

**The Place of Food Science in Newfoundland's High School Curriculum:**

*Preparing for Local, Sustainable Food Culture and Security*

By

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## **Dedication**

To my grandparents, Austin & Margaret Gosling,  
great aunt, Eileen Bidgood  
& their Brother Roger Bidgood

They were selfless  
They taught me to respect Newfoundland  
They taught me to cook  
They taught me to help your neighbor  
They taught me what it means to feed a crowd  
And most importantly, they taught me to  
“do what you can do with what you got”

## Abstract

This qualitative study examined the place of a Food Science curriculum in the Newfoundland and Labrador high school program and the possible effects said curriculum may have on local food culture and security. First, a scan of curriculum documents of current provincial high school programming was completed. Afterwards, a survey was done with seventy-one students at three inner city high schools in St. John's, Newfoundland. Next, a smaller group of students at each of the three schools who completed the survey volunteered to participate in a focus group, in addition to a focus group of six educators at the three schools surveyed and interviews with several prominent food experts on the island. Participants, in conjunction with the curriculum documents, gave their thoughts and opinions on the current presence of food science and sustainability in the Newfoundland and Labrador high school syllabus, where adolescents were learning most of their information about food, whether adolescents made food choices based on criteria for sustainability and whether there is a place for a dedicated Food Science program in the province.

Responses underwent qualitative analysis and a number of categories emerged. The study was guided by a general research question and several ancillary research questions. The principal research question guiding the study was: What do high school students in Newfoundland learn about food security and sustainability through the current curriculum? The ancillary research questions were:

1. What do high school students in Newfoundland understand about food from their current schooling?
2. Does a Newfoundland high school student's education inform their food choices?
3. Where do these students currently find most of their information about food and food culture?
4. What do these students currently understand about food security and sustainability?
5. Does students' location effect their food choices?
6. What do local high school educators (administrators and teachers) understand about the current food presence in Newfoundland school curriculum?
7. What is the understanding of food experts (chefs etc.) about public knowledge relating to food culture, security and sustainability?

The study found that the current high school programming in Newfoundland and Labrador lacks depth in the areas of food sustainability and culture. Results alluded that the province is in a risky position in terms of food security, that the general public is blissfully ignorant about the severity of the issue and that adding a Food Science course to the high school curriculum could add practicality to a modern education system progressively more focused on academia, while strengthening the province's food culture and thus its food security.

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# **The Place of Food Science in Newfoundland’s High School Curriculum:**

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## **Chapter One: Introduction**

### **1.1 Introduction to the Study**

Once a teacher, always a teacher. Once a “foody,” always a “foody.” As most of my non-professional and professional jobs have been in the field of education, in true Newfoundland fashion, most of the rest of my life has revolved around making a meal and entertaining a crowd. Food and food science, with heavy emphasis on local tradition, is not only a personal interest, it’s a hemiola to my pulse. My great uncle founded and managed Bidgood’s grocery store, one of the finest purveyors of traditional local delicacies in Newfoundland and Labrador. My grandmother and great aunt were at the helm of Bidgood’s catering service and my grandfather grew rhubarb, strawberries, carrots and potatoes in our garden. It was commonplace to dig up new potatoes and carrots to be served with fried capelin from Middle Cove in the summer or brook trout in the fall. Before I was old enough to realize it, I was gaining a foundation in appreciating local, sustainable, and renewable resources as a main source of nourishment.

My commitment to local and sustainable food culture is unwavering. Twenty years later, I now have a tattoo of a caribou antler on one side of my forearm and a bluefin tuna on the other. Both indigenous to Newfoundland, the tuna can be found near Grand Bank; the Caribou in barons all over the island and the mainland portion of the province. I figured the moose and cod fish have been overplayed, but also, I need to draw attention to a truth that so many of our modern chefs have been highlighting: Newfoundland is rich in sustainable, albeit less infamous food sources. My heroes have become the likes of Jeremy Charles and Ross Larkin of Raymond’s and the Merchant Tavern, Jon Howse of Fixed Coffee and Baking, and Todd Perrin and Stephen Lee of Mallard Cottage. These people are trying

their damndest to drag the archaic notions of what we (Newfoundlanders) consume into a modern lens. Using local ingredients like seal, cod, moose, rabbit, sea buckthorn, spruce tips and kale in creative and sensible ways, they hope to demonstrate what it means to eat seasonal, local foods while still making delicious, nutritious, and diverse meals.

It is no secret that food security and sustainability are of great global concern. I believe it is of paramount importance to resolve this issue before it's too late and I feel the best approach is to start small and start local in this resolution. Being a teacher, I can't help but hope that proper food science education, starting early and permeating through school curriculum, is a great way to start the conversation and the best chance to instigate lasting change. In this way a strong foundation can be set to tackle such a daunting world problem. Through my research, I hope to find a place for a legitimate Food Science curriculum in the Newfoundland and Labrador high school system and uncover gaps between existing food education and a more holistic, local, modern, and ideal future approach. In order to accomplish this, my initial study looks to determine what high school students in Newfoundland understand about food and food culture via their schooling or other means; how their learning and local (setting) affect their food choices; what these students understand about sustainability and food security; how students, teachers, and parents feel about the current presence of food in the high school curriculum; and what experts in the field feel should be introduced into the curriculum to promote local sustainable food culture and security. In this way, there is future potential to offer courses outside the current curriculum that invite student engagement, allowing not only sustainable food culture and security, but also sustainable education in an increasingly complacent system.

## **1.2 Purpose of The Study**

Through surveying students, interviewing a smaller focus group of students, interviewing a focus group of educators, and interviewing experts in the food industry, this study hopes to examine the place of teaching Food Science in Newfoundland high schools. The study was designed to determine if the participants find a place for a legitimate Food Science curriculum in the Newfoundland and Labrador high school system and uncover gaps between existing food education and a more holistic, local, and modern approach.

## **1.3 Statement of the Problem**

It is common provincial knowledge through media outlets that food related illness like obesity and heart disease are rampant in Newfoundland and Labrador. Furthermore, the researcher's personal experience of walking through empty grocery store aisles the week of a snowstorm does not require peer reviewed evidence to suggest that as an isolated island with our current reliance on importation, food security is shoddy at best. If we are to prepare the province for issues of food security and sustainability that are already becoming serious problems, then it follows that students, the island's future, must have an ample, practical understanding of food science. The connection between the school's place in this understanding and developing students that are prepared with these practical skills is obvious; yet there is a lack of provincial research available on this topic. This study examines the perspectives of students, educators, and local food professionals to learn about the current curriculum's treatment of food science and how we could better prepare adolescents to develop a healthier, stronger food culture going forward.

## 1.4 Research Questions

The study was guided by a general research question and several ancillary research questions. The overarching research question is: What do high school students in Newfoundland and Labrador (NL) learn about food security and sustainability through the current curriculum? The ancillary research questions are:

1. What do high school students in NL understand about food from their current schooling?
2. Does a NL high school student's education inform their food choices?
3. Where do these students currently find most of their information about food and food culture?
4. What do these students currently understand about food security and sustainability?
5. Does students' location affect their food choices?
6. What do local high school educators (administrators and teachers) understand about the current food presence in NL school curriculum?
7. What is the understanding of food experts (chefs etc.) about public knowledge relating to food culture, security and sustainability?

## 1.5 Significance of The Research

Presently, the world is facing a food crisis where people are choosing commodity or convenience over more nutritionally dense and secure food sources. Noack and Pouw (2015) put forth that approximately eight hundred million people face hunger and two billion suffer from malnutrition daily (p.169). While these statistics of hunger mostly speak to vulnerable populations, Slater and Yeudall (2015) make the salient point that “developed countries such as Canada have adequate access to food supplies, sanitation, and care yet do not consume the recommended proportion and levels of... micronutrients required to maintain... health” (p.2). With strikingly high rates of obesity and other nutrition related health issues and illnesses being present in wealthy populations, it’s been established that while a country’s level of food security may be high in terms of quantity of food, the quality of that food can be nutritionally insecure. This is particularly evident in places with nutritionally vapid dietary intakes where consumption of salt, fat and sugar takes precedence over a diet high in fruits and vegetables, whether out of ignorance or low income (Slater & Yeudall, 2015, p.2). These issues of food security also affect the population of Newfoundland and Labrador.

Unfortunately, said food crisis is not limited to issues of food and nutritional security. The sustainability of food production, which vastly contributes to food security is also a growing concern. Fossil fuels play a big role in food production (Buttriss, 2011; Iannetta, Colucci, Presenti & Vitali, 2012; Padilla, Capone & Palma, 2012) and the transportation of food from farm to dinner table. They are a dangerous precursor to greenhouse gases and hence global warming (Kemp, Insch, Holdsworth & Knight, 2010). Therefore, due to an increasing world population and increased instances of food

importation, sustainability of food and its production are becoming a global concern (Buttriss, 2011; Iannetta, Colucci, Presenti & Vitali, 2012; Padilla, Capone & Palma, 2012).

Both Slater and Yeudall (2015), and Noack and Pouw (2015) made the observation that previously, issues of food security and sustainability were largely tackled by the health care community. However, due to the food related illnesses mentioned above, health professionals are seeking methods to get people to eat in a more healthy, sustainable manner (Sandell et al, 2016). Therefore, this researcher, along with many others, believes that a more “comprehensive definition and understanding [of food security] ... requires a long-term perspective and multi-dimensional approach (Noack & Pouw, 2015, p.170). Sandell et al (2016) make a case that this long term, multi-dimensional approach could be food education. They report that by getting food education into schools, society is acting pre-emptively on issues of security and sustainability. Accordingly, all of society has a chance to benefit from food education including, but not limited to: tax payers, the healthcare system, consumers, food makers and producers (p. 20). In this way “food education that begins at childhood may contribute [to] sustainable habits in the long run” (Sandell et al, 2016, p. 21).

This study is purposed around exploring the opinion of local food experts, students, and educators on whether or not Newfoundlanders currently have an adequate understanding of food sustainability and security, and how the province can instill a food culture that champions these ideologies. If we want to avoid the healthcare issues and sustainability problems mentioned in the research above, it serves the study to determine the current presence of food in Newfoundland and Labrador’s high school curriculum and get an understanding as to whether this presence is sufficient by the standards of the

participants. First, the research sought to attain the outlook of educators and students on the place of food science in the province's curriculum. Then, through continuing by asking food professionals about their feelings on the general public's understanding of food culture and security versus what they believe the public should understand in the modern world, a better picture of the deficiencies that current high school programming may suffer was developed. By outlining the sparseness of food information in the curriculum and Newfoundland's current food cultural climate, the study suggests the benefits of adding a stand-alone Food Science course within the province's curriculum.

### **1.6 Why Qualitative Research?**

Qualitative research is appropriate for this study for a number of reasons. Primarily, Willis (2007) maintains that "the goal of interpretive or qualitative research is an understanding of a particular situational context, much more than the discovery of universal laws and rules" (p. 5). Further, Creswell (2015) states that "qualitative research is best suited to address a *research problem* in which you do not know the variables and need to explore... you need to learn more from participants through exploration" (p.16). In trying to understand what high school students from Newfoundland learn about food and then how they integrate it into their lives, I tried to learn more from participants through exploring a situational context. I did not hope to ultimately point to the curriculum as having a negative or positive impact on the students, and I did not try to generalize about the current curriculum, rather as with qualitative research I was more concerned with how "individuals are influenced by their culture and context... [and] how and why emotions, thinking and behavior occur" in order to validate future curricular development (Doyle,

2016, p. 5-6). Also, McMillian (2016) states that qualitative research is inductive in nature, allowing that qualitative research is “the study of a number of individual cases [that] would lead to a hypothesis and eventually to a generalization” (Cohen et al, 2007, p. 4). My study aimed to understand any existing gap in the current food and nutrition curriculum in order to later address said gap, solidifying it as the inductive process characterizing qualitative research.

Check and Schutt (2015) postulate that qualitative research begins with an exploratory research question about what people think and how they act in some educational setting; the questions should focus on human subjectivity. My questions, as stated above, hope to attach meaning to educational events in my own and the lives of high school students in Newfoundland and Labrador.

Additionally, as a qualitative researcher, I was not trying to manipulate or control the behavior or setting (as with quantitative research), because there aren't any external variables that affected my study (McMillian, 2016). The setting of high schools in Newfoundland and Labrador is important because it helped me to understand the state of food education in the province currently and what that means for future implications. The intention was to be able to reconstruct reality based on the opinions of students, teachers, and parents via case studies. As well, my own background was considered as I attempted to make sense of the research through my own frames and pre-understandings (Doyle, 2016). This subjective researcher approach is a hallmark of qualitative research. Wilson (2013) states, qualitative research is subjective, the researcher or subject cannot be left out as the object cannot research itself. Finally, as in all qualitative research, I'm hoped that from this reality, multidimensional phenomena would become apparent in the form of a crucial gap

in sustainable food culture and security. These phenomena would help determine what future studies are warranted in this area of the curriculum (Wilson, 2013).

### **1.7 Delimitations**

Delimitations are used to narrow the research in breadth (Creswell, 1994, p. 110). This research revolved around the following delimitations:

1. Only students in three Newfoundland and Labrador high schools were surveyed and;
2. only students, educators, and food professionals in Newfoundland and Labrador willing to participate in the study were interviewed; and
3. the study examined only the perspectives of these individuals regarding food science, culture, and sustainability science education in Newfoundland and Labrador.

### **1.8 Limitations**

Limitations shed light on the possible flaws in a research design (Creswell, 1994, p. 110). The limitations of this study included:

1. the substantial dependence of the research upon the views of participants as articulated in the student surveys and participant focus groups and interviews;
2. the study used was conducted only in three inner city high schools in St. John's, Newfoundland;

3. participants volunteered to be interviewed and participate in the focus groups, which may have resulted in biased data; and
4. the skill and knowledge of the researcher and his supervisors and advisors in developing and analyzing the survey responses and data from interview and focus group questioning.

### **1.9 Assumptions**

The following assumptions were made while conducting this study:

1. that participants, based on their work in the school system and food industry in Newfoundland and Labrador, had developed perspectives on food science and culture as taught within the school and practiced within the province; and
2. that the participants were truthful in their responses to the survey and/or focus group or interview questions and were willing to communicate their perspectives with the researcher.

## Chapter Two: Review of the Literature

### 2.1 Contextualizing Terminology

#### 2.1.1 Sustainability, Food Culture and Food Security

While each of these concepts deserves attention as stand-alone terminology, it is more important to have an understanding of them in tandem, as they fit into the framework of this research. Specifically, it serves the research to describe the parameters of sustainability as it applies to food security and food culture.

Food security, as described by the Committee on World Food Security (FAO, 2012) “exists when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (p. 7). While this statement largely describes the intent of food security in this study, a more modern and accurate explanation is provided by the FAO (2012) under the guise of *food and nutrition security*, stating:

Food and nutrition security exists when all people at all times have physical, social and economic access to food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life, coupled with a sanitary environment, adequate health, education and care. (p. 9)

This definition is more all-encompassing, and gets to the immediacy of the issue, therefore it will operate as the basis of food security for this study.

Food culture as a concept is harder to define, as it is a much bigger umbrella term for a plethora of ideas. Bonnekesen (2010) postulates:

What is important in regard to food is not the human right or even the biological need; cultures create ideas, rituals and rules around food that specify quite clearly what is good to eat by whom, how people may “reasonably” be denied access, and how to reward or punish those who cultivate, prepare and serve food. In short, food becomes a lens through which we may explore the stratified realities of a society, its ideas

about worth, about class, sex/gender, race, religion, and even nationality and humanity. (p. 280)

In other words, food is so heavily ingrained in culture that not only our families, but our society and specific communities often dictate our choices, preparations, and reactions surrounding food.

Compounding the issue of coming to a consensus on a specific culture's relation to food is regardless of culture or upbringing, objective tastes will always play a part in our association with food, affecting choices and preparations. Of course, it is stipulated that these tastes are learned, as "early familiarization with certain foods promotes a preference for these foods over functionally... [the] exposure effect, evaluative conditioning and the consumers' predilection to form norms and expectations concerning the appropriate food combinations" (Scrob, 2016, p. 95). Here Scrob (2016) speaks to learned behavior, if a child is to eat vegetables as a child without the predisposition that they are horrendous in taste and mouthfeel, perhaps they would continue enjoying them through adulthood. With so many factors affecting our lives in relation to food, its niche in culture can easily become overwhelming. Therefore, with all these considerations, the operational definition of food culture adopted in this study is the connection of food choices, practices and preparations with locale, environmental concerns, the economy, politics, international relations, social stratification, race, gender, history, and religion (Bonnekessen, 2010). In order to get to the root of fostering sustainable food culture, we need to factor how all these individual practices and preferences affect one's life in relation to food and reorient them internally to better suit global well-being, while maintaining cultural identity. Firstly, however, what is meant by sustainable?

Sustainability is a modern buzzword when it comes to many fields of study. It “is a function of how assets and capabilities are used, maintained and enhanced to preserve livelihoods... consider[ing] how our activities today will impact future generations” (Slater & Yeudall, 2015). A sustainable food supply, then, is one that is plentiful; healthy for its consumers and the world; is replenishable for future generations; but only possible through responsible food culture and security (Buttriss, 2011). Next, to acknowledge sustainability as it relates to food culture and security, Alsaffar (2016) suggests that sustainable diets are those with low environmental impacts that promote food security and a healthy lifestyle for current and future generations while being protective and considerate of the environment. These diets also must factor in food that is culturally relevant, affordable, safe and healthy, while maximizing nutritional value and natural and human resources. I postulate that as groundwork for this study, sustainable diets are analogous to sustainable food culture and security as this description corresponds succinctly to the decided terminology above.

### *2.1.2 Food Science in Frame*

While Food Science as a concept covers a large breadth of topics, it is useful to provide a definition in the context of this study. The Institute of Food Technologists in Chicago (2016) designates it as “the study of the physical, biological, and chemical makeup of food; the causes of food deterioration; and the concepts underlying food processing.” They go on to denote that Food Science is devoted to a better comprehension of food processes and safe, nutritious improvement of food products for society.

Miles and Borchardt (2014) describe a similar course that their institution developed, the Science of Food and Cooking, as one covering scientific concepts as they would be discussed via ordinary Chemistry but with emphasis on food and food preparation. Their course was “developed with this description in mind: providing a suitable option for students who will likely not major in science but will develop the ability to understand and interact with scientific material and concepts” (Miles & Borchardt, 2014, p. 1637). While this definition of Food Science goes a long way in teaching the culinary arts in high schools, it doesn’t so much take on the lens of food security and sustainability as it tries to create a stronger foundation in Science via a relatable medium like food. Miles and Borchardt (2014) make their audience acutely aware of this when speaking about food via its constituents:

The four basic food molecules (carbohydrates, proteins, fats, and water) were introduced. The scientific method was explained in context of how to prepare a dish (from planning to cooking to analysis). Similarities between cooking recipes and scientific literature were examined. (p. 1639)

This concept is not secluded to Miles and Borchardt’s (2014) institution’s course, as “The White House Task Force on Childhood Obesity suggests nutrition concepts be taught through an interdisciplinary approach, for example examining caloric needs while teaching math skills” (Carraway-Stage, Hovland, Showers, Diaz & Duffrin, 2015, p. 232). Both Miles and Borchardt (2014) and Carraway-Stage et al (2015) suggest tying food into the current curriculum, in an interdisciplinary fashion to improve student comprehension of tough, pre-existing concepts in other subject areas.

Therefore, a more holistic approach to Food Science as it applies to this research is not to implement food into an existing curriculum, but to expand on courses such as Home Economics and Nutrition to include a much wider proliferation of knowledge. Food Science

as it relates to this research would focus on the conception of a meal from the planting of a seed, to a frying pan and finally to its conversion to energy in the human body, as the IFT (2016) stipulates. In this way, the program could have potential to spark student interest in many sectors including but not limited to agriculture, the culinary arts, farming, health care and all other relevant sciences.

