Nutrition Education Programs in BC Schools: Policy Alternatives to Improve Health Outcomes

by

Dylan Beale

B.A. (Political Science), University of Victoria, 2016
B.A. (Hispanic Studies), University of Victoria, 2016

Project Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Public Policy

in the
School of Public Policy
Faculty of Arts and Social Sciences

© Dylan Beale 2020
SIMON FRASER UNIVERSITY
Spring 2020

Copyright in this work rests with the author. Please ensure that any reproduction or re-use is done in accordance with the relevant national copyright legislation.
Approval

Name: Dylan Beale
Degree: Master of Public Policy
Title: Nutrition Education Programs in BC Schools: Policy Alternatives to Improve Health Outcomes

Examiner Committee: Chair: Dominique Gross
Professor

John Richards
Senior Supervisor
Professor

Nancy Olewiler
Internal Examiner
Professor

Date Defended/Approved: March 30, 2020
Ethics Statement

The author, whose name appears on the title page of this work, has obtained, for the research described in this work, either:

a. human research ethics approval from the Simon Fraser University Office of Research Ethics

or

b. advance approval of the animal care protocol from the University Animal Care Committee of Simon Fraser University

or has conducted the research

c. as a co-investigator, collaborator, or research assistant in a research project approved in advance.

A copy of the approval letter has been filed with the Theses Office of the University Library at the time of submission of this thesis or project.

The original application for approval and letter of approval are filed with the relevant offices. Inquiries may be directed to those authorities.

Simon Fraser University Library
Burnaby, British Columbia, Canada

Update Spring 2016
Abstract

Canadian students are facing severe health implications stemming from increased disconnection with the food they consume and how it affects the physical body. This decade has brought recent increases in morbidity and mortality stemming primarily from modifiable factors that can be changed by choices and behaviour. Irregular eating habits and increased consumption of processed foods have contributed to an increase in Type 2 diabetes, cardiovascular disease, overweight and obesity. As a result, this generation’s children are expected to live a shorter life than their parents.

Currently, British Columbian schools are not mandated through curriculum to include a nutrition education aspect to their health programs, which is one way of encouraging students to adopt healthier habits. Schools are an ideal intervention point for effective programming to reach a large percentage of the population. This study presents several policy options meant to increase student access to current, evidence-based nutritional information through school-based programs that will encourage them to develop healthier habits and relationships with food that will persist into their futures and decrease risk of morbidity and mortality.

Keywords: Nutrition education; school-based programs; decreased risk of morbidity and mortality; British Columbia; curriculum
To my husband Nathan Sykes for his patience and understanding, and to my fellow classmates for their care and support. I would also like to dedicate this to my parents, who have been my anchors and the biggest supporters of my education from the very beginning.
Acknowledgements

I would like to thank my supervisor, John Richards, for his guidance and companionship throughout this process. I would also like to thank my cohort for their constant inspiration and support.
Table of Contents

Approval .................................................................................................................. ii
Ethics Statement ................................................................................................. iii
Abstract ............................................................................................................ iv
Dedication ........................................................................................................... v
Acknowledgements .............................................................................................. vi
Table of Contents ............................................................................................... vii
List of Tables ........................................................................................................ x
List of Figures ....................................................................................................... xi

Chapter 1. Introduction ......................................................................................... 1

Chapter 2. Background and Policy Context ......................................................... 3
  2.1. The Need to Address Nutritional Choices of Canadian Children .................. 3
  2.2. The Canadian Policy Context .................................................................... 5
  2.3. Schools as an Ideal Intervention Point ....................................................... 6
  2.4. Health Education in Canada ..................................................................... 7
      2.4.1. History of Health Education in Canada ............................................. 7
      2.4.2. Comprehensive School Health – A Framework ................................. 8
      2.4.3. Health Education in the Canadian Context .................................... 10
      2.4.4. Current Health Education Challenges ............................................ 10
  2.5. A Focus on Nutrition Education ................................................................. 12
      2.5.1. Evidence for Need .......................................................................... 12
      2.5.2. Requirements for Success ............................................................... 13

Chapter 3. Methodology ...................................................................................... 15
  3.1. Case Studies ............................................................................................... 15
  3.2. Expert Interviews ...................................................................................... 16
  3.3. Limitations ................................................................................................. 17

Chapter 4. Case Study Analysis .......................................................................... 18
  4.1. Introduction ............................................................................................... 18
  4.2. Canadian Case Study Analysis .................................................................. 18
      4.2.1. A Canadian Overweight and Obesity Snapshot ................................. 18
      4.2.2. British Columbia ........................................................................... 19
      4.2.3. Alberta ............................................................................................ 20
      4.2.4. Ontario ........................................................................................... 21
  4.3. International Case Study Analyses .............................................................. 23
      4.3.1. An International Child Obesity and Overweight Snapshot ............... 23
      4.3.2. Australia ......................................................................................... 24
      4.3.3. United Kingdom ............................................................................. 26
Chapter 5. Interview Analysis ................................................................. 28
5.1. Barriers to Positive Student Health Outcomes in BC .................. 28
5.2. Challenges Facing Nutrition Education Programs in BC. .......... 29
5.3. Factors for Success ................................................................. 30
5.4. Evaluation Methods ............................................................... 32

Chapter 6. Policy Options ...................................................................... 34
6.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education 34
6.2. Option 2: Mandate that Teacher Training Includes Nutrition Education .... 35
6.3. Option 3: Hire a School Health Facilitator .................................. 35

Chapter 7. Policy Evaluation Framework: Objectives, Criteria, and Measures ... 37

Chapter 8. Policy Analysis and Recommendations .................................... 39
8.1. Equity .......................................................................................... 39
8.1.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education 39
8.1.2. Option 2: Mandate that Teacher Training Includes Nutrition Education .......... 39
8.1.3. Option 3: Hire a School Health Facilitator for Each School .................. 40
8.2. Development .................................................................................. 40
8.2.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education ........ 40
8.2.2. Option 2: Mandate that Teacher Training Includes Nutrition Education ........... 40
8.2.3. Option 3: Hire a School Health Facilitator for Each School .................. 41
8.3. Effectiveness .................................................................................. 41
8.3.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education .... 42
8.3.2. Option 2: Mandate that Teacher Training Includes Nutrition Education ....... 42
8.3.3. Option 3: Hire a School Health Facilitator for Each School .................. 42
8.4. Stakeholder Acceptance .................................................................. 43
8.4.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education .... 43
8.4.2. Option 2: Mandate that Teacher Training Includes Nutrition Education ....... 43
8.4.3. Option 3: Hire a School Health Facilitator for Each School .................. 44
8.5. Implementation ............................................................................... 44
8.5.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education .... 44
8.5.2. Option 2: Mandate that Teacher Training Includes Nutrition Education ....... 45
8.5.3. Option 3: Hire a School Health Facilitator for Each School .................. 45
8.6. Cost .............................................................................................. 45
8.6.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education .... 45
8.6.2. Option 2: Mandate that Teacher Training Includes Nutrition Education ....... 46
8.6.3. Option 3: Hire a School Health Facilitator for Each School .................. 46
8.7. Recommendation .......................................................................... 48

Chapter 9. Conclusion ............................................................................. 50

References ............................................................................................ 52
Appendix A. Interview Protocol ................................................................. 56
Appendix B. Interview Analysis Tool ............................................................... 57
List of Tables

Table 1: Case Study Selection ................................................................. 15
Table 2: Comprehensive School Health Framework .................................. 15
Table 3: Analysis Guiding Questions .................................................... 16
Table 4: Policy Analysis Framework ...................................................... 38
Table 5: Evaluation Table – Equity .......................................................... 39
Table 6: Evaluation Table – Development .............................................. 40
Table 7: Evaluation Table – Effectiveness .............................................. 41
Table 8: Evaluation Table – Stakeholder Acceptance ............................... 43
Table 9: Evaluation Table – Implementation ......................................... 44
Table 10: Evaluation Table – Cost ............................................................ 45
Table 11: Policy Evaluation .................................................................. 48
List of Figures

Figure 1. Fruit and vegetable consumption, 5 times or more per day, youth (12-17), Canada (excluding territories) and provinces, 2017. Statistics Canada. Table 13-10-0096-01. Health characteristics, annual estimates. .................. 4

Figure 2 Body mass index, self-reported, youth (12-17 years old), overweight or obese, Canada (excluding territories) and provinces, 2018. Statistics Canada. Table 13-10-0096-01. Health characteristics, annual estimates. 19

Figure 3. Percentage of boys and girls, aged 5-9 and 10-16 living with obesity, self-reported: Canada, Australia, and the United Kingdom, 2016. Adapted from World Obesity Federation, 2019. ................................................................. 23

Figure 4. Percentage of total boys and girls, aged 5-9 and living with overweight and obesity combined, measured: Canada, Australia, and the United Kingdom, 2016. Adapted from OECD, 2019. ........................................................................ 24
Chapter 1. Introduction

Increasingly, Canadians suffer from poor nutritional habits, irregular eating habits, and increased consumption of processed foods in favour of fresh fruits and vegetables. This has led to severe outcomes for Canadians of all ages, such as Type 2 diabetes, cardiovascular disease, obesity and overweight (Korzun & Webb, 2014). As a result, Canadian governments, both provincial and federal, have begun to pay closer attention to ways in which interventions can lead Canadians to develop healthier habits (Government of Canada, 2019).

Schools represent an ideal intervention point, where programs can reach a large number of people early on in their development. Studies have demonstrated that habits learned earlier in life can lead to healthier habits in the future (McAleese et. al., 2007; Pérez-Rodrigo & Aranceta, 2003; Vuegellers & Schwartz, 2010; Stephens et. al., 2016). There are many points of intervention in school-based programs, including through physical education, school lunch programs, food and beverage policies, and through nutrition education. Nutrition education is the most easily modifiable of all of these programs, as it often requires the least amount of administration (Colley et. al., 2019). Furthermore, nutrition education programs have been shown to increase children’s nutritional knowledge, increase student fruit and vegetable consumption, and influence lifelong dietary habits and preferences (Parmer et. al., 2009; Storey et. al., 2002).

