

Down to Earth: Ecoliteracy and School Gardens in Foods Nutrition 8-12

by

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Bachelor of Arts, Simon Fraser University, 2007
Bachelor of Education, Simon Fraser University, 2008

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Supervisory Committee

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Abstract

Pervasive environmental concern and calls for a deeper understanding of ecology has encouraged educators and researchers to turn to school gardens as a means of connecting students with nature. This project builds a case for why school gardens are valuable, critiques the current Foods and Nutrition 8-12 curriculum, reviews the literature in regards to how school gardens are used and who the stakeholders are, and presents Seed to Table 11, a BAA course proposal with eight distinct units. Seed to Table 11 builds upon a foundation of ecoliteracy and promotes food citizenship with an emphasis on developing practical skills in garden design, development, and maintenance. Designed to educate students on the food system and foster connections to local food producers within the local community, Seed to Table 11 uses the garden as a central tool for learning.

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Chapter 1: Introduction

“Food is a liminal substance; it stands as a bridging substance between nature and culture, the human and natural, the outside and the inside.” Paul Atkinson (1983)

Who I am

I have always been a person who loves food. I can clearly recall the day when my mother, a capable cook who consistently encouraged my two younger sisters and I in the kitchen, announced that she was done being the chief ‘cook and bottle-washer.’ We would be taking over the role and I, as the eldest at 11 years old, became an enthusiastic and experimental fixture in our kitchen. This passion grew and flourished, mostly as a personal interest but also securing me jobs with catering companies and as a manager and cook running the kitchen and dining room of a small, remote kayaking lodge. I subscribed to food magazines, watched food shows, read food literature, and cooked fervently whenever possible. I met, and continue to meet the popular cultural definition of the elitist-sounding term, ‘gourmet’, a person with refined or discriminating taste who is knowledgeable in the craft and art of food and food preparation. (Wikipedia, 2014). Food is what I know and love and I am continuously fascinated and curious about its influence on our daily lives.

After completing an Arts degree, I became a Humanities teacher. I loved the subject matter and the joys and challenges of teaching secondary school English and History. I taught for several years and thought that I would remain within those two departments well into my later years. Yet, an unexpected change in my career path came after looking to return to work after my second maternity leave. A series of factors had shrunk the English and History departments at our secondary school and I, somewhat surprisedly, found myself in the role of Foods teacher, responsible for teaching Foods 10-12. For several years before my appointment, the Foods room

had experienced a string of temporary and often disinclined non-Foods-based teachers. This is not an uncommon scenario as, increasingly, home economics courses are becoming a rare offering at the secondary level and rarer still are the teachers initially trained to work in these departments. As a result, I found that I inherited little to no resources to assist me in creating a comprehensive Foods curriculum that would both excite and challenge my students. I remember with dismay inventorying the surplus of microwave gadgets and manuals that dated back to the opening of the school in the mid-nineties and the stacks of faded food guide pamphlets that accompanied assignments on nutrients and daily caloric consumption. This was not representative of the Foods program that I had hoped to inherit nor the one I envisioned developing.

My agitation with the existent Foods program grew as I dove into the course descriptions, IRPS, and PLOs and began to familiarize myself with my students. Their knowledge, expectations, and practices revealed to me that Foods class was associated with baking snacks and washing dishes. Now having taught Foods for two years, I am increasingly concerned with the disconnect I see in my students' understanding of their relationship to food and nutrition and the resulting impact on the environment. Many of my students profoundly lack an understanding of the complex interconnections between what they eat, the industrial and agricultural processes involved in modern food production, and the environmental and ecological impacts of their food choices.

Furthermore, I believe that the current BC Foods and Nutrition 8-12 curriculum underemphasizes the above as a significant and timely aspect of ecological literacy, especially as food production practices continue to change with advances in genetic modification, pesticide

and fertilizer applications, a shrinking agricultural land base and growing global population, and the increasing distances our food must travel from farm to table.

Food, School Gardens, and Ecoliteracy

In a time of pervasive environmental concern and calls for a broader and deeper holistic world view, the high school Foods curriculum may not be the first place educators turn to in order to instill a sense of “deep ecology” in students. As used by Capra (1996), deep ecology “recognizes the fundamental interdependence of all phenomena and the fact that, as individuals and societies, we are all embedded in (and ultimately dependent on) the cyclical processes of nature” (p. 6). Instead, ecology, deep or otherwise, remains more often than not in the Science classroom and battles there with a plethora of other PLOs for space and breath. Food in general, however, may provide a more apt basis to encourage competency in the area of ecoliteracy than when first considered. As Michael Stone (2007) notes:

“Food is as basic as sustainability gets. Eating is an activity shared by all students; its relevance to their lives is evident. It lends itself to experiential learning in gardens and kitchen classrooms. Learning where food comes from and how it reaches the table requires understanding fundamental ecological processes...energy flows, nutrient cycles, how one organism’s waste becomes another’s food. Food is an appropriate entrée to teaching the interrelationship of educational, agricultural, economic, social, and political systems” (p. 27).

While certainly not a new concept in the education world, school gardens are again gaining momentum for their ability to enrich student learning, ranging from food experiences and nutrition, to learning environments and environmental stewardship. Specifically, a garden may serve as a bridge when used within a Foods program to deepen students’ awareness and

understanding of food systems, local food movements, and nutrition. Moreover, because gardening is grounded in a natural landscape, students may develop personal connections to the earth. Planting, nurturing, and harvesting food that is then prepared and shared in a Foods classroom may lead to enhanced environmental stewardship and ecological literacy.

Students are Disconnected from Their Food Systems

Despite Stone's (2007) observation that eating is an activity shared by all students and therefore an appropriate door into the world of sustainability, food as a subject of instruction in schools is still relegated largely to the Foods classroom where it remains heavily influenced by the home economics and nutrition models. Weaver-Hightower (2011) asserts, however, that education researchers should examine how food appears in schools in both the explicit and hidden curriculum. Drawing largely on Belasco's (2008) research, he notes that food has been largely overlooked in scholarship perhaps because it has traditionally been deemed corporeal rather than cerebral and therefore unrelated to school's highest aim, the acquisitions of skills and knowledge. Additionally, scholarship has tended to marginalize the domestic, private sphere associated with women and therefore the food preparation that occurs therein as well. Finally, and perhaps most useful here, is Belasco's acknowledgement of the "technological utopianism" that has distanced the consumer from the processes of production and preparation of food. As a result, the growing, killing, processing, fortification, packaging, and marketing of modern industrial food have become an abstraction for the average consumer.