## **2.2 The Immediate Need for Sustainable Food Security and Culture**

It's increasingly more difficult to turn on a television or open social media without seeing some commentary on the global food crisis. Unfortunately, the wide reach of the internet and television is creating a global consciousness to food practices and culture that is also accelerating global food problems. Noack and Pouw (2015) conducted a study that describes how western food culture is infiltrating previously healthy systems all over the world, embedding high-energy (cholesterol, fat and sugar) and low-nutrient food stuffs into a once lean and local diet under a misguided notion of "food security" that simply equates to full bellies and disregards negative consequences. Medical issues exacerbated by these dietary changes, like diabetes, cardiovascular disease and cancer (Alsaffar, 2016), (particularly apparent in Newfoundland, making the issues strike particularly close to home), are also indicating the need for a more sustainable food culture. On the other side of the coin, pressing problems such as hunger and increasing population sizes are putting pressure on the need for food security. In addition to these severe issues, directly going against the concept of global sustainability are the ways in which food is produced for consumption.

Many of the means through which we produce food are anything but sustainable, degrading the environment and contributing to the destruction of biodiversity and climate change. The agriculture industry relies on fossil fuel to synthesize fertilizers and pesticides, deforestation, biomass burning and livestock production, contributing to pollutants like greenhouse gases that destroy the atmosphere (Buttriss, 2011; Iannetta, Colucci, Presenti & Vitali, 2012; Padilla, Capone & Palma, 2012). In conjunction with the agriculture industry, shipping food is environmentally costly in the form of food miles, or the distance that food travels from its site of production to the dinner table (Kemp, Insch, Holdsworth & Knight, 2010). Another key component to food production is fresh water, which is being used quicker than it can be replaced, creating waste water high in biological oxygen demand and suspended solids including nutrients and minerals that cannot be recovered (Lee & Okos, 2011; Olmez, 2014). Additionally, solid and liquid waste from food manufacturing are released into landfills and sewers without any regard to environmental safety (Roy, Orikasa, Nakamura & Shiina, 2014; Wang, 2014). All these missteps and unsustainable practices point towards an environmentally dissonant future. It is vital that the way we approach food and food production globally changes in order to not only allow for sustainable food culture and security, but to permeate change in the health care system and potentially the global economy as well.

### **2.3 How does the Responsibility Fall on the Education System?**

Alsaffar (2016) highlights a case study on the Mediterranean diet, which is widely regarded as sustainable given that it revolves around vegetables, legumes, fruits, nuts, cereals, olive oil, fish, moderate amounts of dairy, and very small amounts of alcohol and red meat. Conceptually, the diet centers around nutrition, biodiversity and most importantly local food production and culture, creating a much lower environmental impact and a more favorable impact on health (Bach-Faig et al, 2011; Burlingame & Dernini, 2011; Gamboni, Carimi & Migliorini 2012; Padilla et al, 2012). Expanding on this notion, considering global seasonal conditions are not always as forgiving as those in the Mediterranean, Alsaffar (2016) in agreement with Noack and Pouw (2015) suggest light processing such as pickling, jarring, smoking and freezing as methods of preservation. In this way, people can continue eating as local and nutritious as possible throughout less favorable months of the year. Unfortunately, these methods are now regarded as almost primitive and the average person is ill prepared to make the most out of sustainable and local food sources in spite of the positive worldly implications. Despite the harmony of the Mediterranean outlook on food culture and sustainability in conjunction with lower environmental impact and a positive effect on health, globally “the issues of food security... continue to be dealt with by the scholarly community and public health community as disconnected issues” (Slater & Yeudall, 2015, p. 2).

As the researcher, I suggest that Scrob’s (2016) ideology of learned behavior be applied to helping mitigate the symptoms of the global food crisis. I believe that if we want people to be more conscious of the impact of their food choices on food security, we need to instill a positive, sustainable food culture. Slater and Yeudall (2015) suggest that to directly

influence individuals, families and communities as well as structures and processes, interventions occur at the practical and strategic level. Their study suggests integrating food and nutrition into community-based programs; scaled-up, gender neutral food education; and provided healthy foods for lunches in daycares and schools. Noack and Pouw (2015) reinforce that by introducing culturally appropriate and locale appropriate diets through school feeding programs, and discussing “sustainable agriculture practices, nutritious cooking methods, and conservation measures... it becomes possible to guide people to help themselves in order to generate greater food...security” (p. 179). As a teacher, I concur that the best way to start effecting change is from an early age in the education system.

Regrettably, households may not have the know-how to obtain complete nutritional or health benefits from food even in homes with sufficient financial resources (Slater & Yeudall, 2015). Our current culture logarithmically multiplies these shortcomings with the glorification of fast, calorie dense food, contrasted by “misguided fads and common misconceptions promulgated by the media, celebrities and popular culture [influence] that weaker [students] are often grossly overconfident about their [food] knowledge” (Chew, 2014, p. 65). These misconceptions are alluring to students because they are often simpler conceptually than reality and propagate fallacies that nutritious eating and weight loss are “easy.” The aftermath of these issues leaves teachers charged with the responsibility of overcoming all these obstacles to teach sustainable food culture and security in schools (Chew, 2014). While increasing access to and understanding of healthier foods for lower income families may not necessarily drive them to consumption, teaching these ideals in the school system might (Slater & Yeudall, 2015).

Carraway et al (2015) make a salient point in saying that “many teachers are not prepared to integrate nutrition concepts into their curricula and may lack basic nutrition knowledge” (p. 232) but stress that because students are familiar with food that this former knowledge could help integrate knowledge in other new academic content, so why not make it a more omnipresent subject in the curriculum? It would seem that our current Home Economics and Food Nutrition education program is riddled with shortcomings. Slater’s (2013) study used interviews to determine major disparities in this system. The research revealed significant external challenges to programming like depreciated value in food education from students, parents and teachers; an appreciably declined student base knowledge of food and nutrition due to lack of exposure at home for a myriad of reasons, making food and nutrition education even more taxing to teach; and due to modern life providing a more complex foodscape, it is more important than ever that teachers help students learn how to steer through it in a health conscious way (Slater, 2013). The main goal of this study is to discover if the same shortcomings in food and nutrition education exist in the Newfoundland high school curriculum in order to suggest reform towards a program with greater emphasis on sustainable food culture and security.

It would appear to me, that only through sustainable food culture, where people make smart food choices for themselves, their community and the environment, is it possible to have sustainable food security. This security cannot and will not exist without a properly anchored food culture, which can be developed with a stronger foundation in Food education, implying the need for more in-depth programming with a focus on local and sustainable food culture and security.

## Chapter Three: Methodology

### 3.1 Method of Study

“The goal in interpretative research is an understanding of a particular situation or context much more than the discovery of universal laws and rules” (Willis, 2007, p. 99). Qualitative research does not aim to control “variables in a laboratory-style setting in order to identify the contribution of each variable to the effects achieved... [but] to highlight the complexity of such work and its dependency on the sensibilities and good judgment of the qualitative researcher” (Eisner, 1998, p. 170). My study attempted to uproot discrepancies in the Newfoundland high school Food Science curriculum in an aim to promote local and sustainable food culture and security in the future. This is not only a specific situation and context, but there are no variables at play and fully understanding the issue requires rich description and detailed opinion from the research subjects and subjectivity on behalf of the researcher. Additionally, the approach is inductive in nature, rationalizing qualitative methods as a means of research.

In order to get to the root of my research questions as highlighted above, I believe the best methodology approach is a *case study*. Creswell (2015) provides an overarching definition of a case study as “an in-depth exploration of a bounded system (e.g., activity, event, process, or individuals) based on extensive data collection” (p. 465). “A case study is an “analysis of one or more events, settings, programs, social groups, communities, individuals, and other *bounded systems*” (McMillan & Wergin, 2002, p.120). Scott and Usher (2011) further elaborate the constitution of bounded systems as programs, events, people, a process, an institution or a social group. The case can be separated out via time, place or physical boundary (Creswell, 2015). My study hopes to determine illogical gaps in

Newfoundland high school's representation of Food Science through analysis of curriculum documents, students, teachers, parents and experts in the field. The nature of this study bounds the system to Newfoundland high schools, acting as a community and the Food Science curriculum as a program. In Creswell (2015), Stake (1995) confirms that case study researchers focus on programs or activities of a group, falling in line with my research purpose.

A case can refer to “a single individual, several individuals separately or in a group, a program, events, or activities... [or] a process consisting of a series of steps” (Creswell, 2015, p. 465). The program or process in question in my study is the Newfoundland high school curriculum and the individuals are those of concern locally within the realm of Food Science education. I heard from high school students about their perceptions of food science, culture and sustainability, alongside of asking teachers, parents, program specialists and experts like chefs Charles, Howse, and Lee, hence the validity of this methodology. Another characteristic of the case study is that the case is located “within [a] larger context, such as geographical, political, social, or economic settings (e.g., the family constellation consisting of grandparents, siblings, and “adopted” family members)” (Creswell, 2016, p. 465). My research is directed towards Newfoundland high schools and studied the students, educators and experts in relation to Food Science, meeting these criteria for case study methodology.

While individual case studies focus on a single entity, collective case studies examine multiple cases as I've described in my research topic (McMillan & Wergin, 2002). Creswell (2015) posits that case studies including multiple cases are denoted a “collective case study, in which multiple cases are described and compared to provide insight into an

issue” (p. 465). My study examined Newfoundland’s Food Science curriculum through the perspective of students, teachers, parents, experts and curriculum documents for insight. Therefore, a collective case study best facilitated this induction.

Creswell (2015), in discussing the case study as a sub category to ethnography as opposed to its own distinct methodology, claims that researchers employing the case study look for shared patterns as a group interacts over time. My study uncovered flaws in a curriculum that, from a yet-to-be-informed perspective, seems to have gone unchanged and unmodified for quite some time. In trying to ascertain not only what is missing from Food Science education within the boundaries of Newfoundland high schools, but what can and should be taught to promote sustainable food culture and security, I was inductively seeking patterns of insufficient education, pointing to the appropriateness of the case study (Creswell, 2015). Creswell (2015), interjects that a case can be considered a procedure of inquiry and that the design is particularly well suited to research situations where it is impossible to separate the phenomenon’s variables from the context in which they exist. Given that my research centered around the Food Science curriculum in Newfoundland and whether or not is sufficient towards making informed, local and sustainable food choices, the variables heavily depended on Newfoundland’s youth, rendering separation from context unfeasible.

Wilson (2013) further refines the definition of case study as “a traditional, systematic approach to looking at events, collecting data, analyzing information and reporting the results, with the end goal of describing the case under investigation as fully and accurately as possible” (p.257). In order to reach this end goal, the researcher seeks to develop an in-depth understanding of the case by collecting multiple forms of data (e.g.,

pictures, scrapbooks, videotapes, and e-mails)” (Creswell, 2015, p. 465). Through multiple sources of data, a thick and rich description of the phenomena forms, a hallmark of qualitative research (Creswell, 2015). It is important to note that towards achieving this description, peers in the studies described in my literature review used surveys, questionnaires, document analysis, interviews and focus groups. Through multiple means of data collection, the phenomena was described in a lush way, engaged a deeper understanding of the flaws of Food Science education in Newfoundland, solidifying the case study as a competent methodology for this research.

### **3.2 Data Collection**

*Eisner (1998)* acknowledges that to understand schools and classrooms, we must pay careful attention to the details of what people say and do, as well as how they do it. Therefore, qualitative research requires data that are descriptive, thick and rich, which often coincides with multiple methods of fieldwork. Though interviewing is a strong method for the case study approach due to its propensity for description of the subject’s thoughts and feelings, *Eisner (1998)* contests that collection of text, documents and artifacts is also vital because this information often reveals what people do not say.

When data collection is pondered in qualitative research, the aim is to embark on “an interpretive process that seeks to understand its fullest meaningful context” (Shank, 2002, p. 75). A rich and thick description of the phenomena at play is sought. Shank (2002) notes that a thick description is not voluminous because it requires the researcher to make choices about what is to be described to understand its meaning; it is not idiosyncratic because it’s anchored in the all-encompassing society and; it is not artistic because it’s

about allowing the research to speak for itself. A thick, rich description serves the phenomena at hand and gives insight into the situation in context. Therefore, it is wise to choose samples and data collection methods that serve this purpose.

### **3.3 Collection Methods**

#### *3.3.1 Sampling*

A “case study may choose a particular person, group of people, or teaching context in order to investigate a phenomenon” (O’Toole and Beckett, 2010, P. 6). LeCompte and Preissle (1993) indicate the importance of the interplay of the focus of the study, population access and the methods of data collection that will be engaged in choosing a sample. In Slater’s (2013) research pertaining to the state of home economics education in Canada, he chose a sample of teachers and superintendents to better understand the issue at multiple levels, adding complexity and credibility to the study. In order to investigate potential phenomena in the impact of teaching Food Science in Newfoundland high schools, I submit that while it was beneficial to sample students from several high schools in the province, the opinion of administration, teachers and experts like chefs will give greater depth and thus confirm-ability to the study. By sampling these voices, more attention was brought to the current Food Science curriculum in Newfoundland and more ideas on a potentially better way to proceed in the future were generated. Also, emergent ideas from the interaction of these individuals in focus groups gave greater credibility to the resulting phenomena.

### *3.3.2 Document Analysis*

Initially, it served this study well to scan through curriculum documents, Newfoundland Department of Education sanctioned nutrition textbooks, and high school programming plans in order to determine what is in writing for Food Science curricula within the system. In order to provide a better understanding of the reality of the situation, it was wise to follow up this document analysis by questioning or surveying the various role players in the study (students, administration, teachers, experts). This information, or secondary information, can reveal a considerable amount when one contemplates by whom, for whom, and why it was created. This then helped inform or interpret information discovered from research participants in questionnaires, interviews and focus groups (Tite, 2016). It is worth noting that Bonnekesen's (2010) study exploring cultural meanings of food in food education employed this method of text analysis to help define food's role in culture and the classroom as well. Through these measures, it can become clearer what is happening in practice versus theory, which is exactly the angle my study wished to explore (Tite, 2016).

### *3.3.3 Surveys and Questionnaires*

Through the literature review, it was determined that most of my peers seeking similar information used a case study as a primary vehicle for their research with questionnaires, interviews, focus groups and text analysis as the medium for data collection. Bonnekesen (2010) was interested to "know the level of my [her] students' awareness of the cultural context of food" (p. 281), so the researcher asked students to fill out a questionnaire which "asked the respondents to remember their families' food habits

and to recount their own relationship with food preparation, moved into questions concerning the symbolic uses of foods, and ended with questions about hunger” (p. 282). Further, Carraway-Stage, Hovland, Diaz and Duffrin (2015) hunted to discover how a food-based Science curriculum affects nutritional knowledge via a mixed methods approach, citing a questionnaire as a major means of data collection. Noack and Pouw (2015) conducted a study to “capture the voices of those who are most affected by food and nutrition insecurity” (p. 173), and they started with a survey “pertaining specifically to agriculture, food, information access, and value positions regarding change and social dynamics in the area” (p.174). Scrob’s (2016) research revolved around how early socialization into food culture impacts lifetime food experiences and employed a questionnaire to commence the study. My study on Food Science in Newfoundland high schools and the development of sustainable food culture and security required a baseline of fundamental knowledge on what students already learn in schools and from their families, as well as what they feel is missing. As this research is analogous to that of the studies in the literature review, questionnaires and surveys are a justifiable means of data collection. After questionnaires and surveys were administered, the information was coded and analyzed to inform the next phase of data collection, interviews and focus groups.

#### *3.3.4 Interviews*

Field experts with a keen interest in local and sustainable food culture and security were asked to complete individual interviews to help paint a more complex picture about Newfoundland’s Food Science curriculum and general public understanding of food security and sustainability. While surveys give a wealth of concrete knowledge and data,

interviewing "... is an essential tool of the researcher in educational enquiry. This is because the preconceptions, perceptions and beliefs of social actors in educational settings form an inescapably important part of the backdrop of social interaction" (Scott & Usher, 2011, p. 115) Unlike the static nature of document probing, interviewing "is flexible enough for you to follow emergent directions and probing that can effectively capture participant's views, beliefs, emotions, thoughts, and thinking" (McMillan, 2016, p. 344). While surveys helped inform what is missing from Newfoundland's Food Science curriculum, they did not tell me how my subjects feel about these discrepancies.

The researcher's "questions and comments are needed to make sense of what the participants say" (McMillan, 2016, p.351) and often will help trigger conclusions that the participants were not privy to without external prodding. This information goes a long way in helping create a more rich description of the phenomena and can only be accomplished via observation and careful recording and examination of the subject's thoughts. In this way, interviewing is much more flexible and dynamic (Creswell, 2015). Scrob (2016), Slater (2013) and Noack and Pouw (2015) all use interviews as a primary research methods to uncover beliefs and understandings of food culture. Scrob (2016) used "face-to-face interviews conducted by the author" (p. 95) and Slater (2013) "used interviews to determine major disparities in the system" (p.617) via guided questioning. Noack and Pouw (2015) cite interviews as helping to serve" the purpose of extracting more specific answers and details" (p. 174). Through asking standard, open-ended questions as suggested by Patton (1990) in LeCompte and Preissle (1993), all participants were probed for experience, knowledge, opinion and feelings, leading to a more lush visualization of Newfoundland's Food Science curriculum and its impact on local food culture. To add

further depth to my research, after analyzing the interview data, focus groups were established.

### *3.3.5 Focus Groups*

Often “researchers find that focus groups, done with participants who have been interviewed individually, add substantially to the collected data” (Creswell, 2015, p. 217). Marshall and Rossman (2006) outline that a focus group is a type of interview in which 7-10 participants, who are somewhat unfamiliar with one another, are brought together based on shared characteristics pertinent to the research questions. This is crucial to creating rich description because “an individual's attitudes and beliefs do not form in a vacuum: People often need to listen to others' opinions and understandings to form their own.” (Marshall & Rossman, 2006, p. 114). In a more relaxed environment, participants will feel more comfortable, and responses to the researcher’s questions may be less contrived than in one-on-one interviews, allowing ideas to crop up that might not have before (Marshall & Rossman, 2006). Bonnekesen (2010) distributed questionnaires to find primary information about her study, then, used class time with her students to paint a deeper picture of the cultural meanings of food. Also, Noack and Pouw (2015) approached their study with focus groups to give clarity to how culture and social change shape food choices. In order to better understand discrepancies in the current Food Science curriculum in Newfoundland, how it leads to undesirable food culture, and what the participants feel can be done to remedy the issue, a focus group was employed. Through creating subgroups of students, educators, and food professionals, it was very likely that conversation between such diverse people would instigate thoughts that hadn’t developed

in a one-on-one interview. For instance, students and educators who may have believed Newfoundland's Food Science curriculum is appropriate as is in a survey simply may not have understood what else is out there to be learned or what food culture exists already at their fingertips. In a group discussion about these concepts, these individuals might be inclined to change their mind about the present situation. Focus groups stand to uncover a wealth of information about misconceptions, beliefs and emotions that help to give depth to a study. Not only do they add richness to research, but they reinforce the credibility and trustworthiness of the design.

While it is beneficial to have a record of the interviews, focus groups, surveys and data analysis, these notes and recordings and what people say are incomplete without field notes to support them. To add both depth and credibility to the research, my study requires that field notes be taken during the focus groups and interviews. McMillian (2016) describes field notes as giving description to the setting, subjects' body language, what they said, and how they looked, alongside of the thoughts and feelings of the researcher to help make a qualitative case study more lush. This way, it is easier to keep track of emerging issues in the study and ethical concerns. Considering my study revolves around food culture, an emotionally charged subject especially given it is a heavy part of Newfoundlanders identity and socialization, these notes are crucial to painting a complete picture and ensuring credibility.

### **3.4 Participants**

In total, seventy-one students participated in the survey portion of the research. They ranged in age from grades ten through twelve, all at the high school level. It is worth noting that the students represented a Nutrition class at one of the schools, a Biology class at another and a Chemistry class at the final school. After the survey was complete, a smaller group of students volunteered from each of the three high school survey groups to participate in a focus group where more open-ended questions were asked.

Three administrators and three teachers took part in the educator focus group with varied backgrounds and teaching areas. Two of the teachers and two of the administrators came from the field of Science. The other principal in the study taught English and the remaining classroom teacher works in the field of Nutrition and Home Economics. Finally, seven food experts were chosen to give interviews. Among them a forager, a butcher, a sommelier and restaurateur and several of Newfoundland's most accomplished chefs. In this way, a wide variety of subjects' experiences and opinions help to further triangulate the study and paint a more complex understanding of the current state of Food Science in Newfoundland's high school curriculum.