Currently, Canadian school curriculum is determined at the provincial level. Health education is included in this curriculum; however, individual schools are responsible for determining what health education looks like in their particular school environments. As a result, often schools who are more resource limited are unable to offer certain programs that those schools with more resources are able to provide (Vuegellers & Schwartz, 2010). The inconsistent and variable availability of nutrition education programs across British Columbia presents many concerns, including equity of program availability, concerns about rigorousness of programs that are available, as well as concerns about consistency.
The purpose of this Capstone is to identify several policy options to increase availability of and elevate the level of existing nutrition education programs across British Columbia. The proceeding section will provide an examination of the background and policy context in which health education programs currently exist in BC. Included in this section is an overview of the rationale behind the focus on nutrition education specifically as opposed to the health education system as a whole.

This Capstone uses several methods of primary research, including a comprehensive literature review, case study analysis of existing programs in Canada and abroad, as well as through expert interviews. Three policy options emerge from this research: adjustment of provincial curriculum to mandate nutrition education, enhancing teacher training to more efficiently include nutrition education, and hiring of school health facilitators in each school. Using specific criteria, these policy options will be evaluated. As a result, I recommend that in the short term, teacher training is updated to include nutrition education, both for existing teachers and for teaching candidates. In the longer term, I recommend that school health facilitators are hired at each school, in order to create a more supportive environment for health education.
Chapter 2. Background and Policy Context

2.1. The Need to Address Nutritional Choices of Canadian Children

Canadians are facing a significant health crisis. Poor nutritional habits have led to a disconnection in the understanding of food and how it affects the physical body. Environmental factors have led to a loss of connection to food management processes, including growing, preparing, and producing food. This has led to severe health outcomes for children and youth. Recent increases this decade in morbidity and mortality primarily from modifiable factors that can be changed by choices and behaviour. As a result, this generation’s children are expected to live a shorter life than their parents. Furthermore, they are expected to develop chronic, avoidable diseases younger than their parents’ generation (Korzun & Webb, 2014).

Irregular eating habits and increased consumption of processed foods in favour of fresh fruits and vegetables have contributed to an increase in health outcomes such as Type 2 diabetes, cardiovascular disease, overweight, and obesity (Korzun & Webb, 2014). According to World Health Organization (WHO) standards, globally 31.5% of children ages 5-13 are considered to be overweight or obese. The WHO uses body mass index (BMI) to calculate obesity and overweight, where a person’s weight (in kilograms) is divided by their height (in metres). A BMI of 25 or more is considered overweight, while a BMI of 30 or over is considered obese (Pierson et. al., 2015). Poor health in childhood has also been proven to impact brain development and affect the way that children learn and absorb information, thereby affecting their education and labour market outcomes in the future (Colley et. al., 2019).

Many of these health outcomes can be traced to poor nutritional habits developed early in life. Nutritional habits acquired when young have been shown to govern their nutritional habits later in life (McAleese & Ranklin, 2007). Studies published examining food consumption in school-age children (between the ages of 5-18) found that nutritional inadequacies in diets, amongst many other factors, can be traced to increased
consumption of foods of low-nutritional value, and decreased consumption of fruits and vegetables (Minaker & Hammond, 2016; Collet et. al., 2019).

Recent studies have found that fruit and vegetable consumption in Canada is concerning low, and that this has grave consequences for population health. Figure 1 demonstrates the percentage of Canadian youth, aged 12-17 who self-reported that they consumed fruits and vegetables five or more times per day. This varied greatly across the country; respondents from Newfoundland and Labrador indicated that only 15% of youth, aged 12-17 consumed fruits and vegetables five or more times a day, compared to 38.7% of respondents in Quebec. In British Columbia, only 26.9% of respondents indicated that they consumed fruits and vegetables five or more times per day.

![Figure 1. Fruit and vegetable consumption, 5 times or more per day, youth (12-17), Canada (excluding territories) and provinces, 2017. Statistics Canada. Table 13-10-0096-01. Health characteristics, annual estimates.](image)

Minaker and Hammond find that appropriate consumption of fruits and vegetables can be tied to decreased risk of cardiovascular disease, Type 2 diabetes and some forms of cancer. They found that, although Canada has a comprehensive national food guide that recommends a diet heavy in fruits and vegetables, very few Canadian youth are consuming enough fruits and vegetables to meet these national recommendations.
Furthermore, this study estimated that 22,000 adult deaths could be averted annually if federally recommended fruit and vegetable consumption levels were met (Minaker & Hammond, 2016).

2.2. The Canadian Policy Context

In 2019, Health Canada published a new Canada’s Food Guide that represented a marked shift away from previous iterations. Whereas, for the past eighty years, Canada’s Food Guide had promoted meat, dairy, and fruit juices, the new Food Guide addressed food and nutrition in a more holistic manner, recommending increased consumption of plant-based foods and water, and emphasis on mindful eating. In addition, the new Food Guide represented a more flexible approach to healthy eating, in order to be better suited to the varying cultural and dietary trends that exist across Canada (Government of Canada, 2019).

The Food Guide recommended that people cook more often with others, eat away from distractions like tv or phone screens, and pay more attention to feelings of fullness and hunger (Webster, 2019). In addition, the new Food Guide differs from previous versions as it does not specify amounts of foods that should be consumed from food ‘groups’ (meat/fish, dairy, vegetables/fruit, bread) and instead demonstrates a range of servings of varying fruits, vegetables, protein sources, and carbohydrates (Barr, 2019).

Health Canada presented their new Food Guide in a transparent manner, articulating each step of their consultation and evaluation process that led to its development, and making this information accessible to the public (Government of Canada, 2019). This new iteration was largely applauded by public health and nutrition experts in Canada for its evidence-based suggestions that promoted plant-based foods and encouraged less consumption of processed foods that were high in salt, saturated fats, and sugars (Webster, 2019).
2.3. Schools as an Ideal Intervention Point

The previous chapter demonstrated a clear need to focus on methods to encourage school-age children in Canada to eat more fruits and vegetables, and less processed food, to ensure that children are making healthy choices, able to learn properly, and able to lead healthy lifestyles. Early action is important, as eating habits are developed early and tend to persist later in life. Schools represent an ideal venue for intervention to deliver services that may help improve health outcomes.

Encouraging proper nutrition and healthy habits in early life can lead to reductions in modifiable risks as a child ages (McAleese et. al., 2007; Pérez-Rodrigo & Aranceta, 2003; Veugelers & Schwartz, 2010; Stephens et. al., 2016). This has been supported by many studies, one of which demonstrated that “during school age, the social environment of children diversifies and extrafamilial influences progressively become more important references. In this period, children are more independent, start making their own food choices and take personal decisions regarding what they eat” (Pérez-Rodrigo & Aranceta, 2003).

For this reason, school-based programs can play a significant role in the development of both healthy and unhealthy habits. Schools are an ideal setting to ensure children are getting the information that they need in order to develop healthy eating habits (Orava et. al., 2017). Schools provide education to a large population; hence, school-based programs that encourage healthy habits are likely to have an effect on the wider community. Encouraging healthy habits at school will encourage students to be more productive citizens, engaging on a higher level with society and create healthy behaviours in generations following them (Pérez-Rodrigo & Aranceta, 2003; Veugelers & Schwartz, 2010).

Studies have demonstrated that participation in school-based food programs have translated into increased food literacy and nutritional knowledge, healthier dietary choices, and improved child nutrition (Collet et. al., 2019). Therefore, it is pertinent that the focus be on schools to adopt policies that promote healthy habits, improve health and nutrition education, and translate into healthier behaviours among students.
2.4. Health Education in Canada

2.4.1. History of Health Education in Canada

Prior to the 1990s, Canadian provinces and territories largely employed traditional school health education instruction and practices. These were top-down approaches, and largely ineffective in addressing health disparities caused by the socioeconomic gaps in society. In the mid 1980s, the ‘Health Promoting School’ concept was first introduced by the Ottawa Charter for Health Promotion and gained traction in Europe and North America. This concept, termed ‘comprehensive school health’ in the USA and Canada, was introduced into curriculums in the 1990s as an alternative to traditional models of health education thinking (St. Leger, 2001). For the purpose of this investigation, Comprehensive School Health (CSH) will be used synonymously with references to the Health Promoting School.

This concept was a clear rejection of previous models of thought regarding health education. It was a more holistic concept, focused on understanding several perspectives of health analysis. The way that CSH emerged as an alternative to a more traditional, old way of health education is best described in the following way:

[CSH] challenged those involved in traditional school health education to rethink the problem-based focus of the health curriculum. This focus, which had framed the direction of school health education in many countries, was characterized by giving students substantial amounts of knowledge in the classroom about diet, physical activity, drugs, safety, oral health, sexuality and relationships, in the belief that such information would develop certain attitudes on which health behaviours would be based (St. Leger, 2001).

The concept was well received in Canada and has been employed in schools. It has been endorsed by Health Canada, the Canadian Teachers’ Federation, and the Canadian Association of Principals, among others (Stolp et. al., 2014). In response to changes in health research over the decades, the model has transformed as well, beginning to put more emphasis on the social and physical learning environment and the effect that this may have on children’s health (Veugelers & Schwartz, 2010).
2.4.2. Comprehensive School Health – A Framework

Comprehensive School Health (CSH) is defined by the Pan-Canadian Joint Consortium for School Health as “…an internationally recognized approach to supporting improvements in students’ educational outcomes while addressing school health in a planned, integrated and holistic way”. The Pan-Canadian Joint Consortium for School Health was established in 2005 as an effort from Canadian provincial, territorial, and federal governments to bring together the Health and Education systems in order to promote child wellness (Pan-Canadian Joint Consortium for School Health, 2015). They endorsed this internationally used framework as a novel approach to school health that incorporated several perspectives and methods (Orava et. al., 2017).

