

**SOWING THE SEEDS OF EXPERIENTIAL LEARNING:
PERSPECTIVES ON THE CREATION OF A HIGH SCHOOL GARDENING
CLASS IN THE HALIFAX REGIONAL MUNICIPALITY**

By

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ABSTRACT

This study uses a Grounded Theory framework to explore the opportunities and barriers of integrating an elective gardening class into the curriculum for high school students in the Halifax Regional Municipality. Four community garden workers participated as key informants in this research. They shared their perspectives on the benefits and detriments of school gardens and how a gardening class could be structured. The conclusion of this study is that the participants believe that the implementation of a high school gardening program would be beneficial to the students, schools and community. The next step for this research is to explore the students' perceptions of a gardening class to determine whether it would be a worthwhile program that they are interested in.

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

School gardening programs in North America are becoming more and more popular. In the 1990s, the Superintendent for Public Instruction in California, US called for “a garden in every school.” Two decades later, there are now over 2000 school gardens in California alone (Carlsson, 2010, p 32). Meanwhile, in New York, the Citywide School Garden Initiative was established in 2010; today more than 200 schools and over 11,000 students are following a garden curriculum issued by the state (Faddegon, 2005).

Although school gardening programs are still more dominant in the United States, similar initiatives are beginning to take root in Canada (School Garden Network, 2013). Here in Nova Scotia, twenty-five schools applied for funding to start a garden program in 2012 (Nova Scotia Department of Agriculture, 2012). So why do schools decide to implement school gardening programs? The research shows that there are three main answers to this question: physical health, mental well-being and food sovereignty. The *School Garden Resource Guide* distributed by the Nova Scotia Department of Agriculture (2011) posits that school gardens help students engage in curriculum while having fun, developing environmental awareness, being physically active, fostering responsibility and helping them to make connections between food and the environment.

1.2 Overview of Problem

School gardens have many benefits to participating students, but as Annie Lowry points out in her Honour's thesis, "the presence of school gardens does not necessarily mean that the gardens are being used as effective educational tools" (2011, p. 1). In the United States, many states such as New York and California are trying to use their gardens as effective educational tools by integrating curricular learning into the hands-on learning of the gardening activities. In a recent case study, Dorothy Blair reviewed twelve current journal articles about the impacts of gardening on education. She found that nine out of the twelve journals identified that integrating gardening into the formal curriculum had beneficial impacts on the students' behaviour and academic achievement (2009).

In Nova Scotia, this amount of progress has not yet been made. Instead of using the school gardens as effective teaching tools, all gardening programs remain extra-curricular activities with no integrated curricular learning. This dissociation between garden-based and curricular learning has created a few challenges for Nova Scotian students.

Firstly, because all the gardening programs are extra-curricular in Nova Scotia, it means that students who wish to participate in the gardening initiatives experience the time and responsibility constraint of juggling their garden based volunteering experiences with their in-class, curricular-experiences. Furthermore, some students miss out on the benefits because they may not be able to stay after class to participate in extra-curricular gardening activities. In 2011, the American Time Use Survey

discovered that sleeping and engaging in educational activities alone account for almost two-thirds of high school students' time. If the garden programs were curricular, as in California and New York, students could be involved during school time in a way that also counts towards their mandatory learning requirements.

Secondly, because the gardening programs currently do not count towards school requirements, there are only a select demographic of students who are willing and able to participate in the initiatives. If there was the additional incentive that students could gain a reward for their otherwise volunteered learning, then the gardening initiatives would be more likely to appeal to a wider range of students.

Thirdly, because the gardens are extra-curricular initiatives it means that they are often facilitated and run by a set of devoted volunteers, rather than full-time staff members. This means that the volunteers experience a heavy, often unpaid, work commitment, in which their services are not recognized to the fullest. Providing these volunteers with a paid position could ease these dynamics.

Because of these three constraints to the extra-curricular school gardening model, I believe it is important to research whether the integration of these programs into a curricular-based learning in Nova Scotia is possible and worthwhile.

1.3 Research Question and Purpose

The research question for this study is this: What are community garden members' perspectives on the potential opportunities and challenges of integrating gardening programs into the curriculum of the HRM school board at the high school level?

For this study I chose to focus only on gardening programs in the Halifax Regional Municipality at the high school level. Although there are some high school gardening programs in Nova Scotia, the vast majority of school gardens are at the elementary school level (NS Department of Agriculture, 2012). Out of the thirty-three schools that received funding from the Department of Agriculture in 2012, only five were at the high school level (person communication with Rick Hoeg, Agricultural Education Liason). This reflects the findings of my literature review, which indicated that the majority of current studies only focus on gardening initiatives in elementary schools and there is very little literature at the high school level (DeMarco, Relf & McDaniel, 1990; Blair, 2009; Carlsson, 2010, Robinson & Zajicek, 2005). My study will address this lacuna in the literature.

I also chose to focus on this age group because it is in high school where students begin to get to choose their elective classes, such as concert band or family studies. It seems logical that a school gardening class could be integrated at this time as an elective curricular class that students could choose to count towards their high school diploma. Furthermore, integrating a gardening program into the curriculum at the high school level is a viable option because it could provide students with job training in agriculture, food production and entrepreneurialism. Additionally, a gardening class could teach students about civic engagement and the many ways to create a positive

change in their community. These learning objectives wouldn't be as successful at the lower school levels.

1.4 Significance of the Study

I believe this study is significant because by researching this topic and interviewing volunteers I will gain an understanding of how one group of interested community members view the importance of gardening as a learning subject at the high school level in the HRM. The end goal of this study is to determine if more research should be dedicated to exploring gardening as an elective high school class in the HRM. If my research findings imply that school gardening initiatives do have a positive impact on the students' learning, then my paper can be put forward to the Halifax Regional School Board as an important topic for further investigation.

CHAPTER TWO: LITERATURE REVIEW AND METHODOLOGY

2.0 Literature Review

This literature review aims to provide an overview of the key themes that are relevant to the topic of school gardening programs. The majority of the literature on school gardening programs falls into three sub-categories of benefits; those focused on physical health, those focused on mental well-being and those focused on food sovereignty. This literature review follows a similar format.

2.1 Physical Health

2.1.1 Nutrition

Child obesity is an increasingly pressing issue; internationally, levels of obesity have tripled since the 1980s (Wells, 2012, p 5). A Statistics Canada report reveals that Nova Scotia is the province with the highest prevalence of overweight children (22.6%) and the third highest prevalence of obesity (9.4%) (Wells, 2012, p 6). These high levels of obese and overweight children in Nova Scotia have been targeted quite heavily in the public school system. One way of targeting obesity is by integrating more fresh fruits and vegetables into children's diets. In 2009, however, three American researchers studied 6,513 children aged two to eighteen to determine whether they were meeting

their recommended fruit and vegetable intake established by the 2005 U.S. Dietary Guidelines for Americans. The middle school and high school aged students were the lowest ranking demographic with 80% of the sample population not meeting recommended fruit intake and 90% not meeting the recommended vegetable intake (Lorson, Taylor & Melgar-Quinonez, 2009). Although this is an American study, it can be deduced that levels of nutrient deficiency could be similar in Canadian children as Canada shares a lot of similar lifestyles with its Southern neighbour.

These two studies on child obesity and insufficient fruit and vegetable intake demonstrate that student health and well-being is an important and pressing topic. School gardening programs have become more popular as a means to combat rising levels of child obesity and nutrient deficiency. In an era where pre-packaged, processed foods have saturated the majority of North American super markets, children and youth are becoming less and less aware of where their food comes from and what it contains. Author Dorothy Blair (1996) believes that in order to combat the obesity epidemic, children need to expand their perspectives on what is edible and overcome their predisposition to enjoy foods that are sweet, salty, fatty and subtropical (p. 30). Advocates of school gardening programs argue that they can help to reintroduce healthy eating by expanding children's knowledge of and accessibility to fresh, unprocessed foods (Blair, 1996, p. 31).

Nutrition is important to schools because a healthy diet promotes optimal growth and development of children, while also reducing risks of obesity, diabetes and other chronic diseases. In Veugelers' and Schwartz's article 'Comprehensive School Health in Canada,' they state that although the Canadian education systems is among the best in

the world, the students' "eating and activity levels are so poor that they have led to prevalence rates of overweight that are among the highest in the world" (2010, p. 5). Because schools are a place that help students establish healthy, lifelong habits, they are a logical setting to help promote nutrition and healthy eating. Veugelers & Schwartz (2010) believe that schools "provide a setting in which to deliver health information to both the student and, indirectly, the home and community," making them a critical entry point for addressing community public health issues more broadly (p. 5).

There are many reasons why nutrition levels in children are suffering. Registered dietitians Erin Oxenham and Amber King argue in the *Journal of Child Nutrition and Management* that "many children have limited exposure to healthy foods and often do not know where foods come from or how they are grown and prepared" (2010, p. 1). The authors believe that the school setting can be used to introduce and reinforce healthy eating behaviours through initiatives like school gardening programs or farm-to-school programs, where local farmers sell their produce directly to schools for their lunch programs. These programs, from Oxenham and King's perspective, have the potential "to promote health and well-being in children, and may ultimately influence food choices through adolescence and adulthood" (2010, p. 1). It is for these reasons that nutrition and student health and well-being is one of the most celebrated aspects of school gardening initiatives.

