A Lesson in Climate Change Education:
Examining how Climate Change is taught in the Nova Scotia Public School Curriculum

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Abstract

As young Nova Scotians grow up, they will have to face the negative impacts of climate change in the province, including sea level rise and increasing storm surges. It is therefore important that this demographic be well informed about the causes and consequences of climate change, and how to adapt to these impacts. Climate Change Education (CCE) is an effective tool to communicate this information. Understanding the positive impact that CCE can have on youth in Nova Scotia, this study seeks to identify the way CCE is taught in Nova Scotia, namely by identifying the dominant CCE framework within the Nova Scotia 9-12 curriculum. To do so, the 9-12 curriculum was read, and every instance of CCE was identified. These examples of CCE were sorted based on content into either a Scientific or Interdisciplinary Framework, and these frameworks are then measured by frequency to discern the dominant way climate change is taught in the classroom. This study reveals that the Nova Scotia curriculum teaches CCE from a mainly interdisciplinary framework, but is very well rounded overall, with a near even balance between the two frameworks. This ensures that students receive a well-rounded education regarding climate change. CCE in the curriculum could be improved by undergoing updates, including more CCE overall, and dedicating more individual lessons and full class units to CCE. This would ensure the continued quality of CCE in Nova Scotian public schools.

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1. Introduction

1.1 Background

Climate change is one of the defining issues of this century, with grave impacts on the environmental, social, and economic well being of the planet. The Intergovernmental Panel on Climate Change (IPCC) estimates that the negative impacts of climate change will intensify as the twenty-first century wears on (IPCC, 2014). This poses a serious threat to a unique and vulnerable demographic: the world's youth. Young people will face the brunt of the negative effects of climate change in their lifetime as climate change worsens. Additionally, governments have set the majority of climate change related targets to end between 2025-2050, meaning the adult lives of today's youth will overlap with this crucial window of time (Corner et.al, 2015). Thus, not only will this generation face the worst of climate change, but they will also be required to take the action necessary to meet these political targets (Busch, 2016).

As such, the world's youth need to be made well aware of global climate change and the challenges it poses to their survival, in order to ensure that they take action to protect themselves and the future of the planet. In this case, education has been suggested as "…an essential element for mounting an adequate global response to climate change " (UNESCO, 2015). In fact, in the 2015 Paris Agreement, Article 12 outlines this exact sentiment:

> Parties shall cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation and public access to information, recognizing the importance of these steps with respect to enhancing actions under this Agreement (UNFCCC, 2015).

It is thus recognized that education has an important role to play in improving the global response to climate change, especially among youth. As a signatory of the Paris Agreement, Canada is certainly responsible for attending to this issue, and exploring ways to educate Canadian youth about climate change. This thesis will thus focus on climate change education in Canada, specifically Nova Scotia, and how it is taught to the youth who need it most.

1.2 Statement of the Problem

Educating Canada's youth about climate change is no easy task, considering the sheer scope of this educational objective. Firstly, the youth population in Canada is considerably large and diverse. As of 2017, approximately 7.9 million people in Canada are under 19 years of age (Statistics Canada, 2017). Disseminating knowledge to this large number of youth, who are at different reading levels, speak different languages, and live thousands of kilometers apart, is a logistical problem. Additionally, depending on geopolitical circumstances, youth in different regions of Canada face a myriad of different climate change impacts, with varying levels of severity.

While there are evidently challenges relating to the spread of climate change knowledge among the youth of Canada, it is not an impossible task. Perhaps the most reliable, widespread way to disseminate this knowledge is through public school education. As of 2015, more than 5 million youth in Canada were enrolled in primary and secondary schools, with more undergoing private education (Statistics Canada, 2017). This means that these youth have consistent access to education every day, which has the power to shape their opinions, personalities, and future career paths. This

provides an ideal platform to spread information about climate change to the population that it will affect the most.

A potential way for Canadian educators to spread this information effectively within schools is by implementing climate change education (CCE). CCE is an important tool for developing effective responses to climate change (UNESCO, 2015). It teaches youth the causes and consequences of climate change, and prepares them to live with its impacts (UNESCO, 2015). Subjects that CCE might cover include climate literacy, environmental science, social issues, disaster risk assessments, and sustainable development (Allison, 2012). Through teaching the causes and effects of climate change, CCE enables students to alter their decision making to ensure it is conducive to mitigating or adapting to climate change (Karpeduwan, Khan, & Nur, 2017).

Since climate change is such an interdisciplinary topic, the nature of the teaching material within CCE varies. In this respect, the way that climate change in the classroom is framed is important. A "frame" is simply the way information is organized: specifically, which elements are selected and emphasized in communication of an idea (Carver, Wiese, & Breivik, 2014). In CCE, framing entails how large ideas such as climate change are broken down and communicated to students, and which parts of the phenomenon are highlighted as most important. In this respect, Busch (2016) states that many teachers tend to either teach climate change from a scientific frame, including scientific processes and environmental impacts, or a more interdisciplinary frame, which goes beyond the science to consider the economic, social, and local impacts of climate change. There are benefits to both frameworks, and comparing the two based on their

strengths and weaknesses is a useful way to identify the most effective and comprehensive way to teach CCE. This thesis seeks to do just that, and these frameworks will be discussed at length in the literature review portion of this thesis.

1.3 Purpose of Study

Climate change education is even more important in regions that are especially threatened by climate change. An example of a region such as this is Nova Scotia, Canada, where the research in this thesis is based. Though it is a small peninsula, with a population just under one million, Nova Scotia is still at dire risk from climate change. Sea level is expected to rise up to 140 centimetres by the end of the century in Nova Scotia, which threatens its coastal communities including large urban centres such as Halifax (Canadian Climate Forum, 2014). Additionally, increased storm activity threatens the province with intense storm surges that could destroy coastal communities (Canadian Climate Forum, 2014).

This threat is not merely social, but economic: much of Nova Scotia's population relies on its fishing industries, which constitute 10% of the province's GDP; sea level rise and storm surges threaten to decimate these as well (Province of Nova Scotia, 2014). Already, ocean acidification has threatened shellfish production, a 1.1 billion dollar industry that employs many Nova Scotians (Canadian Climate Forum, 2014).
Despite the risk posed to Nova Scotia, particularly its youth who might grow to live in coastal communities and work in the fisheries as the sea levels rise, there has been little research completed regarding the quality of its curriculum in regards to teaching climate change. This thesis hopes to fill this research gap, using the following methodology.

1.4 Research question & Methodology

This study seeks to answer the following question: what is the dominant framework in which climate change education is currently taught in the public 9-12 Nova Scotia curriculum? To accomplish this, the grade 9-12 public school curriculum of Nova Scotia will be examined for examples of CCE. Each example of CCE will then be sorted into scientific and interdisciplinary frames, to identify the dominant framework of CCE in the Nova Scotia curriculum. Based on the previous research of framing methods, this investigation will determine the strengths and weaknesses of the Nova Scotia curriculum based on its dominant framework. In doing so, possible amendments to the curriculum can be identified, to ensure better comprehension of climate change and lasting inspiration for activism among students.