Analysis of the Foods IRPs

If students, like the average consumer, are struggling to discuss food processing, manufacturing, and marketing, they are unlikely to find their understanding becoming clearer via existing high school Foods curriculum. Currently, Foods and Nutrition 8-12 heavily emphasizes

food preparation foundations and techniques, nutrition, and healthy eating, minimizing food systems and ecology. For grades 8 through 10, there is little to no mention of environmental or ecological issues in the prescribed learning outcomes of the Foods and Nutrition Integrated Resource Package as they pertain to food and its preparation. The closest consideration of ecological impact for grades 8 and 9, found under the heading “Social, Economic, and Cultural Influences,” is the directive that students discuss factors influencing food choices. However, suggested achievement indicators point to examining the impact of factors such as pricing, quality, convenience, taste, organically grown, locally produced, availability, cultural/dietary needs, and advertising – little that addresses foundational ecological processes and the implications of food systems directly. In grade 10, students are expected to “identify factors that affect food production and supply, especially in Canada today” with suggestions to consider weather, production and fuel costs, growing conditions, local economy, organic production, growing season, and geographic location. Again, little that speaks to ecological literacy specifically.

It is not until grades 11 and 12 that the word environmental even appears and then it remains within a single PLO among 19 others: “demonstrate an awareness of environmental and health issues related to the production and consumption of food” (p. 54). This is modified slightly in grade 12 with the directive that students “analyse global and environmental health issues related to the production and consumption of food” (p. 60). Here the suggested achievement indicator is that students “research and discuss information from a variety of sources about global environmental and health implications of food production (e.g., poverty, world hunger, food security, food banks, quotas, access to safe food, biotechnology, fair trade, farming practices)” (p. 60). While this PLO touches on some of the important aspects of environmental issues related

to food, it does not present a clear picture of the natural systems of which we and our food consumption are a part. Moreover, within this framework, environmental considerations are an accent to the curriculum rather than an underlying foundation. In light of the gaps in knowledge students may have of the interconnected nature of food, it seems reasonable that, in addition to learning about how to reduce food risks to health and ensure a balanced diet, students should also have reasonable knowledge of our current industrial, chemically dependent, and often genetically engineered approaches to agriculture as well as potential alternatives.

Another ready criticism of the relatively minor inclusion of environmental or ecological issues in the Foods and Nutrition 8-12 IRP is that all emphasis is currently placed at the points in the system where human interference occurs rather than at the natural ecological level. For instance, students are considering the food system at the point of pesticide use, biotechnology, farming practices, additives and enrichments, transportation/fuel costs, pest control, fertilizer, soil erosion, global warming, and fair trade practices. This means that students are either assumed to already possess a basic understanding of fundamental ecological processes or are left without. Also of concern is the vagueness and lack of direction in regards to some of the important ecological issues facing students today such as genetic modification which does not appear specifically in the IRP. The IRP does suggest that students discuss “biotechnology,” however this term is ineffective in its ambiguity and is undefined in the document glossary. Moreover, perhaps the greatest danger of overlooking ecoliteracy within the Foods curriculum is that without the basic schemata necessary to engage in dialogue around agricultural practices and the postproduction activities leading to consumption, we may be graduating inadequately informed students who are therefore unable to accurately critique current and emerging food practices.

My Objective

Students' profound lack of agricultural and ecological literacy relates to a renewed interest in school youth being involved at a very personal level with where food comes from. Thorp and Townsend (2001) contend that "as teachers and children continue to experience loss of time, loss of control, and loss of place in their lives, the garden is a powerful leverage point to reverse these processes" (p. 357). This more "hands in the dirt" approach may be a necessary shift in how we educate our students about food. "A "Call to Action" by the School Nutrition Workshop Steering Committee of the Ontario Society of Nutrition Professionals (2004) reported, "[k]nowledge alone does not result in students making healthy food choices. Besides the formal curriculum which teachers use to address nutrition, there are two other levels – the hidden and parallel [external factors such as home, neighbourhood norms and mass media]" (p. 16) . Increasingly, we are realizing that theory alone may be inadequate as the landscape in which children find themselves is now recognized as "the staging ground for their imagination, their story, their sense of the world" (Blair, 2009). Gardens, therefore, are being acknowledged as a means to push back against cultural trends that see children struggle to correctly identify the origins of their food and are without a basic understanding of food cycles.

Orr (2000) argues that when "[p]roperly cultivated and validated by caring and knowledgeable adults, fascination with nature can mature into ecological literacy and eventually into more purposeful lives" (p. 19). With this concept as an underpinning, a remodelled Foods and Nutrition curriculum structured around direct involvement in a school garden may serve to cultivate learning about food that enhances ecoliteracy. The role of the school garden must not be overlooked. Capra (2007) warns that when we teach the principles of ecology in a model of systems thinking it is vital that children both understand the ecology on a theoretical level, but also on an experiential level. To do otherwise, he argues, is to develop students who could leave

school as “first rate theoretical ecologists, but care very little about nature, about the Earth” (p. 17). By merging Foods education with gardening, students witness firsthand the processes of seed to plate and have a sounder foundation upon which to launch investigations into the aspects of processing, preparation, nutrition, and food safety. As Thorp and Townsend (2001) note:

“[G]ardening changes the status of food for all involved. When one gardens, food can no longer be viewed as a mere commodity for consumption; we are brought into the ritual of communal goodness that is found at the intersection of people and plants. Food that we grow with our own hands becomes a portal for personal transformation” (p. 357).

I would like to explore the ways in which school gardens can equip students with the knowledge and skills to become engaged and critical food competent citizens. How can school gardens provide students with knowledge of the processes of seed to table and the skills to think critically about the ways our society grows, markets, prepares, and consumes food? How, too, can school gardens enhance ecological literacy? Answering these questions first requires a review of the literature to ascertain what students understand about food systems, how school gardens are currently being utilized in schools, and student response to participation within these gardens.

With the powerful and engaging possibilities a reimagined Foods and Nutrition curriculum could produce when built upon a foundation of ecoliteracy and underscored with experiential learning in a school garden, it seems that student understanding of food systems and their place within them will not only take root, but flourish.

Chapter 2: Literature Review

School gardens are not a new concept in the education world. Indeed, Froebel's Kindergartens, first established in Germany in 1837, saw school gardens central to the pedagogical approach (Upitis, Hughes, & Peterson, 2013). Pivotal education thinkers Maria Montessori and John Dewey both promoted school gardens as pragmatic and normative means to teach through experience, connect children to nature, and shape moral outlooks (Subramaniam, as cited in Blair, 2009). Today, as school gardens gain momentum for their ability to enrich student learning, interest in their applications is broad and diverse.