2.1.2 Active Lifestyle

A second method of increasing student health and combating child obesity is by increasing levels of physical activity. Research shows that providing more green space and time for activity can help improve students' well-being (Barton, 2009). The Evergreen foundation is a Canadian organization that aims to make Canadian cities more sustainable and livable. One of their main focuses is on helping schools "green" their schoolyards by providing them with funding and resources. In 2006, Anne Bell and Janet Dymont surveyed 59 Canadian schools before and after the Evergreen foundation "greened" their schoolyards. Almost half of the respondents (49%) reported that their new green school ground now promotes more vigorous activity, and the majority of respondents (71%) agreed that their new school ground promotes moderate and/or light physical activity (p. 6). In Oklahoma in 2006, seventy-two children involved in an after-school education and gardening program were studied. Similar results were found, in which there was an 18% increase in the children's physical activity through their participation in this gardening program (Herman, 2006, p. 201).

In the same Evergreen study (Bell and Dymont, 2006), the foundation found that "60% of teachers, parents and administrators involved in school gardens felt the garden encouraged students who are normally less physically active to be more active" (p. 39). The report points out that this is because school gardens provide students with an equitable and accessible means to support a healthy lifestyle. In other words, school gardening programs are open to all students, there are no user fees or transportation costs and furthermore, they provide an alternative means of physical activity that may be more enjoyable for people who do not enjoy other outdoor activities (such as sports).

In Kenneth Bell's PhD dissertation entitled "The Relationship Between Perceived

Physical Competence and the Physical Activity Patterns of Fifth and Seventh Grade Children,” he argues that students’ perception of their physical competence is directly related to their levels of physical activity. Bell defines perceived physical competence as “one’s overall perceptions of personal physical abilities” (1997, p. 3). Based on Bell’s findings, it is likely that students who gain physical competence (or at least perceive to gain physical competence) through gardening activities may boost their levels of physical activity, and therefore improve health outcomes. This is an interesting phenomena because it demonstrates how physical activity can be dependent on students’ self-perception and confidence. In other words, physical well-being can be dependent on mental well-being. The following section of this paper (2.2.2) explores how gardening can improve students’ self-confidence, in which case the inviting and open atmosphere of most school gardens may help create a healthy environment for students to gain a positive perception of their physical competence.

2.2 Mental Well-being

2.2.1 Mental Health

Not only do school gardening programs target physical well-being, such as nutrition and physical activity, but can also improve mental well-being. In Sandra Hofferth and John Sandberg's 2004 article "How American Children Spend Their Time," they discovered that, in the United States, children aged three to seventeen spend on average 13.5 hours per week watching television and only one half hour per week engaged in unstructured outdoors activities (p. 296). To Richard Louv, author of the book, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* (2005), this is very problematic. In his book, Louv explores the relationship between children's decreased exposure to the outdoors, nature and the woods, and many prevailing mental health disorders, primarily Attention Deficit Disorder (ADD). Louv argues that many mental health disorders can be attributed to the decreasing availability of greenspace in neighbourhoods, parental fear of letting their children play freely outdoors, as well as the lure of computers, televisions and video games. Louv calls these mental health issues Nature Deficit Disorder. Medical doctor Andrew Weil believes that Louv coined the term Nature Deficit Disorder not as an official medical disorder, but rather to point out a deep truth that "as part of our evolutionary heritage, human beings - both children and adults - have a profound need for time in wild, outdoor spaces, and we suffer when we don't get it" (2010).

School gardening programs have been seen as a potential outlet to get children outdoors and engaged in an activity that will inspire them creatively while also helping to reconnect them with their natural surroundings. In a 2005 study conducted by Somerset et al, teachers from twelve Australian schools that had school gardening programs were interviewed to determine whether the gardening initiatives had any impacts on the students. It was reported that the majority of teachers perceived improvements in social activity, stress relief, mental health, self-confidence and personal fulfillment (p. 26).

2.2.2 Competency and Self-Confidence:

There is significant research on the topic of how school gardening programs can help improve students' competency and self-confidence. Robinson & Zaijcek (2000) studied 281 third, fourth and fifth grade students to determine whether their participation in a gardening program led to an increase in competency and life skills. In the study, 190 students participated in a one-year school gardening program and the other 91 students remained the control group. Through a series of survey assessments based on the Youth Life Skills Inventory (a criterion-referenced assessment tool), the authors determined that there was a substantial increase in self-understanding and confidence amongst students who participated in the gardening program (2005, p. 453).

In Nova Scotia, Liesel Carlsson studied an elementary school in which she discovered that many participants believe that gardens provide a place for students to improve their confidence and self-esteem. "Children with low self esteem were thought

to benefit from the school garden because of its non-competitive learning environment. The staff felt the non-competitive environment was related to the potential for increased overall self esteem and in turn success in other areas of learning” (2010, p. 107). There is mounting evidence that gardening programs can offer meaningful outlets for students to gain self-confidence and competency but a controlled study at the high school level is necessary to determine whether gardening programs have a similar effects at this age level.

2.3 Food Sovereignty

2.3.1 Global Food Crisis

Summarizing the literature on our current global food situation is an immense task as there are many different factors including a growing population, rising food costs, decreasing availability of farmland and growing conditions, to list a few. At the beginning of this year, *the Guardian* newspaper printed an article titled “UN Warns of Looming Worldwide Food Crisis in 2013,” which summarized many of these factors. The article explains that global grain reserves are desperately low and at the same point food prices are rising drastically every year. In the article, Lester Brown, president of the Earth Policy Research Centre in Washington, states, “we are entering a new era of rising food prices and spreading hunger...The geopolitics of food is fast overshadowing the geopolitics of oil.” Furthermore, it is expected that our population will grow by 30% by 2050, in which case our overall food production would need to be increased by 70% in order to satisfy the anticipated population (2009, p 1).

2.3.2 Food Security

In 1996, it was stated at the UN World Food Summit, that “food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (Food and Agriculture Organization, 2006, p 1). Although levels of food

insecurity are most prominent in the Global South, levels of food insecurity also persist in the Global North. In 2004, The Office of Nutrition Policy and Promotion of Health Canada released the *Canadian Community Health Survey Cycle 2.2, Nutrition (2004): Income-Related Household Food Security in Canada* report, which for the first time provided an in-depth analysis of the levels of food insecurity in Canada. The study targeted 35,107 Canadians of all ages, gender and ethnicities from all the provinces, excluding the three territories, homeless people and First Nations living on reserves. The results showed that in 2004, 2.7 million Canadians lived in food insecure households. In other words, 8.8% of the Canadian population in 2004 did not have sufficient access to a healthy diet to provide them with their essential nutrients and vitamins.

This report is full of shocking data that for the first time made the Canadian government fully aware of the extent of food insecurity in this country. Nova Scotia was the only province to have significantly higher levels of household food insecurity (14.6%) than the national average of 9.2%. In other words, there is a lot of hidden hunger in Nova Scotia that is often not addressed.

This study also discovered that across Canada, households with children experienced higher levels of food insecurity (average of 10.4%) than households without children (average of 8.6%). These statistics demonstrate that children have a large impact on the overall food security of their household. It follows that targeting food security through schools is a potentially underappreciated entry point to addressing this issue. Liesel Carlsson points out in her Master's dissertation that "by growing and providing some free or very low cost produce at school, gardens could increase (and

equalize) at school access to fruit and vegetables to the school, lower cafeteria costs, thereby make a small contribution to individual and to household or income-related food security” (2010, p 31-32). School gardens are thus well positioned to help alleviate this growing problem of food insecurity in Canada.

2.3.3 Food Sovereignty

When discussing the global food crisis, the term food sovereignty is often used synonymously with food security. Although the terms both address the accessibility of foodstuffs, there are substantial differences that distinguish these terms from one another. Food sovereignty was coined in 1996 by La Via Campesina, the world’s largest peasant movement. The term, which was later presented to the World Food Summit, aimed to express dissatisfaction with the dominating food regime and advocated that the producers of food should have the ability to define their own food systems. Furthermore, food sovereignty puts emphasis on supporting sustainable methods of agriculture that are culturally appropriate (Declaration of Nyelini, 2007). In contrast to food security, which is based on citizens having access at all time to satisfactory levels of essential nutrients, food sovereignty aims to assure that food security is obtained in ways that are not detrimental to the environment, people’s ways of living, cultural beliefs or well-being.

The differentiation between food security and food sovereignty is of significance because although school gardening programs address food insecurity, they are foundationally concerned with cementing food access and control. School gardening

initiatives do increase the students and their families' food security by providing them with more access to foodstuffs, but they have a more significant impact on their food sovereignty by allowing them to be the producers of their own food. School gardening programs allow participants to be consumers of the produce grown, thus allowing them to choose what they want to eat and how they want to eat it. School gardening programs emphasize returning the power from large food and agriculture-based corporations in our current food regime to the hands of the producers and the consumers.

2.3.4 The Local Food Movement

The "local food movement" emerged as a response to the global food crisis and food insecurity. The Sustainable Agriculture Research and Education Program at the University of California defines the local food movement as a "collaborative effort to build more locally based, self-reliant food economies - one in which sustainable food production, processing, distribution, and consumption is integrated to enhance the economic, environmental and social health of a particular place" (2002, p. 99). Although there have been many food movements over history aimed to bring food production back to the people (19th century "victory gardens," for example), in this paper the term will refer to the movement that is widely followed today.