### 3.5 Credibility and Trustworthiness

“Research is conducted with the goal of obtaining results that reflect the truth and reality of something, whether that is achievement, the effect of an intervention, for a description of participant perspectives” (McMillian, 2016, p.308) and “scholars simply know quality when they see it” (LeCompte & Preissle, 1993). Suter (2015) postulates that “the validity of qualitative research is often referred to as trustworthiness or credibility” (p. 346); while the qualitative researcher wants perspectives as opposed to absolute truths, an honest rendering of the phenomena is paramount (Taylor & Bogdan, 1998). Creswell (2015) suggests three ways of strengthening credibility: triangulation, member checking and external audit. McMillan and Wergin (2002) define triangulation as “a widely endorsed strategy for strengthening the internal validity of qualitative studies in social science. It is based on the principle of confirming findings through the use of multiple perspectives” (p. 151). They posit that through multiple investigators (a team analyzing data), multiple sources of data (teachers, students, administration, experts) or multiple methods to ascertain findings (interviews, surveys, focus groups), triangulation can be achieved. Thus, in my study, where not only students, but teachers, principals and experts were asked about the Food Science curriculum, triangulation was achieved. Also, through the use of data analysis, surveys, interviews and focus groups, more triangulation was accomplished.

Creswell (2015) notes that member checking requires “one or more participants in the study to check the accuracy of the account” (p. 259) and external audit as hiring an individual independent of the study to review aspects of the research. Upon completion of field notes and data analysis, both of these strategies were employed to ensure that

phenomena resulting from the data collection were an accurate representation of the teaching of Food Science in Newfoundland's high school curriculum.

When attempting to actualize a rich description of this phenomena, confirmability cannot be left out of the credibility and trustworthiness discussion. Lincoln and Guba (1985) suggest that in order to persuade readers that the phenomena is in fact confirmable, researcher subjectivity must be clear. Despite my emotional connection and personal interest in the material, which is commonplace in qualitative research, I have no external motivation or personal stake in the research outcomes. Therefore, I believe that the results of this study, if undertaken by another researcher, would be similar, adding to its degree of credibility.

### **3.6 Data Analysis**

Suter (2015) suggests that while qualitative data comes from many sources, "words combine into meanings, but meanings must be sorted, interpretations considered, and conclusions reached" (p. 350). McMillian (2016) asserts that in order to make sense of what seems like a plethora of white noise when examined from a distance, entire transcripts must be read and then coded into categories based on the initial, general research questions, then conclusions may be reached. Bogdan and Biklen (1998) and Berg (2004) recommend that analysis start broadly, while the researcher is still in the field, making notes and observations that can guide further interviews and narrow research questions to more closely fit the research purpose. Upon collecting data from the students, teachers, administration and experts, I categorized the findings via the original research questions to determine thoughts and feelings on the current Newfoundland high school

Food Science curriculum. As emerging circumstances develop, they were noted during coding to determine how they fit in the bigger picture of the phenomena. Reflection is key to this process and starting analysis before all the data is collected ensured that any subtle nuances in the findings were not lost (Berg, 2004).

By coding and analyzing after each stage of data collection, first the document review, then surveys and finally the interviews and focus groups, it was easier to adhere to Stake's (1995) four stages of data analysis. Stake recommends categorical aggregation as a way of seeking patterns and meanings; direct interpretation to ensure that the researcher is not forcing findings to fit expectations; the establishment of patterns in order to decipher correlations and; naturalistic generalization as a way of understanding emergent phenomena through analysis. By following these stages, I gained insight into the impact on teaching Food Science in Newfoundland and Labrador high schools as it pertains to local, sustainable food culture and security without incorporating any of my biases or losing insight from poor analysis strategies and information overload.

## Chapter Four: Findings and Interpretation of Findings

### 4.1 Introduction

Bogdan and Biklen (2007) assert that once the data have been examined “words, phrases, patterns of behavior, subjects’ ways of thinking, and events repeat and stand out,” leading the researcher to search “for regularities and patterns as well as for topics” (p. 173). According to Merriam (2009) drawing these patterns and topics from the research is “largely an intuitive process, but it is also systematic and informed by the study’s purpose, the investigator’s orientation and knowledge, and the meanings made explicit by the participants of the study” (p. 183). Through coding and analysis of the data collected via the survey, focus groups and interviews, such findings began to emanate from the results. Participants were asked open ended questions in an effort to answer the auxiliary research questions which focused on the following themes:

- high school student’s grasp of food culture, sustainability and security
- where students are currently learning about food and food culture
- implications of current food culture on student nutrition
- food experts’ opinions of current public knowledge relating to food culture, security and sustainability
- the case for a Food Science curriculum in Newfoundland

All emergent themes from the study are supported by direct quotations from the data collection process.

## **4.2 High School Students' Current Grasp of Food Culture, Sustainability and Security**

In order to get an enriched overview of the knowledge base of food science and sustainability of a modern high school student, current Newfoundland and Labrador curriculum documents were scanned in addition to the survey, interviews and focus groups conducted. The researcher's findings can be categorized into the following subsections:

- sustainability content in the Newfoundland and Labrador high school curriculum
- thoughts from high school educators on food presence in the curriculum and student understanding of food sustainability
- broad strokes about understanding of sustainability and food security from student survey responses
- a more descriptive perspective of student understanding from their focus groups

### *4.2.1 Sustainability Content in The Newfoundland and Labrador High School Curriculum*

A logical starting point to understanding food's role in the classroom and culture is via text analysis of existing documents (Bonnekessen, 2010). Upon said analysis, it is no surprise that the word sustainability permeates high school curriculum documents in Newfoundland and Labrador. Objectives that more so seem to border on good intentions about sustainability and food security occur in a number of courses, including: Science 1206, Environmental Science 3205, Earth Systems 3209, Biology 2201, Social Studies, Geography, Physical Education, Healthy Living 1200 and Nutrition 3102. These courses can and should be looked at in two designations, those mandatory for all academic students and those which are not.

Of these classes, the one mandatory course to finish high school with academic status in the province is Science 1206; the introductory, general Science course that all academic students take before specializing in Biology, Physics, Chemistry or Earth Science. This course is divided into four units: Motion, Chemistry, Weather and Ecology. The curriculum document for the Ecology section basically begins with the objective “define sustainability... examine historical attitudes and practices in relation to those of sustainability” (Newfoundland and Labrador Department of Education, 2017, 114-1). This appears to be a strong case for the placement of sustainability within a program that reaches the vast majority of students. However, as an educator, the researcher has taught this course and in practice the amount of time actually allocated to this discussion is meager and wanting. As if to comically and unabashedly support this lack of due attention, the outcome following the former expounds:

Whenever possible these questions relating to sustainability should be addressed in relation to the major industries of this province. This will give students the opportunity to examine sustainability from a more realistic viewpoint given that that they and their guardians would have some contact with these “resource based” industries. (Newfoundland and Labrador Department of Education, 2017, 115-1)

This objective actually begins with the clause “whenever possible” as if to, albeit ironically and unintentionally, highlight the reality that while speaking to sustainability is part of the curriculum, it isn’t compulsory.

Additionally, while the language of the curriculum seems to displace importance on a lengthy discussion of the concept of sustainability, it proves doubly ineffective to address it through the lens of food security by mainly tackling sustainability through the perspective of natural resources, energy and industry. If the reader is thinking food *is* a resource, it isn’t, at least by omission in programming. Credit has to be given as the Cod

Moratorium is mentioned by name in the Science 1206 syllabus. However, it is almost as though it is a passing thought that most students should already understand considering it plagued the province for years and is still talked about in the media. The guide says, “examine historical attitudes and practices in relation to those of sustainability... comparing ‘traditional’ methods and attitudes of fishing and those of the so called ‘modern fishery’. The examination of the concept of sustainability will become clearer to students as they address other outcomes in this unit” (Newfoundland and Labrador Department of Education, 2017, 116-1). Indeed, this moratorium is the best example of a popularized issue of food security within the province; students know that we had to place restrictions on overfishing so as to replenish the stocks and keep the cod population healthy. This is the closest the curriculum comes to addressing food science in a mandatory course and the focus is not even specifically about food culture and security but more from the point of view of renewable resources. Still, the expectation that the concept of sustainability becomes clearer to students as they address these outcomes is lip service when prefaced by clauses that essentially say whenever there is time, sustainability should be mentioned, and when actual classroom practice places less importance on the topic than the programming suggests.

Furthermore, while this may seem like insignificant grounds to chastise the Department of Education, observing that the language could also be taken to mean that they want teachers to tie in sustainability at every opportunity throughout this course, it is grounds to point out that their approach to address sustainability is lacking the imperative angle of its relation to food security. Instead, the syllabus favors focus to sustainability’s application in natural resources, forestry and industrialization. In the excerpt above, the

Newfoundland and Labrador Department of Education (2017) uses buzzwords like “industry” and “resource-based” to describe the educator’s suggested approach to sustainability. Similarly, other optional academic syllabuses give the concept of sustainability the same treatment.

As of the time of research, it is mandatory that students complete some social study, be it Geography or History, in order to graduate with academic status. A comb of the Newfoundland and Labrador Department of Education (2017) curriculum indicates that sustainability in these courses is again tackled as an issue in the local fishery and forestry industry. The guide speaks mostly to local economy, especially in the mention of the Cod Moratorium, rather than food security or survival. Also, a potentially mandatory course, Earth Systems 3209, can replace Chemistry, Biology or Physics as a Science program required for academic graduation. Its programming dictates that the educator “describe sustainable development in relation to the use of Earth resources [and] identify and describe core components involved in the sustainable development of Earth resources” (Newfoundland and Labrador Department of Education, 2017, p. 166). This postulate is surrounded by talk of carbon-based fuels and non-renewable resources and thus does not fit the framework of sustainability as it applies to food science and culture.

Further, all students in the academic stream have the choice between taking Physical Education or Healthy Living, meaning taking one of them is requisite. As if to flagrantly flaunt the infidelity to the issue of food security and sustainability within the province, both the 2100 and 3100 level Physical Education course descriptors mention the word sustainable *once*, in an excerpt that is the same, word for word, as if copied and pasted, in each program: “Through participation and discussion of outdoor activities,

students develop an understanding of the importance of environmental protection and sustainable development” (Newfoundland and Labrador Department of Education, 2011, p.33 and Newfoundland and Labrador Department of Education, 2012, p.37). Two supposedly different courses sport the same overgeneralized outcome. How could an issue that is treated so void of care and detail for instruction from the curriculum developers be treated with importance by educators and students? Given the lack of specificity of the wording of said outcome in programming, this researcher speculates that sustainable development is an issue rarely broached in the average physical education classroom. Conversely, if Physical Education is not taken by an academic student, Healthy Living 1200 is essential.

Healthy Living 1200 is much more focused on the wellbeing component of food science and culture. The Newfoundland and Labrador Department of Education (2002) prescribes that the student “critically analyse the impact of eating practices on the prevention and/ or development of chronic health conditions” (p.38), “demonstrate an understanding of the factors affecting food security... identify the impact of eating practices on society and on the environment” (p. 38) and “identify careers related to food and eating” (p.39). As per the definition of food science and sustainability guiding this study, this course is so far checking all the boxes for a well-rounded approach to the subject matter. In fact, the ideology of this research is well encapsulated by the following objective:

Students could survey the traditional foods of the local population, analyse the findings, publish and distribute them. They should comment on the contribution of local foods to healthy eating; identify local produce, wild game and berries that support healthy eating; and where appropriate, provide some suggestions for modification of eating practices and lifestyles choices. (Newfoundland and Labrador Department of Education, 2002, p. 40)

Essentially, if properly executed, this guideline for Healthy Living 1200 could help students gain an understanding about food security and food culture. Although, this requires that the curriculum document is followed closely. In practice, as a substitute teacher, the researcher has had the opportunity to fill in for this course numerous times at different schools. From this sample, though relatively small and specific, oftentimes students divulge that they spend most of their time in a gym class having recreational time for physical activity. It also serves the study further to note that while it is not without merit that such precise instruction on food sustainability is available to students, it is also only a small part of one unit of a yearlong course that might not have the imperative staying power to create food smart practices outlined in this study.

Finally, the course which pays most service to food science is the only one in the curriculum that is a pure elective, meaning it is unfortunately not essential for graduation. Newfoundland and Labrador Department of Education's (2007) Nutrition 3102 course actually has an entire unit dedicated to food security. It boasts student outcomes such as "understand what it means to have a secure food system... [and to] have an awareness of the complexity of the issues around food security" (p.138). The syllabus provides a definition of food security centering around availability, accessibility and management that is congruent to that which was adopted by this study:

when all people have access at all times to sufficient, safe and nutritious food, as well as food which meets any specific dietary needs and cultural preferences. It also means that foods are produced in a way which does not harm the people who grow the food or the environment, and that farmers receive adequate wages for their efforts. From this, we see that food security is an issue that we are already involved in, whenever we open the door to a grocery store in Burgeo, visit a food bank in Gander, or watch food being unloaded from a boat or plane in Nain. Food Security involves everyone - from the people who buy or eat the food, to grocery store owners, distributors, wholesalers, processors, farmers, fishers, agriculture planners

and people involved in emergency food programs, nutrition, public health, education, labour and government policy makers. It reflects issues such as income and the cost of housing, fuel, transportation and other expenditure which leaves less money for food. Even more overwhelming is the fact that most of the food we eat usually comes from outside the province, often from thousands of miles away and is managed by large corporations (Newfoundland and Labrador Department of Education, 2007, p. 139)

Students should also learn about economic relationships to food security and the relationship between poverty and food availability, propose environmental strategies to better manage natural food resources and to develop action plans to address these issues as a community (Newfoundland and Labrador Department of Education, 2007). Without a doubt, this unit is perfectly aligned with the framework of food science education outlined by this study and is definitely a step in the right direction, but it serves the research to denote that this is only one unit of an entire course. A course that most students will not take because it isn't mandatory and more often than not, those who will enroll in the program may not take it seriously as it is an elective and their level of success is inconsequential to subsequent schooling.

In spite of the researcher's lament that food science isn't more omnipresent in the already prescribed curriculum, it obviously is not the responsibility of all academic courses with an environmental or health component to address the issue of food sustainability. What is important to expose however is that while the topic is considered briefly in some unavoidable classes, the only course that has specific, in depth focus on food culture is an elective that most students going through high school will bypass altogether. Additively, while a scan through the curriculum documents shows the intention of school programming, it does not speak much to how this material manifests in classroom practice via educators or what students internalize from these lessons. In order to better

understand this translation of material, a variety of educators were asked about their understanding of food presence in Newfoundland and Labrador high school programming and what they felt students grasped about food security.

#### *4.2.2 Educators' Reckoning of Student Understanding of Food Science and Sustainability*

The first contact point of the curriculum within schools is the educator. Therefore, to get a more complex idea of food science education in high schools, looking to the teachers' and administrators' thoughts on food presence in the current Newfoundland and Labrador programming and how said programming is carried out and received by students is paramount.

In the educator focus group, teachers and administrators were asked about the availability of information on food sustainability in the local curriculum. Of the three administrators, two gave similar responses. "I have seen this [sustainability] in our functional and alternate curriculum areas, our biology classes and especially our nutrition classes" replied the first, while the second indicated the mention of sustainability in Environmental Science (the alternate/functional programming mentioned by the first) in regards to farming and fishing as well as its place in Healthy Living and Nutrition. It is worth reminding that none of the courses mentioned by these educators are mandatory for the academic high school program. The final principal, who was perfectly candid, replied with "I am not aware of this topic being covered in the curriculum. "

The teachers in the focus group had similar reactions to the latter administrator. Two of the teachers, both of whom have taught Science 1206, which as presented above is the only staunchly mandatory academic course with a sustainability component in its

syllabus, indicated that they didn't know where information on food security and culture may be found. One, a Biology and classroom support teacher said "the only place I see this in the curriculum is Nutrition," while the other, a Chemistry teacher indicated that "Chem 3202 currently has a "What Fuels You" food module with the Thermo unit, but this is about to be made an optional activity. Apart from the Nutrition course (which I have no idea about the curriculum outcomes), I have no idea where food sustainability may be taught." The last classroom educator in the focus group actually teaches Nutrition 3102. As the only participant actually teaching the only course with direct outcomes to food science, it is incredibly apropos with the research problem invoked in this study when a participant said "It is touched upon but certainly not as in depth as it should be....it is a topic that needs to be addressed."

Compounding the lack of educators' awareness of food science in school programming, and their concern that the topic is not given enough care and attention, is the fact that in this study, some teachers and administrators seemed to be conflicted about what the terms sustainability and food culture mean. One of the guiding questions of the educator focus group directly asked about their interpretation on student cognizance about sustainability as it relates to food culture. One of the administrators, who previously gave great insight into where sustainability can be found in the curriculum, went on to suggest that students may have misconceptions on the topic because they themselves felt food sustainability as it relates to food culture is open to interpretation. The vice principal seemed to be ambiguous on their own comprehension, pondering "do[es] the topic mean that in order to have good food options for the future that industries and farmers need to be more sustainable? Do[es] it mean that healthy and nutritious food options is something

that people need to attend to over a sustainable time frame (i.e. their lifetime)?" This particular administrator was also an Environmental Science and Earth Systems teacher in their career. Thus, it follows that their approach to sustainability concerns industry and resources, and that there is discordance between the study's proposed definition of food sustainability and the participants understanding of the concept. If the conduit between the curriculum and the pupils cannot pinpoint these ideas in the curriculum, or their own definition of what these concepts entail, the student body grasping them with any authenticity becomes more difficult.

As if to echo this sentiment, the rest of the educators in the study responded to the same question above harmoniously. Classroom teachers and administrators alike believed that most students had no knowledge of food security, culture, or sustainability. Their responses ranged from the subdued "I don't think they understand or even care"; to the comical "I even have a vegetable garden... and my children help me harvest. They don't care if the potatoes came from Dominion or if they dug them!"; to the merciless "food sustainability is not a priority at all for youth"; and somehow even more dire "They have no clue, I would say that the thought never crosses their minds. They of the generation where they take everything for granted." Educator disenchantment with the modern student aside, ideas on food science appear in the curriculum documents and it is evident that practicing teachers still do not feel as though students have any level of awareness on the issue. These grounds are given further validity by the student survey responses.

#### *4.2.3 Survey Results are in, Students Generalize Knowledge of Food Science and Security*

After the search through the curriculum documents was complete, the researcher administered a survey to seventy-one pupils. It is noteworthy that two of the classes were academic high school courses, a Chemistry and a Biology class, while the other was a Nutrition 3102 class. In this way, the study is further triangulated, getting a more broad and confirmable idea of high school students' consciousness of food culture and sustainability. A number of the questions administered adhered to a cold read of this consciousness, the first of which asking students whether or not they understood the term sustainability as it related to food. Of the group, 22.5% strongly agreed and 45.1% agreed that they had an understanding, but 7% were neutral, while 14.1% disagreed and 11.3% strongly disagreed that they understood sustainability through the lens of food. Another question in the survey asked students if they knew what food security meant. An alarming 22.5% of the participants disagreed and 12.7% of them strongly disagreed that they had any comprehension of this issue. Finally, when asked if their education has informed them about food sustainability practices and security, a staggering 25.4% disagreed and 31% strongly disagreed. These results essentially indicate that at least a third, if not closer to half of the student body represented in this study has some uncertainty about food science and culture by the time they have reached high school. These results follow suit with the woeful suspicions from the educators in their focus group responses above, in that it seems student comprehension of these concepts is absent. However, as condemning as these

survey responses may be, a focus group from each of the classes surveyed was conducted to get a more complex and detailed picture of students' perceptions of food sustainability.

#### *4.2.4 Through the Focus Group Vehicle, Students Define Sustainability and Food Security*

Student consciousness of the terms sustainability, security and culture as they relate to food were illuminated via the survey, but more depth of their perceptions was granted via the focus groups conducted at each school. Frankly, from the discomfort and shyness that the researcher felt in the room at the beginning of the group sessions, the answers that eventually surfaced were unsurprisingly homologous to the results of the student survey and educator focus groups.

In the student focus group, two questions asked revolved around the definition of sustainability and food security. The first of the questions requested students give ideas about what food security meant to them. As anticipated from above, students answered shortly and sweetly with a chorus of "absolutely nothing," "I don't know what it means," and most saliently "I don't think we ever learned about it." Once students became more comfortable and there was an ease of speaking on the topic, some made informed guesses at what food security means, citing "I think of like having food on the table every night... not going hungry." While this observation encapsulates a part of food security, it doesn't encompass the holistic definition of food science with reference to culture and sustainability adopted by this study.