This chapter reviews a sample of the literature pertaining to school gardens. Though certainly not yet the norm in most school yards throughout North America, school gardens are no longer exceptional, especially in those areas where climates lend themselves to year-round gardening. For instance, Graham (2002) estimates there to be more than 2,000 school gardens in the state of California being used for academic instruction in subjects such as science, math, nutrition, environmental studies, and health. Yet despite this growing trend, empirical research of the impacts and effects of school gardens has not kept pace. Reviews of the literature conducted by Blair (2009) and Ozer (2007) both include lengthy discussions of where the research must yet go in order to establish a solid foundational understanding of the true value and complex nature of school garden spaces and their uses. As a result of this research's emergent nature, there is a very wide range of topics pertaining to school gardens that vary in focus from health, food experiences, and nutrition, to student attitude, engagement, and confidence, to learning environments, agricultural literacy, and environmental stewardship. Each approach to analyzing the impact of school gardens sheds more light on the complex and subtle role they may play in education. Gaylie (2011) suggests that how research is conducted may need to evolve to capture what is at play:

“...new holistic interpretations of garden learning bring the need for multi-faceted, multi-sectoral approaches to complex problems facing the earth; such a purpose requires a blend of research, practice, philosophy, pedagogy and recognition of historical practices...today’s gardens invite a multitude of new methods to teachings, learning, and research” (p. 12).

The recognition of this opportunity for new methods of teaching, learning and research may be one of the reasons school garden literature has not yet galvanized into coherent and tested perspectives to the degree of other fields within education research.

Nonetheless, upon reviewing the literature, I argue that school gardens provide powerful and engaging learning opportunities which can effectively be applied across disciplines and with a variety of aims. Furthermore, effective school gardens may provide sufficient experiential education resulting in significant changes in students’ achievement, behaviour, and perceptions. This review begins with an exploration of how school gardens are currently being used by schools, followed by a sketching of the context and understandings that see gardens deemed worthy and even necessary additions to schools. I conclude with a brief look at the garden stakeholders and their perceptions.

How School Gardens are Used

Environmental Education. The call for school gardens and their incorporation into curriculum has deep roots in educational philosophy, though it has been steadily regaining momentum in North American school systems since the environmental activism movement of the 1970s (Lawson, 2004). Studies involving school gardens differ in the diverse approaches to investigating how school gardens are used and their effects. The recent qualitative study of Uptis et al. (2013) investigated how students develop stewardship habits through a well-established

school garden program in an urban public elementary school in Southeastern Ontario. Two research questions guided the descriptive case study: “Do children’s experiences with their school garden program...enhance environmental stewardship” (p.102) and “What programmatic, social, and administrative structures contribute to making school garden programs sustainable over time?” (p. 102).

Focusing primarily on eight students from grades 4, 5, and 6, Upitis et al. (2013) used informal and formal interviews, field notes, and student photo-elicitation to collect data. Through analysis of the data using standard qualitative coding methods, five themes emerged as factors enhancing environmental stewardship. These included the school garden affording opportunities to connect with nature in formal and informal scenarios, building the garden with a sense of ownership, focusing on planting seeds, caretaking and developing a sense of responsibility to the garden, and the pride and pleasure of harvesting (Upitis et al, 2013). As structures that contribute to the garden’s long-term success, three themes emerged; namely, parental involvement, the voluntary structure of the Garden Club, and the strong community connections (Upitis et al, 2013).

Positive environmental attitudes and students’ sense of responsibility are also the focus of Skelly and Bradley’s (2007) study. They measured the impact of responsibility and attitudes towards science and the environment on 427 third-grade students and 28 third-grade teachers. Although Skelly and Bradley were not able to find significant differences associated with the type of garden, All students demonstrated high levels of responsibility and environmental attitudes regardless of garden type, though a slight variance was measured in regards to attitudes towards science, suggesting that the medium-intensity vegetable garden was the most useful for impacting this attitude and the perceived usefulness of science study. The researchers suggest that children are interested in gardening and become invested in maintaining a garden once they

begin to see results and can hold something tangible. The aspects of interacting with the land and experiential learning coupled with the very high level of positive attitude and sense of responsibility result in a strong endorsement for school gardens to be utilized by teachers looking to foster students' sense of responsibility, positive environmental attitudes and the teaching of science (Skelly and Bradley, 2007).

Student Engagement and School Bonding. Block et al.'s (2012) Australian study focuses on a number of schools involved in the substantial Stephanie Alexander Kitchen Garden Program (SAKG). The SAKG program features a 'seed to table' model wherein students plant, nurture, harvest, cook, and share food produced in the school garden. At the time of the study, state support had seen the program expand nationally to include 180 schools across all Australian states and territories. The purpose of the study was to "conduct an independent evaluation...of the processes, impacts, costs, and outcomes of the program" (p. 420).

Using a mixed method approach, the study collected and analyzed both qualitative and quantitative data. Qualitative data was collected in the form of semi-structured group discussion and interviews from two types of focus groups, one comprised of teachers, volunteers, and parents and another comprised of 124 children from 6 of the program schools included in the study. Quantitative data was collected through questionnaires from 592 children (352 from the program and 240 for comparison) and 316 parents (186 from the program and 130 for comparison).

Findings demonstrated that students involved in the SAKG program had increased engagement and confidence. The program also offered significant and valuable opportunities for "connecting and integrating children potentially at risk of long-term disengagement" and for connecting students, teachers, schools and communities (p. 424). Generally, the researchers found that the

program had been “an overwhelmingly positive experience for children and school communities” (p. 427).

Using the school garden as a means to connect with children at risk of disengagement with their education experience is the focus of a study by Ruiz-Gallardo, Verde, & Valdés (2013). Looking specifically at the secondary level, it takes a deeper look into how school gardens may play a role in addressing the reengagement of students with disruptive and low-performance tendencies. Citing statistics for school failure and early school dropout throughout the European Union, United States, and Australia, the study notes that retaining and reengaging these types of disengaged students is a priority among governments throughout the world. The study, conducted over a period of six years with 63 students ranging in ages from 15 to 18 years old, explored how garden-based learning as an instructional strategy using the garden as a specific teaching tool impacts academic success. Spending a weekly average of 16 hours outdoors in the garden with activities that directly involved the garden each day, students’ school experience saw similar subjects grouped together and a reduced number of teachers. Using both qualitative and quantitative data, analysis showed a progressive overall increase in academic success and a reduction in disruptive episodes. Other benefits included improved attitude towards school, increased student responsibility, increase in self-esteem and self-confidence, and skills development. The researchers found their results to be consistent with other studies using gardening programs, though noted that additional future research is needed to measure which portion of success is attributed to garden-based learning itself as the program created a complex and subtle learning climate that may have benefited students in a variety of ways.