1.5 Significance of Study

As previously mentioned, this study is important because it highlights the ways in which climate change is framed and discussed among those who will face the brunt of its impacts. The information given to youth while they are students stays with them as they grow older, forming their beliefs and shaping what is important to them (Mochizuki & Bryan, 2015). More importantly, the way that information is framed impacts students' sense of responsibility, and motivation to solve environmental issues (Busch, 2016). Thus, proper climate change education would ensure that today's youth are not only provided with comprehensive knowledge, but also lasting pro-environmental attitudes that are catalysts for change (McKeown & Hopkins, 2010). To that end, the frameworks that are conducive to this type of learning must be identified and implemented in

curricula in order to give students the best CCE possible. This thesis thus aims to provide information that might enhance the delivery of CCE in Nova Scotia schools, and enrich the attitudes of youth who could go on to become pioneers in the sustainability field. In this way, this thesis is linked to sustainability, and could positively impact the future of Nova Scotia in the face of climate change.

1.6 Limitations

The main limitation to this study will be its small scope. Climate change is a global issue: in examining the Nova Scotia curriculum, this thesis merely scratches the surface of a global movement. Additionally, in focusing on the senior grades, any CCE in primary and intermediate classes in Nova Scotia is excluded from this study. Indeed, studying curricula from across the globe, at all ages, would lead to more extensive results and patterns regarding how climate change is taught, and where global attention needs to be focused in order to improve the quality of CCE. Unfortunately, examining the curricula of each nation across the globe is out of the scope of this research. Additionally, the entirety of the Nova Scotia 9-12 curriculum is not available to the public online: thus, this study is informed by those that are available on the database, as well as any additional curricula that contain CCE, provided by the Nova Scotia Department of Education. The information taken from these curriculum documents is adequate to complete the task at hand, but this narrowed source of data should be noted moving forward.

2. Literature Review

This thesis seeks to determine the dominant framework in which climate change education is currently taught in the public 9-12 Nova Scotia curriculum. The following section will review current CCE literature, with a thematic focus on framework within CCE and a regional focus on Nova Scotia. This will contextualize any further findings, and ensure that any conclusions made will be based on adequate knowledge of the topic at hand. This section sets out to review and synthesize said literature.

2.1 Climate Change Education

Climate change education (CCE) is an important tool that teaches youth about climate change, and how to develop effective responses to the threats it poses (UNESCO, 2015). CCE can be implemented in many ways inside and outside of schools, but classrooms are often cited as an "untapped" opportunity to combat climate change (Anderson, 2012; Mochizuki & Bryan, 2015). Indeed, curriculum-mandated learning gives students a consistent source of information regarding climate change, and thus allows for the proliferation of knowledge, skills, and pro-environmental values among youth (Mochizuki & Bryan, 2015). Additionally, youth generally react positively to the information they are taught in schools: teachers and lecturers are considered "trusted messengers" of climate-based information, and rank highly among power figures that successfully disseminate climate knowledge to youth (Corner et.al, 2015). It is thus clear that formal classroom environments are ideal for CCE.

When implemented in the classroom, CCE has multiple long-term benefits for students. Firstly, and perhaps most obviously, CCE builds a strong basic understanding of

climate change. For example, McNeill & Vaughn (2012) conducted a study observing the impact of CCE on a group of high school students, after realizing that many students had vast misunderstandings of simple climate science such as the greenhouse effect. Three separate high school classes in urban areas underwent an 11-class climate change science unit over the course of several weeks, and 22 students were interviewed about the process. They were given tests before and after their climate change unit, which asked the same basic multiple-choice questions such as "What are the human behaviours that impact climate change?"(McNeill & Vaughn, 2012) Students scored better on every single question on the post-unit test, with some staggering results, such as a 40% decrease in students unable to identify any causes of climate change from the pre-unit test to the post-unit test (McNeill & Vaughn, 2012). This shows the effectiveness of CCE even over a relatively brief learning period.

Another notable impact of CCE is its ability to inspire environmental action among students. After the CCE unit in McNeill & Vaughn's 2012 study, the majority of the 22 interviewed students reported that they would make a concerted effort to engage in individual environmental actions such as carpooling and conserving electricity. This suggests that merely knowing that climate change exists is not necessarily enough to make youth act in an environmentally conscious way: indeed, in this case, comprehensive study on the topic is what inspired action (McNeill & Vaughn, 2012).

CCE does not merely benefit individuals: it contributes to a larger movement to counteract climate change. Mochizuki & Bryan (2015) argue that averting the worst of climate change "…will require profound lifestyle changes, paradigm shifts, and

international cooperation on an unprecedented scale". They theorize that this cannot be reached by any political agreements, green taxes, or financial incentives, but solely through the type of transformative ideological shift that education provides. They go on to point out that classroom education is a cost-effective way to fight climate change, as individuals who undergo CCE will then spread this knowledge to those around them, creating an efficient and costless "multiplier effect". They further claim that CCE is an effective way to approach a holistic, "bottom up" solution to climate change, in which the masses lead mitigation and adaptation efforts, rather than more self-interested elites.

These studies demonstrate that, if applied properly, CCE has the capacity to educate youth about climate change and inspire them to solve environmental issues. This shows that CCE could have tremendous potential among the young population in Nova Scotia, and can encourage them to actually take action to address the risks facing the province.

2.2 CCE In Canada and Beyond

CCE is a relatively new phenomenon. In 1992, the United Nations' Framework Convention on Climate Change (UNFCCC) was formed. This landmark document outlines an agenda for international cooperation to combat climate change, and is signed by 197 countries, including Canada (UNFCC, 2014). Article 6 of this document highlights the significance of CCE as a way to mitigate climate change, stating that parties within the agreement are required to promote and facilitate "The development and implementation of educational and public awareness programmes on climate change

and its effects" (UNFCCC, 1992). This was the inception of a global movement towards CCE. Following the UNFCCC, multiple global movements advocating for CCE began, including the United Nations Decade of Education for Sustainable Development (DESD), from 2005-2014. This was meant to give visibility to the crucial rule that education plays in creating sustainable solutions to issues such as poverty and inequality, often focusing on climate change mitigation and adaptation (UNESCO, 2012). This movement was inspired by the UNFCCC agreement of 1992, and while it advocates a more holistic education regarding development and sustainability, climate change is undoubtedly an integral issue to ESD. These developments display a recent global push toward CCE in the face of worsening climate change.