Another precious insight came from the focus group conducted within the Nutrition 3102 class. These students, by the curriculum and the administrator's measure, should have the greatest grasp on food science as it is articulated in this research. While this did

prove to be true, there was still a certain unease, or “lock lipped” nature to the participants in answering this first rudimentary question. While this could have been because of the researcher as a new presence that they weren’t accustomed to, the quiet seemed more than that, it seemed stunted and searching. Eventually, the students warmed up and began to weigh in. Elaborating on the students from the science classes’ answers, one of the Nutrition students mentioned how they believed food security to mean “making sure there was no chemicals and stuff in your food... [and that] everyone has to get it [food].” Another of the students replied, “I guess it should be like a basic human right to have the access to the knowledge and equal amounts of the stuff so that you know what you are getting and you are getting good quantities and qualities of it.” Food safety and access are definitely parts of food security, but do not sum to its whole ideology. To probe deeper into student knowledge, the focus groups were asked to explain sustainability as it relates to food culture.

This second question elicited more thorough and succinct responses from the students. The energy in the rooms changed, and the participants seemed a little more at ease, with quite a bit more to say on this topic. Students brought up great points, such as “eating locally,” “eating less than you produce so you don’t end up eating more than you can produce in a given amount of time” and “Not having food run out so people go without food,” all of which apply to food sustainability. Participants even began to hint at food security and culture, a concept they never understood by name in the previous question or the survey. One of the participants understood sustainability as “growth of food that won’t damage the ecosystem in term and like green production of it and transportation of it so that it doesn’t need to be shipped in from halfway across the world” and another said “I

think about it sort of like the same way you think about sustainable resources where like you need to be able to use them but you also need to make sure you have them for the future.” Although these statements indicate that participant definitions of sustainability are somewhat developed, like in the curriculum documents and the educator focus group, students seem to be using their understanding of sustainability through natural resources as a guide to apply the concept to food science and culture.

From this portion of the pupil focus group, participants seem to have a base level understanding of sustainability as it pertains to food science, but they have a more difficult time assessing the concept of food security and culture. Their understanding of this concept, as defined by this study, is very rudimentary. These results from the student survey and focus groups considered, in addition to the school programming having little mandatory syllabus on these topics and the focus group of educators being unsure of the depth of school practices based on said syllabus an exploration of where students are currently finding their information about food is warranted.

### **4.3 Where High School Students are Learning about Food**

While students and educator participants mostly agreed that particulars about food science are sparse in current Newfoundland and Labrador high school programming, the pupil survey and focus group demonstrated that students seemed to have gathered some perception and ideas about food throughout their lives. These perceptions implore a clarification of where high schoolers are learning the little information, they do have about food culture and sustainability. Data collected suggest the following subdivisions:

- the school
- the media
- the home

#### *4.3.1 The School*

Students and teachers think some consciousness on food science is developed in schools. One of the teachers cited that “students enrolled in Food and Nutrition course will gain a lot of their information from there,” referring to Nutrition 3102 and an administrator noted “government... through schools... can be influential if done properly.” The latter answer is reminiscent of the lack of depth on the subject in high school programming previously mentioned in the teacher focus group. Some students in the focus groups also mentioned schools as a place where they learned about food, but from body language and reluctant tone, the shallowness suggested by teacher responses is confirmed. At one of the schools a student reported “the nutrition course [is] the only place I’ve heard some stuff about food” and at another school, participants echo these claims with “Nutrition class, I hadn’t really learned any until I took this class, besides maybe like grade 6, something

about how many portions of vegetables and grains you are supposed to eat in a day.” These comments reflect how little educators and pupils feel they encounter food information within the school curriculum, with the issue stemming previous to intermediate school, suggesting that what information they have absorbed thus far has come from other sources. The second most mentioned resource for knowledge on food practices was unsurprisingly, the media.

#### *4.3.2 The Media*

Both the student and teacher focus groups lean on television and the internet as one of main references of modern information on food science and culture. The student focus group, when asked where they found knowledge of food, answered without hesitation “the media,” “commercials,” “cooking shows.” Comparably, educators asked the same question answered with “many students have a keen interest in food, food science, nutrition and food preparation. With the internet at their fingertips... they often use that as a resource” and “make no mistake media plays a role, with marketing shoving certain products to our consciousness.” While these responses place media as one of the main reservoirs of food science intelligence, it is extrapolated via participant tone, subtext and candidness that to meet the standards of food sustainability and culture proposed by this research, the media is a less than reliable asset. More prominently mentioned than both the media and the school is the family as a resource of food information.

### 4.3.3 *The Home*

Throughout the focus groups conducted, the home and family became a staple reply to where students learned most of their understanding of food practices. Only some of the students suggested that they became more cognizant by their families' food choices and practices. Student answers were contrasted by educators, who largely agreed that the family was the most reliable source that students currently have for information on sustainability and nutrition. When asked where students learn most of their information about food, some teachers simply replied, "families at home." The other responses can be acutely summarized by the following excerpt from an administrator:

I think that families are the most influential factor in relation to food and nutrition for students. Students will strongly notice their parent's choices over food options, portions, treats, and even exercise. At a very young age students need to learn that proper nutrition is paramount, and the structure of the eating day needs to be set in stone.

While the excerpt is largely speaking to nutrition, one aspect of food science, and is partial truth, it is also placing heavy weight on the family as having the lion's share of the responsibility on disseminating information about food. As the researcher further probed about whether a strong food culture is best cultivated through the home, flaws in the family as a principal food educator were revealed.

The urgency to ask educators about the home as a primary establisher of food culture was encouraged by one of the student's reply to where they pick up most of their information about food science. The student asserted that they learned most from their "dietician, [because] my [their] mom never knew anything about it [food science]," the student was extremely ill, to the point of almost dying. They were of lower socio-economic status and had an untreated dietary illness as a younger teenager, which without medical

intervention would have been a severe problem. Although most educators felt as though the home is the best place to develop a strong food culture, deficiencies in this thinking started to be unveiled.

With good intention, educators suggested that “the majority of good food practices start from the home” and “the supper table is the one place we can be guaranteed to be together during the day, so it’s logical that the home is the place where a strong food culture is cultivated.” These statements were followed with “you can have the best teachers, social media ads, and community events, but nothing trumps the fact that homes need to be filled with good choices and proper meals need to be planned and arranged.” But that is exactly where this mindset starts to unravel, as the student above suggests, not every family has the ability to sit down together, or the education or finances to educate their children on food sustainability, make good food choices, prepare proper meals and develop healthy food culture.

Furthermore, even without these obstacles, other educators make remarkable points as to the home’s limitations in developing food culture. Most of the educators note that the idea of the nuclear family is changing, and that life is becoming more stressful and fast paced. One of the classroom teachers states that “mealtimes are often a rarity” and another responds that in turn “most parents when they come home are relying on quick fast prepared meals that can be easily and quickly supplied to the family.” They propose that families are “overly relying on fast food choices” and “less nutritious” foods and prepared meals. One of the administrators confirms this point, embellishing “eating habits are being cultivated at home but given the expense of fresh foods and the convenience of fast foods, I think that many families are overly relying on less nutritious foods.” All of these

sentiments make the case that while the family is a place where students learn food practices, neither access nor availability to the right foods and information are necessarily made possible by all families. These are two major postulates of food science and culture, as outlined by this study. The deficiencies of the school, the media and the home in food education are compounded by the lack of depth and clarity in school programming on food sustainability, propounding precarious implications on student food choices.

#### **4.4 Implications of Current Food Culture on Student Nutrition**

It was imperative to the research problem that the researcher sought to know how a student's education impacted their food choices, and if other factors that contribute to creating a sustainable food culture informed their eating. These factors informing student nutrition are:

- the school
- the season
- the local

##### *4.4.1 The School's Role in Student Food Choice*

Given the lack of attention and depth of material on food science in the curriculum as posited above, it is unsurprising adolescents claim that school rarely affects their food choice. In the student survey, 35.2% of students disagreed and 12.7% strongly disagreed that their schooling had any impact on their food choices. These numbers became actualized when the survey groups answered the one open-ended question on the survey concerning their most memorable food related moment from school. Some of the responses

given were comical, such as “eating pancakes with Santa,” or blue cafeteria hamburgers; some were about learning to make treats like pizza and cookies; and others came closer to the function of food science described in this study, reminiscing about learning Canada’s food guide in elementary school and how to spot ads that falsify the nutritional content of foods. At their most adjacent to the terms of this research, students mentioned taking Nutrition in high school, “learning about healthy food choices, Canada’s food guide and how to cook quick and healthy meals,” and talking about GMOs (genetically modified organisms), making them wonder about the composition of the food they are eating. A correlation can be inferred where student reports of food memories are linked to the Nutrition course mentioned above; Nutrition again, at the risk of being repetitive, is not a course that is mandatory for students. At least some students are absorbing food information from this course, but some will never take the course to absorb the material. So, if the school isn’t overly impacting most adolescents’ food choices, it is curious if they have any comprehension of how eating locally and seasonally can impact sustainability.

#### *4.4.2 Students are Not Fussed about Eating Seasonally*

An important postulate of sustainable food culture as developed in chapter two’s literature review is to eat seasonally, which goes hand in hand with eating locally as discussed in the next section. By the design of this research, eating seasonally in most basic terms means to eat food within the season it is produced. The survey results suggested that eating seasonally is not a consideration of adolescents, as 23.9% felt neutral, 18.3% disagreed and 12.7% strongly disagreed that the time of year influenced their food choices. Moreover, in the focus group, student participants mostly claimed they had heard of eating

locally, but they'd "never heard of eating seasonally, like [they've], tried to get certain fruits and they're out of season... but it's never been" a conscious effort to get those foods in season. If nothing else, without much consideration towards seasonal consumption, there is some awareness of eating locally in high schoolers.

#### *4.4.3 Location's Influence on Student Eating*

As described in the literature review in chapter two, eating locally is a pillar of food sustainability and security as it reduces the environmental damage caused by importation and has positive implications for local health. Students were first questioned about their awareness of local, sustainable food sources, to which 36.6% responded that they were completely unaware of them, and 33.8% claimed to be neutral in their awareness.

Exploring further, students were asked if they chose foods based on their local availability or production, to which 36.6% responded neutral, 18.3% disagreed and 9.9% strongly disagreed, a concerning amount of apathy through the framework of this study. In the focus group setting however, some students seemed to have a better grasp on the importance of consuming local food sources.

Predominantly, focus group students responded that they feel safer in eating local foods. They propose reasons such as the food being more fresh, having less pesticides and chemicals (a perception which is not necessarily a reality), a lack of importation and the importance of supporting local businesses as grounds for local food consumption. A participant claimed that eating locally is "more sustainable than getting food that can only be grown in tropical countries that gets shipped in and buying from like grocery stores that are more expensive and less sustainable and don't support your local economy," which

shows decidedly that students are making some connection between eating local and food sustainability even without an enriched high school curriculum. The adolescents are aware that “less shipping [means] less taxes; we [Newfoundland and Labrador] get everything shipped in, which makes the prices go higher” and more importantly that by eating locally “you lower [your] carbon footprint.” While most of the students spoke positively about choosing to eat local, there were murmurings of obstacles that prevent Newfoundland from converting to full local consumption.

While students in the survey made a case for indifference towards eating local foods, the focus groups saw the value of eating local, sustainable food sources, but claimed the task of getting a full spectrum of nutritious foods from provincial sources should be impossible. The pupils’ reasoning was that in certain Social Studies classes, they are taught that “Newfoundland is not made for farming.” One of the adolescents was more forthright, stating “It’s like perpetuated pretty much by the government in school that the soil is too trash to grow anything so then people aren’t interested in farming ... because they just assume that... it’s impossible.” Thankfully some of this cynicism is mitigated by the hope of some students that eating locally and sustainably is “probably easier than we think it is... it’s taught to us that it’s really hard, but I feel like that’s not true.”

It is challenging enough to know that the curriculum lacks depth in the field of food science and sustainability, this frustration is compounded when students in the study claimed that in spite of modern technology advancements and a plethora of untapped farmland resources, they are taught that the province’s soil is infertile, hence making local food production too difficult. These misconceptions perpetuated by schooling could be inhibiting the development of a strong food culture within the province and lead students

to believe that eating locally, and thus more sustainably are of little urgency. Food science and culture as framed by this study propose the contrary, and the comments from food professionals give even more credence to eating locally, sustainably and in a food secure manner.

#### **4.5 Professionals on the Public's Awareness of Food Science and Sustainability**

A crucial part of this study was to establish the current state of affairs of food science, sustainability and culture in Newfoundland and Labrador. The researcher felt that the best people to ask for an honest and accurate opinion of these circumstances would be food industry professionals. To help paint a diverse and complex vignette of modern food culture in the province, interviews were facilitated with several highly accoladed local chefs; a restaurateur and sommelier; a restaurateur who roasts fair trade, sustainable coffee; a butcher; and a professional forager and farmer. All interviewees were asked the same questions and their contributions to the study can be organized in the following categories:

- adequacy of public knowledge of food sustainability
- beliefs about what high schoolers should know concerning food science and culture and the importance of this comprehension
- how a culture can be created in the province that leads to food secure and sustainable consumption

#### *4.5.1 The Public is Largely in the Dark about Food Science and Sustainability*

The first question in the food professional interviews asked if experts felt that the public had an adequate understanding of food security and sustainability and what that understanding might be. All of the interviewees took pause before answering, with the exception of a couple who snickered. The pause was impregnated with frustration. It became quickly apparent that professionals felt the general public is largely unaware of food science and security. As discussed in the educator focus group, most of the expert interviewees reported that “the convenience of grocery stores and... accessibility... to vegetables that are just convenient to buy” have deadened Newfoundlanders’ attention to the consequences of importation on food sustainability and culture.

One of Newfoundland’s top exported chefs, now returned to the province and only serving food produced within it, shared:

I don’t think people do have a good understanding of it [sustainability and security], I don’t think they have it at all because we’ve become people expecting to eat whatever we want to eat whenever we want to eat it. So that means that food has to come from all over the world and that’s not sustainable in the world that we live in. I think that people’s desire for convenience is definitely knocking out their perception of what’s sustainable and what food you should be eating and when you should be eating it so I think that it’s not on people’s radar the average citizen where their food comes from and how they eat it and how it gets produced.

This pattern of uninformed eating and disparaging favor of convenience flies directly in the face of sustainability and it is alarming that experts feel it is the status quo for food consumers in the province. The chef’s opinion was reverberated by the sommelier and part owner of his restaurant. The restaurateur works closely with Food First NL and other organizations around Newfoundland and Labrador to help promote food security in the province. They claimed that Food First NL and other non-profits are promoting how

insecure Newfoundland's food supply really is, but the general public "is unaware of how risky our [the province's] habits are... [in that] our move away from rural agriculture has put ourselves as one of the riskiest places in the modern world for food security." He estimated that 20 or 25% Newfoundland's food was imported in the nineteen twenties, compared to today's astonishing figure of around 90%. Evidently, there is a disconnect from a not-so-distant past and a modern way of consuming on the island.

The discrepancy between the province's historical approach to food security and the modern trend towards importation is particularly disconcerting because a key cultural identifier in Newfoundland's heritage is the cod fishery. The butcher in the study nonchalantly responded, "obviously as Newfoundlanders we've seen first-hand what can happen through the cod industry." Sadly, given the research conducted, attention to these details about the cod stocks are not so obvious. Almost every food professional at some point in their interviews spoke of the cod moratorium, and how the public understood that fishing quotas had to be enforced in order to maintain the fish population. While this should be a perfect identifier of the importance of food security as a concept, modern lifestyles seem to distract consumers from making the connection between our history with the codfish and the issue of food sustainability within our home.

Other participants remind the researcher that this blind spot is not limited to the cod moratorium. Another highly acclaimed chef in the study stated that his grandparents' ethos for survival in a less modern landscape on the island was:

you go hunting, you shoot a moose, you fill your freezer, you jar [and] can it...then you have fishing season, you fill your freezer and you eat fish and you eat canned moose and you eat cellar vegetables ... and you make whatever you can out of it because that was you lived, that was just how you got through the winters.

Albeit, this was survival before grocery stores made their way into rural parts of Newfoundland, but it was also abiding to several postulates of food security and strong food culture. The local coffee roaster and restaurateur's response fell in line with these notions, saying that his grandfather "thinks it's insane to buy vegetables in the store... they grow in the ground... you just plant them in your backyard" and at age eighty five still hunts rabbit and fishes for trout. This participant, like their grandfather, also forages Newfoundland's landscape to help provide his restaurant with locally sourced ingredients but believes that "the last generation, like [his] parents' generation have tried to get away from [living off the land] as a matter of moving up in the world or having a higher social status..[they] didn't want to get their hands dirty... they wanted to go to university and... forgot those traditions."

Most professionals agree that a big part of Newfoundlanders' ignorance toward sustainable food culture stems from losing touch with their traditional way of living. One of the chefs made a salient point that the result of this ignorance is future generations of islanders simply not knowing that there is any other way to eat than through imported foods in grocery stores. For instance, this chef said that their restaurant "did the Harvest dinner out at Lester's and some people that came to that dinner were like I've never been to Lester's before, I didn't know you could buy veg[tables] here." Lester's is a fully developed farm local to St. John's that has been around for years, and still people have no idea that it is even a possibility to buy their products. Some of the experts interviewed generalized that all Newfoundlanders know is big brand super markets, and while one of the chefs said it, all participants agree that "we [Newfoundlanders and Labradoreans] forgot how to live off the land and no one is teaching the kids how, it's getting lost." Well

versed on the subjects of food security and culture, experts have many opinions on what students should learn to help reconnect old ways of living to the modern Newfoundland perspective.

#### *4.5.2 Expert Views on the Importance of Food Science Knowledge for Students*

The experts agreed that high school students in Newfoundland should “understand where their food comes from, how their food is processed, and the time that goes in[to]” preparing it. One of the chefs made direct reference to food culture as defined by this study in stressing the importance of “sitting down making a meal, enjoying it, and talking about whatever else happened that week or that day” for adolescents and their families. When asked what high school students should understand about food culture, another of the chefs, eyes wide and incredulous, bluntly retorted:

food is food man, it's like breathing, it's like air... we've turned it into this commodity... it's like it's the thing that keeps you ALIVE... it's what you need to survive and be healthy and thrive in the world, I think that's what people need to start appreciating and understanding more, it's a vital element to your survival on the planet ... we can have... fabulous dining experiences and all this kind of stuff but you have to understand how to cook, you have to be able to cook, you have to be able to cook for yourself it's a big breakdown in our society when people don't cook for themselves anymore, it's a human connection that's lost... and it has way more ramifications than people even appreciate

Professionals advocated that educating high schoolers on the basics of food science and culture is kindred to getting Newfoundland and Labrador back to the strong roots it once had in food security and sustainability.

This is so imperative because as the excerpt from the chef above broached, food extends past the roll of commodity and into other sectors of living, including health and employment in the province. Without grandeur, one of the chefs noted that “food is

everything, it's your health." There is an obvious connection between the Newfoundland population's current food culture and its higher rates of obesity and other food related illness. Local media is constantly reporting about heightened instances of heart disease and type two diabetes in NL. Experts feel as though a proper knowledge of food science could help instill healthier food culture in the province, therefore alleviating some of these problems.

It is also not shocking that professionals suggested that the younger population in Newfoundland is generally leaving the province for economic prosperity elsewhere. One of the chefs in the study said frankly that they think students "need to learn about sustainability and food security because... like our generation, we're starting to care, you know and we are being as local as we can and as small business as we can... but if the next generation doesn't [learn some of these skills] everything's going to go to shit and there's going to be nothing left on this island." This opinion that the health and the economy will continue to decline in the province was unanimous. Another of the chefs was similarly curt:

People are not going to try, they're not going to farm anymore... but with the livestock and the farming or everything in general, there's millions of things that come to put that together and if we don't focus on making this island work together and sustaining it, then it's all just going to go to shit and everyone' going to lose their jobs .

The shared vulgar language is hardly a signifier of undereducated participants, but it is certainly an urgent call to arms. The participants believe that if students were taught more about food security and sustainability, it would open up avenues for personal and provincial success.