There is a multitude of social, economic and environmental reasons why the local food regime is growing in popularity. A study on the David Suzuki Foundation's website states that the average North American meal travels 2,400 kilometers from the site of

the production to the consumer (“Food Miles for the Family, 2012”). This distance is often referred to through the term “food miles,” which is a concept that was created in the 1990s by Tim Lang, a professor in Food Policy at the City University London. The term is used to reflect how much greenhouse gas was released in the transportation of foodstuffs. Once this term started being used in popular media, it became a simple approach that allowed people to become more aware of the impact that their food had on the environment. In many ways, the term became the founding basis for the surge in the local food movement’s support. The concept of food miles was fortified in 2007 when two Canadian authors, Alisa Smith and James MacKinnon published their world-recognized book *The 100 Mile Diet: A Year of Local Eating*. Soon after, the “100 Mile Diet” became a household term across North America, which spurred great interest in eating local food.

The local food movement has two main obstacles, however: a degenerating rural farming population and access to farm lands. Statistics Canada states that in 2006, 80% of the Canadian population lived in urban areas, while only 20% of the population lived in rural areas.

At the same time that our farming population is dwindling so is our access to farming property. In her Honours report, Emma Norton states, “Statistics Canada (2009) found that though the number of farms is fewer, the total mass of agricultural land is remaining stable at about 67,582,500 hectares because individual farm sizes are growing” (2012, p. 7). In other words, the local food movement is challenged by the fact that the majority of Canadians live in urban areas and do not have access to small scale farms because the majority of farming land is dedicated to large scale farming.

Supporters of school gardening programs believe that their initiatives can help support this new desire to be sovereign over the food that we eat and where it comes from. Their approach aims to bridge the gap between the demand for local, healthy food and the inaccessibility to obtain it by creating small-scale farms and gardens on school properties within the urban core. In doing so, school gardening supporters envision that they would be able to teach students and their families to live healthier lifestyles, while also sparking interest in agriculture and gardening.

2.4 METHODS

2.4.1 Role of the Researcher

It is important to me to acknowledge at the outset that the topic of school gardening is of great personal interest. As someone who recently taught myself how to garden and grow my own food, I realized how much I feel I could have benefited from a gardening class in a high school setting.

Notwithstanding my personal interest on the topic, I remained as unbiased as possible during the data collection and analysis for this study. In all cases I abided by what I had stated in my research ethics application for Dalhousie University. Above all, it was my primary and utmost goal to compile results that would be useful for the Halifax Regional School Board.

2.4.2 Research Design

I adopted a qualitative exploratory approach in this study. I recruited four participants to discuss their perceptions of whether integrating school gardening initiatives into the curriculum as an elective class for high school students would be beneficial or not. Two sub questions to this study are 1) why are programs more popular for the younger age group, and 2) whether older students are interested in food production?

I had initially planned to recruit participants who were involved with school gardening initiatives at high schools in the Halifax Regional Municipality. Due to time restraints on this project, however, I was unable to complete the Halifax Regional School Board's (HRSB) own internal ethics application, which made it impossible to interview gardening volunteers who were affiliated with the school board's union. With the exception of a few cases, the majority of school garden volunteers in the HRM fell under this category of affiliation.

In order to increase my sample size I decided to extend my research question so that it targeted community garden volunteers as well, rather than just school garden volunteers. The community volunteers I contacted, however, had to be involved in initiatives that directly engaged high school age youth in gardening programs. I aimed to recruit participants from gardening initiatives on the Halifax peninsula, as well as the rest of the HRM. This study presents certain volunteers' perspectives and is not necessarily representative of all garden volunteers within the HRM.

Studying community volunteers was beneficial because they are the people who are directly involved in garden initiatives and are therefore the ones who witness first hand how the gardens affect students. Furthermore, interviewing volunteers rather than school staff and teachers assured that my study did not put any extra stress on the HRSB's resources.

Participants for this study were contacted and recruited through multiple approaches. Some participants were recruited based on my previous knowledge of their involvement in gardening initiatives. The remainder of participants were recruited through emails I sent to organizations across HRM that work on youth gardening

programs. I did not screen or decline any participant who offered to be apart of this study. In the end, I successfully recruited four participants for this study.

All data was collected through oral, face-to-face interviews with participants. This method was chosen so that the data collection could be as easy as possible for the participants. All interviews were conducted in the participants' offices or preferred space during a time agreed upon. I audio recorded each discussion in order to ensure accuracy with the participants' thoughts and quotations. In all cases, the participants were free to withdraw from the study for any given reason.

To analyze the results from this study I used the Grounded Theory framework. I chose to use Grounded Theory because this framework helps investigate the actualities of the social world and helps analyze the collected data with no preconceived ideas or hypothesis (Glaser & Strauss, 1967). Furthermore, I believed it was an effective methodology for understanding new theory and emergent phenomena.

Firstly, I transcribed all of my oral interviews to text. I then identified key themes within each interview. Secondly, I compared the key themes from all the interviews to determine what the reoccurring, common concepts were amongst all the participants. Thirdly, I explored these key themes in relation to a wider literature review to determine whether the findings on the topic of high school students in HRM are similar to findings on other age groups and regions.

2.4.3 Consent and Ethical Approval

Dalhousie University's Board of Ethics approved my ethics application on January 16, 2013. A copy of this letter can be found in Appendix #2. Written consent

was obtained from all participants before beginning the interview process. Once the interviews were complete and their transcripts were compiled, I also obtained formal consent to use their information and quotations for this report. A copy of these consent forms can be found in Appendix #4.

2.4.4 Limitations

Although this study is credible and adds to the academic field of research on the topic of school gardening, there are limitations that must be acknowledged.

Firstly, the inability to interview garden volunteers who are affiliated with the Halifax Regional School Board's union limits this study because these volunteers would understand both the hands-on learning aspect of school gardening initiatives as well as the more bureaucratic aspect of the department's curriculum. Future studies on this topic should allow more time to obtain an ethics approval from the HRSB so that the perspectives of volunteers may be investigated.

Secondly, the possible sample size for this study was drastically decreased once it was determined that volunteers affiliated with the HRSB union would not be able to participate. The smaller possible sample size resulted in fewer participants able to be a part of this study, making it less credible than if more participants had been involved. Once again, the time line of an Honours project also played a huge role on limiting participant recruitment because only so many interviews could be conducted during one semester.

Thirdly, all four of the participants in this study are community members who are involved in and enthusiastic about gardening initiatives. These advocates' perspectives are therefore potentially biased and not representative of the larger community. It is recommended that future studies include a broader demographic of people.

Finally, due to both Dalhousie's and the Halifax Regional School Board's strict ethics processes, I was unable to conduct research on students who are involved in gardening initiatives. This limits this study because students are the population who would directly benefit or not from the implementation of my findings.

CHAPTER THREE: FINDINGS AND DISCUSSION

3.1 Participants

All four participants in this study are female. Two are young adults, one is middle aged and one is retired. All of the participants had previous involvement in gardening initiatives before their current placement. Two of the participants have a formal education in gardening and two of the participants have become involved due to personal interest. The least amount of time a participant has been involved in this field is two years and the most amount of time is thirty years.

3.2 Demographics and Values

The three different gardens studied in this research have very different demographics of people that use the spaces but the values and expectations of the users are often the same. At Garden #1, there are a lot of university students, people in the non-profit workforce, as well as many retired and semi-retired seniors (Participant #1). The demographic at Garden #2 is the exact opposite, where they have a mixture of organizations, youth, and school aged children, but the majority of the population is middle class families (Participant #2). At Garden #3, there is a range of ages and professions but it is the large youth demographic who anchor's the garden activities (Participant #3 and Participant #4).

Although the three gardens have an array of different people who use the spaces, the volunteers' communal values seemed to be similar at all of the gardens. The participants informed me that the majority of volunteers get involved because they want to be involved with initiatives that focus on social and environmental activism. Furthermore, they share an interest in creating a beautiful atmosphere, in working with their hands, in celebrating agricultural heritage and in meeting their neighbours.

3.3. Key Themes: Challenges and Barriers of School Gardening

In my interviews, the participants all identified many benefits of gardening programs that are congruent with those that appear in my literature review. A large portion of studies on school gardening initiatives only focus on the benefits and opportunities. I believe it is important to include the challenges and barriers in my study because it provides a more rounded, realistic idea of what is involved with the creation of a school gardening program. In this section of the thesis I will therefore examine the challenges that came up during my interviews with the participants. For each challenge and barrier that is addressed, the participant suggests ways to mitigate the negative impacts of these barriers so that the implementation of a school gardening program can be made easier.

3.3.1 Perception of Gardening Programs

The four participants in this study all agreed that one challenge for gardening programs is for them to market themselves as a credible, worthwhile activity rather than simply a hobby. Participant #4 believes that “gardening needs to be approached in a way that makes it seem more substantial than just a hobby.” People need to understand that gardening “is science-based, creativity-based, entrepreneurial-based, and food production-based. [Overall,] gardening needs to be approached in a more interdisciplinary way.” Furthermore, Participant #1 also points out that there is a common perception that gardening is only for people who are either “rich in time or rich in money.” In other words, many people believe that gardening is a leisure activity for people who have the time to commit to it. This is a dominant narrative that needs to be challenged in order for gardening programs to become more widely accepted.