In the same way Ruiz-Gallardo et al. (2013) address the need for education institutions to find ways to connect with and engage students, Ozer’s (2007) review of school garden literature looks

at the notion of school bonding and attachment. She acknowledges that school bonding as a potential effect of school gardens on students has not been empirically studied thus far, but anecdotal claims “reflect dimensions of students’ feelings of attachment, pride, and belonging to their school as well as a sense of attachment to adults in the school setting” (p. 854). Mainly from garden coordinators and teachers, these claims report students ‘finding refuge’ in the garden, spending additional free time there at break and lunch, showing up early to school to investigate garden developments, and referring to the spaces as “our garden.” Ozer argues that this is a worthy area for future study as empirical research already suggests that students’ level of bonding to a school is related to “a range of important health and achievement outcomes throughout adolescence and adulthood” (p. 854). If school garden programs are able to increase the effects of students’ connection to school, Ozer suggests that the scope of garden programs may be effective well beyond the typical areas of academics, behaviour, and health.

Health and Nutrition Education. Gibbs et al. (2013) also focused on the Stephanie Alexander Kitchen Garden Program and investigated school garden programs as a mechanism for introducing children to different foods. Both qualitative and quantitative findings of the study supported the success of the program in increasing children’s willingness to try new foods. Statistical evidence showed that “the odds of reporting they were always willing to try new foods was twice as great for children in the program compared with the comparison group” (Gibbs et al., 2013, p. 143).

Somerset et al.’s (2005) qualitative study sought to determine the nature and extent of school gardens in eastern Australia. Their method involved collecting and analysing data from sample group interviews drawn from participants at thirteen schools that had or previously had school vegetable gardens. Researchers found that while the primary motive for starting vegetable

gardens in the schools generally was not nutrition education, this was a useful consequence and often led to allocated class time for nutrition-related issues in conjunction with gardening. Specifically, “the gardens were reported to address identified barriers to healthy eating such as enhanced availability through improved exposure, expansion of taste preferences, peer interaction and school support for healthier eating” (p. 32). In light of the data, the researchers found that school vegetable gardens represented a useful vehicle for nutritional health promotion.

Academic Achievement. The application of school gardens as a teaching tool for nutrition and health education, environmental stewardship, engagement and confidence, and even “school bonding” is an understandable approach for most who may be skeptical of the school-gardening movement. Yet when it comes to school gardens and academics some are downright scornful. In an editorial in *The Atlantic*, Caitlin Flanagan (2010) wrote that “With the Edible Schoolyard, and the thousands of similar programs, the idea of a school as a venue in which to advance a social agenda has reached rock bottom. This kind of misuse of instructional time began in the Progressive Era, and it has been employed to cheat kids out of thousands of crucial learning hours over the years, so that they might be indoctrinated in whatever the fashionable idea of the moment or the school district might be” (p. 4). She blasts school gardens for taking students away from valuable class time spent in the conventional manner learning the conventional subjects and even questions the notion of experiential learning: “The ever-evolving rationale behind the school-garden movement mashes together two emotionally stirring ideas: first, that kids will learn by doing, and second, that millions of poor kids have so little access to fruits and vegetables that if they don’t spend their school day growing some on campus, they will never get

any at all” (p. 3). Though perhaps hyperbolic in her argument, Flanagan represents a significant portion of critics who disbelieve the claim that school gardens support academics.

A recent study review by Williams and Dixon (2013) looks to address these types of concerns. Driven by the inquiry question: What is the impact of garden-based learning on academic outcomes in schools, the researchers analyzed 48 studies spanning from 1990-2000. The extant literature shows that specific curriculum/subject links are made with science, language arts, mathematics, social studies, and writing. They agree that linking these subjects to school gardens should be supported by evidence as meeting academic needs. Upon analysis, the data is striking, though offered with several criticisms of the literature. Firstly, the researchers note that nearly half the studies selected for analysis focused on students in grades three, four, or five, and nearly half worked with sample sizes of 175 students or less. A call for further research at the whole school and district level is needed, they argue, as well as study at the other grade levels in order to achieve a more accurate picture of the relationship between school gardens and academic achievement. Nonetheless, school gardens are found to support academics:

“The results of the studies show overwhelmingly that garden-based learning had a positive impact on students’ grades, knowledge, attitudes, and behavior. These positive impacts prevailed for nearly every outcome group, including the elementary, middle, and high school levels, with positive impacts of 85%, 83%, and 91%, respectively, although the number of studies at the high school level was the lowest. The preponderance of overall positive findings is important since research methodologies of the 48 studies were found to be highly eclectic. These findings speak to the potential of garden programs in benefitting academic and academic-related outcomes” (p. 225).

Williams and Dixon argue, however, that the school garden movement has not included in its laudable growth parallel, focused, and rigorous research to support its mandates and that this deficit will prevent school gardens from gaining the legitimacy many desire.

Garden Background Contextual Knowledge and Understandings. While the bulk of interest in school gardens has been in nutrition, academic, behavioural, recreational, social, political, and environmental remediation, there is also a growing recognition that the landscape in which children find themselves is central in informing their sense of identity and their sense of the world. Hess and Trexler's (2011) study steps away from the school garden to examine elementary school students' understandings of the agri-food system more broadly. Citing the increasing issues future society will meet "at the social, economic, and political interface with agriculture" (p. 1), the researchers contend that agricultural literacy is a well-established societal necessity. Using qualitative research methods, the study examines elementary students' understandings of agriculture compared to expert conceptions of grade-specific benchmarks for science and agricultural literacy. More specifically, it explores students' schema for common foods, food origins, and the journey food travels from farm to consumer. Two other objectives of the study were to determine informants' backgrounds and agricultural experiences and to ascertain if themes or commonalities were shared among informants' understandings of the food system and their backgrounds and experiences.

Hess and Trexler (2011) used semi-structured interviews and field notes to gather data from 18 participants, grades 4 through 6, from urban southern California. In order to complement previous studies, the purposive sample was selected based on gender, ethnicity, location, and type of residence and to reflect the demographics of the local urban schools. As a launch point to the interview, students were asked to dissect a cheeseburger from a nationally known restaurant

chain and to identify and group components and then explain the groupings. Framed by benchmarks for science and agriculture, the students' responses guided the interview process.

Data analysis revealed that school field trips to farms and visits to relative's gardens were the most frequently mentioned agricultural experiences among the participants, though they did not appear to influence schema development related to where food comes from or how it travels to the plate. Generally, participants were able to correctly identify the components and origins of the cheeseburger, with the exception of the bun to which only 28% were able to correctly identify that the bun came from a plant (Hess and Trexler, 2011). When asked to identify the plant or animal that produced each of the components, half or more were able to correctly describe the specific origins of the cheese, meat patty and tomato, while less than half correctly identified the origins of the lettuce, onion, bun, and pickle. Additional questions regarding how the food travels from farm to consumer revealed that participants "lacked the schemata necessary for entering into discourse about agricultural crops and postproduction activities leading to consumption" (Hess and Trexler, 2011, p. 9). In short, the study found that participants "lacked a basic understanding of food processing, manufacturing, and marketing" (p. 9).