The sommelier interviewee put these concepts in more succinct terms. They postulated that with the modern world came modern education and a shift away from an

agrarian society. Accordingly, they continued: “with higher education comes less hands on work [and] more people with university degrees is great but not from an agricultural standpoint because the youth are removed from the actual growing and the old guard of people that grow food are dying.” Therefore, this interviewee suggested that high schoolers should learn about agriculture and food science as a viable enterprise that is not just about money and “a way of life but... also something that is more than just a piece of pork on a Styrofoam tray at” a supermarket. Abiding the definitions put forth by this study, the sommelier proceeded “there needs to be a broader understanding of food culture [by students] from inception to plate; there needs to be a broader understanding of how that food is developed, processed and brought to you.”

While the hunch that enriching student understanding of food science in NL could have importance not only in schools but in the health care and economic industries is a nice one, it is little but a hunch unless there is planning in motion to improve the current culture. Thankfully, not to simply propose that students learn everything from the inception of a meal to its consumption and the culture and science behind it as a solution, food professionals provided ideas on instilling a stronger food culture within Newfoundland that could better promote security and sustainability in the future.

#### *4.5.3 Creating a Food Culture in Newfoundland and Labrador that promotes Food Security*

Professionals all agreed that creating a new food culture within the province would be hard, because as one of the participants recounted “you’re swimming upstream now in terms of the way the world’s going... I mean I think I was talking to a guy the other day [he said] it’s a statistic that people eat... 15% of the time in their car.” In the chef’s eyes, as

someone who feeds people daily and tries to create an experience for them, this estimate is a perfect example of the province having lost connection to the food we consume, a connection that we desperately need to get back. They continued by verbalizing that:

everyone in Newfoundland and Labrador likes to stick their flag in the ground and talk about you know we lost our fishery, we need to get it back, we're losing our culture we need to get it back... well it's the same thing with food... and being able to cook ... [it's] a basic life skill.

One of the restaurateurs divulged that to facilitate this connection, there needs to be more access to food science for the public in order to “create an excited young workforce.” They proposed that the amount of out-migration and apathy to the food industry as suggested in the previous section is preposterous when we have such a small population outweighed by such large expanse of land. To this participant, “that equals... the absolute potential to take that land and turn it into agriculture.” While the restaurateur spoke, their eyes were full of exigency, as if to respond to the school curriculum suggesting Newfoundland's soil as unfarmable, they said:

green housing is a necessary step that needs to happen. It's not even a question of how and when, it's a question of absolute necessity in order to turn the tide on our food security. Our seasons are growing longer... only from greenhouses. It's the... only way that we can ensure food stability, [by] an energized, youthful workforce that are excited about getting their hands into the dirt.

Continuing, they stated that government support through subsidies and interest free grants would be integral to see this sort of agriculture start up and succeed.

The rest of the interviewees in the study highly concurred that a young workforce which places importance on food sustainability and security, along with government support towards the use of our natural resources is critical in strengthening our food culture. The butcher in the study expanded this point to say that we can develop this culture “by having different working pieces... within the food community that are vocal,

knowledgeable and communicating with everyone... [The province] needs to... see the link between education and food and kitchen staff, culinary arts and where food is coming from farm wise." Like another participant said in regard to bringing this community together and getting a more secure food culture on its legs, "it's a lack of knowledge and it's an intimidation thing" that keeps people complacent and perpetuates current dangerous habits. Traditionally, a lack of knowledge can be solved through education, which is coincidentally what the other food experts suggested.

When asked how to create a culture in Newfoundland and Labrador that promotes food security and sustainable eating, the professional forager gave a very on the nose, one-line response, "start in the schools, start by teaching kids." The pastry chef concurred; the province can develop sustainable eating "by teaching the children." Another participant elaborated further:

I think you really have to start from the bottom up. So, starting kids early in the school is very important. It's one of these things like the more that you see a thing, the more you come to believe it, right? So, the more restaurants we have serving local foods, seasonal food, the more it's going to become part of the culture. When I came back to Newfoundland 6 or 7 years ago, this was hardly even in the public conscious and now it's like it's on the tip of everyone's tongue. Sustainable food, in season, was that harvested locally, was that animal killed in a natural environment? And that's not only good for the public culture in Newfoundland and for business but it's also great for nutrition. Local food is just simply better, fresher food is better.

Their methodology for bringing about a change in the island's food culture is hard to argue; by educating children in the current world climate, where other places even within our own country are realizing the importance of food security and sustainability, Newfoundland could stand a better chance.

One of the chefs recalled his own experience at school, saying that after a Home Economics class in grade seven and eight, local sustainability was not mentioned much.

Now, their son is in school and his school lunch is typically meatballs, rice and a vegetable. The chef posited the lunches are:

not horrible, but they're definitely not teaching anything about what they're eating... I definitely think junior high, high school, elementary school, it should be more taught and known about because that's how we reach everybody, we [people] don't get to go through life without going there.

Overwhelmingly, food professionals agreed that school is an impactful starting point to reformed food security in Newfoundland and Labrador.

#### **4.6 The Case for a Food Science Curriculum in Newfoundland**

If there was one thing unanimously agreed upon by the professional focus group, when it comes to injecting the Newfoundland and Labrador high school curriculum with a Food Science course, it "a hundred percent belongs there, without a doubt." With more families favoring convenience over food security as suggested by the educator focus group and the experts, and the students and educators suggesting that not every family has equal access to this information, it follows that the school could be a key role player in purveying information about food and sustainability. The research makes a case for a developed Food Science curriculum in the province through the following arguments:

- perceived deficiencies in the school's current influence on food culture
- perceived deficiencies in the home's influence on food culture
- perceived benefits of offering Food Science curriculum in schools

##### *4.6.1 Perceived Deficiencies in School's Current Influence on Food Culture*

As it stands, many of the interviews and focus groups noted the lack of foresight in food choices of adolescents at school. Students claimed that their peers were blissfully

unaware of the implications of food choices, bringing “a bag of chips for lunch and not something healthy.” They progressed with more dire reality that “lower income families can’t afford healthy food... which is why they are spending their money on” unhealthy canned food. To compound the problem, students reported that school cafeterias in the province don’t offer eating solutions that are any more cost or nutritionally beneficial. This sentiment echoes a sentiment brought up by one of the interviewed chefs who mentioned that school lunches were not terrible, but they still have a long way to go if the goal is instilling proper food culture.

The student interviewees claim the lack of this culture in schools is even further exacerbated by the Nutrition course, the one course whose syllabus boasts the vast majority of information on Food Science in the Newfoundland high school curriculum. The adolescent focus group put forth that while this course “does help a bit but it doesn’t get deep enough into it... what do people end up cooking in nutrition? Cookies... what does the cafeteria offer to eat, chips and cookies.” Students at another school noted “The healthiest thing we made in nutrition was like chicken goulash... it wasn’t even healthy.” In response, another student gave a timely reminder that Nutrition is the closest you would get to instruction on food security and sustainability and “not even everyone takes nutrition either, it’s an elective course... [and] if you don’t take it, then you just don’t get any of this.” Illustrating the futility of what could be a very valuable course in Nutrition, and the missed opportunities of the cafeteria and school food programs, the student, looking defeated, finished with in regard to creating sustainable food culture, “I feel like the school isn’t really that involved.”

One of the administrators in the educator focus group contested that while schools have their cafeteria services contracted out, the government provides guidelines to the companies for healthy food choices. They believed that healthy choices are built into the daily menus, but this comment and the observations of the student focus group suggest that they are simply that, choices. These healthy foods are interspersed with less nutritionally dense, less sustainable, and definitely not local choices. Through the responses in the student focus group, even with the Nutrition course in place, it's apparent that not all students are equipped to make the right choice. Finally, the administrator argued that schools "have limited influence on families and the foods they choose to buy and eat." While this is true, it neglects that even limited influence is paramount in some student's households.

#### *4.6.2 Perceived Deficiencies in the Home's Influence on Food Culture*

All of the participants in the focus groups and interviews mentioned that the home isn't always the best resource for information on food security. A significant number of the educators and the professionals postulated that families often favor convenience over nutrition and sustainable food sources. However, adolescents seem to believe that the issue is more rooted in a lack of education or expertise of their educators. A student in the focus group passionately interjected:

There's probably like more well educated people than your parents like I'm sure that all our parents know lots about it, but if someone is trained to teach people about it, obviously they're going to learn more... a lot of lower income households don't know a lot about that sort of thing, and they're not really concerned with it, which is totally fair, but if it was taught at school that could help with other societal problems

Students at other schools continued by noting that not all people have equal access to food information but just like the stipulations of food security, “everyone should have equal access” to education about these topics.

One high schooler felt that because everyone should have equal access to this information, that the government should not “put responsibility on households... to teach their children about food sustainability... when... the curriculum here does not cover it as much as you’d like to, it’s something that at least most people should be made aware of where it’s really important.” Concurring, another of the students in the study put forward that food science is “like sex ed where people [feel] that should be taught in the home, but there needs to be some covering of it in school because obviously not everybody can get that in their home.” This comparison is simple but effective, if the food culture in Newfoundland is to change, the population has to be reached and the school is one place where that can happen. Finally, as a more extreme example, the student with the food related illness mentioned above divulged that their family consisted of a single mother who doesn’t have a wealth of knowledge on nutrition or food science. When their mother is working, the student has to take care of meals for their family and without the support of a proper education on these concepts, felt like they are left struggling to offer the right care. With a considerable amount of frustration, the adolescent expressed “I shouldn’t have to struggle through this, I should know how to do this.”

These adolescents have made an appreciable point in that this misunderstanding of proper food culture can be a problem perpetuated instead of supported by the home. They propose that these misconceptions are not solely linked to socioeconomic status, but also more often than not, misinformed parents that lead their children into practices favoring

convenience that are less than ideal for provincial food security. Just as this study's definition of food science demands that everyone has equal access to food, students from all backgrounds need to have equal access to information that helps them make food secure and sustainable choices. A curriculum designed for Food Science administered within schools could prove to be an equalizer in Newfoundland and Labrador and help turn the tide on this critical issue.

#### *4.6.3 Perceived Benefits of Adding a Food Science Curriculum in Schools*

As all adolescents are required to attend school by law, it follows that the school is an excellent place to educate the public about food sustainability. Research in this study supported that equalizing public understanding of the importance of a healthy food culture to ensure food security is a strong perceived benefit of adding a Food Science curriculum to schools. An administrator in the study said that "courses in school and teachers can send important messages about food in general... especially about establishing food cultures that are sustainable." Similarly, when asked about additional information on sustainability belonging in the high school curriculum, one of the teachers in the educator focus group replied with certainty, "of course it does, because schools contain the most important stakeholders in our future: Our youth." This teacher implied that to ensure a prosperous future for the island, both economically through the agriculture industry as discussed by the professionals in the study and environmentally as implied by sustainability, students need to be educated about food science as they will one day be responsible through the changing of the guard.

In their focus group, students agreed with the educators, saying the school “has one of the biggest places in creating this food culture because out of all the places where a person... would go to learn, school is the biggest... even in comparison to their home life.” This adolescent is proposing that because school takes up the majority of a child’s life and has the most reach, in that all children must attend until a certain age, it is the best place to instill the kind of thought process that leads to food secure and sustainable behavior. In other words, students in the focus groups believed that having food science curriculum within schools would reach the largest audience possible for the longest period of time, likely raising awareness and achieving the benefit of a more sustainable food culture in Newfoundland. At another of the schools, a student confirmed this point by advocating that “kids are taught to trust authority and school is the number one authority for kids... seven hours a day.” The adolescent continued, with the current provincial curriculum condemning Newfoundland’s soil as unfarmable, it would do well to have food science curriculum in schools while minds are still malleable and impressionable to combat this stigma.

In the food expert interviews, one of the main perceived benefits of a Food Science curriculum in Newfoundland and Labrador was instilling a better food culture within NL, congruent with the findings in the educator and student focus groups. The sommelier interviewed considered the addition of such a syllabus as “the only way to make sure that students and young adults come out with at least a broad understanding of how food gets on their plate,” hence contributing to a safer food culture. At the most rudimentary level, the butcher suggested that “young people are the future and if they have the information in front of them... [they will] basically better” the conditions of food security in the province.

One of the chefs from the study elaborated on this, they felt as though the province has lost touch with its roots, and that “our young kids today have very little knowledge about food and how its grown... real food is so far removed from what people eat that kids just don’t know about it.” Evidently, by the terms proposed by this study, this is crippling to Newfoundland’s food culture. The chef went on to say that food sustainability is a very basic concept that was once necessary for survival but got tarnished by modern times changing people’s expectations of food availability. The participant continued by saying “food knowledge, about how to cook should be in school, kids need to know about food in a way that they don’t” and the benefit of having this syllabus in schools is bringing back that feeling that sustainability is necessary for survival at a time in our history when the dangers of a lack of food security are once again at a critical point.

Expanding on this chef’s points, one of the others in their interview encompassed this benefit of adding food science to provincial school programing in a quintessentially Newfoundland manner. When asked if information on sustainability as it relates to food belongs in the school curriculum, this chef replied:

you should know where your food comes from, not just through a flashy commercial or someone cool trying to sell you a brand name product...you should go to the farmers market and see the people that have the weathered hands who dug the carrots out of the ground, the potatoes, they’re nice, they’re happy, they’re cheerful, they usually always got a real good sweater on. But we have varieties and varieties of vegetables and they’re good and they’re not ripening on a boat coming across the ocean... you learned the history of everything in school, why not learn the history of your food and where it comes from... Everyone knows growing up in Newfoundland... your family hunted and they got moose and rabbits... but what about vegetables and... things like beef and pork and chickens and turkeys... you can get all that on the island... if your back is against the wall and there’s nothing coming to the island, can you sustain, would you know how to go fishing... or grow vegetables [and] not wait [until] avocados go on sale

In essence, the chef is outlining that allowing students to explore food within a school setting, and bringing them to see where their food comes from and what it costs to make it can go a long way towards changing the modern climate on food culture to one that adheres to secure, sustainable practices.

The coffee roaster submits that a Food Science curriculum in Newfoundland could have auxiliary benefits to a stronger food culture in the province. They indicated that such a curriculum is “a good thing for both public knowledge, health [and] outdoor activities” and more importantly, made the point that “students have trouble understanding the value of school [because] it doesn’t relate to their day to day life when they leave the classroom.” The coffee roaster is alluding to the fact that a Food Science curriculum could have benefits on the population’s health and also have the benefit of adding practical knowledge to school programming that adolescents will take with them through their lives. This is a considerable benefit and is confirmable. When asked if food science has a place in school programming during the student focus groups, one participant, visibly vexed, proclaimed:

personally I don’t think we need to have the same water cycle drilled into our head over the course of elementary school to high school, yet we don’t learn about things like food sustainability to the extent that we should so I think that [school] is the most important place for it to be taught.

Clearly, students in the focus group deemed some of the current school curriculum as repetitive and impractical in terms of future life skills and they crave that practicality. One of the chefs during their interview equated a Food Science curriculum in the province to learning important life skills. They stated “it’s understanding that [Food] is not just sustenance, it’s a practical way to apply “skills that have been learned in school, skills that permeate lifelong, everyday actions. To drive this benefit home, the chef went on to declare that “It’s the same thing as trying to teach someone I think how to do their taxes in high

school, there needs to be more practical information especially in a society that's moving more and more in the away of practicality." Therefore, a major perceived benefit of adding a Food Science curriculum in Newfoundland and Labrador is bringing more practical skills into the classroom that students will be able to apply to their lives after school ends.

Another benefit of bringing a Food Science curriculum to the province is that it has cross curricular appeal that could help students relate harder concepts in other courses to the more practical and life applicable knowledge they gain from such a program. The coffee roaster interviewee proposed food science as:

a natural extension of biology or even physical education... I feel like. You could teach food security in school and have an edible school yard and really get into the place of education, so much of our education system is without place, it could be taught anywhere exactly the same.

The roaster is implying that growing food, an exercise that could be a pillar of a food-based syllabus, is an opportunity to bring the classroom outside the school and have adolescents learn in the setting where the course material is happening. In this way, students have the opportunity to see plants growing and to see animals raised, both of which can be linked to high school biology courses. Coinciding with the coffee roaster, the sommelier in the study suggested that while a Food Science curriculum should include food security and have a benefit of propagating sustainability, this material:

doesn't need to be forced down people's throats, but it [would be] so easy to teach about agricultural areas, how much land it takes to produce x amount of x product...you can incorporate mathematics, you can incorporate different areas of curriculum into teaching food security, it doesn't need to just be let's talk about potatoes, its incorporating critical thought, incorporating mathematics, incorporating science, so it's a practical way to apply basic knowledge.

Just as proposed in the previous paragraph, participants feel as though practical skills learned in a Food Science course can be applied to help students use critical thinking to

relate and thus understand material in other high school courses. Two of the other chefs in their interviews gave a more concrete example of this in that their restaurant ferments fruits and pulp from juiced vegetables to make vinegars. This process is scientific and specifically chemistry in nature. The pastry chef deduced that a food science course, could “teach kids about food and sustainability and that [ the fermentation] could be a whole other part of it where you can use this stuff that is what's yucky” or considered waste and turn it into something completely new and useful. In this way, students have the ability to not only learn about low waste, sustainable practices but also relate the chemical process back to other school courses, practicality that is a huge benefit to a possible Food Science curriculum.

A final positive of introducing a Food Science course into the Newfoundland curriculum is more of a benefit by proxy. The pastry chef in the study made a note of how quick adolescents are to share their knowledge. They stated, “if you teach the kids and they’re really stoked on it, they’ll go home and tell their parents about it which might help educate an older generation.” In less colloquial terms, the chef is saying that getting students excited about cooking, eating sustainably and promoting food security could have an effect that trickles upwards. This excitement has the potential to adolescents scaffolding out their knowledge to parents, grandparents, family and friends, helping familiarize the general population with the importance of changing their ways and living in a more food secure lifestyle, thereby contributing to a healthier food culture. In this way, the study closes by return, coinciding with the first perceived benefit of a Food Science syllabus in Newfoundland and Labrador, ensuring provincial food security and a stronger food culture.

#### **4.7 Summary of The Results**

The results of this study suggest the importance of teaching food science in high schools in Newfoundland and Labrador. The comb of the curriculum documents illustrated that while information on sustainability and food security exists in the current provincial high school syllabus, the depth of coverage is minimal, often favors natural resources and forestry as opposed to food, and when the topic is approached in further depth, the course offered is not a mandatory one. The student surveys indicated that the understanding of food sustainability, food science, food culture and food security were minimal, and that students were not considering food choices based on the criteria of security and sustainability. While student and educator focus groups reported the Nutrition course as one that contained information on food science, they criticized the breadth of material offered through the syllabus and more importantly how that translated into classroom practice. The educator focus group made the case that ultimately food choices and food culture were developed through the home, as the majority of an adolescent's day is spent there. However, students, administrators and teachers in the focus group also discussed that in addition to modern trends of people favoring convenience over nutrition, some families are not equipped with the knowledge or finance to develop a healthy food culture within the home. These home issues are given confirmability through the food expert focus group who feel that the general public is considerably unaware of the food security and sustainability crisis the world and Newfoundland and Labrador more specifically is starting to face.

Luckily, the student focus group insinuated that some young people are not completely unaware of the importance of food sustainability. When asked, several of the

pupils in the study were able to give working definitions of food security. The expert interviews proposed that adolescents should at least know where their food comes from, how it is processed, how to prepare it and how to keep their eating habits sustainable. In addition, food experts made the point that this process could be supplemented by reminders of the implications of food choices on the healthcare system. The professionals also suggested teaching students about careers in food, like agriculture, which adolescents in their focus groups reported is frowned upon in their current schooling, as some courses perpetuate that Newfoundland's soil is impossible to cultivate. All focus groups and interviews converged to theorize that a stand-alone Food Science curriculum could be beneficial in both adding practicality to the current high school syllabus and instilling a healthier, more sustainable food culture in the province.

## **Chapter 5: Conclusions**

### **5.1 Introduction**

The results of this study led the researcher to several conclusions about the current state of food science and food culture within Newfoundland and Labrador's school system. From these conclusions, implications were developed giving importance to the research. Finally, these implications present several avenues for future research surrounding Food Science curriculum in the province.