On a similar theme, Participant #3 mentioned that she met a lot of youth “who think gardening isn’t cool.” Participant #2 also pointed out that she has seen a fair amount of youth “showing reluctance [about gardening], but it’s more shyness about trying a new activity.” Many youth feel insecure about trying a new activity and especially one that isn’t as popular as many other standard extracurricular activities such as basketball or piano lessons.

In all cases where youth were experiencing hesitation about getting involved with gardening initiatives, the participants explained that having another person show the youth the value of gardening has opened them up to the opportunity. Participant #3 thinks that “its like anything when you’re an adolescent; regardless of your interests

sometimes it's the peer pressures that dictate what you're involved in." Participant #3 explained that often students wouldn't get involved with the garden until they realize they have other friends who are involved and committed. Authors Harry Vorrath and Larry Brendtro explore the dynamics of this phenomenon in their book *Positive Peer Culture* (1985), stating that young people have the ability to bring out the positive self-worth in one another through positive peer pressure.

It appears that, just as the common narrative that gardening is a hobby must be dismantled, so too must the narrative that gardening is "uncool" and not worthy of young peoples' time. If a gardening program wants to be successful it appears that emphasis needs to be put on promoting and educating as to why gardening is a worthwhile and beneficial endeavour. The first step in this process would be to research the students' perceptions on gardening to determine what aspects of gardening restrict young people from getting involved.

3.3.2 Time commitment and Learning Curve

Another main theme that came up was that gardening requires a large time commitment and has a steep learning curve. Many extra-curricular and hobby activities can be done during leisure time without much commitment, but with gardening, the yield of the crops is dependent on the time and energy input from volunteers. A successful garden requires volunteers to commit a certain amount of time each week, rather than just showing up whenever they have leisure time.

Children spend 40 hours a week in school, which represents 41% of their time based on a calculation of 14-hour days (Rickel & Becker 1997). This statistic goes to show that children already have large time commitments and so time for leisure activities is already very limited. Participant #3 stated that a lot of the kids that come to Garden #3 have major time commitments at home, such as chores, babysitting and homework. The youth “bring themselves, [however] and they come with so much enthusiasm and love.” The youth at Garden #3 are so committed to the garden that they come in for three-hour shifts twice a week and rarely ever show reluctance.

On top of this time commitment, Participant #1 believes there is also the restriction that gardening has a significant learning curve. The implementation of a garden requires both skilled labourers who can build garden beds and infrastructure and knowledgeable agriculturalists who have an understanding of growing conditions (soil pH, necessary nutrients, water schedules, sister planting, crop rotation etc). Participant #2 also brought this point up and emphasized that, although she has written a few gardening textbooks and teaches the subject matter, she is still always learning herself. Considering that there is a lot to learn and that youth are already under time restrictions, this can be a barrier for them to get involved with gardening initiatives. Integrating gardening programs into the curriculum could mitigate the time commitment and learning curve barriers, making a gardening class no more intensive than any other high school class. This way, there would be less of a conflict between the youths’ curricular and extra-curricular time commitments. Furthermore, the learning curve of gardening could be better mitigated if there was a constant instructor whose responsibility was to facilitate the students’ garden learning.

3.3.3 Safety

Safety was a priority issue for all participants. That said, all participants agreed that gardening does not pose a significant safety threat. As Participant #1 says, “anything that could happen on the street could happen on the farm as well. But that has nothing to do with the garden itself.” Participant #2 described some of the specific safety concerns that could pose a threat to the people participating in the garden. They included sunburns and insect bites, muscle pain, dehydration, foot pain from not wearing protective footwear and tetanus from injuries with dirty tools. In 1994, the Injury Control and Risk Survey collected data to determine the impact of injuries from moderately intense activities such as gardening, weightlifting, aerobics and bicycle riding. This study included 5,238 participants from all 50 American states. The study determined that out of this sample population only 1.6% of participants injured themselves during gardening activities (Powell et al, 1998). Gardening injuries were more prominent than injuries from the other activities, however, so it is evident that there are risks that need to be mitigated through more supervision and safer practices.

Participant #3 pointed out that gardening programs don't exist within the four walls of a classroom and so there is inherently more potential danger, but not enough to limit gardening initiatives. A school looking to implement a garden program should be aware of these dangers and threats but should also acknowledge that they are not putting a student at any more risk than a physical education class. Richard Louv, author

of *Last Child in the Woods*, believes that “our society is teaching young people to avoid direct experiences in nature” (p. 6) because nature is dangerous and represents the unknown. Louv argues, however, that children strongly benefit from spending time outdoors playing and engaging in hands-on activities and that the fear of nature should not restrict this healthy child development.

In 2009, an American federal bill, the No Child Left Inside Act, was introduced to the House of Representatives. This Act aims to encourage environmental education for students between kindergarten and grade twelve by getting them engaged in outdoor activities (Bucklin-Sporer & Pringle, 2011). So far, five states have endorsed the movement and are in the process of creating more outdoor education programs where students can interact with the natural environment in a safe and secure way. Many activists and the participants in this research believe that school gardening programs could provide students with a safe, semi-monitored way to interact with nature. Participant #3 point out that when the students come together in the safe space of the garden it “allows them to explore a different side of themselves that they might not be able to explore otherwise,” which, from her perspective, is very important to their development. With the supervision of trained gardening staff members and an enforced set of rules, a gardening class could provide students with a reasonably safe way to engage in this new activity.

3.3.4 Cost

The final detriment that emerged in the interviews was the topic of garden expenses. Participant #1 states that “its unfortunate that we live in an era where it is more expensive to grow your own food than it is to buy it.” Being able to convince people that it is worthwhile to produce their own food is therefore a difficult task. Participant #1 is looking at this topic from the perspective that as a garden coordinator she is aware of the financial situation of the garden. For users of the garden, however, their participation in garden programs is free and is therefore not a barrier. The initial setup cost would be a major expense for a school looking to start a garden program, but it would be beneficial for the school community by providing the students with a place to garden without having to take on the startup cost themselves. In a survey of Canadian schools, “65% of school gardens were reported to cost less than \$2000 for start-up and 24% cost less than \$500” (School Garden Resource Guide, 2011).

When considering the cost of running a school garden program, schools should factor in the ability to hire a staff member who is responsible for garden maintenance and upkeep. In 1996, there was a national school gardening survey that studied the success rates of different school gardening programs across the United States. The survey had 236 respondents from 42 different states. When the respondents were asked what the most crucial factor for garden success is, the most frequent response (63%) was the necessity for a staff member who is responsible for all garden activities (DeMarco, Relf & McDaniel, 1999, p. 278). In other words, gardens can exist without a constant staff member, but they won't be as successful as a garden that has someone who is committed to tending to it. This resource, however, must be calculated into the expected cost and is therefore a barrier that must be addressed.

In an age of financial austerity towards the public sector it may be difficult for schools to justify creating a gardening program. In Nova Scotia, however, the majority of garden costs can be covered through funding from different organizations. The Nova Scotia Department of Agriculture, for example, has a School Garden Project in place that provides schools with up to \$500 for the implementation of a garden on their property. The Evergreen Foundation is another promising resource for the creation of school gardens as it offers funding between \$500 and \$3,500 for tools, materials and professional services. The TD Bank Friends of the Environment Foundation also provides educational institutions with funding for environmental stewardship and school greening projects. Furthermore, many funding opportunities for garden initiatives can be found through community wellness boards and health organizations. Once a garden has been successfully implemented, an entrepreneurial aspect can be incorporated so that revenue can be generated from the sale of the garden's produce. At Garden #3, the youth create and sell homemade salad dressings to community members, which help cover many of their garden costs.

Although the costs of the garden itself can be covered through donor funding and entrepreneurial initiatives, the Halifax Regional School Board would still need to cover the cost of a staff member to help facilitate the students' learning. I suggest that the Halifax Regional School Board pilot a one-year curricular garden program with a paid educator to determine whether the benefits to students' learning outweigh the associated costs. The HRSB could also contact other school boards who have curricular garden programs, such as the California Department of Education ("A Garden in Every School" program) and the New York City Department of Education ("NYC:

Learn to Grow” program) for recommendations and advice.

3.4 Integration of Gardening into the Curriculum

3.4.1 Gardening Programs at the Elementary School Level

When conducting my research I discovered that across North America, the majority of school gardening programs are at the elementary school level (DeMarco, Relf & McDaniel, 1990; Blair, 2009; Carlsson, 2010, Robinson & Zajicek, 2005). In 2010-2011, LifeLab conducted a survey with the California School Garden Network in order to gather information that could be used to help support schools that were looking into implementing a gardening program of their own. They also discovered that the majority of school gardening initiatives in California were at the elementary level. LifeLab sent surveys to teachers and staff members who were involved with a school gardening program. Of the 599 respondents, 56.7% worked with elementary schools, and only 11.4% worked with high schools (Fischer, 2011). From this survey it can be deduced that in California there are more elementary schools involved with gardening programs than high schools.

I asked the participants of my research why they felt more elementary schools were involved in gardening programs than high schools. The responses varied, but all touched on how it is easier for the garden to be used as a teaching mechanism at the elementary school level because the learning objectives and requirements are less strict at that learning level. Participant #3 believes that the learning requirements are much broader at the elementary level, so it is easier to “incorporate gardening as a medium to communicate those skills.” Participant #2 put it, “by the time students get to high school

there is such a strong emphasis on very detailed curricular outcomes that have to be achieved, where when you're in elementary school the teachers have more freedom in what they can do to obtain their learning outcomes." The participants believe that because there is this emphasis on strictly following the curricular objectives high school teachers become strained for time and therefore become more focused on obtaining their learning outcomes than creating innovative learning environments.