This concept identifies a framework of areas to address when setting out to develop a healthy school program. This framework revolves around four pillars: teaching and learning, social and physical environment, healthy school policy, and partnerships and services. Although this framework does not prescribe specific programs, which, in the Canadian context, allows schools or school districts to institute programs that work for them, it represents a framework so that those developing programs can institute in what they conclude to be the most effective way. In developing health programming, all of these areas need to be considered in order to develop a school food program that translates into the most rigorous results for student health (Pan-Canadian Joint Consortium for School Health, 2015).

Research has demonstrated this framework to be effective in addressing many of the nutritional problems: chronic disease, overweight and obesity, and premature morbidity and mortality. Implementation of this framework in schools has effectively improved health and educational outcomes, translating into effects that last (Pan-Canadian Joint Consortium for School Health, 2015; Stolp et. al., 2014). This framework places importance on mobilizing communities to ensure that school programs result in social transformation (St. Leger, 2001). It recognizes that true change requires the input of families and communities at large, in order to ensure success and transformation beyond school boundaries (Pan-Canadian Joint Consortium for Health, 2015).
In their Developing Healthy School Communities Handbook, the Alberta Healthy School Community Wellness Fund presents programming to implement Comprehensive School Health in Alberta schools. Among the suggested programs or practices are peer support and mentoring teams, encouraging student voice, incorporating multiple delivery methods for increasing knowledge and awareness, including drama productions, media campaigns, and engagement with outside speakers (Alberta Healthy School Community Wellness Fund, 2014).

Schools that work to engage their students and students’ communities are able to bridge some inequities due to socioeconomic factors and enable all students to have a sense of engagement and understanding of materials that will benefit them all, through community engagement and equal opportunity (Veugelers & Schwartz, 2010). In this sense, CSH was seen as a strategy with which to combat inequities that, inevitably, result in health disparities between the rich and the poor (St. Leger, 2001).

In their analysis of the effect of a CSH framework, St. Leger argues that this framework succeeds in several ways. They argue that the educational skills learned at schools are intrinsically interrelated with those skills needed for nutrition education, and that, from a multidimensional perspective, the CSH framework enables children to apply knowledge learned in school from a health perspective. Furthermore, St. Leger argues, “[CSH] endeavoured to increase student knowledge and skills by shifting health into a more dynamic and political domain, and to provide young people with opportunities to develop skills in advocacy and to achieve a sense of empowerment” (St. Leger, 2001).

It is clear that CSH has been successful in shifting school perspectives on health education and how best to educate school-age children on how to live healthy lives. However, as the next section will discuss, implementation and evaluation of this framework in the Canadian context has demonstrated that, in translation, this framework has not been as effective as it appears in isolation.
2.4.3. Health Education in the Canadian Context

At present, Canada does not have a national school food program. Instead, each province or territory in Canada develops its own curriculum and program that represents its constituents. In many cases, these programs have components, methods of evaluation and delivery, and funding mechanisms that differ across the country (Colley et. al., 2019; Veugelers & Schwartz, 2010).

Policies that rule health education, if present, can exist at the provincial or territorial level, or can exist at the school district or specific school level. Ultimately, in Canada, schools have the responsibility to deliver health education, but the methods differ. Some schools may offer specific health courses, while others may choose to incorporate health education into subject areas, like science or math (Veugelers & Schwartz, 2010).

Studies have highlighted the lack of comprehensive examination of health education and food programs in Canadian schools (Stephens et. al., 2016). Canada is a diverse country, and schools reflect this diversity. This translates into differences in all aspects of school life, including school curricular demands, physical and social environment, and language and religious instruction (Veugelers & Schwartz, 2010). Because of the regional variation, establishing specific curricula and programming that is relatable and impactful for all students in the province has been difficult. The lack of consistent program expectations, however, has led to inequities in the system.

2.4.4. Current Health Education Challenges

There have been several comprehensive efforts to highlight challenges to implementing health education, in Canada and beyond. Significant barriers stand in the way of comprehensive school health programs that intend to influence student health through education. Some of these barriers indicate a lack of resources, including time allocated and availability of funds. Other barriers are due to traditional structure and function of schools, including teachers’ abilities and willingness to engage.
In order to be effective, health programs must be consistent, implemented with a sufficient time commitment, and content must be repeatedly taught to children. Many studies found that current programs did not meet these standards, and that the lack of consistency and intensity resulted in little to no change in behavior and knowledge acquisition (Colley et. al., 2019). Much of this lack of change is due to insufficient resource allocation to ensuring that these programs are implemented and carried out to completion (St Leger, 2001).

The fundamental school environment has been identified as another barrier preventing effective health education in schools. Research demonstrates that attention needs to be paid to the way that features of school are organized, and to the way that students are seen as part of schools. A move to a more student-centred and less hierarchical school structure would enable students to be more involved in constructing curricula and policy changes that benefit them. Furthermore, student-centred schools would illuminate more modern processes that may translate into more effective learning methods (St. Leger, 2001). Policies that do not accurately reflect current ideologies and cultural priorities also emerged as a barrier to effective health education, as students are less likely to engage when policies reflect outdated or irrelevant information (Veugelers & Schwartz, 2010).

As public health information and evidence is consistently changing and is context-specific, teachers must be willing to constantly learn new information in order to ensure that what they teach is appropriate. Although teachers in Canada are well qualified, course work in health education or CSH is not mandatory in all Canadian universities (Veugelers & Schwartz, 2010). To make up for this, teachers must be dedicated to consistent professional development (St. Leger, 2001; Veugelers & Schwartz, 2010). However, research demonstrates that any changes to the health education system must be gradual; if they are too sudden, they are less likely to be sustainable, as teachers and administrators of health education may be overwhelmed (Stolp et. al., 2014).
2.5. A Focus on Nutrition Education

2.5.1. Evidence for Need

Effective nutrition education can incorporate all aspects of the CSH framework presented previously, including teaching and learning, social and physical environment, healthy school policy, and partnerships and services. Nutrition education has been defined as knowledge of “concepts and processes related to nutrition and health, including information about healthy eating, diet and disease prevention, nutritional value of foods, and awareness of dietary guidelines” (Colley et. al., 2019) Nutrition education presents an accessible intervention point for policy change, as it does not require broad societal or community change that is required by other health education interventions. Moreover, because nutrition education is not always as regulated as other health education aspects, like physical education, it is often not prioritized (Carraway-Stage et. al., 2015).

Several studies have shown that the introduction of nutrition education has increased children’s nutritional knowledge, increased fruit and vegetable consumption, and influenced lifelong dietary habits and preferences among children (Parmer et. al., 2009; Story et. al., 2002). In addition, researchers found that interventions with a nutrition education aspect resulted in students having better ideas of nutritional contents of food, as well as food preparation and cooking methods (Colley et. al., 2019).

Nutrition education can take many forms, including food preparation and consumption, learning food skills, hands-on activities like school gardens and farms, and learning the nutritional contents of food (Colley et. al., 2019; McKenna, 2010). Schools are able to incorporate nutrition education in many ways, including in core school curricula, like math and science, as well as through outside education opportunities in the community (Story et. al., 2002).

Current evaluations of nutrition education programs across Canada are by no means comprehensive, but one study regarding student involvement in available health education programs found that Canada was behind its North American counterpart with regards to program availability. This study found that 68% of U.S. schools offered
classroom-based nutrition education, whereas only 59% of Canadian public schools had these programs available. 33% of U.S. public schools offered a garden or farm-to-school program, whereas only 15% of Canadian schools offered school garden programs (Stephens et. al., 2016).

Nutrition education is, in itself, a multifaceted concept, and is employed differently from school to school. Proper evaluation of existing and planned programs is important to ensure that programs are having good effect. Evaluation can take place in varying ways: dietary recalls in the form of surveys of school-age children, as well as testing of their nutritional knowledge. This is not without difficulty; the following section identifies several key areas that effective nutrition education must cover in order to impact health outcomes for students.

2.5.2. Requirements for Success

Nutrition education is most effective when programs are culturally informed, properly resourced, consistent and long term, hands-on, and inclusive of all stakeholders. Furthermore, in order to fit in with the CSH framework, nutrition education should primarily fit the requirements of the CSH and be student-focused (Pérez-Rodrigo & Aranceta, 2003).

Culturally relevant programs will ensure that children understand and acknowledge programs, and that the skills and tools being taught will be relevant for children outside of their school environment (Pérez-Rodrigo & Aranceta, 2003). One way to ensure material is culturally relevant is by promoting peer-led interventions, which can give young people not only insights into the lives of their peers, but also empower young people to share their lives, knowledge, and skills with each other. This has been proven to be effective in reducing damaging behaviour in children (Story et. al., 2002).

Programs must also be adequately resourced, referring not only to materials and funding. Required resources may vary depending on location, including human resources, administrative support, and peer or community involvement (Stolp et. al., 2014; St. Leger, 2001). It is important to ensure not only financial resources are in place, but also
to ensure that supports are in place in order to prioritize the program, including administration buy-in and leadership (Stolp et. al., 2014).

As part of health education, nutrition education must be consistent and long-term. Studies show that most effective programs will be taught in all grades throughout the school year, and that sufficient time be dedicated to these programs (McKenna, 2010). This will require evaluation methods that ensure that the commitment is being followed through.

Research has demonstrated that nutrition education is most effective when it incorporates a hands-on element. Many schools have decided to incorporate garden-based activities along with nutrition education, which has been shown to have a significant effect on nutrition-related behavior (McAleese et. al., 2007; Lukas & Cunningham-Sabo, 2011).