This profound lack of agricultural literacy relates to the increased interest in school youth being involved at a very personal level with where food comes from. Thorp and Townsend (2001) contend that increasingly teachers and children are less in control, have less time, and less sense of place in their lives. Gardens, they argue, can provide a counter to these processes and even a reversal. "For a very small investment of space and money," Thorp reasons, "the garden [provides] a venue for healing these wounds of modernity. The larger rhythms present in our little 30' x 30' plot of earth cannot be segmented, fragmented, or disconnected; they patiently await our arrival (p. 357). The repeated sensory contact, intimacy with the space of interaction,

and confidence in the processes of nature are more and more being recognized as important responses against the forces of our society that have children so disconnected from their food.

Garden Stakeholders. Successful school gardens usually involve a number of stakeholders. Among these are principals, teachers, and school food, health, and nutrition professionals who play a key role in child nutrition. The study of Jaeschke et al. (2012) examines the perceptions of these various school personnel in regards to the sustainability and use of school gardens. The researchers assessed “incorporation of school garden produce into the school lunch program, use of school gardens to affect the cost of school lunches, creation of a sustainable food source through school gardens, and ways school gardens are utilized at schools” (p. 1).

Using surveys sent to a convenience sample of principals, teachers, food, health, and nutrition professionals from schools with school gardens across the United States, the researchers addressed broad topics such as the effectiveness and sustainability of the school gardens and more specifically topics such as which items were produced in the garden and how they were used. From 27 completed surveys, participants identified that their school gardens may not have produced enough food to incorporate into school lunch programs or, if enough food was produced, that there was no available way to do so. A further barrier to incorporating school garden grown food into lunch programs was the perception of too many insurance and liability risks. Nonetheless, about half the participants reported that garden produce was used in the school cafeteria.

In regards to perceptions related to school gardens and their use, data from the study shows that 85.2% were in agreement that school gardens can be used in academic instruction and a further 88.9% believed that they may be used for consuming garden produce. However, several factors were also identified as barriers to school gardening including not enough time, a lack of

teachers' interest, and a lack of teachers' training in utilizing a school garden project (Jaeschke et al., 2012).

While Jaeschke et al. (2012) examine the perceptions of principals, teachers, and school food, health, and nutrition professionals in regards to school gardens, Bowker and Tearle (2007) turn the focus to children in the garden. The researchers examine children's perceptions of school gardening and its impacts on their learning. Uniquely, it draws from students from schools in England, Kenya, and India who were involved in a 67 school international project called Gardens for Life (GfL). This context allowed the researchers to attempt to gain an understanding of what school gardening means to the children themselves and to "illuminate any common and distinct features which are noted in the three continents" (p. 87).

Qualitative methods of inquiry were used to gather data from students at 6 schools involved in the GfL project in the form of interviews, diagrams and concept maps, pictures, drawings, and field notes. In addition to meeting definitions of rigor, the diversity of forms of data helped to mitigate the potential language barrier for the children whose first language was not English. The researchers acknowledged that children's drawings can show things "that a child is often unable to put into words" and that these drawings and the concise concept maps provided an opportunity for students "to express their understanding about their school garden through drawing as well as through words" (p. 89).

While the common purpose of the GfL project was 'growing food,' the study reveals distinct cultural differences among the students' perceptions and understandings of the school gardens. The researchers acknowledge that the results from a few schools cannot be taken as representative of all the schools in that country, yet assert they are indicative of similarities and differences among how children perceive and understand school gardens in Kenyan, English, and

Indian schools. In common among the children in all three countries was a positive attitude to school gardening. The data indicated “a sense of pride, excitement, and high self-esteem among children associated with gardening” (p. 97) and a valuing of experiential learning. Differences in the perception of the school garden emerged in the degree of horticultural knowledge, the garden as a means for growing vegetables for consumption and a source of income, and conservation issues of caring for the world. Overall, the study supports the concept that school gardens can be used to deliver many aspects of the school curriculum while providing a means to become more environmentally aware, but that “there needs to be a recognition that children have different perceptions and understandings of school gardening, depending on their unique environment and culture” (p. 99). This, they assert should be used both positively and pro-actively.

Ostertag (2009) presents a case study involving five children engaged not with a school garden per se, but an environmental education program at the University of British Columbia (UBC) Farm. Working as an adult volunteer mentoring children grades 3-7, Ostertag explored the multiple ways children develop and enact their ecological identities, understood as the way children’s sense of self is extended in relationship to nature. It was found that the children co-constructed their ecological identities through an interplay between their experiences at the UBC Farm and their own sense of agency and family contexts. Specifically, hands-on engagement with the natural world cultivated “an ethic of care – or feelings of love, empathy, and responsibilities for nature” (p. 133). This study is notable in that it offers empirical evidence on the impact spending time connecting with nature, in this case through activities carried out on the farm, can have in shaping children’s sense of self and how they connect, love, empathize, and feel responsible as a person in their connection to nature.

Conclusion

In reviewing the literature surrounding school gardens, one is struck with the diverse aims school gardens are purported to meet. Ranging in purpose from nutrition education to agricultural awareness to increasing self-esteem and a sense of community, gardening has been enthusiastically taken up in schools as a means to improve students' academic results and school behaviour. The literature demonstrates that school gardens with dedicated teacher leadership, parental involvement, and strong community connections have greater chances of long-term success, while a lack of teacher time, interest and training are barriers to a garden's growth. With both qualitative and quantitative studies supporting the notion that school gardens can be effectively applied across disciplines in order to provide powerful and engaging learning opportunities, it seems that school gardens will not only continue to take root, but to flourish.

Chapter 3: Seed to Table 11 – A BAA Food Citizenship Course

If one listens to the evening news or flips through the weekend newspaper chances are material will arise that focuses on personal health, climate change, the impacts of globalization, or social justice. A culture of consciousness is forming around issues of well-being that centre on the individual, society at large, and even the planet. Within our schools, calls for a broader and deeper holistic world view and pervasive environmental concern have educators revisiting current curriculum with an eye to “green” material and encourage a sense of what Capra (1996) calls “deep ecology.” Deep ecology is the recognition that all phenomena is fundamentally interdependent and both individuals and societies are embedded in and dependent upon the cyclical processes of nature. With this movement has come a renewed interest in school gardens and the role food plays in developing ecoliteracy.