### **5.2 Conclusions Drawn from the Study**

The study determined overwhelmingly that these students, educators and food professionals believe there is a place for Food Science in the Newfoundland and Labrador high school curriculum. The current high school syllabus, students and educators all demonstrated a lack of depth in the school's treatment of food security, sustainability and culture. Students and educators also suggested that the home may be even less well informed when it comes to making secure food choices and developing strong food culture. The result of this lack of breadth of food science in current schooling and home life seems to be Newfoundlanders who are ill advised and uninformed in secure and sustainable eating. Additionally, because of the lack of information on food science in the current school programming, professionals and students suggest that it is hampering students' interest in pursuing careers in the food production industry. Considering the current state of food culture on the island, food industry professionals made comments on how to strengthen this culture and food security going forward. Finally, a case was made for the

importance of adding a Food Science curriculum to Newfoundland and Labrador's high school program.

### *5.2.1 Lack of Food Science Depth in the Current Newfoundland Curriculum*

Upon a comb of the current Newfoundland and Labrador Department of Education mandated high school syllabus, the treatment of food sustainability, security and culture was lacking. Some courses offered material relating to sustainability, though it was mostly allocated to discussing the concept as it relates to forestry and natural resources. While the cod moratorium was raised as a talking point in one of the mandatory courses containing discussion on sustainability, it was one talking point, in one objective, in one lesson that is considered for one class of an entire unit of Science 1206. While this course is mandatory, so all academic students will enroll, unfortunately the coverage on food security is minimal. On the other end of the scale, the high school programming boasts Nutrition 3102, a one credit course that boasts an entire unit of coverage on the topic of food security and sustainability, but sadly this course is an elective and most students do not have to take it.

The reality of food science presence in the local curriculum was further solidified via the student survey and focus group interviews with students and teachers. The survey results made it clear that an alarming number of students had either a neutral comprehension, or no comprehension at all of terms like sustainability and food security and even more concerning, that over 75% of students in the study felt as though their education had not informed them of food sustainable or secure practices.

The results of this survey are unsurprising when coupled with the educators' focus group responses on the current state of food science in the Newfoundland curriculum.

Some of the administrators were able to pinpoint places that topics like sustainability and food security appeared in the functional curriculum and in the nutrition course. Conversely, other teachers and administrators felt as though while information about food shows up momentarily in some of the science courses offered, it is largely absent from the academic, mandatory program. Furthermore, regardless of whether the educators agreed about the presence of food science in the current syllabus, they all believed that the average student had little to no comprehension of sustainability or what a secure food culture entailed.

The student focus group shed more light on adolescents' current understanding of food science from their schooling. When asked to give a definition of food security, most students were hesitant to answer and looked challenged by the question, but eventually some managed to pull together a relatively honest and abiding definition to the one presented by this study. When further probed to explain sustainability as it related to food culture, participants had less difficulty formulating an opinion. They believed it to mean that food was grown and consumed in such a way that it had minimal impact on the ecosystem and allowed for long term replenishment of stocks. However, just as in the provincial curriculum, there is a lack of depth in this understanding as it didn't fully envelop the definition of food sustainability and security adopted by this study. Evidently, through the syllabus document scan, the educator focus group and the student surveys and focus groups, the study presents a perceived deficiency of information related to food science and culture in the current Newfoundland and Labrador high school program.

### *5.2.2 The Home and the Media are No Better Help in Instilling Strong Food Culture*

After analyzing high school students' comprehension of food sustainability and security from their schooling and discovering a surface level treatment of the material, the study sought to determine where most of their information about food was coming from. Almost 48% of the adolescents in the survey portion of the data contributed that their education had no impact on their food choices. It is worth noting that 18.3% of students in the survey felt neutral about their education impacting their food choice. This discrepancy lends even further insight because of the three classes surveyed, one was a Nutrition class, the course with the most syllabus outcomes surrounding food security and healthy food culture.

In alignment with these numbers, most educators in their focus group reported that the school has little influence over student food choice, even though a couple of the administrators in the study believed, contrary to the reports of the student survey, that the Nutrition course offers guidance. Educators did agree however that the media had a role in adolescent eating behaviors, but not necessarily a positive one, as one teacher mentioned that marketing is aggressively shoving certain products into their conscious. They felt as though commercials and cooking television shows, in conjunction with the internet are all influences on student food choice. The student focus groups were in agreement with the educators, citing the media as a major contributor to their food knowledge.

Finally, both students and educators cited the family as the biggest influence over student food choice. Some students noted the family as an influence over their eating habits. Conversely, educators place heavy credence on the family and their eating lifestyle

as having the most impact on an adolescent's food culture, as educators felt as though most of an adolescent's time is spent in the home. However, some of the educators were quick to remind the others that we are living in a world of convenience, and oftentimes families are making choices that are less nutritious and sustainable in order to feed a family and keep up with a more fast paced, modern lifestyle. Additionally, educators and students in the focus groups agreed that not all families have the same access to information regarding healthy food culture and sustainable food practice. Whether it be because of lower socioeconomic status or simply a lack of education in the parents' generation, the research results show that not all families in Newfoundland and Labrador are equipped to inform adolescents on food secure and sustainable praxis.

### *5.2.3 The Result? Students Aren't Making Food Secure Choices*

Although most students have heard of eating locally, the student survey and focus groups suggested that eating seasonally was a concept they hadn't heard of, much less adhered to. In the survey, 31% of students disagreed or strongly disagreed that the time of year influenced their eating behavior, and almost 24% felt neutral. The focus group lent deeper insight into these patterns, where students claimed they had never heard of eating seasonally.

The student survey responses didn't bode much better for adolescents considering local food sources. Over a third of pupils in the survey claimed to be completely unaware of local food sources and 28.2% disagreed or strongly disagreed that they chose food to eat based on its local production. Contrasting these numbers, students that volunteered for the focus groups replied that they feel safer eating local foods. These adolescents believed that

local foods are more fresh, less treated with chemicals and leave less of a carbon footprint than foods imported from elsewhere. These deductions are salient because they make a case that students are acquiring some understanding of sustainability and food security from somewhere, even if it isn't the school or the family. Yet, as encouraging as these responses are, it was equally disappointing that more than one adolescent in the study reported that they had been taught Newfoundland's soil is infertile. Thus, because of this perceived soil infertility, students have been led to believe that it is almost impossible to grow food here, and therefore the majority seem to believe eating locally and sustainably is almost impossible. In other words, eating seasonally and locally, or in a food secure manner is not currently a priority for high school students in Newfoundland and Labrador.

#### *5.2.4 Food Professionals Weigh in On Current Newfoundland and Labrador Food Culture*

Food experts interviewed in the study felt as though the population of Newfoundland and Labrador is currently generally unaware of what it takes to build a healthy food culture within the province and live in a sustainable manner. They commented, in agreement with the educators in the study, that most Newfoundlanders have fallen prey to the convenience of grocery stores and accessibility to imported foods over their past habits, where hunting, fishing, farming and foraging were the principal means of sustenance. Chefs feel as though the general way of the westernized world is that we expect to eat whatever we want, whenever we want and that these practices are simply not sustainable. Moreover, the food professionals don't believe that where food comes from or how it's produced is even remotely on the average Newfoundlander's radar. Some of the interviewees plead ignorance, suggesting that Newfoundlanders are not even aware of the

availability of locally produced food for consumption. Even more discouragingly, food experts estimate that NL's general population has no idea how severe the province's habits are in terms of food security. It bears repeating, the sommelier and restaurateur in the study gravely responded: "our move away from rural agriculture has put ourselves as one of the riskiest places in the modern world for food security."

#### *5.2.5 The Case for adding Food Science to Newfoundland's High School Curriculum*

As determined by the scan of curriculum documents, student surveys and focus groups, and educator focus groups, the current Newfoundland and Labrador high school syllabus leaves a lot of stones unturned when it comes to food security, sustainability and culture education. While the Nutrition course exists and contains some of this information, it not a mandatory course, thus most students bypass it going through school. Also, in the student focus group, students made the case that often teacher practices in the Nutrition course do not reflect the curriculum provided. The participants claimed that most of the food they made, such as cookies or goulash, was neither healthy, nor sustainable. Between the food choices provided by schools in cafeteria programs being perceived as less than healthy and sustainable by students, and said students contending that the school has very little impact on their food choices anyway, this study finds the school's current role in creating a strong food culture within the province falling short. This issue of not developing a healthy and secure food culture within the province is exacerbated by the fact that some homes are not necessarily qualified to teach their children about the importance of eating sustainably. Therefore, unless students are keen on the subject and using media

and the internet to find information about food security and sustainability, they are largely uninformed on the urgency of these issues.

This deficiency in the education of Newfoundlanders is having a trickle-down effect. With the want for awareness of food science in the high school syllabus, adolescents are largely unaware of the possibilities of careers in food and food production. The island has shifted away from its past, agrarian ways, in no small part because of a shift towards modern education, but also because as students suggest, the current curriculum tells them that Newfoundland and Labrador has poor soil quality, short growing seasons and is thusly unfarmable. However, food professionals in the research suggest that with modern technology and greenhouses, farming our land is not only possible, but becoming of paramount importance for NL's food culture and security.

Students, educators and food professionals agree that there is room for a dedicated Food Science curriculum in Newfoundland and Labrador high schools. Educators in their focus groups noted that children are the future of the province, so in order to instill a healthy food culture on the island, all bets are on it starting with educating them on food security. Substantiating these findings, the student focus groups mentioned that material on sustainability absolutely belongs in the syllabus because other than their homes, that's where people growing up in the province will spend the majority of their time. When one considers that not all homes are equal in knowledge about food secure eating habits, the school can be a great equalizer in educating the public for future prosperity.

Correspondingly, the food professional interviews support these claims, asserting that having access to food science material in schools will help strengthen the possibility that

young adult Newfoundlanders and Labradoreans develop an understanding and appreciation of how food gets on their plate.

Results from the study also suggest benefits of a Food Science curriculum that are auxiliary to creating a healthier food culture within Newfoundland. Firstly, food experts suggested the obvious possible benefits to the public's health within the province and the potential that proper education has to reduce the strain on its healthcare system. Secondly, both students and the professionals propose the benefits of adding a more practical course to the high school syllabus. The expert interviews likened a Food Science course to teaching adolescents how to do their taxes. It's not just about teaching young adults how to cook, its teaching them that the land is farmable, and they can become a farmer, or that they can take skills learned in high school and pursue a career as a chef, restaurateur or food scientist. These practical skills can be used to spark an interest in the province's previous ways of life, contributing to both a healthier food culture and food security for the island. Furthermore, professionals and students mentioned the advantage of placing practical knowledge in a syllabus full of academia. They suggested a program like Food Science could allow students to relate the skills they've learned in a more hands on course to more difficult concepts in academic centric classes. In this way, students can employ critical thinking and problem-solving skills learned in Food Science classes to help them understand Math or Chemistry courses. A final supplementary positive of adding such a curriculum to the Newfoundland and Labrador high school system is that when students become invested in something they learn; they have a tendency to spread that information to others. Two of the chefs interviewed put forth that if you teach a student something that excites them, they may very well go home and share that knowledge with their family.

Considering that experts suggest most of the current population is in the dark about issues like food security and sustainability, this potential upstream flow of knowledge to parents and guardians is crucial to reaching all Newfoundlanders on a problem of acute urgency.

### **5.3 Importance and Implications of the Study**

Research of this type is vital to creating a sustainable, secure food culture in Newfoundland and Labrador. It is evident that food security is a growing global concern, but with the health and dietary issues facing the province, along with the carbon footprint associated with importing the majority of our food, development of a better food culture has reached a critical point on the island. One of the experts interviewed estimated that upwards of 90% of the province's food is currently imported from elsewhere, creating a severe carbon footprint. While more positively, importing food provides year-round access to a variety of different fruits and vegetables that are harder to cultivate in NL, the expert claimed that in the past, as low as 20% of food was imported and sustained the population. This reported discrepancy is a chilling supposition that has severe implications on not only a provincial, but global level.

The findings of this study illuminate that there is a place for a dedicated Food Science curriculum within high schools in the province. Not only would such a curriculum add more practical, hand-on type teaching and learning to school programs, but it would open the doors towards a more sustainable food industry and make better use of an island whose population continues to leave in search of a more economically sound lifestyle. If adolescents learned how to properly use the land we have in abundance, there is a potential of creating more jobs in the province.

Finally, and most importantly, by enriching a curriculum that these students, educators and food experts agree is lacking breadth of information on food sustainability, with a more informative Food Science program, the province has the opportunity of educating people about the gravity of improving our current food culture and security on the island. An opportunity that we must embrace for the successful future of Newfoundland and Labrador.

#### **5.4 Avenues for Future Research**

As the world catapults towards a global food and climate crisis, there needs to be further exploration of how to teach children how to treat the planet with respect and start reversing the effects of the abuse it has suffered. This study determined in broad strokes that a Food Science curriculum could be beneficial to Newfoundland, but ensuing research could implore to determine how a more defined, global food science curriculum in schools could impact these problematic issues. Furthermore, on a smaller scale for later avenues, while this study determined that adding such a syllabus to Newfoundland and Labrador high schools would be beneficial to food culture on the island, it did not explore what that programming would look like in reality. Future research could revolve around the kinds of materials that would be included in programming, such as agricultural knowledge, culinary skills and food chemistry and biology.

## References

- Alsaffar, A. A. (2016). Sustainable diets: the interaction between food industry, nutrition, health and the environment. *Food Science And Technology International*, 22(2), 102-111.
- Bach-Faig, A., Berry E.M., Lairon, D., Reguant, J., Trichopoulou, A., Dernini, S., et al. (2011). Mediterranean diet pyramid today. Science and cultural updates. *Public Health Nutrition* 14(12A): 2274–2284.
- Berg, B. (2004). *Qualitative Research Methods*. Fifth edition. Long Beach, CA: Allyn & Bacon.
- Bogdan, R. & Biklen, S. (1998). *Qualitative research in education: An introduction to theory and methods*. Third edition. Boston: Allyn & Bacon.
- Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative research for education: An introduction to theories and methods*. Fifth edition. Boston: Pearson.
- Bonnekessen, B. (2010). Food is good to teach. An exploration of the cultural meanings of food. *Food, Culture & Society*, 13(2), 279-295.
- Burlingame, B., and Dernini, S. (2011). Sustainable diets: The Mediterranean diet as an example. *Public Health Nutrition* 14: 2285–2287.
- Burlingame, B., Dernini, S. (2012). *Sustainable diets and biodiversity: Directions and solutions for policy, research and action*. Rome: FAO; Bioversity International.
- Buttriss, J. L. (2011). Feeding the planet: an unprecedented confluence of pressures anticipated. *Nutrition Bulletin*, 36(2), 235-241
- Carraway-Stage, V., Hovland, J., Showers, C., Díaz, S., & Duffrin, M. W. (2015). Food-Based Science Curriculum Yields Gains in Nutrition Knowledge. *Journal Of School Health*, 85(4), 231-240.
- Check, J. & Schutt, R. K. (2015). *Research methods in education*. Los Angeles: Sage.
- Chew, S. L. (2014). Food Science Education and the Cognitive Science of Learning. *Journal Of Food Science Education*, 13(4), 65-67.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education: The nature of inquiry- setting the field* (6<sup>th</sup> ed.). New York, NY: Routledge Press.
- Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.

- Creswell, J. W. (2015). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5<sup>th</sup> ed.). Boston, Ma: Pearson, Merrill, Prentice Hall.
- Doyle, C. (2016). *Qualitative research methods: course notes*.
- Eisner, E. (1998). *The enlightened eye: Qualitative inquiry and the enhancement of educational practice*. New Jersey: Prentice-Hall.
- FAO Committee on World Food Security. Coming to terms with terminology: Food security, nutrition security, food security and nutrition, food and nutrition security. Rome, Italy: Food and Agriculture Organization; 2012. Available at: [http://www.fao.org/fsnforum/sites/default/files/file/Terminology/MD776\(CFS\\_\\_Coming\\_to\\_terms\\_with\\_Terminology\).pdf](http://www.fao.org/fsnforum/sites/default/files/file/Terminology/MD776(CFS__Coming_to_terms_with_Terminology).pdf). Accessed July 19, 2016.
- Gamboni, M., Carimi, F., and Migliorini, P. (2012). Mediterranean diet: An integrated view. In: *Burlingame B and Dernini S (eds) Sustainable Diets and Biodiversity- Directions, Solutions for Policy, Research and Action*. Rome: FAO, pp. 262–272.
- Iannetta, M., Colucci, F., Presenti, O., and Vitali, F. (2012). Food and energy: A sustainable approach. In: *Burlingame B and Dernini S (eds) Sustainable Diets and Biodiversity- Directions, Solutions for Policy, Research and Action*. Rome: FAO, pp. 274–279.
- IFT Institute of Food Technologists. About food science and technology. Chicago, IL. (2016). Available at: <http://www.ift.org/knowledge-center/learn-about-food-science/food-facts/about-fs-and-t.aspx>. Accessed July 21, 2016.
- Kemp, K., Inch, A., Holdsworth, D.K., and Knight, J.G. (2010). Food miles: Do UK consumers actually care? *Food Policy* 35(6): 504–513.
- LeCompte, M. & Preissle, J. (1993). *Ethnography and qualitative design in educational research*. Second edition. San Diego: Academic Press.
- Lee, W., and Okos, M.R. (2011). Sustainable food processing systems - Path to a zero discharge: Reduction of water, waste and energy. *Procedia Food Science* 1: 1768–1777.
- Lincoln, Y & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage
- Marshall, C. & Rossman, G. (2006). *Designing qualitative research*. Fourth edition. Thousand Oaks: SAGE Publications.
- Merriam, S. B (2009). *Qualitative research: A guide to design and implementation*. Hoboken, NJ: John Wiley and Sons.
- McMillian, J. (2016). *Fundamentals of educational research*. Boston: Pearson.

- McMillan, J. & Wergin, J. (2002). *Understanding and evaluating educational research*. New Jersey: Merrill Prentice Hall
- Miles, D. T., & Borchardt, A. C. (2014). Laboratory Development and Lecture Renovation for a Science of Food and Cooking Course. *Journal Of Chemical Education*, 91(10), 1637-1642.
- Newfoundland and Labrador Department of Education. (2002). *The Newfoundland and Labrador curriculum: Healthy Living 1200*. Retrieved From: [https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/physed/healthyliving/SectionIII\(b\).PDF](https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/physed/healthyliving/SectionIII(b).PDF)
- Newfoundland and Labrador Department of Education. (2007). *The Newfoundland and Labrador curriculum: Nutrition 2102/3102*. Retrieved From: <https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/familystudies/nutrition/Nutrition%202102%20-%203102.pdf>
- Newfoundland and Labrador Department of Education. (2010). *The Newfoundland and Labrador curriculum: Newfoundland Studies 2205*. Retrieved From: [https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/socialstudies/NL%20Studies%202205%20CG%20\(August%202010\).pdf](https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/socialstudies/NL%20Studies%202205%20CG%20(August%202010).pdf)
- Newfoundland and Labrador Department of Education. (2011). *The Newfoundland and Labrador curriculum: Physical Education 2100/2101* . Retrieved From: [https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/physed/2100-2101/section2\\_curriculum\\_outcomes.pdf](https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/physed/2100-2101/section2_curriculum_outcomes.pdf)
- Newfoundland and Labrador Department of Education. (2012). *The Newfoundland and Labrador curriculum: Physical Education 3100/3101* . Retrieved From: [https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/physed/3100-3101/section\\_2\\_curriculum\\_outcomes.pdf](https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/physed/3100-3101/section_2_curriculum_outcomes.pdf)
- Newfoundland and Labrador Department of Education. (2017). *The Newfoundland and Labrador curriculum: Earth Systems 3209*. Retrieved From: [https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/science/es3209/ES\\_3209\\_Unit\\_5.pdf](https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/science/es3209/ES_3209_Unit_5.pdf)
- Newfoundland and Labrador Department of Education. (2017). *The Newfoundland and Labrador curriculum: Science 1206*. Retrieved From: [https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/science/Science\\_1206\\_Curriculum\\_Guide\\_2017](https://www.ed.gov.nl.ca/edu/k12/curriculum/guides/science/Science_1206_Curriculum_Guide_2017)
- Noack, A. L., & Pouw, N. M. (2015). A blind spot in food and nutrition security: where culture and social change shape the local food plate. *Agriculture And Human Values*, 32(2), 169-182.