Finally, within the CSH framework, school nutrition programs must address students' physical and social environments, both within schools and outside of schools by acknowledging and incorporating the various stakeholders that influence children’s health. In a qualitative analysis of the necessary components of a nutrition education program, one study found that ‘buy-in’ from several stakeholders, including teachers, students, principals, families, and higher leadership, including the school district and provincial governments was necessary in order to ensure that programs were pursued (Stolp et. al., 2014).
Chapter 3. Methodology

3.1. Case Studies

Four case studies were analyzed in order to explore how health education programs are determined and delivered in various jurisdictions. These jurisdictions included two within Canada, Alberta and Ontario, as well as international jurisdictions, Australia and the United Kingdom. Table 1 provides an overview of the jurisdictions.

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Curriculum &amp; Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta</td>
<td>Curriculum is provincially determined. Governance of education delegated to school districts.</td>
</tr>
<tr>
<td>Ontario</td>
<td>Curriculum is provincially determined. Governance of education delegated to school districts.</td>
</tr>
<tr>
<td>Australia</td>
<td>Curriculum is determined by ACARA, an independent national Crown authority. This authority is also responsible for evaluation and governance.</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>All state funded schools required to follow statutory national curriculum. Schools responsible for organization and governance of programs.</td>
</tr>
</tbody>
</table>

Table 1: Case Study Selection

Countries selected for case studies were evaluated in terms of the comprehensive school health framework. Table 2 provides a guide to the comprehensive school health framework. Table 3 gives insight to the questions used to guide this analysis.

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching and Learning</td>
<td>Formal and informal learning opportunities that build knowledge and skills related to health</td>
</tr>
<tr>
<td>Social and physical environment</td>
<td>Buildings and equipment, relationships and emotional wellbeing</td>
</tr>
<tr>
<td>Healthy school policy</td>
<td>Policies and rules at all levels of governance that influence the school environment and student health</td>
</tr>
<tr>
<td>Partnerships and services</td>
<td>Connections between the community and the school, including parents, community organizations, health professionals, etc.</td>
</tr>
</tbody>
</table>

Table 2: Comprehensive School Health Framework
<table>
<thead>
<tr>
<th>Area</th>
<th>Questions</th>
</tr>
</thead>
</table>
| **Description of the program/programs** | - How is the program structured?  
- What share of students does the program reach?  
- Who is responsible for implementation?  
- Are there any evaluative methods in place to examine effectiveness? |
| **Teaching and Learning**              | - What is taught to students? What do students learn?  
- Where do teachers/educators source their nutritional information?  
- Does the program consider alternative teaching methods/skills? |
| **Social and Physical Environment**    | - Does the program take advantage of physical space for student interaction?  
- Does the program consider the specific physical, social or cultural environment of students? |
| **School Policy**                      | - Is the program governed by legislation?  
- Does the program use any established standards of nutrition (established by the province/nation)? |
| **Community & Partnerships**           | - Does the program take advantage of connections between students and their communities outside of school?  
- Does the program actively engage parents/caregivers so that it can have more reach? |

**Table 3: Analysis Guiding Questions**

### 3.2. Expert Interviews

Expert interviews were conducted in order to inform the policy options and act as complement to the information collected through the literature review and the case study findings. Interviews were conducted with three individuals, representing experts in the fields of nutrition, education, and dietetics. Interviewees are:

- **Anonymous**, Professor of Land and Food Systems, British Columbia
- **Cayley Velazquez**, Professor in the Faculty of Health Science, Kwantlen Polytechnic University
- **Lisa McKellar**, Regional Executive Director, Dieticians of Canada
3.3. Limitations

The most significant limitation on the analysis policy options to improve student health outcomes through nutrition education is availability of data. As most nutrition education programs are informally implemented based on the specific school, much evidence of structure, implementation, and evaluation of these programs, if completed, is reported on informally. This lack of access to data presents difficulty in effectively determining how potential policy options could play out in particular schools. Indeed, echoed in much of the literature and primary research is the absolute need for more comprehensive evaluations of current programs and how they are implemented in schools.

Because of this, research gathered from the case studies is incomplete, as, for most of the cases studied, evaluations of these programs were either insufficient or completely absent. Having more rigorous examination of programs and policies implemented in these case studies would have resulted in more rigorous analysis.

A secondary data limitation is the complexities associated with evaluation of health outcomes in general. As many factors influence health outcomes, it is difficult to isolate the effects of specific programs or policies on individual health. Therefore, comprehensive health measurements, including BMI, are often insufficient in effectively measuring the individual health.

A final limitation is insufficient interview results. As school districts have their own ethics approval process, I was unable to interview representatives from schools that may have had unique insights into program availability and implementation within schools. This would have enabled a more rigorous supportive analysis of case studies, as well as a much more thorough evaluation of my policy options. Therefore, I was only able to include perspectives from researchers as well as governmental administrators in evaluating my research.
Chapter 4.  Case Study Analysis

4.1. Introduction

In order to evaluate the programs included in the case studies, I will use the comprehensive school health framework, which acknowledges that effective programs must be reinforced through a variety of activities and relationships in the school environment.

Many aspects of school management are delegated to the school districts in Canada. However, curriculum is usually designed at the provincial level. As representative provinces, I will consider British Columbia, Alberta, and Ontario in order to determine how programs vary across Canada.

I will also include Australia as a case study. Although regulation of education is the responsibility of the state or territory, a national curriculum is taught at all Australian primary and secondary schools. This study will demonstrate the difference between curriculums decided at a provincial and at a national level.

The United Kingdom updated their National Curriculum in 2015 to require that all children and young people, aged 5-14, study cooking and nutrition. An evaluation of the efficacy of this policy change has been conducted.

4.2. Canadian Case Study Analysis

4.2.1. A Canadian Overweight and Obesity Snapshot

Figure 2 indicates the percentage of total population of Canadians aged 12-17 who self-report that they are overweight or obese in 2018. This data was collected using the Canadian Community Health Survey, who consider overweight and obesity to be consistent with the World Health Organization guidelines, where a BMI above 25 is considered overweight and a BMI above 30 is considered obese. According to data from this survey, 23.7% of Canadian youth, aged 12-17 self-reported that they were
overweight or obese. In British Columbia, 21.5% of youth self-reported that they were overweight or obese, compared to 24% and 22% in Alberta and Ontario, respectively.

Figure 2  Body mass index, self-reported, youth (12-17 years old), overweight or obese, Canada (excluding territories) and provinces, 2018. Statistics Canada. Table 13-10-0096-01. Health characteristics, annual estimates.

4.2.2. British Columbia

Healthy Schools BC is an online inventory of programs and services available to teachers and educators in order to implement healthy school initiatives, using the CSH framework. Included in this is a learning framework, resource guide for teaching and learning, as well as an activity guide for the comprehensive school health four pillar framework. This presents an online resource for educators to consult when developing their project plans (Healthy Schools BC, 2019).

In 2010, the Vancouver School Board (VSB) implemented the VSB Sustainability Framework, intending to help Vancouver become the greenest, most sustainable school district in North America (VSB Sustainability Framework, 2010). Included in this framework are supports for nutrition education programs like school gardens and food preparation and tasting activities (Stephens et. al., 2016). The most recent Sustainability Plan, released in 2018, includes supports for school-level conservation projects, an
example of which is a classroom ‘energy diet’ (VSB Environmental Sustainability Plan, 2018).

In 2015, Black et. al. (2015) conducted a comprehensive review of a sample of elementary and secondary schools in Vancouver, assessing their integration of healthy and sustainable food initiatives. They found that 75% of schools had a school garden, and that, although secondary schools offered more regular food preparation activities, 91% of schools had at least some kind of food preparation facility. However, many of these programs were new, and frequency of use of these food preparation programs varied. Food-related teaching and learning activities existed to some degree at most schools, but they were not well integrated across the entire school curriculum.

4.2.3. Alberta

The Alberta Project Promoting Active Living and Healthy Eating in Schools (APPLE) was implemented in 2007/2008 in ten schools in and around Edmonton, Alberta. The project is funded by the Public Health Agency of Canada, as well as several other local and national donors (APPLE Schools, 2019). As part of this program, one school health facilitator (SHF) was hired in each school. These SHFs participates in a six-week training program, becomes educated in nutrition, physical activity, and community development, and is positioned at their school full time (Storey et al., 2012). Since 2008, APPLE schools have expanded into Manitoba, the Northwest Territories, and British Columbia, now servicing 74 schools. APPLE Schools continues to host learning events for school health facilitators and school health champions (APPLE Schools, 2019).

As part of their training program, SHFs undergo an additional three-day training program each year, where experienced SHFs and new SHFs are encouraged to learn and build a sense of team with each other. In addition, the APPLE Schools project hosts a yearly conference, as well as several knowledge exchange events each year. These events are meant to encourage knowledge transfer, build comradery, and learn about new healthy eating, physical activity, and mental health resources. In their schools, the SHF works with members of the community, including students, parents, and school staff, to create a school action plan that suits the individual school needs (APPLE Schools, 2019).
The APPLE program aimed to improve healthy eating and active living among children by increasing school-based capacity, changing the school environment, and by ensuring that the healthy choice was the easiest choice for students. The ultimate goal of this project has been to integrate healthy living into all elements of the school, and involve participation from parents, students, staff and community stakeholders (Roberts et. al., 2016).

A comprehensive evaluation of this program indicated that, in schools with APPLE facilitators, students were more likely to consider trying new foods, have a change in attitude towards healthier living, increase their school engagement and participation, and appreciate healthy foods during school events. Furthermore, increasing parent engagement resulted in parents providing healthier lunches for their children. In addition, teachers began to see this program as complementary to their work, instead of adding to their existing workload (Storey et al., 2012).