From a personal standpoint, the journey of this Masters project has resulted in a new and more focused conviction regarding food, school gardens, and ecoliteracy. Specifically, having positioned myself as an individual and an educator, analyzed the current Foods 10-12 curriculum, and delved into the academic literature, I now see attempting to rectify the lack of fundamental ecological and environmental content in the current Foods curriculum as detrimental to both the content areas already in place and those that are missing. The importance of foundational ecological understanding as well as a more nuanced concept of the global, regional, and local food systems would be better driven in a vehicle carrying fewer passengers. Food, school gardens, and ecoliteracy demands a course unto itself that would combine both the theoretical and practical components to encourage deep understanding.

This chapter outlines the justification for developing a new course, the process and components of doing so, and the rationale behind its design. It includes the completed application for Seed to Table 11, a potential Board Approved course designed to encourage students to consider how

their food comes to them, the implications of that process, and the skills and techniques to grow and prepare food themselves. At the end of the course framework a number of resources can be found that expand upon key concepts and may help drive lesson design.

Board/Authority Authorized Courses

A Board/Authority Authorized (BAA) course is a course allowed into the local course offerings of a school district. Generally, these courses are designed to meet a need or satisfy a particular interest within the community while offering choice and flexibility to students (BC Ministry of Education, 2012). The Ministry of Education sets out the requirements and procedures for developing these courses in a guidebook that emphasizes certain components. For instance, it clarifies what qualifies as acceptable for a BAA course, how it must differ from other courses already offered, and the number of credits awarded. Students may enroll in a BAA course to satisfy any of the 28 elective credits required for graduation. Upon completion, a proposed BAA course will be scrutinized by the Ministry of Education, the school district, and the school before approval.

School District/Independent School Authority Name	Campbell River
School District/Independent School Authority Number	72
Developed by	Angel Murphy
Date Developed	March 2015
School Name	Timberline Secondary School
Principal's Name	Dr. Jeremy Morrow
Superintendent Approval Date (for School Districts only)	
Superintendent Signature (for School Districts only)	
Board/Authority Approval Date	
Board/Authority Chair Signature	
Course Name	Seed to Table
Grade Level of Course	11
Number of Course Credits	4
Number of Hours of Instruction	120
Prerequisite(s)	None
Special Training, Facilities or Equipment Required	None
Course Synopsis	See next page

Table 1. Board/Authority Authorized Course Framework Template.

Synopsis

Food is a liminal substance; it stands as a bridging substance between nature and culture, the human and natural, the outside and the inside.” Paul Atkinson (1983)

Seed to Table 11 is a multidisciplinary course that aims to provide students with some of the major skills and tools required to think critically about the current food system, participate in the processes of growing food, and recognize and prepare locally-grown food. Specifically, the course focuses on systems thinking, ecoliteracy, gardening design and practice, and local food movements and resources. Students will develop skills in cooking techniques and preparation and be responsible for the planning, implementation, care, and harvest of a school garden. The course is delivered through a combination of theoretical and experiential methods that encourage team work and cooperation.

Rationale

Rapid environmental change and food-security and sovereignty are fast becoming pressing concerns not only of activists and policy-makers, but of consumers in the supermarkets and at the dinner table. On the other hand, a growing disconnect exists for many in their relationship to food and nutrition and the resulting impacts on health and the environment. At the high school level, many students profoundly lack an understanding of the complex interconnections between what they eat, the industrial and agricultural processes involved in modern food production, and the social and ecological costs. Students who enroll in Seed to Table 11 will engage with learning opportunities that put them in direct contact with where food comes from and what it takes to produce it. With an emphasis on ecoliteracy, hands-on involvement in the school garden, and field trips to points of local food production, this course moves beyond other traditional Foods courses which also feature cooking techniques. Designed to be practical as well as theoretical,

this course will appeal to those students who desire opportunities to learn through experience and observation.



Figure 1. Seedlings emerge.

Unit/Topic	Title	Time
Unit 1	Food and You	5
Unit 2	Our Current Food System:	5
Unit 3	Sustainability, Systems Thinking, and Ecoliteracy	5
Unit 4	Food Systems Strengths and Weaknesses	15
Unit 5	Garden Planning and Design	10
Unit 6	Gardening Practices	20
Unit 6	Localization: Seasonal and Local Food Preparation and its Environmental and Community Impacts	40
Unit 7	Outbound: Fieldtrips to Local Food Sources	10
Unit 8	Harvest and Celebration	10
	Total Hours	120 hours

Table 2. Organizational structure.



Figure 2. Working in the garden.

Unit Descriptions

Unit 1: Food and You (Time: 5 hours). *“Food is our common ground, a universal experience.”*

-James Beard

In this unit students will begin to make connections between their daily experience with eating and the food system at large. The food system, encompassing all the processes from seed to table and back again and the resources that support these processes is one that is largely unseen and only indirectly experienced by most students. Nonetheless, their daily food choices have a profound effect on the operation of the food system and impact on the complex set of interconnected processes that bring food to our supermarkets, restaurants, and tables. Students will begin to contemplate their place within this system and trace the connections their food has to the system at large.

It is expected that students will:

- identify and explore their relationship to food and the food system.
- explain the role that food plays in their life
- describe their own and someone else's food customs and habits
- recognize different food customs, culture, and values
- list some of the steps that make a meal possible

Unit 2: Our Current Food System

“To be interested in food but not in food production is clearly absurd.” -Wendell Berry

A food system is the interrelated and interconnected elements that function together to produce what we eat. In short, it is how we get our food. By exploring our current food system, students will gain an understanding of how a particular type of food is available to them, the resources required to produce that food, the impacts of production, consumption, and disposal, and the broader connection to other areas of life.

It is expected that students will:

- describe all processes involved in feeding people: growing, harvesting, processing, packaging, transporting, marketing, consuming, and disposing of food and food packages.
- analyze the inputs needed and outputs generated at each step.
- examine how the food system operates within and is influenced by the social, political, economic, and natural environments.
- evaluate the human resources that provide labor, research, and education with the food system.
- describe how the consumer participates in the food system

- assess the ways in which the food system is connected to many other areas of life, such as nutrition, health, community, economic development, and agriculture and environmental conditions.
- investigate the environmental and social costs related to food production, processing, storage, and distribution
- describe the attributes of global, regional, and community food systems.

Unit 3: Sustainability, Systems Thinking, and Ecoliteracy (Time: 5 hours). *"Look deep into nature, and then you will understand everything better."* -Albert Einstein

In this unit students will expand upon their understanding of ‘food systems’ to the theory of systems thinking as illustrated by Fritjof Capra. Systems thinking encompasses the notion that organisms do not exist in isolation, but are ruled by interdependence and interconnection. This arrangement of relationships creates a whole that is greater than its parts and produces certain patterns and processes, such as cycles, networks, and nested systems. The quality of the web of relationships determines the collective ability to survive. Students will also explore the concept of sustainability through the efficient and environmentally responsible use of natural, human, and economic resources, the creation of efficient infrastructures, and the enhancement of quality of life. Finally, this unit will include an exploration of Traditional Ecological Knowledge and the areas of similarity and difference to current systems theory. Traditional Ecological Knowledge is a living body of knowledge and beliefs by indigenous cultures that stems from a holistic and interconnected viewpoint. It is based on observations and interactions of living beings in their local environment and emphasizes the whole of nature.