There are currently many resources, however, suggesting many easy ways that gardening can be incorporated into the curriculum for an array of high school classes. Some of these resources provide an extensive curriculum that other schools could follow, such as the curriculum put forth by Kansas Green Schools. This curriculum demonstrates the many ways that gardening can be integrated into math, art, science, social studies, writing and physical education classes through the creation of a list of lesson plans that correspond to certain high school learning objectives from Kansas' school board. Another example of an available resource is the National Organization's "Agriculture in the Classroom" website which provides a collection of learning activities ranging from labs on soil pH to historical studies of how crops were harvested and transported in the 19th century. A full list of curricular resources can be found in Appendix #2.

3.4.2 The Creation of an Elective Gardening Class

There are a few limitations that must be acknowledged reading this final section of my paper. First, I would like to acknowledge that although this topic was explored within the context of the Halifax Regional School Board they have made no mention of or shown interest in this topic. Second, neither my participants nor myself have degrees in Education and therefore have little to no understanding of the process of creating or amending classes. Thirdly, I could not find any research on whether an elective high school class exists in any school abroad, so I was unable to explore this topic in relation to initiatives in other cities. The research in this section was based solely on the participants' perception of what an elective gardening class could look like and whether it would be beneficial or not. Due to these limitations, my findings, therefore, cannot be used as concrete evidence for whether an elective gardening class should be created or not. The purpose of this section of my research was to initiate discussion on this topic and hopefully generate enough interest so that the topic is studied more in depth in the future.

When discussing this topic, all of the participants emphasized that a gardening or food production class shouldn't focus exclusively on gardening skills and that a more interdisciplinary approach was necessary. The participants discussed how environmentalism, culinary arts, planning and design, book keeping and accounting and many other programs could be integrated into a gardening-based class. Participant #4 believes that ideally schools could offer different modules that relate gardening to the array of related skills: "it just can't be only about the garden." In Participant #3's interview, she made the connection between what a

gardening class could look like in relation to other high school elective classes. She finds it “mind blowing that gardening is not already apart of the curriculum considering that woodworking, cooking and sewing classes have been recognized as fundamental skills that people need. Growing your own food isn’t recognized and that is ridiculous.”

The most popular approach for integrating a gardening class within an interdisciplinary approach was to pair the hands on gardening skills with class time entrepreneurial skills. Participant #3 states that a gardening class would need to be paired with “another strong skill like entrepreneurship so that it would attract people who are interested in business for instance.” Participant #1 suggests taking a Community Supported Agriculture (CSA) approach so that if the gardening program was successful then the class would be generating a crop that they could sell for an income, which would provide an outlet for even more learning opportunities while decreasing the garden’s costs. Participant #1 believes that if there was a class that had an entrepreneurial aspect and an agricultural aspect then it might have “ a broader appeal and a more rounded skill set.” Many high schools already teach business and entrepreneurial classes, so in these cases there is the possibility that gardening could be worked into this curriculum to provide a hands-on practicum for the in-class learning.

3.4.2.1 Barriers:

Although all the participants were very enthusiastic about the idea of a high school gardening class, they also acknowledged that there are barriers that would need to be addressed before a gardening class could ever be implemented within the Halifax Regional School Board.

The first barrier to the implementation of a gardening class is that the typical growing season for fruits and vegetables is during the summer months, when students aren't in school. Furthermore, the beginning of the academic school year is during the harvest season rather than the planting season, so students might experience a teaching approach that seemed backwards and nonsensical. An opportunity to overcome this challenge could be for students to start the class in the Spring semester (January-June) of one year and complete the class in the following fall semester (September-December) of the next year. Although this wouldn't follow the traditional school format, Participant #2 believes that this approach would make the most sense for a program of this style. However, Participant #1 believes that the class could take a standard semester approach if the growing season could be extended through the use of greenhouses and cold frames etc. Either way, the HRSB would need to put significant amount of thought into the logistics of what a gardening class could look like.

A second barrier is that it could be difficult to find instructors for garden-based classes, because the instructors would need to be knowledgeable in gardening practices as well as in education. There may not be any potential staff who are trained in this sort of teaching, but gardening and agriculture are growing fields of interest, so I

believe that there are many potential instructors who would be willing to become certified to teach at the high school level. Furthermore, there are already a lot of resources available that could help facilitate this process and make it easier, such as the Curriculum for Agricultural Science Education (CASE) or the Centre for Integrated Agricultural System's "Towards a Sustainable Agriculture" curriculum. More detail on these resources can be found in Appendix #2.

There are some other smaller barriers that could restrict the success of a garden-based curriculum class, such as how the weather could cause disruption to the instructor's lesson plan or how a succession plan would be necessary to maintain the flow of new students working in the garden from one year to the next.

Despite these barriers, the participants in this study all believe that it would be useful for concrete thought to go into the development of a gardening class in a way that could overcome these barriers and make it a worthwhile endeavor for students to pursue.

3.4.2.2 Curricula, modules and frameworks

All four participants believe so strongly in the ability of gardens to be teaching mechanisms that they are currently all in the process of creating their own frameworks, models and curricula to help facilitate the teaching process at their garden. Participant #4 stated that they are working on their own model “with the hopes that it could someday be a part of a curriculum.” They want it to be a model that is “flexible and based on the premise that each community can take it and modify it to their own needs.”

On one hand it is very exciting to hear that these programs are coming up with their own initiatives, but on the other hand it also emphasizes the divide between the role the gardens workers are playing and the role the Halifax Regional School Board is playing in educating students through garden-based learning. The fact that all three organizations are coincidentally working on their own teaching mechanism show both that there are people interested in learning in this approach and also that the participants believe it is a worthy endeavour. There is a problem in the fact that, although these people may be very knowledgeable in garden-based practices, they are probably not the best people to be inventing a teaching curriculum. As Participant #2 put it, their farm has made “a stab at this [curriculum], but it really should be invested into.” Participant #2 believe that the development of a curriculum would require someone with a degree in education to focus on the curriculum for eight to twelve months to develop something that really works.

In other words, as much as there needs to be knowledgeable garden workers invested in this process, there also needs to be knowledgeable education staff working on this initiative

as well. Furthermore, the creation of one curriculum that could be applied to all the different community and school gardens would save many people the time and effort of attempting to create their own curriculum. The Halifax Regional School Board could be a valuable participant in this discussion.

CHAPTER FOUR: CONCLUSION

4.1 Conclusion

In this thesis I explored the many ideas behind school gardening programs and emphasized that there is currently a lot of interest in this topic both within and outside the Halifax Regional Municipality. Despite the fact there are many challenges and barriers to the implementation of school gardening programs, it appears that the majority of authors and researchers, as well as the participants in this study, believe the benefits outweigh the detriments. Through my research I also discovered that the majority of literature on the topic is at the elementary school level and that there is very little research on the role of school gardens at the junior high and high school levels. The participants in this study believe this is because it is easier for garden-based learning to be integrated into the curriculum at the lower learning levels. They all felt it was equally as important, however, if not more important, that this learning style be included at the high school level as well.

Overall, my research discovered that there is a divide in motivation and enthusiasm between community garden workers and the Halifax Regional School Board. In this study the participants expressed their devotion to garden programs and emphasized that their main role is to help facilitate the learning so that more people can benefit from the garden programs. The fact that all four of the participants in this research are currently working on their own educational curricula, frameworks and

models demonstrates that they strongly believe gardens can be a beneficial learning tool.

The Halifax Regional School Board, however, has expressed only marginal interest in garden-based learning approaches. Thirty-three schools have gardens in Nova Scotia, but in all cases they are used as extra-curricular activities rather than as an outlet to facilitate curricular learning. In an age of funding cuts to education, it may be difficult for the HRSB to consider integrating a new class into the curriculum. As this paper has shown, however, the integration of a gardening class could have many potential benefits to students' physical health, well-being and food sovereignty. If the HRSB decided to invest in this initiative, then they could help provide students with the educational resources that the participants in this research are currently attempting to sort out for themselves. In other words, if the HRSB recognized that there is a large amount of interest in gardening programs then they could work to create one standardized curriculum that could help facilitate students' learning, rather than each community garden attempting to create their own personal resources. If this was the case then the participants in this research are just some of the many skilled and educated community members who are enthusiastic about the idea of working with the HRSB to create a standardized gardening curriculum for high school students.

I believe that a gardening class, like the one that was explored in this paper, could help mitigate the burgeoning risks of childhood obesity and food insecurity while providing students with a fun and exciting new way of learning. There is already both a large array of research on this topic, developed curricula and general interest from both students and garden workers. I hope that this paper can add to the field of research on

this topic so that the HRSB staff can learn of the benefits and opportunities that a gardening class could bring to our students and to our whole community.

4.2 Suggestions:

This paper is just preliminary research on this topic. It is limited by the fact that my participants work with community gardens rather than directly with school gardening programs. My research with these participants demonstrated that there is a lot of interest on this topic, however, and that it should be further studied. I suggest that the next vital steps of research on this topic are to study the HRSB population that works directly with gardening programs to determine whether they believe an elective gardening class would be beneficial or not. Furthermore, I believe it is absolutely necessary that the student population be studied to determine whether they are in fact interested in a program that could give them high school credit in this subject matter.

