have questions, please contact the researchers which are listed in the study information letter found through the link.

Please follow the link below to the information letter regarding this survey.

Thank you for your time,

Appendix E: Ethics Approval Letter

Lakehead UNIVERSITY

Research Ethics Board
t: (807) 343-8283
research@lakeheadu.ca

July 16, 2021

Principal Investigator: Dr. Ellen Field
Student Investigator: Mark Frank
Faculty of Education (Orillia)
Lakehead University

Dear Dr. Field and Mark:

Re: Romeo File No: 1468737
Granting Agency: N/A
Agency Reference #: N/A

On behalf of the Research Ethics Board, I am pleased to grant ethical approval to your research project titled, "Perspective on Climate Change Education, Solutions, and A Vision for Change from Environmentally Conscience Youth in British Columbia".

Ethics approval is valid until July 16, 2022. Please submit a Request for Renewal to the Office of Research Services via the Romeo Research Portal by June 16, 2022 if your research involving human participants will continue for longer than one year. A Final Report must be submitted promptly upon completion of the project. Access the Romeo Research Portal by logging into myInfo at:

https://erpwp.lakeheadu.ca/

During the course of the study, any modifications to the protocol or forms must not be initiated without prior written approval from the REB. You must promptly notify the REB of any adverse events that may occur.

Best wishes for a successful research project.

Sincerely,

Dr. Kristin Burnett
Chair, Research Ethics Board

/sw