It is expected that students will:

- Connect with natural spaces, including outdoors spaces such as local wild areas, school gardens, and agricultural developments
- Explain how TEK integrates the concept of sustainability and systems theory
- Become familiar with systems thinking and the concept that human beings are a part of the web of life rather than separate and superior
- Identify the effects human behaviour has had socially and environmentally
- Describe key patterns and processes of systems theory including networks, nested systems, cycles, flows, development, and dynamic balance

Unit 4: Food System – Strengths, Weaknesses, and Challenges (Time: 15 hours). *“Every aspect of our lives is, in a sense, a vote for the kind of world we want to live in.” Frances Moore Lappé, author of Diet for a Small Planet*

An educated food citizen is one who can competently navigate and critique the current food system based on knowledge and understanding of what it takes to produce food. Through an awareness that his or her food acquisition and consumption has impacts socially and environmentally, a food citizen will consider food origin, means of production, range of accessibility, and sustainability in his or her decision-making. This unit aims to move students towards food citizenship by engaging students in the topics and issues that serve as strengths, weaknesses, and challenges in current foods systems and the tools for thinking critically about multiple aspects of these systems.

It is expected that students will:

- critique current trends in societal expectations for agricultural commodities
- identify the factors that affect the sustainability of a food system (e.g., population growth, urbanization, economic activity, soil depletion, loss of agricultural land)

- examine challenges related to the safe and efficient production, handling, and distribution of food
- investigate negative environmental effects of food production such as pollution from feed lots, contamination of gene pools by GM organisms and deforestation
- discuss competing land use interests (e.g., agricultural use, wildlife habitat, urban expansion, recreation demands)
- investigate the influence of supply and demand on food production such as food and diet trends, cultural perception, social status, organic food preferences, local vs. transported/global products, seasonal diet, and genetic alteration concerns

Unit 5: Gardening Practices (Time: 20 hours). *“To forget how to dig the earth and to till the soil is to forget ourselves” -Mahatma Ghandi*

Through gardening one can learn about food production in a very direct and practical way. This unit is designed to bring students into the garden to develop first-hand experience with organic gardening principles and practices. By spending time in the garden, students witness the processes of seed to plate on a firsthand experiential level. Students will participate in garden design, planting, maintenance, and harvest.

It is expected that students will:

- prepare beds for planting
- describe practices that enhance production (e.g., pest control, fertilizer, organic methods, crop rotation, tillage)
- use appropriate tools for preparing soil and know the four major components of soil and soil minerals
- understand why compost is an important amendment in creating tilth

- differentiate between crops' needs for light, spacing, and depth, as well as their days to germination and plant height.
- plant seeds, possibly using several different methods.
- test soil for moisture content and correctly water plants
- identify weeds and eliminate them
- mulch garden pathways and in beds where appropriate
- thin beds appropriately and where needed
- articulate the process of pollination and its importance in our food system
- identify examples of buds, flowers, and fruits, botanically, in the garden

Unit 6: Localization – Seasonal and Local Food Preparation and its Environmental and Community Impacts (Time: 40 hours). *“Eating's not a bad way to get to know a place.” -*

Michael Pollan, The Omnivore's Dilemma: A Natural History of Four Meals

In this unit students will become familiar with locally produced food and ways to prepare them. Cooking techniques and preparations will favour local, in-season foods, with an emphasis on health and nutrition. Students will also consider the broader economic, environmental, and social implications of choosing food that is local versus food produced by a global food system. This unit is designed to bring the theoretical underpinnings of the course to the plate where students will consider the theory will enjoying the meal.

It is expected that students will:

- explain the differences between local and global food systems
- gain an enhanced awareness of the local food system and foods from their region
- explore and evaluate which foods are complementary to local food-growing conditions
- understand the seasonality of food

- prepare recipes with an emphasis on local, in season foods
- develop kitchen skills and cooking techniques
- compare the benefits and drawbacks/challenges of local and global food systems
- understand the role of energy in the food system
- describe the impacts of transporting food
- explore the connections between personal food choices and food systems
- explore the effects of consumption and how personal choices effect the environment at large

Unit 7: Outbound – Fieldtrips to Local Food Resources (Time: 10 hours). *“Teaching kids how to feed themselves and how to live in a community responsibly is the center of an education.” -Alice Waters*

Interacting with the community and visiting local places that produce food allows students to cultivate connections to their local food system. This unit is designed to provide students with perspective on the realities of local food production and career opportunities connected to regional markets.

It is expected that students will:

- develop their relationships with their community food providers
- analyse challenges and opportunities faced by local food growers
- visit local farmer's market, vineyard, orchard, berry farm, and greenhouse.

Unit 8: Harvest and Celebration (Time: 10 hours). *“People who love to eat are always the best people.” — Julia Child*

To conclude the course, students will participate in the harvest and preparation of a celebration meal.

It is expected that students will:

- harvest food produced in the garden
- prepare dishes for celebration
- reflect on the growing season and knowledge and experience gained

Instructional Components

- direct instruction (lectures)
- indirect instruction (case studies, problem solving)
- interactive instruction (structured controversies, facilitated discussions)
- independent study (essays, journals, research projects)
- experiential learning (field trip, garden work)
- group work

Assessment Components

Type of Assessment	Details	Weighting (%)
Formative* (80%)		
Summative (20%)		
	Total	100%
*The individual percentage breakdowns between the formative assessment components (80% total) will be subject to student input during the first few days of the course.		

Table 3. Assessment Components.



Figure 3. Staff and students hard at work.

Learning Resources

This collection of resources is meant to provide both contextual and specific information for a garden-based, food-focused classroom. Some speak more generally about living in a sustainable manner, traditional ecological knowledge, and how to bring that mindset into and around schools, while others argue the benefits to learning and well-being when children are immersed in natural environments. Also in the collection are resources that paint the picture of our global food system and how to influence that system by introducing aspects of ecoliteracy and garden work into the curriculum. Together, they provide a launching point that will familiarize one with some of the key concepts Seed to Table 11 is built upon.

Books.