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Appendix #1: Gardening Curricula

Centre for Integrated Agricultural Systems: Toward a Sustainable Agriculture
<http://www.cias.wisc.edu/curriculum/modl/index.htm>

→ A curriculum containing five modules focused on sustainable agriculture. Each module contains background history as well as lesson plans and suggested activities.

Curriculum for Agricultural Science Education
<http://www.case4learning.org/curriculum.html>

→ A structured sequence of agriculture courses and serves as a model for elevating the rigor and relevance of agricultural education.

Evergreen Foundation: Lesson Plans
<http://www.evergreen.ca/en/resources/schools/teachers/lesson-plans/index.sn>

→ Lesson plans that have been submitted by teachers who are interested in sharing their experiences and wisdom with others teaching in green school grounds.

Kansas Green Schools: Gardening Curriculum
<http://www.kansasgreenschools.org/kansas-school-gardens-activities>

→ A resource of lesson plans that are paired up with Kansas' school board's high school learning objectives.

National Organization: Agriculture in the Classroom.
http://www.agclassroom.org/directory/topic_search_results.cfm?advSubmitted=yes&gAll=on&acAll=on&agAll=on&Media=8&scope=1&MySubmit.x=39&MySubmit.y=16

→ A collection of learning activities ranging from labs on soil pH to historical studies of how crops were harvested and transported in the 19th century.

Appendix #2: Ethics Approval Letter

January 16, 2013

Ms Lucy Dykhuis

Science\General (Science)

Dear Lucy,

REB #: 2012-2867

Project Title: School Gardening as an Elective Class in the Halifax
Regional School Board's Curriculum

Effective Date: January 16, 2013

Expiry Date: January 16, 2014

The Social Sciences & Humanities Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be in accordance with the Tri-Council Policy Statement on *Ethical Conduct for Research Involving Humans*. This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,



Dr. Sophie Jacques, Chair
Appendix #3: Consent Forms

Participant #1

Participant #2

Participant #3

Participant #4

Appendix #4: Ethics Application

Indicate the Research Ethics Board to review this research:

Health Sciences OR Social Sciences and Humanities

Project Title: School gardens and high school students' learning in the Halifax Regional Municipality

1.1 Student researcher: Lucy Dykhuis			
Department	Environment, Sustainability and Society		
Degree program	20 Credit Combined Honours		
Email	Lucydykhuis@dal.ca	Phone	902-225-8807
I agree to conduct this research following the principles of the Tri-Council Policy Statement <i>Ethical Conduct for Research Involving Humans</i> and consistent with the University <i>Policy on the Ethical Conduct of Research Involving Humans</i> .			
Student signature:			

1.2 Supervisor Name: Matthew Schnurr			
Department	International Development Studies		
Email	matthew.schnurr@dal.ca	Phone	902-494-7711
I have reviewed the attached ethics application prior to its submission for ethics review, including the scientific/scholarly methods of the research project, which is described in the ethics application, and believe it is sound and appropriate. I will ensure this research will be conducted following the principles of the Tri-Council Policy Statement <i>Ethical Conduct for Research Involving Humans</i> and consistent with the University <i>Policy on the Ethical Conduct of Research Involving Humans</i> .			
Supervisor signature:			

1.3 Department/unit ethics review (if applicable). Minimal risk research only.
This submission has been reviewed and approved by the research ethics committee.
Authorizing name and signature:
Date of approval:

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SECTION 2. PROJECT DESCRIPTION

2.1 LAY SUMMARY [500 words]

In lay language, briefly describe the rationale, purpose, study population and methods.

School gardens have become more and more popular over recent years. In 2012, twenty-four schools in Nova Scotia applied for funding to start a garden, not including those schools that already had preexisting gardens (Nova Scotia Department of Agriculture, 2012). The sheer numbers and rate of expansion implies that school gardens have positive impacts on the students, school and community. The *School Garden Resource Guide* distributed by the Nova Scotia Department of Agriculture (2011) states that school gardens help engage students in curriculum while having fun, develop environmental awareness, be physically active, foster responsibility and help them to make connections between food and the environment. I believe these statements are worthwhile, but are in need of deeper examination.

For this reason, I will investigate the perspectives of volunteers who assist high school gardening programs about how school gardening initiatives could contribute to high school students' (grades 10-12) learning in the Halifax Regional Municipality. I will conduct primary data collection in high schools in the Halifax Regional Municipality (HRM) and compare my findings to what I found in my literature review to determine whether gardening initiatives contribute to learning outcomes or not. If my study results imply that school gardening initiatives do have a positive impact on the students' learning then my paper can be put forward to the Halifax Regional School Board as an important topic for further investigation.

For this project I will consider only High Schools in the HRM because after I conducted my literature review I learned that the majority of current studies only focus on school gardening in Elementary Schools. Although I agree that this is an important age group to focus on, I chose to focus on High School aged students in order to expand the academic field.

I believe my study is significant because it will investigate whether these claims made by the Nova Scotia Department of Agriculture and many other pro-garden sources reflect the reality of school gardening initiatives in HRM. By further studying this topic and interviewing volunteers I will gain an understanding of how one group of interested community members views the importance of gardening as a learning subject at the high school level in HRM. The end goal of this research is to determine if more study should be dedicated to exploring gardening as an elective course in the HRM high school curriculum.

Works cited:

Blair, D. (2009). "The Child in the Garden: An Evaluative Review of the Benefits of School Gardening." *The Journal of Environmental Education*. 40(2): 15-38

Nova Scotia Department of Agriculture. (2012). *School Garden Project*. Retrieved from: <http://www.gov.ns.ca/agri/agaware/schoolgarden.shtml>

Nova Scotia Department of Agriculture. (2011). *Nova Scotia School Garden Resource Guide*. Retrieved from: <http://www.gov.ns.ca/agri/agaware/schoolgarden-guide.pdf>

2.2 RESEARCH QUESTION

State the hypotheses, the research questions or research objectives.

What are the perspectives of volunteers who support school garden initiatives on integrating these programs into the curriculum of the HRM school board at the high school level?

2.3 RECRUITMENT

2.3.1 Describe how many participants are needed and how this was determined.

For this study, I will aim to recruit two to three participants from three different schools in HRM, making a total of six to eight key informants. One school will be chosen from the Halifax peninsula, and two others will be chosen from within HRM, but outside of Halifax. This study will only look at three schools due to time restraints of the study, and will therefore be a geographical representation of three schools rather than a pan-HRSB survey. Although this may seem like a small sample size, there are only five high schools in the HRM that have school gardens so studying three of these five will yield a representative sample.

2.3.2 Describe recruitment plans and append recruitment instruments. Describe who will be doing the recruitment and what actions they will take, including any screening procedures. Describe any inclusion / exclusion criteria.

This study will recruit its six to eight volunteers through the Nova Scotia Department of Agriculture's Agricultural Education Liason, Rick Hoeg. The three schools that will be used must fulfill three criteria: 1. They must be a high school. 2. Must have a garden (or access to a local community garden) that is used on a regular basis. 3. There must be volunteer workers who are willing to participate in this study.

Once the three schools are chosen, I will contact the principals of each school to explain my study to them and ask for their support and approval to let me talk with volunteers associated with their school (see **3.2**). It is not possible to interview teachers or students for this study. This is because the Halifax Regional School Board requires their own internal ethics application and they will not be reviewing applications until the beginning of February, making it impossible for me to be able to include teachers and unionized staff in my study. Studying volunteers will be beneficial on one hand because they are the people who are directly involved in garden initiatives and will therefore be the people who witness first hand how the gardens affect students. Furthermore, interviewing volunteers rather than staff and teachers assures that I am not putting any extra stress on the school board's resources.

Two to three volunteers who are involved in gardening initiatives at each chosen school will then be contacted by email to see if they are interested in discussing this topic. If their

response is positive then a preliminary phone conversation will be set up to further discuss the basics of this research question and to verify that they are still comfortable discussing this topic. If the participants are comfortable with the topic then an interview time will be organized that is most convenient to them.

The actual interviews will occur in person at the interviewee's office or another place that is easily accessible for the interviewee. At this time I will go over the consent form with them and make sure to answer any questions they may have. Once the participants consent to participate in my study I will begin the interview process.

2.4 METHODS AND ANALYSIS

2.4.1 Discuss where the research will be conducted, what participants will be asked to do and the time commitment, what data will be recorded using what research instruments (append copies). Discuss any blinding or randomization measures. Discuss how participants will be given the opportunity to withdraw.

The research will be conducted in the participants' offices or preferred space during a time slot that has been prearranged and agreed upon.

The research will have a time commitment of around an hour, including reviewing the Consent Form.

As the researcher, I will perform the survey orally so that all the participants have to do is answer my questions. Nothing will need to be written down (other than signing the consent form), and no additional time outside of the meeting will be necessary.

If the participants agree, I would like to audio record the interviews as well as take notes so that I can verify the participants' quotations and ideas in order to assure that I use them correctly and in context.

Participants will be given the opportunity to withdraw at any moment for any given reason.

If this occurs, however, it will be necessary for me to find another participant to fill their role. If that is the case then I will follow the same recruitment methods as stated above.

2.4.2 Describe your role in this research and any special qualifications you have that are relevant to this study (e.g. professional experience, methods courses, fieldwork experience).