Recent evidence suggests that students from APPLE schools are, relative to non-APPLE schools, more likely to be healthy at home, are more active, and are less likely to experience mental health issues in adolescence. Furthermore, the changes experienced in schools enables students to change their home environment as well, and that students in APPLE schools are more supportive of healthier home environments. (APPLE Schools, 2019).

### 4.2.4. Ontario

The Ontario government implemented a School Food and Beverage Policy in 2010, which set nutrition standards for food and beverages sold in publicly funded elementary and secondary schools in Ontario. Although this held school boards accountable for the sale of food and beverages, it did not apply a provincial mandate to specify the inclusion of nutrition education programs. Therefore, any programs developed are developed at the school-board level (Ontario Ministry of Education, 2010).

The Ontario Healthy Schools Coalition and the Ontario Society of Nutrition Professionals in Public Health School Nutrition Working Group have prioritized a health school
nutrition environment, aligning themselves with priorities of the comprehensive school health promotion framework (Renata et. al., 2012).

For example, the York region school district has created a number of programs and services that are helping the region improve student health. This school district has provided nutrition services staff in order to consult with schools about how to create a healthier school food environment. They also provide an online network of support services and classroom resources for teachers in order to help them expand their nutrition knowledge.

Teachers are offered workshops, as well as curriculum support resources that help them incorporate nutrition into their current curriculums. These resources are informed by the Canada Food Guide, the School Food and Beverage Policy, and include information about comprehensive school nutrition, as well as food insecurity, body weight and self-esteem.

York has also worked to create a volunteer-run cooking program with a focus on fruits and vegetables, available for children in grades 5-8. This program runs once a week for five weeks, and students make two recipes each week. Included in this program is knowledge transfer about healthy food choices, food skills and cooking methods, and increased knowledge of fruits and vegetables.

This program is entirely volunteer-run, and volunteers who are trained are able to run the program at their school at any time. This program is available at no cost for schools, however they are responsible for purchasing their own ingredients and having their own cooking utensils (York Region, 2019).

There are no current reported measures to examine the effectiveness of these resources and services.
4.3. International Case Study Analyses

4.3.1. An International Child Obesity and Overweight Snapshot

Figure 3 depicts the percentage of boys and girls, aged 5-9 and 10-16 in Canada, Australia, and the United Kingdom who are living with obesity. This self-reported data was compiled in 2019 by the Child Obesity Foundation sourced from a WHO survey in 2016. The WHO determine that those with a BMI of over 30 are considered obese. In each country, and in each age group, boys are more likely to be obese than girls. In addition, children aged 5-9 are more likely to be obese than children aged 10-16. The United Kingdom had the lowest percentage of boys and girls, in both age groups, living with obesity. Although obesity levels for both boys and girls, 5-9, in Canada were higher than those in Australia, obesity levels for boys and girls aged 10-16 were higher in Australia than in Canada.

![Figure 3. Percentage of boys and girls, aged 5-9 and 10-16 living with obesity, self-reported: Canada, Australia, and the United Kingdom, 2016. Adapted from World Obesity Federation, 2019.](image-url)

It is important to acknowledge the difference between self-reported data and measured data, especially when it comes to public health, as there is often a disconnect between the two. Although measured data for the young populations of these countries that were only considered obese has not been reported, a 2019 OECD report on health indicators
conveyed higher levels of combined overweight and obesity in all three of these countries.

This data, which was collected in 2016 by the World Health Organization, depicted measured combined overweight and obesity among 5-9 year olds by sex. According to this data, Australia, Canada, and the United Kingdom were all above OECD average, with a higher percentage of 5-9 year olds in Australia measured overweight and obese than those in Canada and the United Kingdom. This data is displayed in Figure 4.

![Figure 4. Percentage of total boys and girls, aged 5-9 and living with overweight and obesity combined, measured: Canada, Australia, and the United Kingdom, 2016. Adapted from OECD, 2019.](image)

**4.3.2. Australia**

In Australia, the Australian Curriculum, Assessment and Reporting Authority (ACARA), an independent authority and a Commonwealth entity, is responsible for developing a comprehensive national curriculum. This entity was established under Section 5 of the *Australian Curriculum, Assessment and Reporting Authority* Act on December 8, 2008. The curriculum includes Foundation years to Year 12. In addition to the development of the curriculum, this entity is also responsible for assessment, and works to collect and publish information about the performance of each Australian school (ACARA, 2019).
The Australian school curriculum mandates that students from year 1 to year 10 receive food and nutrition education. This incorporates food groups and recommendations for healthy eating. As an educational base, the curriculum refers to the Australian Guide to Health Eating and the Australian Dietary Guidelines for Children and Adolescents (Ronto et al., 2016).

In Australia, the current curriculum covers food and nutrition in two areas: 1) Health and Physical Education and 2) Design and Technologies. Nutrition education is taught in the Health and Physical Education area, and food skills are taught in Design and Technologies (Sadegholvad et al., 2017). In most schools, food and nutrition education programs resides nearly entirely within the home economics learning area and includes learning for making healthy food choices when selecting, planning and preparing foods (Ronto et al., 2016).

Nutrition Australia, an independent body that aims to promote health and wellbeing for all Australians, offers a range of services for primary and secondary schools in Australia. They base their services on the latest science and research, and offers programs run by qualified health professionals and educators. Among its programs is Food&ME, a series of educational units that are linked to the Australian curriculum through Health and Physical Education. This series is offered to students from Preschool to Year 8. These programs give students the opportunity to learn about the relationship between food and health and enable them to have more autonomy in their food choices (Nutrition Australia, 2019a).

Nutrition Australia also acknowledges the importance of including the wider community in these programs and offer learning programs that enable parents and families to be engage with their children. These programs include cooking demonstrations and workshops and aim to encourage more sustained and holistic food change. As part of this service, a registered practicing dietician delivers a professional development at school, lecturing on topics related to the food groups, implementing activities for children such as school gardens (Nutrition Australia, 2019b).
4.3.3. United Kingdom

Obesity remains a significant issue among British primary schoolchildren, with 2016 reports indicating over 10% of children aged 5-9 and 10-16 are obese (World Obesity Federation, 2019). Furthermore, the OECD that over 32% of boys and girls, aged 5-9, are living with overweight and obesity (OECD, 2019). To address this, since 2015, practical food preparation and food education have formed part of the National School curriculum in England, Scotland and Wales. In addition, there is significant support from external parties, such as health advocacy groups and others, to offer free and accessible information to support and encourage food and nutrition education. These programs have expanded in recent years to provide resources for teachers, as well as mobile and internet-based activities (Schneider & Theobald, 2016).

Evaluations of this change have been conducted by external groups, as no monitoring or evaluation has been mandated as part of the curriculum change. This evaluation was undertaken to clarify what students were learning, the resources that they used, the activities available, and how the wider school and external communities were involved in shaping and enhancing these programs (Ballam, 2018).

This review, titled the ‘Food Education Learning Landscape’ was conducted by the Jamie Oliver Food Foundation from November 2016 through to September 2017. It concluded that around two-thirds of primary and secondary school teachers reported that this curriculum change did not translate to actual program change, and that many schools suffered a lack of lesson planning, funding, and teacher resource provision. Some schools reported insufficient amount of cooking and nutrition, with results indicating that most students receive less than twenty hours of nutrition education per year, with many students receiving much less. Time allocation is not specified in the curriculum change (Ballam, 2018).

Whereas food education is compulsory, there is little to no support for primary school teachers to enable them to teach these subjects. There is a marked lack of food specialists, and limited teacher training (Schneider & Theobald, 2016). Furthermore, many teachers reported that they were constrained from providing necessary education by lack of time,
budget and resources, and that they suffered from lack of opportunity to increase their own knowledge through professional development. The majority of teachers agreed that specialists should be introduced to teach food education, and that food-specific training courses remained largely unavailable.

As part of this review, some key performance indicators were drafted for both primary school and secondary school students. Primary school students should receive no less than 18 hours of food education per year, with over half being practical education. Secondary school students should receive 24 hours per year of food education, of which over one half should be practical. This education should consist of growing food and learning about food origins, the application of healthy eating by preparing food (Ballam, 2018).
Chapter 5. Interview Analysis

Semi-structured interviews were conducted following a flexible interview protocol. The intent was to determine interviewees’ insights into the existing state of nutrition education programs, challenges facing these programs, and requirements for future successful programs.

5.1. Barriers to Positive Student Health Outcomes in BC

Summary:

- Lack of cohesion between stakeholders, including both governmental and non-governmental organizations, school districts, school administrators, and the wider school community.
- Lack of clear evidence-based best practices.
- Lack of cohesion between programs offered at schools.
- Lack of understanding of what nutrition education programs are and look like.
- Influence of ‘upstream factors’ that influence student health that are difficult to control at the school level.

Interviewees were asked what, in their opinion, were the most significant factors preventing positive health outcomes for students in BC. One response was the perceived lack of coordination and cohesion of the many players operating in order to facilitate a school health program. One interviewee mentioned that this lack of cohesion occurs at the provincial level, with the differing responsibilities of the Ministry of Health and the Ministry of Education, but that it also occurs between the academic world, the municipal level and the school districts, as well as the NGO world. Respondents indicated that these players are all important in order to create effective programs, but that the lack of cohesion created ineffective program development and redundancies.

Interviewees suggested that one barrier to positive student health is the lack of clear best practices, in terms of data and program analysis. Respondents indicated that there is no confidence that current practices are based on best available practice.
Interviewees indicated that a lack of consistency in programs offered in schools frustrates progress towards positive health outcomes. In their responses, interviewees mentioned that all health programs in schools need to be in line with each other; for example, having a comprehensive nutrition education program teaching students about healthy foods cannot work if it coexists with a school lunch program that pushes unhealthy food options.