This global movement has taken root in Canada as well. For example, provinces such as Alberta, Ontario, and Nova Scotia have all begun to investigate how to implement CCE in schools; these efforts will be further discussed in chapters four and five. Additionally, non-governmental organizations are working to help educators integrate CCE into their classrooms. For example, the Learning for a Sustainable Future (LSF) organization is a Canadian charity that works with educators, students, school boards, and governments across Canada to integrate concepts about sustainable development and climate change into the Canadian education system (Learning for A Sustainable Future, n.d.). To do so, the LSF provides free resources to Canadian teachers and students such as online curriculum resources, leadership programs, and action projects, which focus on climate change and sustainable development (Learning for A Sustainable Future, n.d.). This allows educators to integrate these materials easily into

their classrooms. Overall, the LSF has worked closely with 111 school boards across Canada to ensure their goals are met (Learning for A Sustainable Future, n.d.). Global movements such as the UNDESD and the UN Sustainable Development Goals have boosted the relevance of LSF's cause, and the UNDESD specifically inspired the LSF to focus on a holistic, interdisciplinary education method in line with the global movement (Learning for A Sustainable Future, n.d.).

The LSF, alongside provincial education efforts, shows that Canada, and furthermore, Nova Scotia, have become a part of a global trend towards embracing CCE. Knowing Canada at least accepts CCE as an important educational tool, further research is warranted to understand the nuances of CCE in Canadian schools, including how it is taught. This will be the focus of the remainder of this thesis.

2.3 Methods of Teaching Climate Change

Since it is clear that CCE in general is a valuable educational tool, it is important to examine the best way to implement it in practice. Since climate change is such an interdisciplinary, complex topic, there is much debate regarding how to teach it in classrooms. A significant breadth of research on this subject has emerged since the new millennium, yet the ways educators teach CCE across the globe is still varied and inconsistent (Monroe et.al, 2017). In order to deliver an effective and comprehensive curriculum regarding climate change, educators and curriculum designers must first identify a solid base of material that is worth teaching. In this respect, how climate change is framed in the classroom is important; that is, what materials are being presented as the main themes of CCE, and how these materials are contextualized and

delivered. In fact, framing has been proven as a significant way to shape students' attitudes regarding environmental issues, as often the presentation of different frameworks effect a person's sense of responsibility, and motivation to act on environmental problems (Busch, 2016).

In this respect, the available literature tends to split CCE into two main frames: a science-based frame, which focuses on the scientific processes behind climate change, and a more interdisciplinary frame, which examines how humans contribute to climate change, and in turn, how they will be affected by it (Busch, 2016). While both of these methods have merits, there is much debate over which is more likely to encourage lasting action among students, and inspire a more comprehensive understanding of climate change in general.

2.3.1 Science Based Approach

Much of CCE that has been integrated into curricula thus far has been from a scientific framework (McKeown & Hopkins, 2010). A scientific framework is one in which educators emphasize climate change as a primarily scientific issue that has profound impacts on the earth's physical systems (Busch, 2016). It focuses on elements of climate change such as natural causes of climate change, global impacts, and atmospheric science and chemistry (i.e. carbon levels in the atmosphere and temperature) (Busch, 2016). The current reliance on the science-based frame in CCE is understandable, as the basic scientific processes that drive climate change fall into disciplines such as geography and earth science, and thus the topic as a whole fits well into science curricula (Johnson, 2013). Additionally, Monroe (2017), theorizes that due to basic

knowledge gaps and complete misunderstanding of climate change among students, CCE educators often believe that their duty should focus on starting with the basics of the concept, and delivering simple scientific information surrounding climate change.

To further examine how the scientific framework is used in classrooms, Busch (2016) observed seven high school and middle school teachers teach a climate change unit in their schools, finding that 55.3% of the discussion in class was science based. Most teachers used statistics, graphs, and facts and figures to teach about issues such as temperature increase and carbon in the atmosphere, and framed their lessons around these basic concepts. Though this is a small case study and could no doubt be expanded to include a larger sample size to improve its accuracy, it shows the general trend among teachers to slightly favour science-based frames while teaching climate change.

This literature shows that the relevance of climate change to scientific subjects often enforce a science-based framework in CCE. In many ways, this scientific framework is incredibly useful. Longitudinal data from multiple studies suggests that students with a strong understanding of the scientific processes behind climate change report more awareness of environmental issues later in life (Anderson, 2012). However, many other studies suggest that relying on solely a scientific framing in CCE is insufficient. There is a breadth of research that suggests that purely scientific knowledge is not necessarily causally linked to promoting environmental action: in fact, other factors such as social, cultural, ethical, and economic understandings of climate change might be more important to determining the future actions of youth (McNeill & Vaughn, 2012). This mirrors the ineffectiveness of past science-based efforts in education, such

as sex education that merely taught anatomy, which did not subsequently lower pregnancy rates among youth (McKeown & Hopkins, 2010).

Additionally, Busch (2016), points out that the way that most science based knowledge is taught—with an emphasis on graphs, tables and figures—does not align with research-based recommendations for effective communication regarding climate change. This is because science-based frameworks rely on cognitive reasoning, while action taking is driven primarily by emotion (Busch, 2016). Although a science-based framework is a good conceptual starting point for many students, it could be beneficial for educators to stray from this norm and utilize other CCE frameworks.

2.3.2 Interdisciplinary Approach

Many researchers agree that since climate change is such an interdisciplinary issue, the educational delivery of CCE must mirror the complexity of the problem itself (Busch, 2016; McKeown & Hopkins, 2010; Mochizuki & Bryan 2015). This could be achieved by utilizing an interdisciplinary CCE framework. This framework may include studying how climate change impacts people, what behavioral changes might be necessary for positive impact, and finally, the economic, social, and cultural consequences of climate change (Busch, 2016). This method splits its focus into many more disciplines than the science-based framework, and could be integrated across all subject areas, including social studies, math, geography, science, language, drama, and the arts (Anderson, 2012). This framework studies climate change from the critical, holistic lens that the UNDESD encourages: it focuses more on the future, or "development" of the world, rather than solely focusing on climate change in the

present (Mochizuki & Bryan, 2015). This interdisciplinary method is being employed in many curricula, though admittedly less than the science-based method previously studied (McKeown & Hopkins, 2016). In fact, in Busch's study, a mere 25% of lessons were completed using an interdisciplinary frame (Busch, 2016).

Research suggests that this type of framework could inspire more immediate action, as it allows humans to connect more with the material (McNeill & Vaughn, 2012). This is because it is psychologically harder for humans to connect with inanimate objects such as earth systems, or to conceive the vastness of the planet itself, as these subjects are outside the everyday human experience (Busch, 2016). This type of education could thus create more passionate students, with more pressing desires to solve issues relating to climate change.

Though this type of education is clearly effective, it should not exclude scientific processes, as these processes illuminate important knowledge regarding how ones actions impact the physical world. For example, students who misunderstand air pollution may not realize that they can personally create air pollution, and incorrectly assume that it is merely larger forces that do so (McNeill & Vaughn, 2012). Thus, scientific reasoning and a focus on personal responsibility should back this interdisciplinary framework, in order to ensure its relevance.