My role as a researcher in this study will be to facilitate discussion, but not lead it.

It is also my role to abide to my Research Ethics applications for Dalhousie University. It is also my responsibility to assure that participants are feeling comfortable and safe discussing any topics at hand.

I have some previous experience in this type of study from a semester long volunteer placement at the Ecology Action Centre here in Halifax. I facilitated both a before and after survey on a three weeklong event that the EAC hosted.

Also, I am currently in the process of obtaining a Sustainability Leadership Certificate,

where we have received training in various qualitative methodologies, including semi-structured interviews.

Furthermore, the SUST 4900 Honours class has given sufficient training on ethical research, including a presentation from Karen Gallant.

The topic of school gardening is of personal interest to me because as someone who recently taught myself how to garden, I realized how much I could have benefited from learning those skills in a High School setting. When casually discussing my thesis topic with other students at Dalhousie, many agreed that they would have benefited from a gardening elective class in High School as well.

I recognize I have a personal interest in this topic, in that I enjoy gardening as a hobby myself and would like to see more people share the benefits from participating in gardening. Nevertheless, it is my primary and utmost goal to compile results that will be useful for the HRSB.

2.4.3 Describe plans for data analysis in relation to the hypotheses/questions/objectives.

A constant comparison method will be used to analyze the results from this study. When reviewing the participants' information I will identify common themes and patterns that reoccur in the data. From this I will gain an understanding of the perspectives of volunteers who support school gardening initiatives and if they believe these initiatives may be integrated in to the high school curriculum. These themes will then be studied and compared with existing theories and the findings of similar studies.

Although the majority of the research on school gardening initiatives is at the elementary school level, I believe a lot of the same themes and concepts will be able to transcend the age gap and be applicable to the older age group as well. These methods will help me deduce whether school gardening initiatives have an impact on high schools students or not.

2.4.4 Describe and justify any use of deception or nondisclosure and explain how participants will be debriefed.

Not applicable

2.4.5 Describe any compensation, reimbursement or incentives that will be given to participants (including those who withdraw).

Not applicable

2.5 INFORMED CONSENT PROCESS

Describe the informed consent process (i.e. how and when the research will be described to the prospective participant and by whom, how the researcher will ensure the prospective participant is fully informed of what they will be asked to do). If non-written consent is proposed, describe why and the process. If a waiver of informed consent is sought, address the criteria in the guidance document and TCPS articles 3.7 and/or 5.5. Address

how any third party consent (with or without assent) will be managed. Describe any plans for ongoing consent, and/or community consent. Discuss how participants will be given the opportunity to withdraw (their participation and/or their data, and any limitations on this).

Append copies of all consent forms or any oral consent script.

At the beginning of the interview with each participant, I will orally go over the consent form for this study. This will be done orally so that the participant does not just skim the form and sign consent without fully knowing what they are agreeing to. Furthermore, going over the consent form in person allows them to ask me any questions relating to the research as I am explaining the research process. In other words, this will further assure that the participants know exactly what is expected from them, as well as know their rights (i.e, to skip a question or withdraw from the survey at any time).

See **3.2** for the attached Consent Form.

After each interview has been conducted I will present each participant with a transcript of the interview to check for accuracy and clarity. At this point the participants will have the option to either approve the whole transcript or modify certain aspects. It will be made clear to the participants that anything that they approve I will be able to use in my final paper, including direct quotations. It will also be made clear to the participants that my paper may be presented to the HRSB so that during this consent process they will know who the audience of the final paper will be. I will review the previous consent form with the participants to assure that they did not feel uncomfortable at any point during the study and that they continue to know their rights as a participant even after the surveys are complete. Once they have approved that information and direct quotations from their transcripts may be included in my paper, I will have them sign the signature form (**3.4**) again to confirm.

2.6 PRIVACY & CONFIDENTIALITY

2.6.1 Describe how data will be stored and handled in a secure manner, how long data will be retained and where, and plans for its destruction.

Data, including my hand written notes and my audio recorded files (if the participant has accepted to have the audio recorded), will be stored on my personal, password protected laptop until I have received my final grade from my submitted Honours project. After this time (April 2013), the data will be stored in Dr. Schnurr's office (in his locked cabinet). This data will be destroyed after five years. The copy of this data on my personal computer will be deleted as soon as I have received my final grade in this course.

2.6.2 Address any limits on confidentiality, such as a duty to disclose abuse or neglect of a child or adult in need of protection, and how these will be handled. Such limits should be described in consent documents.

Not applicable

2.6.3 Does your use of any survey company or software to help you collect, manage, store, or analyze data mean that personally identifiable information is accessible from outside of Canada?

No

2.6.4 Describe the measures to be undertaken for dissemination of research results and whether participants will be identified (either directly by name or indirectly). If participants will be quoted in reports from the data, address consent for this, including whether quotes will be identifiable or attributed. Describe how participants will be informed of results that may indicate they may be at risk (in screening or data collection), if applicable.

My research will be disseminated to my thesis advisor, to my Sustainability Honours class, and within the Dalhousie academic community (for example, the final paper will be publicly posted to Dal Space for others to access and read).
All volunteers will not be identified by name in my final paper or presentation. Direct quotations will be attributed to pseudonyms. The names of the two schools will also be attributed to pseudonyms, so that the study does not only represent those two specific schools but will instead be understood to fit into the larger context of the HRSB.
If all participants consent then I would like to present my final paper to the Halifax Regional School Board as well so that the HRSB can take my research into consideration.
Participants will know that it is my intent to present the final paper to the HRSB. Once our interview is completed, however, I will give them the opportunity to review their transcript to decide whether they would liked their statements included in my paper knowing that it will be presented to the HRSB. See **2.5** for more information.

2.7 RISK & BENEFIT ANALYSIS

2.7.1 Discuss what risks or discomforts are anticipated for participants, how likely risks are and how risks will be mitigated.

This study exposes participants to minimal risks.
Some discomforts that I anticipate for some participants will be that some members may feel that they should not be making suggestions of improvement for the current school board's initiatives. These risks will be mitigated by informing participants that my research is not meant to critique the HRSB's current approaches but instead to explore whether students' learning could be improved through an increase in garden initiatives.

2.7.2 Identify any direct benefits of participation to participants (other than compensation), and the indirect benefits of the study (e.g. contribution to new knowledge)

This study will hopefully benefit participants by allowing them to express what they would like to see in the public school system in HRM. If the participants propose changes they would like to see in relation to school gardening proposals then those ideas will appear in my paper, which I will hopefully present to the HRSB.

On contrary, if the overall opinion is that more resources should not be put into school then participants will also benefit from my sharing that information with HRSB as well.

This research process will also allow the participants to become more familiar with what the Sustainability program at Dalhousie is working on. This may be a topic of interest for some participants, especially those who work with school gardens and are looking to network within the Environmental Sustainability field.

2.8 CONFLICT OF INTEREST

Describe whether any conflict of interest exists for any member of the research team in relation to potential research participants (e.g., TA, fellow students), and/or study sponsors, and how this will be handled.

Not applicable

SECTION 3. APPENDICES

Appendices Checklist. Append all relevant material to this application. This may include:

- Recruitment Documents (posters, verbal scripts, online postings, any invitations to participate, etc.)
- Screening Documents
- Consent Forms (see section 3.2 below)
- Research Instruments (questionnaires, surveys, interview or focus group questions, etc.)
- Debriefing Forms
- Permission Letters (Aboriginal Band Council, School Board, Director of a long-term care facility)

3.1 Recruitment form



Recruitment Letter

Project Title: School gardens and high school students' learning in the Halifax Regional Municipality

Dear Rick Hoeg,
Environmental Education Liason,

My name is Lucy Dykhuis, a fourth year student at Dalhousie University. As part of my degree in Environmental Sustainability, I am conducting research on the topic of school gardening in the Halifax Regional Municipality. As you are actively involved in providing funding for school gardens across the Municipality, I was wondering if you may be able to help me with my project.

For my research, I am hoping to identify three separate high schools in the HRM that have a garden that is used on a regular basis. I am then looking to interview two to three volunteers who support the gardening programs at each school. The research question for this study is: What are the perspectives of volunteers who support school garden initiatives on integrating these programs into the curriculum of the HRM school board at the high school level?

This is where I am looking for your help! Would you be able to suggest three schools that you believe fit into this criteria:

- Is a high school.
- Has a school garden or a local community garden that is used on a regular basis
- One is on the peninsula of Halifax, two are more suburban/rural.

Furthermore, do you know exact people who you think may like to talk to me about this topic? It will take them approximately an hour of their time in January.

Because I am unable to complete the Halifax Regional School Board's internal ethics approval process due to time constraints, I can only talk to members of the community who are involved in the school gardens but are not directly affiliated with the School Board.

This research will be taking place under the supervision of Dr. Matthew Schnurr from Dalhousie University. You may contact him with any questions at 902-494-7711 or matthew.schnurr@dal.ca

Thank you for any help you are able to provide me with. It is greatly appreciated and will help me further our community's knowledge of school gardening and education within HRM.

Best regards,
Lucy Dykhuis

3.2 Letter of Permission

Letter of Permission

Project Title: School gardens and high school students' learning in the Halifax Regional Municipality

Dear Principal of _____ High School,

My name is Lucy Dykhuis, a fourth year student at Dalhousie University. As part of my degree in Environmental Sustainability, I am conducting research on the topic of school gardening in the Halifax Regional Municipality.