One respondent also indicated that there was a lack of consistency in determining what nutrition education or food literacy is. This respondent indicated that, for some, it’s just teaching about the food guide, or curriculum-based initiatives. For others, it includes a broader set of issues that range from individual health to food systems and sustainability.

The last major theme was that “upstream factors” influence student health, and these factors are resistant to change via school interventions. They stem from the social determinants of health. Poverty and vulnerability of students can limit the effectiveness of positive, supportive school environments.

### 5.2. Challenges Facing Nutrition Education Programs in BC

**Summary:**

- Need for a positive, supportive school environment in order to support nutrition education programs, where staff is supported, and programs are supported by other cohesive programs.
- Existing programs are socially embedded and therefore resistant to change.
- Lack of willingness to act from teachers, especially when they feel unsupported.
- Absence of a policy window

Interviewees were then asked to focus on nutrition education programs specifically and think about the most pressing challenges that face the system today. One response was that change is very difficult to create, even if quality programs are created. One respondent indicated that expectations of what a nutrition education program can change needs to be moderated, and that even with a supportive teacher and curriculum, it’s
difficult to effect behaviour in any particular direction. As a result, positive, evidence-based programs that are implemented in schools without a positive, supportive school environment are very unlikely to result in change. This support needs to be in the form of other program provisions that are in line with nutrition education ideals and supported by administrative and teaching staff in the school.

Another theme was the stickiness of program change. Respondents indicated that programs tend to be socially embedded, and that curricular changes are unlikely to result in actual program development and change in a short time. Respondents indicated that this, as well, is due to the problem of program change being implemented in schools that don’t have positive, supporting school environments.

Respondents indicated that resting expectations for program development and delivery on teachers was difficult, as teachers do not always respond well to increased workloads without sufficient supports. In addition, respondents indicated that food is complicated, and that teachers themselves may have complicated relationships with food that may impact how they are able to teach their students about these subjects. Therefore, resting expectations that teachers will be entirely responsible for program development and delivery will not result in positive change.

A final theme was the perceived reluctance to commit to change from the provincial level. One respondent indicated that they had the sense that school nutrition programs were not a high priority at the moment, and that the nature of the education system was that only a few priorities could be focused on at this time.

### 5.3. Factors for Success

**Summary:**

- Reduce duplication in program delivery.
- Ensure that evidence-based policies are made and enforced.
- Set standards so that schools know what policy changes will look like in their schools.
• Sufficient support and buy-in of:
  o Specialists (dieticians, researchers, etc.)
  o Governmental organizations
  o Non-governmental organizations
  o Administrative and school staff
  o Community members

• Ensure that program changes in schools are supported by other programs with similar goals.

• Teacher and teacher candidate training.

Interviewees were asked what they think needs to be involved in order to make sure nutrition education programs are effective and successful. One response was the absolute need to reduce duplication in program delivery. Respondents indicated that this goal can be met by ensuring that all stakeholders are on the same page and working in line with each other, and that those who are responsible for program creation and delivery are informed and supported.

One major theme was the need for evidence-based policy that was enforceable. Establishing the research that supports policy decisions and sharing those decisions with those who are responsible for implementation is necessary in order to support policy changes. Policy changes require a clear outline of the mandated change, whether curricular or not, a clear idea of how it will be supported, the resources designated to support, and the expected impact. Respondents indicated that policy changes at the governmental and school district level are only effective if they are actually enforced on the ground, as individual schools are often resistant to change.

Respondents highlighted a need for buy-in from stakeholders across the board as to why nutrition programs were important. These stakeholders would include governmental ministries, non-governmental organizations, school districts, and school staff, among others. This was a consistent perception that, without a cohesive effort, within schools and outside of schools, programs were much less likely to be effective.
Furthermore, supportive nutrition education with other health programs with similar goals, whether through outdoor education or a school lunch program, was necessary in order for nutrition education programs to have any effect.

Respondents indicated training teachers to be more comfortable integrating food in their classroom teaching was necessary to ensure that students learned. Respondents recommended extensive work with teachers, including in professional development, but also through inviting teachers to engage in hands-on experiential learning. Respondents indicated that those responsible for program delivery, whether teachers or outside professionals, needed training, time, and a supportive principal and school administrative environment.

5.4. Evaluation Methods

Summary:

• Significant gap in evaluation methods for nutrition education programs in schools.

• Difficulty determining effectiveness of particular programs on student health.

• Evaluation indicators may include:
  o Number of students who participated.
  o Knowledge about fruits and vegetables.
  o Determination of student skill to cook/prepare certain foods.
  o Evaluation of attitude/behaviour change towards healthier foods.

Interviewees were asked if they knew of any evaluation methods able to determine the relative success or effectiveness of programs. A consistent theme from interviewees was that there was a significant lack of published program evaluations. If completed, interviewees indicated that these evaluations were mostly being conducted and shared internal to specific programs. Respondents cited a clear lack of peer-reviewed information on this subject, and that, across Canada, there are a lack of longitudinal studies that tracked the effects of specific programs on the health of students.
Respondents reported that there is significant difficulty in determining how specific programs affect health outcomes, as health is determined by multiple factors. For this reason, attempts to isolate the effects of certain programs on health outcomes is frustrated by external factors difficult to control. One respondent indicated that this meant that program developers and evaluators needed to connect more with the academic world in order to create evaluative methods that were informed by evidence and best practices.

Interviewees were asked if they knew of any specific indicators that could be used to evaluate program effectiveness. Respondents indicated that most of these indicators were to be qualitatively derived, in terms of measuring the number of students who participate in activities and the time that they dedicate to specific activities or programs. Qualitative measurements include assessing student knowledge about fruits and vegetables and a determination of student ability to cook and prepare different foods. In addition, respondents suggested that an evaluation of attitude or change in behaviour towards healthier foods would benefit evaluations.
Chapter 6. Policy Options

This section outlines policy options for improving nutrition and food education programs in BC. The options outlined are informed by the literature review, case study analysis, and information from the expert interviews.

6.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education

This option would adjust the BC education curriculum to include a specific mandate that ensures that nutrition education is taught in school programming. Currently, the provincial government mandates that all public and private schools have a health aspect to their curriculums, which leaves room for each school district or school to employ different practices.

Should the BC Ministry of Education specifically require nutrition education, it would leave schools and school districts the autonomy to design and employ programs that specifically address their own needs or use their own resources. In this sense, although nutrition education would be mandatory, it would leave individual schools and districts the flexibility to design programming that suits their students, acknowledging the diversity of the province. This curriculum could include options for nutrition education, and guidelines on how to implement said programs. Programs could include incorporation of nutrition education in lesson planning, use of school gardens and growing equipment, or opportunities for students to learn how to cook foods and read recipes.

Necessary parts of a curriculum change are standard setting and evaluation methods. Standard setting is important, as this curriculum change should not specify the exact program structure or style. Standard setting should include requirements to reach a certain percentage of the student population, certain number of hours of programming taught, certain amount of time spent doing activities meant to encourage healthy habits. By setting standards, the province can ensure that change occurs while still respecting
flexibility. This should be accompanied by a comprehensive evaluation method, meant to ascertain the effects of this change on a yearly basis. This evaluation should include a diet recall for students, as well as a consultation with teachers on the changes that they see in their students and in their classrooms. In order to gather purposeful data, this should be conducted systematically across schools, as it would be important to have a big sample. Accordingly, a consistent set of evaluation criteria would be necessary. As an effort to engage the outside community, parents/guardians and other community members should be engaged in this evaluation as well.

6.2. Option 2: Mandate that Teacher Training Includes Nutrition Education

This option would require that a nutrition and food education component be mandatory in all teacher coursework in Canadian universities. In addition, more funding and opportunity should be allotted to ensuring that teachers have access to consistent professional development throughout their teaching careers in order to have up to date information to teach their students. As part of this, the province can lean on the federal government to provide a current teachers’ guide that incorporates information from the most recent Canada Food Guide so that there is less burden on teachers to create lesson plans for their students.

These changes should be gradual and consistent, so as not to overload teachers and ensure that changes are being implemented in a sustainable fashion. As part of this, there should be regular reporting from and consultation with teachers so as to inform proper proceedings. If teachers are consulted on curriculum changes, these changes are more likely to suit their specific needs and the needs of their students. If teachers are engaged, they are more likely to be willing to change their habits and teaching methods so as to keep up with current nutrition education standards.

6.3. Option 3: Hire a School Health Facilitator

This option would align with the mission in the Alberta Project Promoting Active Living and Healthy Eating in Schools, where a school health facilitator is hired in each school.
These facilitators would undergo a period of training, which would enable them to engage students to improve their healthy eating and active living. The training programs for these teachers would have to include up to date information that would reflect current federal food standards.

The facilitator would prioritize and acknowledge the cultural and dietary priorities of the students in their school, realizing the variation across the province. These facilitators would be responsible for engaging with students, teachers, parents, staff and community stakeholders to ensure that there would be more holistic, comprehensive change in schools.

This option would have to include an evaluation method which would address students, teachers and school faculty, and external community members, including parents and guardians, to ascertain the effects of this change.

Research conducted in this study has identified two general objectives for nutrition education programs in schools. First, these programs must generate some identified healthy habit changes for students. Second, changes resulting from these programs must be translated into habit changes outside of the school environment.

In order to determine the most effective policy or policies, the options will be evaluated against six criteria. These criteria include equity, development, effectiveness, stakeholder acceptance, administrative complexity and cost. These criteria will be measured on a scale of 1-3, where 1 is low, and 3 is high. As cost is often the most prohibitive factor for implementing educational programs, cost has been weighed two times the amount of the other criteria.