Indeed, though there are two main frameworks that could be studied, the two are not mutually exclusive. McKeown & Hopkins (2010) suggest that educators think about climate change as a two pronged concept: the first being "climate", narrowing in on the important scientific processes of climate change, and the second being "change",

focusing on a wide breadth political, social, and behavioral processes and changes (McKeown & Hopkins, 2010).

Since CCE is still a young subject, there is no real conclusion regarding which approach is more effective. Therefore, the literature cited above should be considered for its material, but not examined for any definitive conclusions. These studies remain an excellent way to understand CCE and the differences between teaching frameworks within it. Considering this literature, moving forward, one can better analyze the effectiveness and comprehensiveness of CCE in Nova Scotian schools, based on the dominant framework within the curriculum.

2.4 CCE in Nova Scotia

CCE has tremendous potential in Nova Scotian schools. As of the 2016/2017 school year, 118,657 students attend public school in Nova Scotia (Government of Nova Scotia, 2017). This means that, if implemented consistently and effectively through school curricula, CCE could be presented to a young and impressionable audience of 118,657 Nova Scotian youth. This could potentially create an entire generation of well-informed students, with an understanding of how to adapt to climate change and fight against it. This is of utmost importance in this province, considering the aforementioned risks to Nova Scotia that climate change poses, such as flooding and industry collapse.

Considering what's at stake, it is not surprising that CCE in Nova Scotia has been previously studied. Much of this literature comes from Jillian Baker, Jason Loxton and Kate Sherran of Dalhousie University. In their 2013 study, they examined 45 grade four students on Nova Scotia's south shore, and asked them to complete artwork before and

after learning a seven- step module on climate change (Baker, Loxton, & Sherran, 2013). They found that before the modules, students had many misconceptions regarding climate change, and most of their artwork focused purely on pollution rather than actual climate change. However, after the modules, the artwork of students showed improved concordance of climate change, with all but five students painting themes related to climate change, seven of which were linked to complex concepts such as mitigation. This study displays the ease by which CCE is integrated into student's knowledge base, and the ability of CCE to reduce misconceptions and/or confusion between climate change and other environmental issues such as pollution.

Baker & Loxton (2013) also prepared a report for the Nova Scotia Climate Change Adaptation Fund, which assessed the readiness and needs of Nova Scotian educators in regards to CCE. The bulk of this report is the findings of a survey wherein pre-service students, as well as full time teachers, were asked about their knowledge of issues related to climate change. This study displayed that Nova Scotian teachers, while harboring some misconceptions about complex issues in climate change, had very strong knowledge of the basic science behind climate change. Teachers also showed strong support for government-led action against climate change, as well as enthusiasm for the creation of other learning opportunities about climate change. Importantly, teachers also noted that climate change should be taught across several subjects, as it is an interdisciplinary topic, yet, point out that there is a near absence of CCE from the existing Nova Scotian Curriculum. This research shows that while educators in Nova

Scotia support CCE, and generally have sufficient knowledge to teach it, they could benefit from more formal opportunities in the curriculum to actually do so.

These findings regarding the curriculum are a valuable research point when considering CCE in Nova Scotia. The Nova Scotia curriculum structures the lessons that teachers give, and teachers are expected to adhere to it in order to provide a complete education to their students. This means that the absence of CCE from a curriculum can determine the extent to which it is taught: many teachers cut anything that isn't formally required to teach (Donavon, 2014). In the case of Nova Scotia, 75% of educators say that absence from the curriculum is the reason they do not teach CCE (Baker & Loxton, 2013). Additionally, as previously mentioned, it is not only how often CCE is used in the curriculum that matters, but *how* it is implemented within it: scientific and interdisciplinary frameworks yield different impacts among youth.

It is clear that the curriculum of Nova Scotia has the potential to influence CCE in schools, and dictate how it is taught. However, this is an area of study that has been neglected by researchers. Considering this, this thesis will attempt to close this knowledge gap by identifying how climate change is framed within the public school curriculum, and discussing the implications of these findings.

2.5 Previous Methods of Study

Many methods have been used to examine how CCE is taught in the classroom. Literature reviews can be of use, as they offer an opportunity to survey, explore, and question the published works in the academic world (Monroe et.al, 2017). In a study by Monroe et.al, 2017, the EBSCOHost academic database was surveyed for basic terms,

such as combinations of “Climate Change”, “Global Warming”, “Climate Education”, “Sustainability Education”, etc. These search results were then narrowed down by eliminating papers that did not focus on CCE, did not assess educational intervention, and did not empirically measure their results. This left Monroe with a final sample of 49 papers, which were used to synthesize information about demographics, types of programs, and assessment tools relating to CCE.

Another method of research that is frequently used to analyze how CCE is taught is pre and post test case studies, such as those undertaken by Baker & Laxton (2013) and McNeill & Vaughn (2012). In both cases, teams of researchers provided units of CCE for teachers to deliver, and gave students some type of test (in these cases, a quiz or an art-based exercise) both before and after the unit in order to measure their understanding of climate change. In both cases, the students performed considerably better in the post test, after they had been exposed to CCE, which suggests that CCE had effectively developed their understanding of and connection to climate change issues.

While these types of research are undoubtedly useful, they do not best fit the parameters of this study. Literature reviews tend to demand the review of up to one thousand articles. Thus, it is out of this project’s scope. Additionally, when focusing on a small area such as Nova Scotia, there are fewer academic papers to rely on, and thus an academic literature review would not yield satisfying results. Additionally, a pre and post test case study would require a lengthy ethics process, as in order to work in schools, researchers often have to go through two to three ethics reviews. Again, this is out of the time scope of the current thesis.

In this case, a more appropriate method of study is a framework analysis, which can be used to identify how a concept such as CCE is represented within a document such as the Nova Scotia Curriculum (Carver et.al, 2014). Busch (2016) completed a frame analysis examining how a climate change unit was framed by seven teachers, by recording teacher's lectures on video and interpreting their language, thematic focus, and the information passed to students. Furthermore, Busch assigned codes to certain frames, based on common language and thematic subjects within CCE, and identified the frequency in which these coded frames are used. This allowed Busch to understand the frequency of scientific and interdisciplinary framing in CCE, and points the reader towards the general trends in this respect.

This method is the most appropriate in the pursuit of understanding how CCE is presented in schools within the parameters of this study. Considering the breadth of subjects in the Nova Scotia curriculum, including courses in geography, history, and sociology, as well as a solid science curriculum in each year from grades 9-12, "scientific" and "interdisciplinary" remain appropriate frameworks for analysis. Studying the prevalence of these frameworks in the curriculum will identify whether one framework is greatly favored over the other. It could thus also display how well rounded the Nova Scotia CCE curriculum is, based on how evenly the frequency of the two frameworks is split. This type of study could thus identify the strengths and weaknesses of the way CCE is taught in Nova Scotia.