- Olmez, H. (2014). Water consumption, re-use and reduction strategies in food processing. In: *Tiwari BK, Norton T and Holden NM (eds) Sustainable Food Processing*. Oxford: John Wiley and Sons Ltd, pp. 401–434.
- O'Toole, J. & Beckett, D. (2010). *Educational research: Creative thinking and doing*. Victoria: Oxford University Press.
- Padilla, M., Capone, R., and Palma, G. (2012). Sustainability of the food chain from field to plate: The case of Mediterranean diet. In: *Burlingame B and Dernini S (eds) Sustainable Diets and Biodiversity- Directions, Solutions for Policy, Research and Action*. Rome: FAO
- Roy, P., Orikasa, T., Nakamura, N., and Shiina, T. (2014) Environmental sustainability in food processing. In: *Tiwari BK, Norton T and Holden NM (eds) Sustainable Food Processing*, Oxford: John Wiley and Sons Ltd, pp. 39–62
- Sandell, M. E., Ojansivu, P., Hoppu, U., Hillgrén, A., Mikkelsen, B., Lyytikäinen, A., & Lagström, H. (2016). Future for food education of children. *Futures*, 83, 15-23.
- Scott, D. and R. Usher. (2011). *Researching education*. London: Continuum.
- Scrob, M. L. (2016). Does an early socialization into a food culture condition lifelong food preferences? Evidence from a retrospective study. *Appetite*, 10195-103.
- Shank, G. (2002). *Qualitative research: A personal skills approach*. Upper Saddle River, NJ: Merrill Prentice Hall.
- Slater, J. (2013). Is cooking dead? The state of home economics food and nutrition education in a Canadian province. *International Journal Of Consumer Studies*, 37(6), 617-624.
- Slater, J., & Yeudall, F. (2015). Sustainable livelihoods for food and nutrition security in Canada: a conceptual framework for public health research, policy, and practice. *Journal Of Hunger & Environmental Nutrition*, 10(1), 1-21.
- Stake, R. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Suter, W. N. (2015). *Introduction to educational research: A critical thinking approach*. Los Angeles: Sage.
- Taylor, S. & Bogdan, R. (1998). *Introduction to qualitative research*. New York: John Wiley
- Tite, R. (2016). Education 6466: Qualitative Research Methods. Memorial University of Newfoundland, Online notes.

Tiwari, B.K., Norton, T., and Holden, N.M. (2013) *Sustainable Food Processing*. Oxford: John Wiley and Sons Ltd.

Wang, L. (2014). Energy consumption and reduction strategies in food processing. In: *Tiwari BK, Norton T and Holden NM (eds) Sustainable Food Processing*. Oxford: John Wiley and Sons Ltd, pp. 377–400.

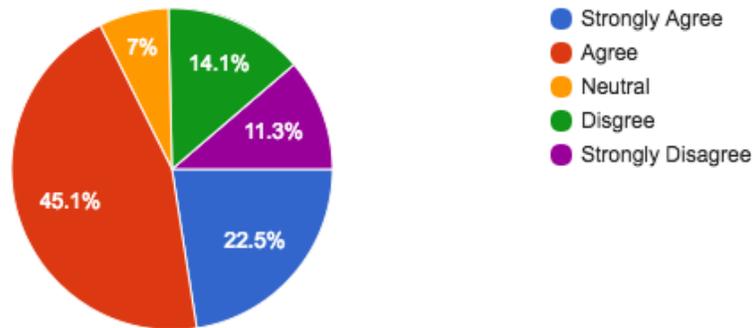
Willis, J. J. (2007). *Foundations of qualitative research: interpretive and critical approaches*. London: Sage Publications.

Wilson, E. (Ed). (2013). *School-based research*. London: Sage Publications.

## Appendix A: Student Survey Responses

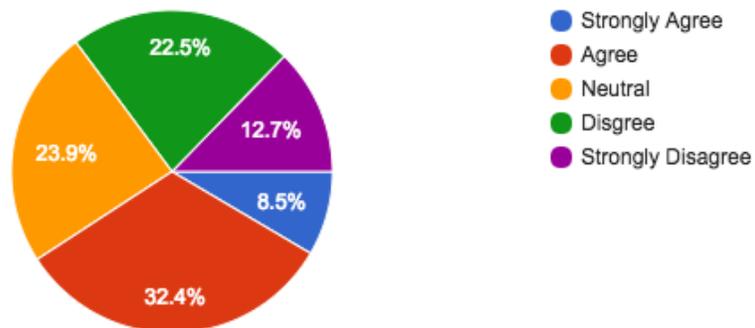
I have an understanding of what the word sustainable means as it relates to food:

71 responses



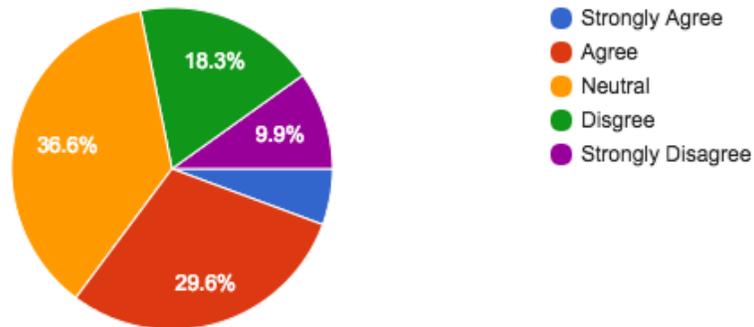
I have an understanding of what the phrase food security means:

71 responses



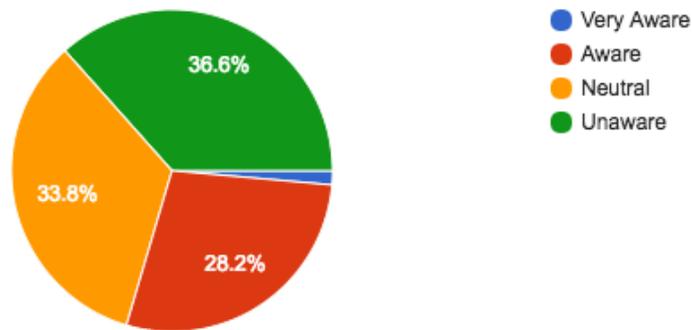
### Do you select foods based on their local availability?

71 responses



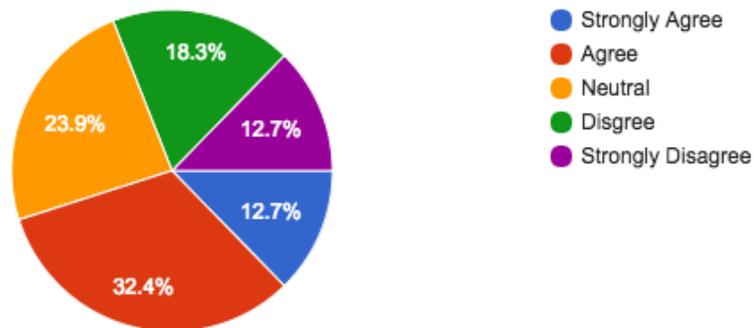
### What is your awareness of local, sustainable food sources?

71 responses



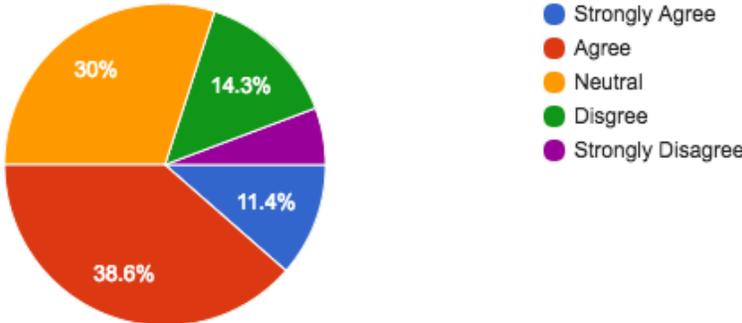
### Does the time of year influence your food choices?

71 responses



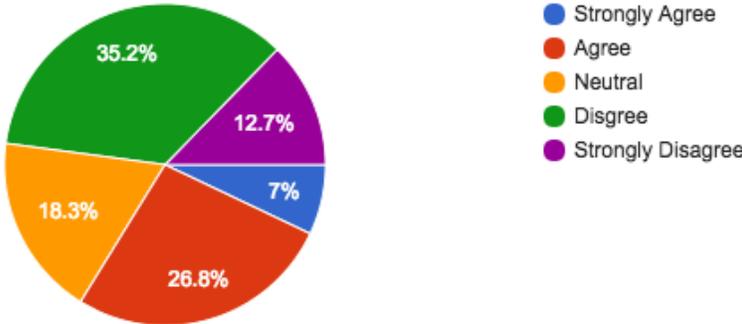
### Do you feel as though you eat in a health conscious matter?

70 responses



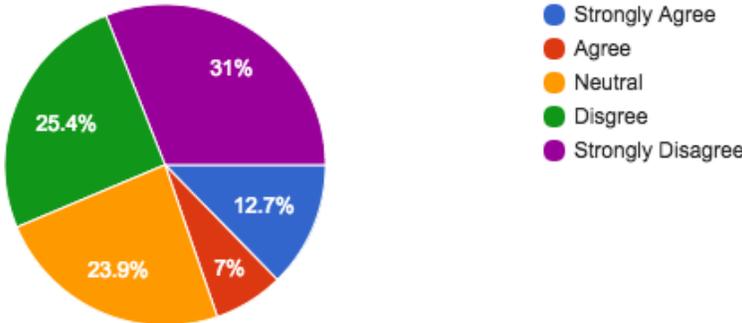
### Does your education influence your food choices?

71 responses



### Has your education informed you about food sustainability practices and security?

71 responses



## Describe the most memorable moment in your education that pertains to food.66 responses

Learning about how to cook and produce (4)

nutrition class (2)

cant remember (2)

GMO video made me think about what are in the foods i eat

Learning about different food related illnesses.

Making cookies

When I was in grade 10 I had a music teacher that was really into growing all of her own food. She only ever had me in class when she was subbing for my History teacher, but I liked it alot and proceeded to do it as well. It is because of this that I think growing your own food is so important.

making cookies in nutrition

cooking in junior high home ec class

The GMO video we watched made me wonder whats really in the food we eat, where before I never put any thought into what im eating

Neutral

Ads that fake the way we see our food

Lunch

Cooking actual food by following instructions

we made cookies

learning techniques in my highschool nutrition class

cooking in nutrition

learn gmo

Learning about fishing and agriculture in Newfoundland

My cafeteria burger being blue...

In grade 6 we learned about the food pyramid in health class.

Taking Nutrition

There is none.

home economics in junior high

School Christmas breakfast

eating pancakes with santa

Burning food to see the sustainment and energy it can give you

Nutrition Class?

Chemistry 3202 Food Value Calculations

Eating pancakes

Baking apple crumble in Nutrition

Home economics in grade ninee

Junior High Home Ec.

Maybe learning the food chart in primary school

Making food in home economics, back in junior high

making mexican dip in nutrition

Set cheeses on fire

we learned about it one day in career development

Watching a documentary about the meat and dairy industry

Home ec in grade 8 i made pizza

Buying ice cream from the canteen in junior high

Making cookies in home economics in grade 9

I don't know

Learning how to cook in 8th grade Home Ec.

home economics in grade eight

home economics class in junior high when we would sometimes cook and actually be hands on with making and preparing food

learning about the food pyramid in grade 9

When we made turkeys out of apples candy and toothpicks in grade 2 for thanksgiving

I've had teachers preach about healthy eating and the food pyramid, mostly in elementary school, but nothing about how sustainable these healthy foods are. Also learning to bake certain things in 8th grade Home Economics, but we never discussed anything about sustainability then either. These are my main food related education memories.

I recorded what I ate for a day for health class in junior high.

making pizza in healthy living. otherwise, my education in food hasn't been at school but at work on a farm. Being told outside of the course in Biology 2201 that Canada's Food Guide is outdated and provides misinformation.

Making tacos in healthy living class

In nutrition class in grade 12 I've been learning about healthy food choices, Canada's food guide and how to cook quick and healthy meals.

telling us about the different insects on what foods

The most memorable moment I can think of is when I did Home Economics in junior high, both years were fun and helped my view of food expand, but to the extent that it should have.

learning to make cookies or smoothies in home economics in the eighth grade

In grade 8 during Home economics when we would bake different cookies or cupcakes

Making tacos in healthy living

making breakfast sandwiches

different insects on different plants

## Appendix B: General Recruitment Form for Participants

### Participate in Food Sustainability Education Research!

My name is Adam Hefferman, and I am a Chemistry teacher and a student in the Education Faculty at Memorial University of Newfoundland. I am conducting a research project called “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security” for my master’s degree under the supervision of Dr. Jerome Delaney purpose of the study is to better understand high school student’s perception of Food Science as it pertains to food culture, security and sustainability. I seek understanding of how the current Newfoundland High School Curriculum informs this understanding through examining content related to this subject within the curriculum; speaking to students, teachers and principals about their experience with this curriculum; and, speaking with local food experts and chefs about what they feel the general public should understand about food sustainability and security and whether these topics belong in the school’s curriculum.

I am contacting you to invite you to participate in an *online survey / interview / focus group* in which you will be asked to *specify topic and types of questions and/or types of activities or tasks*. Participation will require *specify minutes / hours / days / # of testing sessions* of your time and will be held at *specify location*.

If you are interested in participating in this study, please *specify what they need to do (e.g. click the link below to access the online survey; contact me to arrange a meeting time; come to the lab / meeting specify when and where)*.

If you have any questions about me or my project, please contact me by email at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca) or by phone at 709-746-1933.

Thank-you in advance for considering my request,

Adam Hefferman

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University’s ethics policy. If you have ethical concerns about the research, such as your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr.chair@mun.ca](mailto:icehr.chair@mun.ca) or by telephone at 709-864-2861.

## **Appendix C: Student Survey Consent Form**

Informed Consent Form

Title: “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security”

Researcher(s): Adam Hefferman  
Memorial University of Newfoundland Faculty of education  
adamhefferman@nlesd.ca

Supervisor(s): Dr. Jerome Delaney  
Memorial University Faculty of Education

You are invited to take part in a research project entitled “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security.”

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. Additionally, given your status as an adolescent student, your parents will have to also consent to your participation. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Adam Hefferman, if you have any questions about the study or for more information not included here before you consent.

It is entirely up to you and your parents to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

### **Introduction**

I’m Adam Hefferman, a graduate student writing my thesis in curriculum studies for the Faculty of Education at Memorial University and a Chemistry teacher at Waterford Valley High School. As part of my Masters thesis, I am conducting research under the supervision of Dr. Jerome Delaney concerning the representation of local food culture, sustainability and food security in Newfoundland’s high school curriculum.

#### Purpose of study:

The purpose of this study is to better understand high school student's perception of Food Science as it pertains to food culture, security and sustainability. I seek understanding of how the current Newfoundland High School Curriculum informs this understanding through examining content related to this subject within the curriculum; speaking to students, teachers and principals about their experience with this curriculum; and, speaking with local food experts and chefs about what they feel the general public should understand about food sustainability and security and whether these topics belong in the school's curriculum.

In this study, the term Food Science is defined as the comprehension of food processes and products. Food security is defined as people having physical, social and economic access to food of adequate quantity and quality, in order to meet their dietary needs for a healthy, active life. Food culture is defined as the connection of food choices, practices and preparations with locale, environmental concerns, the economy, politics, international relations, social stratification, race, gender, history, and religion. Finally, sustainability as it relates to food, food culture and security refers to diets with low environmental impacts that promote food security and a healthy lifestyle for current and future generations while being protective and considerate of the environment and also factoring in food that is culturally relevant, affordable, safe and healthy.

#### What you will do in this study:

Initially, surveys will be conducted in an effort to inform later focus groups.

The survey instrument consists of 1 page (see Appendix A) is a form consisting of 9 questions. The First 8 questions are of multiple-choice nature, which require a response ranging from strongly agree to strongly disagree. The final question is free form response asking about the most memorable moment students had that pertains to food.

#### Length of time:

The survey will take no more than ten minutes to complete.

#### Withdrawal from the study:

Participation can be ended at any point in the study by simply not clicking submit on the online survey.

#### Possible benefits:

Participant Benefits from the study could include:

- 1) It gives educators, students and experts in the field throughout St. John's the opportunity to "voice" their thoughts/opinions on food science and sustainability content in the Newfoundland High School curriculum;
- 2) In addition to study participants being given the opportunity to evaluate said content in the curriculum, focus group participants and interviewees will be able to voice their opinions what they feel food science's weight and role in the curriculum should entail.

Benefits to the scholarly/ scientific community could include:

- 1) While some food science education exists in the Newfoundland High School Curriculum via health, nutrition and home economics, it's seldom tied into the culinary arts and local sustainability and food security. If this information on food sustainability and security was properly addressed in the curriculum, education could extend to the later possibility of impact on local food issues, economy and the health care system. As such, this researcher sees this contribution to the body of literature in this area as "the" major benefit of this study.

Possible risks:

No risks shall be accrued through participating in this study.

Confidentiality

Confidentiality is ensuring that identities of participants are accessible only to those authorized to have access.

Confidentiality will be ensured in this study because no personally identifiable information will be collected. This study will be conducted online with participants accessing a website to familiarize themselves with the study and to actually complete the survey instrument. No names will be included on the survey instrument and no names will be included in any report or journal article generated from the study.

Anonymity:

Anonymity refers to not disclosing participant's identifying characteristics, such as name or description of physical appearance.

Because of the nature of this study, participant anonymity will not be an issue. As stated above, no names will be included on the survey and no names will be used in any reports or journal articles generated from the study. Care will be taken to ensure that no details are included which may enable informed readers to guess participant's' identity.

Recording of Data:

SurveyMonkey.com will be used to record all data.

#### Storage of Data:

This researcher will be using SurveyMonkey.com to conduct this online survey, as well as google documents to conduct some focus groups, while other focus groups and interviews will occur on campus. All the data from the study will be stored on a password-protected USB stick. This USB stick will be kept in a locked filing cabinet for a minimum period of 5 years (as per MUN policy: "Data will be kept for a minimum of five years, as required by Memorial University's policy on Integrity in Scholarly Research."). Only this researcher and his supervisor, Dr. Jerome Delaney, will have access to this data and USB stick. At the end of 5 years this data will be destroyed (i. e., erased).

The on-line survey company, SurveyMonkey), hosting this survey is located in the United States and as such is subject to U.S. laws. The US Patriot Act allows authorities to access the records of internet service providers. Therefore, anonymity and confidentiality cannot be guaranteed. If you choose to participate in this survey, you understand that your responses to the survey questions will be stored and may be accessed in the USA. The security and privacy policy for the web survey company can be found at the following link: .

<https://www.surveymonkey.com/mp/policy/privacy-policy/>.

#### Did you know?

If you are worried that your survey responses could be exposed to the U.S. government, SurveyMonkey allows you to conduct anonymous surveys in which no personally identifying information is collected from survey respondents, including IP addresses. If you don't collect the information, it can't be exposed! Please see their explanation of how customers can do this at [http://help.surveymonkey.com/app/answers/detail/a\\_id/335/](http://help.surveymonkey.com/app/answers/detail/a_id/335/).

— (<https://www.surveymonkey.com/blog/en/blog/2011/05/10/patriot-act/>)

#### Reporting of Results:

The collected data will be used in a thesis and will be reported via direct quotations and in aggregated or summarized form without personally identifying information.

#### Sharing of Results with Participants:

An executive summary of the findings, as well as a copy of the thesis will be posted to a website and a physical copy of the thesis will be submitted to the QEII Library at Memorial University (available at <http://collections.mun.ca/cdm/search/collection/theses>) for the purpose of sharing with participants and the general public.

#### Questions:

You are welcome to ask questions at any time during your participation in this research. If you would like more information about this study, please contact the researcher at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca).

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr@mun.ca](mailto:icehr@mun.ca) or by telephone at 709-864-2861

Consent:

By completing this survey you agree that:

You have read the information about the research.

You have been able to ask questions about this study.

You are satisfied with the answers to all your questions.

You understand what the study is about and what you will be doing.

You understand that you are free to withdraw from the study, without having to give a reason, and that doing so will not affect you now or in the future.

You can end your participation by simply closing your browser or navigating away from this page.

However, once you complete this survey and click submit, your data cannot be removed because we are not collecting any identifying information and therefore we cannot link individuals to their responses.