This analysis will be informed by the information from the literature review, case studies, and the interviews. This framework is detailed in Table 4.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure</th>
<th>Indicators</th>
</tr>
</thead>
</table>
| Equity          | The extent to which the option is inclusive of the needs of all BC school children. | Very inclusive = 3  
                             Moderate Inclusive = 2  
                             Not inclusive = 1 |
| Development     | The extent to which the option supports the long-term health of all BC school children, determined by delivery on CSH pillars.  
                             - Teaching and learning  
                             - Social and physical environment  
                             - School policy  
                             - Partnership and services | Delivers on all 4 pillars = 3  
                             Delivers on 2-3 pillars = 2  
                             Delivers on 0-1 pillars = 1 |
| Effectiveness   | The extent to which the option effectively improves nutrition education for BC school children. | Estimated proportion of students reached (in %):  
                             60-100% = 3  
                             25-59% = 2  
                             1-24% = 1 |
| Stakeholder     | The extent to which stakeholders, both governmental and local, are expected to receive and support the option. | High Acceptance = 3  
                             Moderate Acceptance = 2  
                             Low Acceptance = 1 |
| Acceptance      |                                                                          |                                                   |
| Implementation  | The extent to which governments are able to implement the option, excluding cost. | Low barriers = 3  
                             Moderate barriers = 2  
                             High barriers = 1 |
| Cost            | The estimated annual aggregate cost to government and/or school districts for program implementation. | Low cost = 3  
                             Moderate cost = 2  
                             High Cost = 1 |

Table 4:       Policy Analysis Framework
Chapter 8. Policy Analysis and Recommendations

8.1. Equity

<p>| Equity: The extent to which the option is inclusive of the needs of all BC school children. |</p>
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Option 1: Curriculum Adjustment</th>
<th>Option 2: Teacher Training Adjustment</th>
<th>Option 3: School Health Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very inclusive = 3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Moderately Inclusive = 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not inclusive = 1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Evaluation Table – Equity

8.1.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education

This option is expected to be very inclusive, as any changes to the provincial curriculum could be adjusted to each school. In this sense, changes to the curriculum would only specify that nutrition education would be mandated, and let each school or district determine how that would look within the school. This flexibility would allow environmentally- and culturally-specific programs to be supported, as long as they were proven to teach food literacy and nutrition education.

8.1.2. Option 2: Mandate that Teacher Training Includes Nutrition Education

This option is expected to be moderately inclusive, as it has been demonstrated through this analysis that depending on teacher’s abilities to effectively teach nutrition education will result in inequities across the board. This is because teachers themselves have their own relationships with food that will inevitably impact their teaching of the subject, and simply increasing a teacher’s knowledge of the subject will not always result in increased learning for school children. Furthermore, this would result in inequities between teachers who are still in training and teachers who have been teaching for many years, as those who are still in training are more likely to absorb nutrition information than those who have been teaching for longer.
8.1.3. **Option 3: Hire a School Health Facilitator for Each School**

This option is expected to be highly inclusive, as these school health facilitators will be ideally sourced locally and have knowledge of the environment around the school, the students they will be responsible for teaching and their lives, and how best to address these students in facilitating healthier habits. Therefore, there is expected to be equity in ensuring that all students and their needs are respected in program creation and delivery.

8.2. **Development**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Option 1: Curriculum Adjustment</th>
<th>Option 2: Teacher Training Adjustment</th>
<th>Option 3: School Health Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delivers on all 4 pillars = 3</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Delivers on 2-3 pillars = 2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Delivers on 0-1 pillars = 1</td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Table 6: Evaluation Table – Development**

8.2.1. **Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education**

Although it is likely to vary, it is expected that this option will deliver on only 2 pillars. As this is a curriculum change, and schools have the flexibility to determine how these changes will play out within their schools, this change only guarantees that school policy and teaching and learning will be adjusted. Although these changes may eventually affect the social and physical environments, and some schools may elect to include community partnerships in their specific program delivery, it is not guaranteed.

8.2.2. **Option 2: Mandate that Teacher Training Includes Nutrition Education**

Much like in Option 1, this option only guarantees that 2 pillars will be addressed. School policies will be altered as materials that are required for teachers to learn are being adjusted. In that sense, teaching and learning will also be affected, as teachers will ideally learn new skills that can be transferred to the student population. However, the social and
physical environment of the school will not be changed with this option. Community partnerships will also not be addressed. Much like Option 1, there is a chance that these pillars may be addressed down the line due to these policy-level adjustments, it is not guaranteed.

8.2.3. **Option 3: Hire a School Health Facilitator for Each School**

This option is expected to deliver on all 4 comprehensive school health pillars. School policy is altered mandating that each school include a school health facilitator on their staff, and that affects the content that is taught to students and the way students learn. The social and physical environment is changed as they are exposed to new methods of learning through these new staff members, who will be externally trained on nutrition education and how these programs can be structured. Finally, as described in the Alberta APPLE project, school health facilitators have made a keen effort to include the community in their teaching plans and activities, ensuring that students are actively engaging with their environment outside of schools.

8.3. **Effectiveness**

| Effectiveness: The extent to which the option effectively improves nutrition education for BC school children. |
|---|---|---|
| Indicator | Option 1: Curriculum Adjustment | Option 2: Teacher Training Adjustment | Option 3: School Health Facilitator |
| Estimated proportion of students reached (in %): | 50% (3) | 50% (2) | 100% (3) |
| 60-100% = 3 | | | |
| 25-59% = 2 | | | |
| 1-24% = 1 | | | |

Table 7: Evaluation Table – Effectiveness
8.3.1. **Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education**

This option is expected to reach 50% of students, as information from the case studies and the interviews suggests that provincial-level policy change alone is not effective to change policies at the school level. Reports from the United Kingdom indicate that mandating that schools include nutrition education programs has not actually resulted in changes at the school level, as teachers are often overburdened, and necessary supports are not in place. Therefore, this option, without necessary financial and capacity supports, is not likely to have wide success.

8.3.2. **Option 2: Mandate that Teacher Training Includes Nutrition Education**

This option is expected to reach around 50% of students, as it is not guaranteed that giving teachers knowledge of nutrition education will result in students learning that knowledge. The exact numbers of students that this option would reach is difficult to estimate, as it would depend on individual teacher’s willingness to learn and incorporate that information into their lesson plans. Furthermore, teachers at earlier stages of their careers will be willing to adjust their teaching styles and incorporate new information into their education plans than teachers who have been teaching for longer periods of time.

8.3.3. **Option 3: Hire a School Health Facilitator for Each School**

This option is expected to reach 100% of students, as having a specific staff member responsible for program delivery in each school ensures that all BC school children will have access to nutrition education programs.
8.4. Stakeholder Acceptance

<table>
<thead>
<tr>
<th>Stakeholder Acceptance: The extent to which stakeholders, both governmental and local, are expected to receive and support the option.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
</tr>
<tr>
<td>High Acceptance = 3</td>
</tr>
<tr>
<td>Moderate Acceptance = 2</td>
</tr>
<tr>
<td>Low Acceptance = 1</td>
</tr>
</tbody>
</table>

Table 8: Evaluation Table – Stakeholder Acceptance

8.4.1. Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education

This option is expected to have low stakeholder acceptance, as resistance from within the Ministry of Education and within schools is expected to be significant. Officials in the education ministry are sure to believe that it is too difficult to specify in the curriculum a program that ensures flexibility for each school in different districts. Furthermore, altering the curriculum is a lengthy and extensive job and is not a light undertaking for ministry officials.

Stakeholders outside of government are also likely to resist this option. As informed in the interviews, changes in the curriculum don’t always translate into changes in the school environment. Such changes are often resisted and seen as just another mandate that teachers and staff find themselves unable to incorporate into the school. The case studies demonstrate that curriculum adjustments often increase the burden on teachers, who are likely to resist this option as well.

8.4.2. Option 2: Mandate that Teacher Training Includes Nutrition Education

This option is expected to have medium stakeholder acceptance, as there is expected to be significant resistance from teachers and teachers’ unions, while government and school administrators would likely offer less resistance. As informed by the interviews and the case study analysis, many teachers believe that they are responsible for too much in terms of program delivery and are likely to believe that becoming responsible for more
is too much work. However, as this does not require much from government, there is expected to be less resistance from them. While school administrators are likely to have to deal with teachers on a more personal level, this option would also likely encounter less resistance from them.

8.4.3. **Option 3: Hire a School Health Facilitator for Each School**

This option is expected to have high stakeholder acceptance, as this is likely to be widely embraced by most, if not all stakeholders. The case studies evidenced that teachers are often grateful for the opportunity to seek assistance from an outside expert on these subjects, and teachers and administrators are more likely to appreciate the inclusion of a school health facilitator in their environments. Furthermore, parents and caregivers will likely be happy to know that their children are learning from accredited educators.

8.5. **Implementation**

<table>
<thead>
<tr>
<th>Implementation: The extent to which administrative, both governmental and local, are able to implement the option.</th>
<th>Option 1: Curriculum Adjustment</th>
<th>Option 2: Teacher Training Adjustment</th>
<th>Option 3: School Health Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low barriers = 3</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Moderate barriers = 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High barriers = 1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9: Evaluation Table – Implementation

8.5.1. **Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education**

This option is expected to have high barriers to implementation, as much work at the government level would go into crafting this policy change, and much work at the district/school level would go into implementing this policy change. At the government level, a specific mandate to devise not only a policy change but the rigorous standard-setting and evaluation that it necessitates would likely be very difficult to implement. Schools and districts would be responsible for ensuring that the policy change was translated and supported in the classrooms, which is likely to be difficult not only to
implement but to be sure that it is implemented in the proper way. This would be very complex and would vary from school to school.

8.5.2. **Option 2: Mandate that Teacher Training Includes Nutrition Education**

This option be very easy to implement, as it would require using many of the existing structures in place. Altering educational requirements would require some implementation but changing education structures for teachers would be relatively simple. Furthermore, existing teachers already have professional development days and opportunities, so altering these opportunities and providing new ones would be a fairly simple procedure.