While an observation-based case study such as Busch's is out of this project's scope, a frame analysis based on a different primary source of data, such as curriculum

documents, would be an appropriate way to properly answer the research question of this thesis. Related qualitative studies of the Nova Scotia curriculum have been completed in the past, including qualitative content analysis of environmental education in the grade six curriculum (Spence, 2011). This method is thus feasible, and a promising one to identify how climate change is framed in the Nova Scotia Public Curriculum. This method will be further outlined in the following section.

3. Methodology

3.1 Rationale for a Qualitative Design

This thesis uses a qualitative research approach to examine the dominant framework of CCE within the Nova Scotia public high school (Grades 9-12) curriculum. This intermediate-level curriculum has been selected due to the more developed and diverse nature of the classes offered in high school. Coding and framework analysis are used to complete a document analysis of the curriculum documents in order to identify the dominant CCE framework within them. This qualitative analysis produces insights into dominant frameworks based on the curriculum data, with the goal of examining the implications of these frameworks on the Nova Scotia education system and its students.

3.2 Study Methods

3.2.1 Document analysis

This study is principally a document analysis. A document analysis is a systematic procedure for reviewing and analyzing documents, wherein the researcher elicits meaning and gains broader understanding based on the document. In order to do so, relevant data within the document must be selected, appraised, and synthesized

(Bowen, 2009). In this case, the Nova Scotia curriculum is the subject of this document analysis. The data is selected based on relevance to the subject at hand (CCE), synthesized and sorted based on frameworks, and the findings are appraised based on the existing literature which states the benefits and shortfalls of different CCE frameworks. A digital copy of the curriculum retrieved from the Nova Scotia education department's free online database is the basis for this study, as well as the relevant documents missing from the database, sent by a representative of the department of education.

3.2.2 Coding

The Nova Scotia Curriculum document as it stands is insufficient to answer the proposed research question; data within it needs to be sorted and refined in order to make meaningful conclusions. In order to complete this synthesis, this study uses coding to sort the scores of data provided by the curriculum documents.

Coding entails the process of picking words and phrases out of data that symbolize or represent a larger attribute or idea (Saldana, 2009). For example, in the Nova Scotia curriculum, should one encounter a lesson about "World War II", "D-Day", and "the Holocaust" these words can be interpreted as historical events that occurred during the 20th century, and thus coded into broader categories such as "history". This method identifies patterns in data, since words and phrases with similar characteristics are sorted into the same code.

In particular, this thesis identifies words, phrases, lessons, etc. that are relevant to climate change education within the Nova Scotia Curriculum. To do so, the curriculum

is examined for material that fits the definition for CCE that is laid out by UNESCO, which states the following:

> Climate Change Education is a powerful tool for developing such responses and helping people address climate change. It helps learners understand the causes and consequences of climate change. It prepares them to live with the impacts of climate change and empowers learners to take appropriate actions to adopt more sustainable lifestyles. (UNESCO, 2015).

When material that fits this description is found, this data is stored in an Excel spreadsheet, where it can be easily manipulated and analyzed. Here, the relevant page numbers, keywords, and corresponding curriculum document are recorded. Each Excel record includes a brief contextual keyword that describes the academic discipline that the example of CCE is rooted in. For example, “history” may be recorded in the case of a lesson about past climate change summits, and “science” may be recorded in the case of a lesson about ice albedo affect and its impact on climate change. In the case of this study, six keywords were identified in the curriculum and used: science, technology, culture, social, economics, and geography.

While coding is a crucial aspect of analysis, it does not constitute the analysis itself: instead, it acts as a link between the data itself to themes and ideas, and further analytic processes (Saldana, 2009). In this case, by creating these keywords that are easy to sort into broader patterns or trends, this process provides the information necessary to sort each example of CCE into overarching frameworks, and thus discern a dominant framework in a framework analysis.

3.2.3 Framework Analysis

Framework analysis, first presented by Erving Goffman in 1974, is used to identify how documents, individuals, and other sources construe information, by identifying a "primary" or dominant framework. The dominant framework is that which has the highest probability of being noticed, processed, and accepted by the majority of people (Carver et.al, 2014). In the case of the Nova Scotia curriculum document, CCE has a higher probability of being processed from a given frame based on how often that frame is included in the curriculum, as teachers are often likely to frame their lessons based on the subjects' inclusion in the curriculum (Busch, 2016). Thus, the frequency of the frames is paramount to this study.

In undertaking the framework analysis, this study first uses Excel to sort the data by the aforementioned "academic discipline" keywords they were assigned in the coding process: these key words (history, science, geography, social, etc.) imply how CCE is taught in every given instance within the curriculum. This study goes on to form larger "Frameworks" out of these individual keywords. This is because the goal of the thesis is not to identify what subjects teach CCE, but to discern whether the *general way in which CCE is taught* in the Nova Scotia curriculum is more scientific, or if it includes other aspects of study that consider human impacts, such as social, cultural, political, and historical aspects of climate change. Therefore, individual keywords and categories were sorted based on content into broader groups. Busch (2016) conducted a similar framework analysis, splitting results into a "science" framework and a "social" framework, in order to identify how teachers most frequently framed climate change

while teaching (Busch, 2016). This study uses similar categories, with a “science” framework encompassing any coded material pertaining to science or technology, and an “interdisciplinary” framework encompassing coded material that addresses geography, social studies, culture, economics, and any other human-based or sociological subject. Once the data is grouped into frameworks, the frequency of each is calculated to finally discern which framework is employed most commonly in the curriculum.

Finally, it is important to note that Goffman points out the social and cultural significance of dominant frameworks, stating, “Taken altogether, the primary frameworks of a particular social group constitute a central element of its culture” (Goffman, 1974, p 27). Considering this significance, this study uses a deductive approach, using the framework analysis in order to identify the broader social implications the dominant CCE framework of the Nova Scotia high school curriculum might have on students, and what it suggests about the values of the Nova Scotia education system (Neuman, 2000).

In sum, this project first organizes CCE-relevant material within the Nova Scotia Curriculum into academic keywords that have been designed based on the content and context of how each individual instance of CCE is taught. From there, the study goes on to group these codes into two broader frameworks: scientific and interdisciplinary. The frequency of the use of each framework is calculated, and thus, the more dominant of the two frameworks is identified.

3.3 Limitations

This study focuses on the Nova Scotia curriculum, which is presented as an objective, informational resource for teachers. While the curriculum provides teachers with the bulk of their teaching material, it is not the sole factor in the presence of CCE in education in Nova Scotia. This thesis, in focusing on solely the curriculum document, does not take into account any individual efforts made by teachers in the province: that is, including CCE in parts of their classes not made mandatory by the curriculum, field trips pertaining to CCE, implementing aforementioned resources such as the LSF, or any other special activities. Surely, this type of education is valuable to Nova Scotian students, but examining it is outside of the scope of this thesis. Thus, this study should be taken as a base-value evaluation of CCE in Nova Scotian high schools: one must consider that teachers might occasionally teach beyond what the curriculum dictates.