For my research I am hoping to recruit three separate high schools that have gardens that are used on a regular basis. I aim to talk to two to three volunteers from each school who work with the gardens. My exact research question is: What are the perspectives of volunteers who support school garden initiatives on integrating these programs into the curriculum of the HRM school board at the high school level? Earlier this month I was in contact with Rick Hoeg, the Agricultural Education Liason for the Department of Agriculture, who suggested that your school may be interested in participating in this study.

I am therefore seeking your permission to contact members of your school community who are involved with your gardening initiatives. Because I am unable to complete the Halifax Regional School Board's internal ethics approval process due to time constraints in my project, I can only talk to members of the community who are involved in the school gardens but are not directly affiliated with the School Board's union.

The research will take approximately one hour of the participants' time in January.

I hope you are able to grant me permission, as it would greatly help me further our community's knowledge of school gardening and the role it has on education within the HRM.

This research will be taking place under the supervision of Dr. Matthew Schnurr from Dalhousie University. You may contact myself at 902-225-8806 or lucydykhuis@dal.ca OR Matthew at 902-494-7711 or matthew.schnurr@dal.ca with any questions you may have.

Best regards,
Lucy Dykhuis

3.3 Research instruments

Interview Script:

Project Title: School gardens and high school students' learning in the Halifax Regional Municipality

Thank you very much for agreeing to participate in this survey with me, your involvement is greatly appreciated. I also appreciate you taking the time to go through the Consent Form for this survey. This is a very exciting topic for me so I am really looking forward to discussing it with you today. I hope you feel the same way.

1. Tell me the history of your involvement with the school garden.
Can you explain what you know about the garden before you got involved.
2. What are the various aspects of the garden that you are involved in?
Planning, planting, ongoing maintenance, harvest, preserving, school lunch programs, cooking, workshops, outreach etc.
3. From your role (as a direct affiliate, indirect affiliate, observer) with the garden at this school do you see any benefits or detriments that the garden has on the students, school or community at large?
Please explain what these are and why you think they occur.
4. Who are the users of the garden at your school?
 - In general, do you think high school students or elementary school students are more involved in school gardening? What do you think contributes to these differences?
5. What are the experiences of the students who get involved in the garden? Do you feel enough students are involved in the gardening activities? If not, how could more students be encouraged to participate?
6. Where does the majority of the funding for the school garden come from?
 - Are you as a volunteer involved in fundraising? If so, describe the fundraising activities.
 - Is the current funding covering the garden's costs? Take into consideration the profit that is made during the harvest season.
7. Who do you think should provide the leadership and support for school gardens?
Community volunteers, the HRSB, Department of Agriculture, others.

8. What improvements would you like to see made to the garden initiative?
- What improvements would you like to see made in regards to the garden as a teaching mechanism?
9. This school has a lot of elective classes, such as art, band, drama etc. Would a school gardening class be similar or different to these other elective classes, and in what way?
10. Would you like to see a school gardening elective class integrated into the curriculum at this school similar to band, art or drama?
- If so, what would you envision this class to look like?
 - Do you think this is a program that students would be interested in?
 - What do you think some challenges and opportunities of this integration would be?
11. What other questions should be explored about gardening initiatives for the school board?
12. Is there anything else you would like to say about the topic of school gardening and integrating it into the curriculum for students in grades ten till twelve?
- Is there anything that you think students might want to say about this topic that you could express for them?

Thank you so much for your time and commitment. Your answers will be a big help for my project. Once my final draft of this paper has been submitted I will send you a copy of the paper to review.
It will be at this time that you can agree or disagree to allow me to share my results with the Halifax Regional School Board.

3.4 Consent Form



CONSENT FORM

Project Title: School gardens and high school students' learning in the Halifax

Regional Municipality

We invite you to take part in a research study being conducted by Lucy Dykhuis who is a student at Dalhousie University, as part of her degree in Environmental Sustainability. Taking part in the research is up to you and you can leave the study at any time. There will be no impact on you if you decide not to participate in the research. The information below tells you about what you will be asked to do and about any benefit, risk, or discomfort that you might experience. You should discuss any questions you have about this study with Lucy Dykhuis.

Who Is Conducting the Research Study

Lucy Dykhuis will be the principal investigator for this research study. She will be the only one in contact with you during her study.

If you would like to talk to anybody else or gain more information regarding this topic, however, you can contact her thesis supervisor, Professor Matthew Schnurr, of the International Development Studies department at Dalhousie University.

Purpose and Outline of the Research Study

School gardens are very popular in the HRM and they are said to have benefits on the students, the school and the community. This research will investigate whether school garden initiatives can contribute to high school students' (grades 10-12) learning in the Halifax Regional Municipality. This study will only look at high schools in the HRM because the majority of academic research is focused on elementary school and I wish to expand this field of research.

Two to three participants from three different high schools in the HRM will be included in this research. Due to the limited time constraints of this research, the results will represent a geographical study of these three schools rather than a pan HRSB analysis. There are only five high schools in the HRM that have school gardens so studying three will represent the majority.

Who Can Participate in the Research Study

Because this study is not going through the HRSB's internal ethics review process (due to time restraints within the Honours program), only members of the community who are not directly affiliated with the school board and its union will be able to participate in this study. In other words, teachers, students and principals will be excluded from this study. Instead, this study will focus on members of the community who are actively involved in the school gardens, but not directly associated with the school board.

What You Will Be Asked to Do

To help us understand whether school gardening initiatives can help high school students learning, we will ask you to participate in an oral survey that will take approximately one hour of your time. The principal investigator, Lucy Dykhuis, will set up a time and place to meet in person that is convenient for you. After reviewing the Consent Form with you she will proceed to ask you approximately ten questions about how you perceive school gardening in the school you work with. She has requested to be able to conduct an audio recording of the survey as well, so that all quotations can be exact and used in the right context. If you would not like to be recorded please let Lucy Dykhuis know and she will record your survey answers in text only.

Possible Benefits, Risks and Discomforts

The principal investigator believes that participating in this study will be low risk and will not result in any major discomforts. There are no known risks for this study, other than that you may potentially feel uncomfortable making suggestions of improvement directed towards the HRSB. These suggestions are not to be seen as a complaint of the current system, but rather an improvement of what could make it even better. However, if at any time a question makes you feel uncomfortable for any reason please ask the principal investigator to skip that question. You are also able to withdraw from the study at any time, as will be discussed below.

The principal investigator hopes to share the results of this study with the HRSB once the final paper is completed. Once again, if there are any questions that you would not like to share knowing that the HRSB will be reading the final result then please tell the investigator that you would like to skip that question.

Participating in this study might not benefit you directly, but it will allow us to learn about the place you work with in hopes of improving it for future years. We hope that you feel comfortable with the above stated risks. Please feel free to ask the principal investigator any questions regarding these risks before signing the consent form.

Privacy and Confidentiality

The information that you provide us with will be kept private on the principal investigator's personal, password protected laptop until the final paper is complete. During this time, only the research team at Dalhousie University will have access to this information. We will describe and share our findings in class presentations about my thesis topic. We will be very careful to only talk about group results so that no one will be identified.

Once the final paper is submitted, all data will be transferred to a locked filing cabinet in the thesis supervisor's office for five years. After five years, all information will be disposed of in a secure way.

If You Decide to Stop Participating

You are free to leave the study at any time. If you decide to stop participating at any point in the study, you can also decide whether you want any of the information that you have contributed up to that point to be removed or if you will allow us to use that information. As there is not much time given to write a Honours Thesis, this decision will have to be made in less than two weeks since the time of the interview.

How to Obtain Results

Once the study is complete, we will provide you with a copy of your interview transcript. At this point you can review your transcript to assure that your thoughts and statements are accurate and in proper context. You will have the option to either approve the transcript as is or modify/withdraw certain parts. The sections that you approve, including direct quotations, will then be used in my final paper. Please note that my final paper may be presented to the HRSB so anything that you approve may be shared with the HRSB. Pseudonyms will be used, however. There will be a spot on the consent form that you sign at the beginning of the research process to sign if you agree to have your contributions to this paper shared with the HRSB.

Questions

We are happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact Lucy Dykhuis at 902 225-8807 or lucydykhuis@dal.ca) or Matthew Schnurr at 902 494-7711 or matthew.schnurr@dal.ca at any time with questions, comments, or concerns about the research.

If you have any ethical concerns about your participation in this research, you may also contact Catherine Connors, Director, Research Ethics, Dalhousie University at (902) 494-1462, or email: ethics@dal.ca

3.5 Signature form



Participant Approval Form

Project Title: School gardens and high school students' learning in the Halifax Regional Municipality

I, _____, have read and understand the consent form regarding this study. I have been given the opportunity to discuss it with the principal investigator and my questions have been answered to my satisfaction. I agree

to take part in this study. However I realize that my participation is voluntary and that I am free to withdraw from the study at any time.

I agree that the researcher may:	Yes	No
Audio-record the interview with me		
Re-contact me during future phases of research		
Use substantial direct quotations from the survey as long as they are anonymous		

Signature

Date

After reading a copy of my interview transcript,
I, _____, consent to have my submission to Lucy Dykhuis' paper be submitted to the Halifax Regional School Board to be read and reviewed. I understand that Lucy's paper will contain my direct quotations, but will be presented anonymously.

Signature

Date