8.5.3. **Option 3: Hire a School Health Facilitator for Each School**

This option is expected to have moderate barriers to implementation. It would require some work on the government side to create standards for educating school health facilitators but adding a faculty member to schools would not require much in terms of implementation for individual schools and school districts.

8.6. **Cost**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Option 1: Curriculum Adjustment</th>
<th>Option 2: Teacher Training Adjustment</th>
<th>Option 3: School Health Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low cost = 3</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Moderate cost = 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Cost = 1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 10: Evaluation Table – Cost**

8.6.1. **Option 1: Provincial Curriculum Adjustment to Mandate Nutrition Education**

This option is expected to come at high cost to the provincial government and to school districts. Altering a provincial curriculum is consistently an expensive procedure, not
only in terms of financial contributions but also the time it takes to craft such changes. Furthermore, the structures that would have to be in place to evaluate changes in schools would be costly to finance.

In some school districts, any curriculum change results in additional costs to schools. In order to respect this change, schools may have to hire new teaching or administrative staff and may be responsible for providing more services or facilities than they may have at the moment. This would also provide an equity issue, as some schools may be able to afford more or better equipment or services than other more resource-strapped schools.

8.6.2. Option 2: Mandate that Teacher Training Includes Nutrition Education

This is expected to be a low-cost option, as it involves using many of the same structures and services that already exist. There may be a slight cost to altering the education framework that teachers are subject to, and a slight cost to increasing or altering professional development opportunities, but it is not expected to be significant. In addition, there may be some costs associated with printing of new materials and some training for existing teachers. Teaching candidates, however, will have new materials incorporated into their existing curriculum, which is expected to come at no or little cost.

8.6.3. Option 3: Hire a School Health Facilitator for Each School

This is expected to be a medium cost option, as it would require some resources from the provincial government and/or from school districts in hiring and setting standards for educating school health facilitators. Furthermore, whatever facilities or services they would require in order to compose an effective nutrition education program may pose additional costs to the school or school district. However, this option is not expected to come at a cost similar to a curriculum change, as the change would not be as wide-reaching as a curricular change.

It is estimated that each school health facilitator would be paid around $50,000 per year. This cost can be mitigated by the sharing of a health facilitator among schools.
that have a small student population. Furthermore, rolling this program out slowly can be more helpful in adjusting to the cost.
8.7. Recommendation

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Curriculum Adjustment</th>
<th>Teacher Training Adjustment</th>
<th>School Health Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Development</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Stakeholder Acceptance</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Implementation</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Cost (2x)</td>
<td>2</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11</strong></td>
<td><strong>17</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

*Table 11: Policy Evaluation*

This analysis demonstrates that, when evaluated by the criteria presented, both teacher training adjustment and hiring school health facilitators score significantly higher than implementing a curriculum adjustment mandating nutrition education. However, much of the research presented in this project indicates the importance of school policy, as long as it is met with a supportive school environment.

Therefore, it is recommended that the province and school districts begin to implement teacher training adjustment and consider pursuing the hiring of school health facilitators in each school. Teacher and teacher candidate training is a fairly simple investment to make, and one that will begin to reshape the nature of schools, making the school environment much more supportive to higher level policy changes. This can be done through increased professional development days targeted to learning about nutrition education and can eventually include increased nutrition information taught to teachers during their training.

Following this adjustment, it is recommended that school health facilitators are hired in each school, whose job and responsibility is tailored to the specific needs of the schools. It has been demonstrated in the APPLE project that school health facilitators can
effectively increase student capacity to learn about nutrition, while respecting teacher’s responsibilities. This option, though, would present a significant increase in cost to government and potential costs to some or all school districts. Therefore, it is recommended that this option be explored in the future. In the meantime, efforts to determine effectiveness and cost-effectiveness of this option can be undertaken in order to support this decision in the future. Additionally, a pilot program in a few willing schools could be developed in the short term to establish effectiveness, gauge the willingness to participate, and begin developing criteria for evaluating outcomes.

Curriculum changes would be the most difficult and most costly option to implement, as it would require a significant amount of work from all stakeholders involved in the school system. Therefore, it is recommended that this third option not be pursued at this time, but that investigators and researchers continue to commit themselves to improving student health by conducting studies and evaluations of the most effective measures by which to ensure students are building health habits through schools. By implementing the two recommended policy options, it will help build the supportive school environment that can make any curriculum change implementation significantly smoother in the future.
Chapter 9. Conclusion

In order for school nutrition education programs to be effective, it is important that any model of nutrition education respect the comprehensive school health framework, addressing teaching and learning, school policy, social and physical environments, and community and partnerships. Healthy habits are not only built within the classroom, and it is important that those who are responsible for development of these programs ensure that the skills learned will be translated into student lives outside of schools.

One recurring theme through both the case studies and the interview portion of this analysis has been the absence of evaluation and assessment of current programs and plans across the province. A provincial assessment of programs that are in place at different schools, their effectiveness, their resources and the needs to fulfill these programs, as well as whether these programs are evaluated and how will illuminate the existing landscape at which nutrition education is taught in BC. Without this, proper analysis on a comprehensive level cannot be conducted.

In addition, any program or structure that will be implemented must be implemented set to a standard and with an evaluation method attached to it. These programs are new, and therefore need to be held accountable and need to be evidenced by feedback. Although it is difficult to assess results of these program changes, qualitative analysis, such as a diet recall, or a survey disseminated to school children and staff, will provide valuable feedback that can be used to assess and alter existing plans.

Adjusting teacher training to include nutrition education will enable teachers to be more familiar with nutrition education subject matter and allow them to more easily include these topics within their daily class activities. However, it is important that schools begin to take a more comprehensive and holistic view of how they are uniquely positioned to encourage healthier habits within students that can have lasting effects on their lives.

I conclude by addressing the need for a shift in the entire school environment towards a new perspective on food, and its importance for student success. The research conducted through this capstone has consistently shown that it is almost impossible for any specific
program to succeed without the presence of a positive, supportive school environment. This can either enable or prevent good programs from finding success, and therefore schools must work harder to prioritize these initiatives and ensure that they are taken seriously.
References


Appendix A. Interview Protocol

Nutrition Education Programs in BC Schools: Policy Alternatives to Improve Health Outcomes

Questions

1. Can you describe your experience working with nutrition education, either professionally or in the BC education system?
   a. How long have you been doing so?
2. What strikes you as the most important factors preventing positive health outcomes for students in BC?
3. Thinking generally about nutrition education programs in BC, what do you think are the most pressing challenges that face the system today?
   a. How does this vary across the province?
   b. In your opinion, has this changed or remained the same in the past 5 years?
4. What do you know of current measures being taken to address student health through school-based education programs in order to increase knowledge of nutritional information in BC schools?
   a. How does this initiative vary across the province?
5. Where do resources come from for these initiatives?
   a. Who is responsible for the implementation?
   b. Where does the directive come from?
6. Do you know of any current measures being taken to ensure that existing programs are effective?
   a. Evaluation methods or procedures?
7. Do you know of any specific programs or policies being practiced in other parts of Canada that do a good job at improving student health outcomes through nutrition education programs?
   a. How do these programs work? Who is responsible for ensuring the supports and services?
   b. Do these programs have measures to evaluate effectiveness?
8. Are there any specific solutions that come to mind that would improve nutrition education programs in the short-term or the long-term?
9. Who do you think needs to be involved in order to make sure nutrition education programs are effective?
10. If you were the sole decision maker for improving nutrition education programs in BC, what specific programs would you support/allocate resources to over the next five years? Why these programs?
11. What are some evaluative measures to evaluate program effectiveness?
   a. Are there any specific criteria or indicators?
Appendix B. Interview Analysis Tool

What strikes you as the most important factor(s) preventing positive health outcomes for students in BC?

<table>
<thead>
<tr>
<th></th>
<th>Cohesion between stakeholders</th>
<th>Cohesion between school programs</th>
<th>Current policies not being enforced</th>
<th>Upstream determinants of health</th>
<th>Difficulty changing socially embedded programs</th>
<th>Lack of literature on school food programs</th>
<th>Lack of understanding of best practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview 1: 01/17/2020</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview 2: 01/22/2020</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview 3: 01/22/2020</td>
<td>✗</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✗</td>
</tr>
</tbody>
</table>
What do you think are the most pressing challenges facing nutrition education programs in BC today?

<table>
<thead>
<tr>
<th></th>
<th>Financing</th>
<th>Lack of action from teachers</th>
<th>Consistent offering for all students</th>
<th>Clear determination of what nutrition education is</th>
<th>Need for supporting programs</th>
<th>Need to review current provincial and local programs</th>
<th>Absence of policy window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview 1: 01/17/2020</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview 2: 01/22/2020</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview 3: 01/22/2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

What do you think needs to be involved in order to make sure nutrition education programs are effective?

<table>
<thead>
<tr>
<th></th>
<th>Reducing duplication</th>
<th>Involvement of health professionals (dieticians, researchers)</th>
<th>Policy that is enforceable</th>
<th>Administrative/school environment support</th>
<th>Designated health champion in each school</th>
<th>Evidence-based program justification based on research</th>
<th>Teacher and teacher candidate training</th>
<th>Community of supports</th>
<th>Standard setting so schools know what changes will look like</th>
<th>Buy-in from all stakeholders</th>
<th>School program cohesion</th>
<th>Raise awareness of importance of programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview 1: 01/17/2020</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview 2: 01/22/2020</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview 3: 01/22/2020</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
What are some evaluative measures that can be used to determine program effectiveness?

<table>
<thead>
<tr>
<th></th>
<th>Number of students who participated</th>
<th>Knowledge about fruits and vegetables</th>
<th>Determine whether student has skill to prepare/cook items</th>
<th>Attitude/behaviour change toward eating healthier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interview 1:</strong> 01/17/2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interview 2:</strong> 01/22/2020</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Interview 3:</strong> 01/22/2020</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>