3.4 Methods for Verification

After determining the dominant framework of CCE in the Nova Scotia curriculum, this study will use preexisting literature to determine the strengths and weaknesses of both an interdisciplinary and scientific CCE framework, and thus to apply it to Nova Scotia. This literature will be consulted in the discussion to determine the benefits of the curriculum, as well as its faults and suggestions for improvement. The frameworks in the Nova Scotia curriculum will also be considered in light of movements such as the UNDESD, and how well it fits into the goals of these global movements that sparked the spread of CCE.

4. Results

4.1 Summary of the Data Source

33 curricula ranging from Grades 9-12 were examined in order to understand how CCE is taught in Nova Scotia. These curricula were taken from multiple different academic faculties, in order to ensure that a breadth of material was addressed and no possible instance of CCE was missed. Of these curricula, CCE material was found in 13 separate documents. Overall, in the 4200 pages read, there were 42 records of CCE found in the curriculum. Each of these records were sorted in an Excel chart to identify the context and details of each example of CCE in the classroom. In doing so, these records become more than a representation of *how much* CCE is taught in the Nova Scotia Curriculum, but rather *how* it is taught. This chapter will review these results, how they have lead to the identification of a dominant interdisciplinary framework, and the implications this has for Nova Scotian students.

4.2 Summary of Results

CCE was mentioned in 13 of 33 reviewed curriculum documents. The detailed results of which curricula include CCE are listed below in Figure 1. It is important to note that CCE is present in every grade from 9-12, particularly in the upper years. This means that students can start learning about climate change in grade nine, and have the opportunity to continue developing their knowledge every year until they graduate.

Curriculums Read (Curricula with CCE Bolded)
Social Studies 9
Energy Science 9
Math 9
Drama 10
Drama 11
Science 10
Geography 10
Global Geography 12
Mikmaq Studies 11
Geology 12
Biology 11
Biology 12
Oceans 11
Tech 10
Production Tech 11 & 12
Transportation Tech
Film 11 & 12
Sociology 12
African Canadian Studies 11
Physics 11
Physics 12
Canadian History 11
Global History 12
Tourism 11
Entrepreneurship 12
Math 10
Math 11
Math 12
Pre-Calculus 11
Pre-Calculus 12
Foundations of Mi'kmaq Language
Canadian Literature 12
Dance 11

Figure 1: CCE In the Nova Scotia Curricula Examined

While it is interesting to address the classes in which CCE is taught, it is important to note that class division does not directly correlate with what type of material is being taught in these classes. For example, in grade eleven history, students

are asked to make a presentation about the future of the global environment, and the impacts that economic development has had on the planet's health. This class, though rooted in humanities, thus emphasizes economics as the main perspective in which CCE is taught. For this reason, each record of CCE in the Nova Scotia curriculum was analyzed based on which academic discipline it is rooted in, rather than merely the class in which it was included.

In doing so, six main disciplines were identified within CCE (See Figure 2). Overall, social and scientific material is taught most, along with a substantial amount of geographic and economic material, and minimal technological and cultural material. This shows that the addition of CCE in these 13curricula has ultimately allowed material in multiple disciplines to be taught as part of CCE in the Nova Scotia Curriculum.

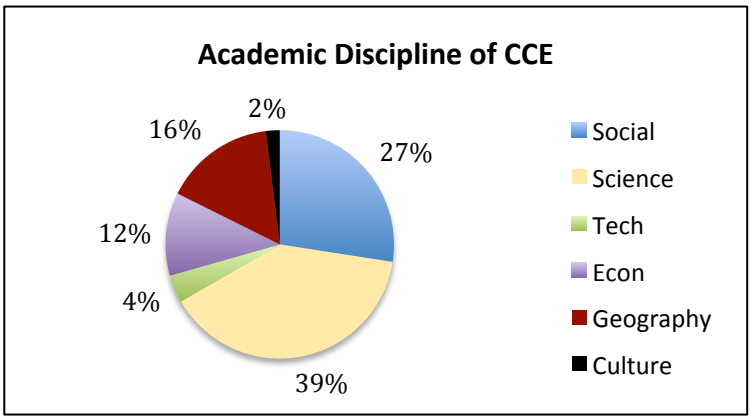

Figure 2: Distribution of Academic Disciplines within CCE in the curriculum

4.3 Framework Analysis

In examining the prevalence of different academic perspectives within CCE, we can piece together an understanding of the overarching CCE framework that the Nova Scotia curriculum emphasizes. Each record of CCE was categorized into scientific or

interdisciplinary frameworks, based on their academic roots. In doing so, records that included a social, economic, cultural or geographical perspective were considered interdisciplinary, while records that were rooted in science and technology were categorized as scientific. Those with a mix of the two categories were categorized as interdisciplinary, as they include a multitude of academic perspectives and refrain from focusing on scientific processes.

This categorization is supported by multiple sources of literature that were consulted for the purposes of this study. Busch emphasizes how social subjects, including cultural studies, economics, and geography, fall outside of the scientific framework, as they focus on the future of the planet and the human causes of climate change, rather than natural processes happening currently (Busch, 2016). Additionally, Monroe (2011) states that many educators teach from a scientific perspective by utilizing fact-based disciplines like science and technology, rather than disciplines such as economics or cultural studies, which become political and go into depth about actions that humans can take to prevent climate change. Anderson (2012) also defines interdisciplinary CCE by specifically naming subjects within it such as geography, social studies, and the arts, or a combination of these disciplines on top of a scientific framework. These types of divisional splits remain fairly consistent within the consulted literature, and thus are the basis of the process of sorting individual academic disciplines into larger frameworks.

Once this process was applied to each of the 42 records, it became clear that the Nova Scotia curriculum's dominant framework is an interdisciplinary one— but just

barely. 54% of the records demonstrated an interdisciplinary framework, while 46% demonstrated a scientific framework. The prevalence of an interdisciplinary framework is likely due to the wide variety of curricula that CCE is present in, as well as the frequency of geography, social, cultural, and economic issues taught within CCE, as demonstrated by Figure 2 above.