By consenting to this online survey, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

Please retain a copy of this consent information for your records.

Also, clicking submit below and submitting this survey implies your agreement to the above stipulations.

A copy of this Informed Consent Form has been given to me for my records.

\_\_\_\_\_  
Signature of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of participant's Guardian

\_\_\_\_\_  
Date

Researcher's Signature:

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

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Signature of Principal Investigator

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Date

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr.chair@mun.ca](mailto:icehr.chair@mun.ca) or by telephone at 709-864-2861.

## **Appendix D: Student Focus Group Consent Form**

Informed Consent Form

Title: “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security”

Researcher(s): Adam Hefferman  
Memorial University of Newfoundland Faculty of education  
adamhefferman@nlesd.ca

Supervisor(s): Dr. Jerome Delaney  
Memorial University Faculty of Education

You are invited to take part in a research project entitled “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security.”

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. Additionally, given your status as an adolescent student, your parents will have to also consent to your participation. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Adam Hefferman, if you have any questions about the study or for more information not included here before you consent.

It is entirely up to you and your parents to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

### Introduction

I’m Adam Hefferman, a graduate student writing my thesis in curriculum studies for the Faculty of Education at Memorial University and a Chemistry teacher at Waterford Valley High School. As part of my Masters thesis, I am conducting research under the supervision of Dr. Jerome Delaney concerning the representation of local food culture, sustainability and food security in Newfoundland’s high school curriculum.

### Purpose of study:

The purpose of this study is to better understand high school student’s perception of Food Science as it pertains to food culture, security and sustainability. I seek understanding of how

the current Newfoundland High School Curriculum informs this understanding through examining content related to this subject within the curriculum; speaking to students, teachers and principals about their experience with this curriculum; and, speaking with local food experts and chefs about what they feel the general public should understand about food sustainability and security and whether these topics belong in the school's curriculum.

In this study, the term Food Science is defined as the comprehension of food processes and products. Food security is defined as people having physical, social and economic access to food of adequate quantity and quality, in order to meet their dietary needs for a healthy, active life. Food culture is defined as the connection of food choices, practices and preparations with locale, environmental concerns, the economy, politics, international relations, social stratification, race, gender, history, and religion. Finally, sustainability as it relates to food, food culture and security refers to diets with low environmental impacts that promote food security and a healthy lifestyle for current and future generations while being protective and considerate of the environment and also factoring in food that is culturally relevant, affordable, safe and healthy.

What you will do in this study:

Initially, surveys will have been conducted in an effort to inform the focus groups that happen later.

Three focus groups will be conducted with a selection of 5 students at each of the three schools in order to provide a more descriptive, detailed picture of Food Science as it appears in the Newfoundland High School curriculum.

Length of time:

The focus group will last approximately forty five minutes.

Withdrawal from the study:

Withdrawal from the study can occur up to one month after the focus group is complete. The researcher feels this is a fair amount of time for participants to reconsider their contributions. After the month, analysis will be completed and the thesis will be written. After this point, removal of data will be impossible, though no personally identifiable information will be included in the final study.

Participation can be ended at any point in data collection or analysis until publication by July 1st of 2017. In order to end participation, simply contact the researcher at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca) and contributions will be destroyed free of consequence.

Possible benefits:

Participant Benefits from the study could include:

- 1) It gives educators, students and experts in the field throughout St. John's the opportunity to "voice" their thoughts/opinions on food science and sustainability content in the Newfoundland High School curriculum;
- 2) In addition to study participants being given the opportunity to evaluate said content in the curriculum, focus group participants and interviewees will be able to voice their opinions what they feel food science's weight and role in the curriculum should entail.

Benefits to the scholarly/ scientific community could include:

- 1) While some food science education exists in the Newfoundland High School Curriculum via health, nutrition and home economics, it's seldom tied into the culinary arts and local sustainability and food security. If this information on food sustainability and security was properly addressed in the curriculum, education could extend to the later possibility of impact on local food issues, economy and the health care system. As such, this researcher sees this contribution to the body of literature in this area as "the" major benefit of this study.

Possible risks:

There is potential of minor discomfort or embarrassment if the student does not have prior knowledge of Food Science, Sustainability or Food Security; given they will be asked about these topics as they apply to the Newfoundland High School curriculum. However, these topics especially as they pertain to food are rather current and base knowledge of them is not expected or desired of participants.

Confidentiality

Confidentiality is ensuring that identities of participants are accessible only to those authorized to have access.

Confidentiality cannot be guaranteed as the focus groups will happen on campus in groups of five students in real time, and therefore participants will know what other participants have contributed. However, no names will be included with the focus groups data and no names will be included in any report or journal article generated from the study.

Anonymity:

Anonymity refers to not disclosing participant's identifying characteristics, such as name or description of physical appearance.

Because of the nature of this study, participant anonymity from focus groups is not possible. As stated above however, no names will be included on the focus groups and no names will be used in any reports or journal articles generated from the study. Care will be taken to ensure that no details are included which may enable informed readers to guess participant's' identity.

Recording of Data:

Audio recording will be used as a means of recording focus groups and interviews

Do you agree to the use of such devices?    Yes    No

#### Storage of Data:

This researcher will be using google documents to conduct some focus groups, while other focus groups and interviews will occur on campus. All the data from the study will be stored on a password-protected USB stick. This USB stick will be kept in a locked filing cabinet for a minimum period of 5 years (as per MUN policy: “Data will be kept for a minimum of five years, as required by Memorial University’s policy on Integrity in Scholarly Research.”). Only this researcher and his supervisor, Dr. Jerome Delaney, will have access to this data and USB stick. At the end of 5 years this data will be destroyed (i. e., erased).

#### Reporting of Results:

The collected data will be used in a thesis and will be reported via direct quotations and in aggregated or summarized form without personally identifying information.

#### Sharing of Results with Participants:

An executive summary of the findings, as well as a copy of the thesis will be posted to a website and a physical copy of the thesis will be submitted to the QEII Library at Memorial University ( available at <http://collections.mun.ca/cdm/search/collection/theses>) for the purpose of sharing with participants and the general public.

#### Questions:

You are welcome to ask questions at any time during your participation in this research. If you would like more information about this study, please contact the researcher at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca).

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University’s ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr@mun.ca](mailto:icehr@mun.ca) or by telephone at 709-864-2861

#### Consent:

Your signature on this form means that:

You have read the information about the research.

You have been able to ask questions about this study.

You are satisfied with the answers to all your questions.

You understand what the study is about and what you will be doing.

You understand that you are free to withdraw from the study without having to give a reason and that doing so will not affect you now or in the future.

You understand that any data collected from you up to the point of your withdrawal will be retained by the researcher for use in the research study.

If you sign this form, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

Your signature:

I have read what this study is about and understood the risks and benefits. I have had adequate time to think about this and had the opportunity to ask questions and my questions have been answered.

I agree to participate in the research project understanding the risks and contributions of my participation, that my participation is voluntary, and that I may end my participation.

I agree to be audio-recorded during the interview / focus group  Yes  No

I agree to the use of anonymous quotations.  Yes  No

A copy of this Informed Consent Form has been given to me for my records.

\_\_\_\_\_  
Signature of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of participant's Guardian

\_\_\_\_\_  
Date

Researcher's Signature:

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

\_\_\_\_\_  
Signature of Principal Investigator

\_\_\_\_\_  
Date

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr.chair@mun.ca](mailto:icehr.chair@mun.ca) or by telephone at 709-864-2861.

## **Appendix E: Educator Focus Group Consent Form**

Informed Consent Form

Title: “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security”

Researcher(s): Adam Hefferman  
Memorial University of Newfoundland Faculty of education  
adamhefferman@nlesd.ca

Supervisor(s): Dr. Jerome Delaney  
Memorial University Faculty of Education

You are invited to take part in a research project entitled “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security.”

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Adam Hefferman, if you have any questions about the study or for more information not included here before you consent.

It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

### Introduction

I’m Adam Hefferman, a graduate student writing my thesis in curriculum studies for the Faculty of Education at Memorial University and a Chemistry teacher at Waterford Valley High School. As part of my Masters thesis, I am conducting research under the supervision of Dr. Jerome Delaney concerning the representation of local food culture, sustainability and food security in Newfoundland’s high school curriculum.

### Purpose of study:

The purpose of this study is to better understand high school student’s perception of Food Science as it pertains to food culture, security and sustainability. I seek understanding of how the current Newfoundland High School Curriculum informs this understanding through

examining content related to this subject within the curriculum; speaking to students, teachers and principals about their experience with this curriculum; and, speaking with local food experts and chefs about what they feel the general public should understand about food sustainability and security and whether these topics belong in the school's curriculum.

In this study, the term Food Science is defined as the comprehension of food processes and products. Food security is defined as people having physical, social and economic access to food of adequate quantity and quality, in order to meet their dietary needs for a healthy, active life. Food culture is defined as the connection of food choices, practices and preparations with locale, environmental concerns, the economy, politics, international relations, social stratification, race, gender, history, and religion. Finally, sustainability as it relates to food, food culture and security refers to diets with low environmental impacts that promote food security and a healthy lifestyle for current and future generations while being protective and considerate of the environment and also factoring in food that is culturally relevant, affordable, safe and healthy.

What you will do in this study:

A focus group with teachers from each of the schools (Gonzaga, Waterford Valley High School and Holy Spirit High School) will be conducted via open edit Google Document, asking questions about Food Science, Sustainability and Food Security in the Newfoundland High School curriculum.

Length of time:

The focus group questions will take approximately fifteen minutes to complete within Google Docs.

Withdrawal from the study:

Withdrawal from the study can occur up to one month after the focus group is complete. The researcher feels this is a fair amount of time for participants to reconsider their contributions. After the month, analysis will be completed and the thesis will be written. After this point, removal of data will be impossible, though no personally identifiable information will be included in the final study.

Participation can be ended at any point until publication by July 1st of 2017. In order to end participation, simply contact the researcher at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca) and contributions will be destroyed free of consequence.

Possible benefits:

Participant Benefits from the study could include:

- 1) It gives educators, students and experts in the field throughout St. John's the opportunity to "voice" their thoughts/opinions on food science and sustainability content in the Newfoundland High School curriculum;
- 2) In addition to study participants being given the opportunity to evaluate said content in the curriculum, focus group participants and interviewees will be able to voice their opinions what they feel food science's weight and role in the curriculum should entail.

Benefits to the scholarly/ scientific community could include:

- 1) While some food science education exists in the Newfoundland High School Curriculum via health, nutrition and home economics, it's seldom tied into the culinary arts and local sustainability and food security. If this information on food sustainability and security was properly addressed in the curriculum, education could extend to the later possibility of impact on local food issues, economy and the health care system. As such, this researcher sees this contribution to the body of literature in this area as "the" major benefit of this study.

Possible risks:

No risks shall be accrued through participating in this study.

Confidentiality

Confidentiality is ensuring that identities of participants are accessible only to those authorized to have access.

Confidentiality cannot be guaranteed as the focus groups will happen via Google Document in groups of several teachers in real time, and therefore participants will know what other participants have contributed. However, no names will be included with the focus groups data and no names will be included in any report or journal article generated from the study.

Anonymity:

Anonymity refers to not disclosing participant's identifying characteristics, such as name or description of physical appearance.

Because of the nature of this study, participant anonymity from focus groups is not possible. As stated above however, no names will be included on the focus groups and no names will be used in any reports or journal articles generated from the study. Care will be taken to ensure that no details are included which may enable informed readers to guess participant's' identity.

Recording of Data:

Google Documents will be used as the method of recording data.

Storage of Data:

This researcher will be using google documents to conduct focus groups. All the data from the study will be stored on a password-protected USB stick. This USB stick will be kept in a locked

filing cabinet for a minimum period of 5 years (as per MUN policy: “Data will be kept for a minimum of five years, as required by Memorial University’s policy on Integrity in Scholarly Research.”). Only this researcher and his supervisor, Dr. Jerome Delaney, will have access to this data and USB stick. At the end of 5 years this data will be destroyed (i. e., erased).

#### Reporting of Results:

The collected data will be used in a thesis and will be reported via direct quotations and in aggregated or summarized form without personally identifying information.

#### Sharing of Results with Participants:

An executive summary of the findings, as well as a copy of the thesis will be posted to a website and a physical copy of the thesis will be submitted to the QEII Library at Memorial University (available at <http://collections.mun.ca/cdm/search/collection/theses>) for the purpose of sharing with participants and the general public.

#### Questions:

You are welcome to ask questions at any time during your participation in this research. If you would like more information about this study, please contact the researcher at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca).

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University’s ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr@mun.ca](mailto:icehr@mun.ca) or by telephone at 709-864-2861

#### Consent:

Your signature on this form means that:

You have read the information about the research.

You have been able to ask questions about this study.

You are satisfied with the answers to all your questions.

You understand what the study is about and what you will be doing.

You understand that you are free to withdraw from the study without having to give a reason and that doing so will not affect you now or in the future.

You understand that any data collected from you up to the point of your withdrawal will be retained by the researcher for use in the research study.

If you sign this form, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

Your signature:

I have read what this study is about and understood the risks and benefits. I have had adequate time to think about this and had the opportunity to ask questions and my questions have been answered.

I agree to participate in the research project understanding the risks and contributions of my participation, that my participation is voluntary, and that I may end my participation.

I agree for data to be recorded via Google Documents during the focus group  Yes  No

I agree to the use of anonymous quotations.  Yes  No

A copy of this Informed Consent Form has been given to me for my records.

\_\_\_\_\_  
Signature of participant

\_\_\_\_\_  
Date

Researcher's Signature:

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

\_\_\_\_\_  
Signature of Principal Investigator

\_\_\_\_\_  
Date

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr.chair@mun.ca](mailto:icehr.chair@mun.ca) or by telephone at 709-864-2861.

## **Appendix F: Professional Interview Consent Form**

Informed Consent Form

Title: “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security”

Researcher(s): Adam Hefferman  
Memorial University of Newfoundland Faculty of education  
adamhefferman@nlesd.ca

Supervisor(s): Dr. Jerome Delaney  
Memorial University Faculty of Education

You are invited to take part in a research project entitled “The Place of Food Science in Newfoundland’s High School Curriculum: Preparing for Local, Sustainable Food Culture and Security.”

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Adam Hefferman, if you have any questions about the study or for more information not included here before you consent.

It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

### Introduction

I’m Adam Hefferman, a graduate student writing my thesis in curriculum studies for the Faculty of Education at Memorial University and a Chemistry teacher at Waterford Valley High School. As part of my Masters thesis, I am conducting research under the supervision of Dr. Jerome Delaney concerning the representation of local food culture, sustainability and food security in Newfoundland’s high school curriculum.

### Purpose of study:

The purpose of this study is to better understand high school student’s perception of Food Science as it pertains to food culture, security and sustainability. I seek understanding of how the current Newfoundland High School Curriculum informs this understanding through

examining content related to this subject within the curriculum; speaking to students, teachers and principals about their experience with this curriculum; and, speaking with local food experts and chefs about what they feel the general public should understand about food sustainability and security and whether these topics belong in the school's curriculum.

In this study, the term Food Science is defined as the comprehension of food processes and products. Food security is defined as people having physical, social and economic access to food of adequate quantity and quality, in order to meet their dietary needs for a healthy, active life. Food culture is defined as the connection of food choices, practices and preparations with locale, environmental concerns, the economy, politics, international relations, social stratification, race, gender, history, and religion. Finally, sustainability as it relates to food, food culture and security refers to diets with low environmental impacts that promote food security and a healthy lifestyle for current and future generations while being protective and considerate of the environment and also factoring in food that is culturally relevant, affordable, safe and healthy.

What you will do in this study:

Interviews with professionals and chefs within the community will be conducted using audio recording equipment in person with the principal investigator, Adam Hefferman, asking questions about Food Science, Sustainability and Food Security in the Newfoundland High School curriculum.

Length of time:

Each interview will last approximately fifteen minutes.

Withdrawal from the study:

Withdrawal from the study can occur up to one month after the interview is complete. The researcher feels this is a fair amount of time for participants to reconsider their contributions. After the month, analysis will be completed and the thesis will be written. After this point, removal of data will be impossible, though no personally identifiable information will be included in the final study.

Participation can be ended at any point in the study until data analysis by July 1st of 2017. In order to end participation, simply contact the researcher at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca) and contributions will be destroyed free of consequence.

Possible benefits:

Participant Benefits from the study could include:

- 1) It gives educators, students and experts in the field throughout St. John's the opportunity to "voice" their thoughts/opinions on food science and sustainability content in the Newfoundland High School curriculum;
- 2) In addition to study participants being given the opportunity to evaluate said content in the curriculum, focus group participants and interviewees will be able to voice their opinions what they feel food science's weight and role in the curriculum should entail.

Benefits to the scholarly/ scientific community could include:

- 1) While some food science education exists in the Newfoundland High School Curriculum via health, nutrition and home economics, it's seldom tied into the culinary arts and local sustainability and food security. If this information on food sustainability and security was properly addressed in the curriculum, education could extend to the later possibility of impact on local food issues, economy and the health care system. As such, this researcher sees this contribution to the body of literature in this area as "the" major benefit of this study.

Possible risks:

No risks shall be accrued through participating in this study.

Confidentiality

Confidentiality is ensuring that identities of participants are accessible only to those authorized to have access.

Confidentiality will be ensured in this study because while personal identifiable information will be collected, it will not be submitted in data collection. This study will be conducted in person with the researcher, Adam Hefferman. No names will be included on the interviews and no names will be included in any report or journal article generated from the study.

Anonymity:

Anonymity refers to not disclosing participant's identifying characteristics, such as name or description of physical appearance.

Because of the nature of this study, participant anonymity will not be an issue. As stated above, no names will be included in the interviews and no names will be used in any reports or journal articles generated from the study. Care will be taken to ensure that no details are included which may enable informed readers to guess participant's' identity.

Recording of Data:

Audio recording will be used as a means of recording focus groups and interviews

Do you agree to the use of such devices?  Yes  No

Storage of Data:

This researcher will be using google documents to conduct some focus groups, while other focus groups and interviews will occur on campus. All the data from the study will be stored on a password-protected USB stick. This USB stick will be kept in a locked filing cabinet for a minimum period of 5 years (as per MUN policy: "Data will be kept for a minimum of five years, as required by Memorial University's policy on Integrity in Scholarly Research."). Only this researcher and his supervisor, Dr. Jerome Delaney, will have access to this data and USB stick. At the end of 5 years this data will be destroyed (i. e., erased).

#### Reporting of Results:

The collected data will be used in a thesis and will be reported via direct quotations and in aggregated or summarized form without personally identifying information.

#### Sharing of Results with Participants:

An executive summary of the findings, as well as a copy of the thesis will be posted to a website and a physical copy of the thesis will be submitted to the QEII Library at Memorial University ( available at <http://collections.mun.ca/cdm/search/collection/theses>) for the purpose of sharing with participants and the general public.

#### Questions:

You are welcome to ask questions at any time during your participation in this research. If you would like more information about this study, please contact the researcher at [adamhefferman@nlesd.ca](mailto:adamhefferman@nlesd.ca).

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr@mun.ca](mailto:icehr@mun.ca) or by telephone at 709-864-2861

#### Consent:

Your signature on this form means that:

You have read the information about the research.

You have been able to ask questions about this study.

You are satisfied with the answers to all your questions.

You understand what the study is about and what you will be doing.

You understand that you are free to withdraw from the study without having to give a reason and that doing so will not affect you now or in the future.

You understand that any data collected from you up to the point of your withdrawal will be retained by the researcher for use in the research study.

If you sign this form, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

Your signature:

I have read what this study is about and understood the risks and benefits. I have had adequate time to think about this and had the opportunity to ask questions and my questions have been answered.

I agree to participate in the research project understanding the risks and contributions of my participation, that my participation is voluntary, and that I may end my participation.

I agree to be audio-recorded during the interview / focus group  Yes  No

I agree to the use of anonymous quotations.  Yes  No

A copy of this Informed Consent Form has been given to me for my records.

\_\_\_\_\_  
Signature of participant

\_\_\_\_\_  
Date

Researcher's Signature:

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

\_\_\_\_\_  
Signature of Principal Investigator

\_\_\_\_\_  
Date

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr.chair@mun.ca](mailto:icehr.chair@mun.ca) or by telephone at 709-864-2861.