The emphasis on interdisciplinary learning produces a vast array of benefits for Nova Scotian students. In learning from an interdisciplinary framework, students can better understand climate change from a human perspective; that is, how it impacts Nova Scotians economically, socially, and culturally, as well as how to make individual efforts to adapt to, prevent, and mitigate its impacts. Students who learn about how human actions relate to climate change make great strides in developing responsible environmental behavior (McNeill & Vaughn, 2012). This type of education also avoids the emotional disconnect between humans and the statistics and facts they are learning, and turns the discussion to a more relatable, human perspective that is easier for students to understand and connect to (Busch, 2016). An interdisciplinary perspective also allows students to guide their decision-making processes using the knowledge gained about climate and the environment (McKeown & Hopkins, 2012). This becomes especially important in issues such as community development and political processes, as it allows students to consider how their communities are immediately affected by climate change, and the decisions that need to be made to improve their situation (McKeown & Hopkins, 2012). In Nova Scotia, this could lead to students advocating for comprehensive coastal development policies to protect coastal villages

and fisheries, or supporting leaders with carbon reduction policies that could prevent the worsening of climate change.

Despite this, it is clear that the interdisciplinary framework does not absolutely dominate, as there is a mere 9% split between the frequencies of the two frameworks. This is positive, as it means that students are not deprived of important scientific knowledge, such as the processes behind climate change and its environmental impacts. A deficit of this type of knowledge is indeed detrimental to a complete understanding of climate change (McNeill & Vaughn, 2012). This even split in the curriculum therefore prevents basic knowledge gaps regarding climate change, and ensures students understand the environmental impacts of their actions.

4.4 How CCE Is Used

Another important way to discern the strengths and weaknesses of CCE in Nova Scotia is to examine exactly how it is utilized in the classroom. Different methods of CCE practice place differing levels of importance on climate change related material itself, and thus yield different results among students. For example, in Geography 12, there is an entire unit about the negative impacts of climate change caused by human activity. Meanwhile, in Math 11, the rate of global temperature rise and temperature rise in the United States alone are used as an example of how two seemingly different statistics can be based on the same data. Note that in the first example, climate change is the backbone of what is being taught, with the learning goal of the unit being to understand how humans contribute to climate change. In the second example, however, statistics are the focus of the lesson, while climate change merely serves as an example of this

overarching category. This shows that CCE can be used to bolster other subjects and concepts, and while this is useful, it might miss the important cross-curricular, complex nature of climate change, which existing literature emphasizes must be a part of successful CCE (Mochizuki & Bryan, 2014). Indeed, more comprehensive CCE can be seen in examples of full units or lessons about climate change, or in overarching learning goals in curricula that relate to increasing climate change awareness.

Understanding this, each record of CCE was examined to determine specifically which teaching methods were employed. This data was separated into three categories: CCE used as an example of another concept or to compliment another subject, entire units, lessons, or assignments relating to CCE, and overarching learning goals of curricula which pertain to CCE. The results of this examination can be seen in figure 3 below.

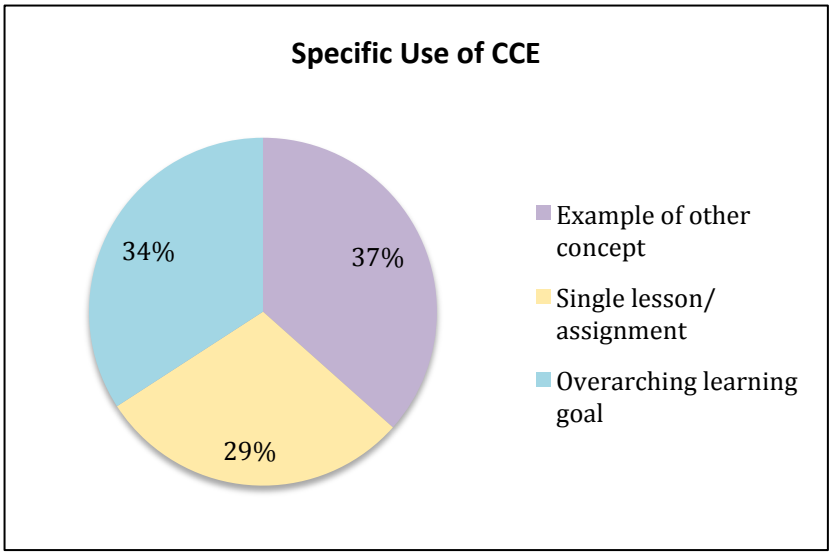

Figure 3: The Specific ways CCE is used in the NS Curriculum

Here, again, results are relatively well rounded across categories. However, the "overarching learning goal" results are slightly inflated, as five of these records are the

same page from five different science curricula, which emphasizes the need to teach science with sustainable development and stewardship issues in mind. Considering this, it becomes clear that climate change related material is most often used in the curriculum as an example of another concept. This includes CCE being used as a source for test questions, a key term to understand in another unit, or an example of another concept such as human/environment interaction or environmental stress. This use of CCE is often brief in nature, and diminishes CCE's possible impacts. Indeed, students could benefit more from instances where CCE is the main focus of a lesson, or the overarching theme of an entire unit or class.

Considering this, it is important to note that the records that fell under a scientific framework were more likely to address climate change as an example of another concept, often avoiding full lessons about climate change. 10 of the 15 records in the "example of another concept" category were found in the scientific framework. This implies that of the two frameworks studied, the interdisciplinary framework tends to include more records that focus entirely on CCE, while the scientific framework often uses CCE as an example of other scientific concepts taught within it. This further shows the differences between the two main frameworks studied. While overall, the Nova Scotia curriculum could benefit from focusing on lessons, assignments, and learning goals dedicated solely to climate change, the interdisciplinary framework from which the curriculum is taught seems more conducive to this type of CCE. Thus, if the curriculum continues to grow while employing this framework, it could likely improve in this category as well.

4.5 Conclusions

Overall, the fairly even split of the Nova Scotia curriculum into scientific and interdisciplinary CCE frameworks indicates a well-balanced approach to teaching climate change. As McKeown & Hopkins (2011) stated, it is important to include both perspectives to ensure that students are provided with a well-rounded understanding of climate change. This split also sets the Nova Scotia curriculum apart from studies such as that of Busch (2016), which found that scientific frameworks dominated in the classroom, therefore neglecting valuable knowledge that stems from interdisciplinary understanding of climate change, as well as long-lasting activism and emotional connection to the issue. In employing both frameworks, teachers in Nova Scotia avoid this dilemma, and give their students all the tools they need to understand and adapt to climate change.

5. Recommendations

While Nova Scotia's curriculum is fairly well balanced, there are always improvements that can be made to improve CCE in Nova Scotia. This study will thus conclude by addressing the ways that these results can help identify the parts of the Nova Scotia curriculum that could be amended to improve CCE.

5.1 Updating Curricula

One unexpected result of this study was the age of the Nova Scotia curriculum in general. The median publishing year of all 33 curricula studied was 2003, while eight curricula were published in the 1990s. This includes Geography 10 and Social Studies 9, both of which yielded multiple cases of CCE. This indicates that not only is the

curriculum outdated in general, but that some of the curricula which account for a vast portion of CCE overall are over twenty years old. In subjects such as geography, science, and social studies, which are constantly evolving and changing, this lack of current material could become a barrier to reliable, up-to-date education within Nova Scotia's schools.

This is especially concerning considering climate change related material, which can change as quickly as the climate itself. New important scientific and social advancements regarding climate change are constant, and CCE should reflect this if it is to be truly effective. For example, every single instance of CCE in the Nova Scotia curriculum that directly refers to the impacts of the greenhouse effects and fossil fuels trapping heat uses the term "global warming". However, in recent years, scientists and experts have transitioned into using the term "climate change", to incorporate the broad range of impacts stemming from the greenhouse effect such as sea level rise and ice mass loss, rather than merely the climactic warming trend (NASA, 2018). This underscores the gap between what the curriculum is teaching and the scientific consensus that has emerged in recent years.

Additionally, many impacts of climate change are exponential, and worsen as time goes on, such as increasing sea level rise and ice albedo effect. These effects thus may not have been as severe at the time these curriculums were written, and are omitted. Some impacts of climate change may not have even existed at the time the curriculum was written, such as various animal extinctions or climate refugee crises, also leading to omission of these important concepts. This displays a need for the curriculum

to be reviewed and updated, in order to ensure students are receiving accurate and modern knowledge regarding climate change.

Indeed, a constantly changing climate requires a constantly changing curriculum. Education departments in other places in Canada have recognized this, and acted accordingly. For example, in Alberta, a $65 million dollar curriculum overhaul was announced in 2016, to be completed at the end of 2018, with an update to climate change material being one of the major changes (French, 2016). This, along with provincial government initiatives for CCE and the help of outside organizations, could put Alberta at the forefront of CCE in Canada, and give Albertan students an opportunity to learn the most effective CCE possible. A similar effort from Nova Scotia could make the province a national leader in CCE as well.

5.2 Increasing CCE in General

Though the CCE in Nova Scotia public schools is well distributed between both CCE frameworks, it remains fairly non-existent within the curriculum overall. Additionally, as exemplified above, many records of climate change related material were not within full lessons or units, but used briefly in other subjects as test questions or examples of other concepts. It is thus clear that CCE may still be underrepresented in the Nova Scotia curriculum. This echoes the sentiment made clear in Baker & Loxton's 2013 survey of Nova Scotia's educators, of which 75% claimed there was an absence of climate change related material in the curriculum.

Part of why CCE is so absent from the curriculum could be its emphasis on other environmental material. While many curricula indeed include environmental material

that focuses on conservation and sustainability, very little of it alludes to climate change at all. The majority of the curricula with environmental material focus on less complex issues, such as deforestation or oil spills. For example, the Grade 10 Science sustainability unit emphasizes how humans must value the environment, but leaves out climate change and instead focuses on issues such as clear cutting, ocean dumping, and waste dumping.

This material may be emphasized to avoid the large scale of climate change, as human cognitive capacity is limited to addressing two to three variables at a time in any given problem (Ledly, Rooney-Varga, & Neipold, 2017). Since climate change is such a complex system, with multiple stakeholders, impacts, and feedback patterns, teaching the nuances of the subject could overwhelm students (Ledly et al., 2017). Indeed, direct causality, such as a company spilling oil into the ocean, is easier to understand than complex issues such as sea level rise and increasing temperatures, which are caused by multiple stakeholders with no true solution at hand (Ledly et al., 2017).

Despite its complexity, CCE can still be taught effectively, and thus should not be avoided by educators altogether (Ledly et al., 2017). Considering this, the environmental issues most addressed in the Nova Scotia curriculum could no doubt be supplemented with material about climate change, as climate change tends to be inexorably connected to every other environmental issue. Indeed, deforestation becomes a more severe problem when climate change creates forest fires, and in turn, deforestation worsens climate change by eliminating carbon sinks in forests. These types of interactions could clearly easily be addressed in curricula that focus on these types of issues, and would

enrich the student's understandings of the complete issues. Therefore, CCE could simply be added to pre-existing environmental units, and in thus could have a larger presence in the curriculum overall.

5.3 Moving Forward

Considering the above observations, in order to successfully improve the CCE curriculum in Nova Scotia, educators can utilize multiple resources. For example, perhaps Learning for a Sustainable Future, or outside organizations like it, could examine the Nova Scotia curriculum for ways to increase the relevance and occurrence of CCE. LSF's online resources could be utilized by educators to compensate for other possibly outdated resources. Another valuable resource that could be utilized by Nova Scotia teachers is the 2013 guide "Taking on climate change: a teaching companion for educators in Nova Scotia", written by Jillian Baker. The guide outlines why it is important to teach climate change and provides information on climate change basics from both a scientific and interdisciplinary framework, providing educators lesson ideas and further reading on the subject (Baker, 2013).

Additionally, Nova Scotia could look at examples elsewhere in Canada to enhance its CCE resources. The Ontario Ministry of Education, for example, has a document that outlines how to integrate environmental education into every single high school subject, including unconventional ones such as French and Drama and Dance (Government of Ontario, 2017). Additionally, the Government of Alberta has recently prioritized grants to community organizations for CCE, encouraging organizations to go into schools and help implement CCE to improve the students' quality of education

(Weber, 2017). One such organization is the Alberta Council for Environmental Education (ACEE), which has published a lengthy guide to “Excellent Climate Change Education” for educators, including an annotated list of peer-reviewed sources to help teachers understand how to teach climate change (ACEE, 2017). The Nova Scotia Curriculum could be improved by drawing on these best practices.

5.4 Final Conclusions

This study shows that the Nova Scotia 9-12 curriculum emphasizes an interdisciplinary CCE framework. This ensures that the benefits of learning with an interdisciplinary perspective, such as long-term activism, emotional connection, and comprehensive understanding, is provided for students. Additionally, while the dominant CCE framework is interdisciplinary, a scientific framework is utilized to almost the same degree. This gives students a reliable and tangible understanding of the scientific processes behind climate change, and how they impact the physical world around them. In using both frameworks, the curriculum is well rounded, and is likely to provide an excellent education in climate change to Nova Scotia’s youth.

On the other hand, the curriculum can be improved by updating it to include more modern material, especially in dynamic subjects such as science and social studies. CCE should also have an overall greater presence in the curriculum. Finally, a transition could be made towards dedicating full lessons and curricula to CCE, rather than using it most often to bolster other subjects. If these changes are made on top of the existing well-rounded model of CCE in the curriculum, they could create a groundbreaking CCE program in Nova Scotia.

Most importantly, the existing CCE in the Nova Scotia curriculum, as well as any possible additions and improvements that may be made in the future, provide a valuable resource to the demographic most threatened by climate change in the province: youth. In learning the causes, consequences, and ways to live with climate change, students can be prepared to face the impending economic, environmental, and social change that threatens Nova Scotia. The CCE resources examined in this study are thus an integral step in ensuring a secure future in Nova Scotia, and will give the next generation the tools they need to succeed in the face of climate change.

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