- *The Omnivore's Dilemma*
- *In Defense of Food: An Eater's Manifesto* Michael Pollan
- *Animal, Vegetable, Miracle* Barbara Kingsolver
- *Last Child in the Woods* Richard Louv
- *Teaching Green: The High School Years*

- *Greening School Grounds* Tim Grant, Gail Littlejohn
- *Creating Habitats for Learning* Tim Grant, Gail Littlejohn
- *David Suzuki's Green Guide* David Suzuki
- *Plants of Coastal British Columbia* Jim Pojar, Andy MacKinnon
- *Plants of Northern British Columbia* Andy MacKinnon

Print Materials.

- Discovering our Food System Cornell University
- Pacific Northwest Plant Knowledge Cards Vancouver Island and
Coastal Communities
Indigenous Food Network

Documentaries.

- Food Inc.
- The Future of Food
- Just Eat It!
- Waste = Food

Web Resources.

- Centre for Ecoliteracy
<http://www.ecoliteracy.org/>
- Stephen Ritz: A teacher growing green in the South Bronx (13:38)
http://www.ted.com/talks/stephen_ritz_a_teacher_growing_green_in_the_south_bronx
- Janine Benyus Shares Nature's Design (24:00)
www.ted.com/talks/lang/eng/janine_benyus_shares_nature_s_designs.html
- Traditional Ecological Knowledge
<http://ankn.uaf.edu/IKS/tek.html>

- Education Outside Schoolyard to Market Curriculum

<https://www.educationoutside.org/schoolyard-market-curriculum>

Conclusion

To understand where food comes from and how it reaches the table is a key piece of ecoliteracy. It is also a foundational aspect of understanding health and sustainability and can have profound effects on the quality of life of individuals and the planet. As an educator, I feel the dynamic relationship between food, school gardens, and ecoliteracy is so rich that students would best experience it through customized curriculum rather than as an additional unit in an already existing traditional high school Foods course. Seed to Table 11 was designed to introduce students to these concepts in a way that both addresses the theory, but also puts their hands directly in the dirt to experience the processes first-hand. The designed units allow students to explore the food system and their role within it, plan and facilitate the growing of a food garden at school, and participate with local food culture. With this knowledge and experience, food citizenship takes root and informed and critical choices about food prosper. In the following chapter I analyze my own growth as a professional and the aspects of my thinking, beliefs, intentions, and activities that have changed or been reinforced as a result of my experiences throughout my MEd program.

Chapter 4: Comprehensive Exam

My Project

If I consider my growth through this graduate experience as a seed that has cycled through the seasons, I think back to my initial questions: How can school gardens provide students with knowledge of the processes of seed to table and the skills to think critically about the ways our society grows, markets, prepares, and consumes food? How, too, can school gardens enhance ecological literacy? These ideas were planted into the rich soil of current academic research where they set down strong roots. My understanding of the diverse ways school gardens are used and the characteristics of successful programs that feature school gardens has deepened. I feel empowered by my knowledge and the context I have to position myself as an educator within the school garden conversation. This inquiry bore fruit in the form of a project that has had a profound effect on what I now consider to be key aspects of Foods education. By designing curriculum that utilizes a school garden for very specific purposes, I can capitalize on the numerous additional benefits of having students work outside with their hands. I am certain this experience will influence my teaching practice in countless ways. In my most hopeful scenario, it sends additional seeds of inquiry out on the wind in all directions.

My project is comprised of four chapters. In the first chapter I position myself as an individual, an educator, and a more specifically, a Foods teacher. I share my passion for food and outline my concerns with the lack of ecoliteracy currently offered in the Foods 10-12 curriculum. I argue that there is an assumption that students have a working understanding of the food system when in fact very little is in the IRPs that addresses food beyond the point of the consumer. I also propose that school gardens may be an effective teaching tool for educating students about food and ecoliteracy. In chapter 2, I review the literature regarding school gardens and their applications and examine who the stakeholders are and why school gardens may be useful in

teaching about food. In the third chapter I offer a BAA course proposal called Seed to Table 11. This course uses a school garden as an underpinning to teach about food systems, ecoliteracy, local food, and cooking techniques. It emphasizes hands-on involvement with producing food and developing relationships with local food providers. Its aim is to provide students with the knowledge and skills to become competent food citizens, able to think critically about where their food comes from, the impacts of its production, processing, and distribution, and the role they play as consumers. This final chapter offers reflection, anticipation of the continued impacts of this graduate experience of my professional career, and recommendations for other educators who may be interested in school gardens and Foods curriculum.

Professional Development

The most significant change in my professional thinking has been a shift in the importance I place on the concept of ecoliteracy in combination with the food system. This shift began during coursework in our Environmental Education class with Mijung Kim. Most significant were the readings and research I engaged with that served as powerful evidence of the need to bring the environment into the center of both how and what we teach. Some research outright shocked me. This was the case with Hess and Trexler's (2011) study. This study examined grades 4 and 6 students' schema for common foods, food origins, and the journey food travels from farm to consumer. The researchers presented the students with a common fast-food cheeseburger and asked the students to identify and group the components as plant or animal. Half or more were able to correctly describe the origins of the cheese, meat patty, and tomato, while less than half correctly identified the origins of the lettuce, onion, bun, and pickle. Particularly as a food teacher, I found this alarming but also because it speaks to what Belasco (2008) discusses as the "technological utopianism" that has distanced the consumer from the processes of production and

preparation of food. This study illustrated to me the sharp disconnect many students have from the agricultural world, but also more broadly, the natural world. The fundamental components of the natural world such as plant and animal are becoming difficult for students to identify while the growing, killing, processing, fortification, packaging, and marketing of modern industrial food have become an abstraction.

In the context of high school Foods courses, ecoliteracy and the food system is barely addressed or not at all. Earlier in the project, I had envisioned designing some units that addressed the local food movement and that utilized our languishing school garden to produce crops that students could then prepare in the Foods room. These units would be embedded in the traditional Foods 10-12 courses that I currently teach and serve as supplementary to what remain largely cooking courses. These units, I hoped, would address the lack of context students are given for how food comes to them and the processes involved in its production. In teaching Foods, I have long realized that I can make zero assumptions about the knowledge and skills students bring into the room when it comes to how to cook. (I now make how to use a can opener a routine part of my instruction). However, a growing familiarity with the literature surrounding ecoliteracy and school gardens, and the day-to-day interactions with my students have underscored and reinforced the importance to also teach what is largely assumed students already know: how the food system operates, where food comes from, how they interact with this system, and the implications of the choices they make as consumers three meals a day. I now see teaching ecoliteracy in tandem with food citizenship as critical and requiring its own course. Rather than simply embed a unit into my current Foods courses, I developed Seed to Table 11 as a course that would address the fundamentals of ecoliteracy and the food system in conjunction with the school garden. This shift in thinking has resulted in what is likely a superior final

product in that it does not force oversimplifications or the omission of key concepts to allow for a nuanced final picture of how food comes to be on the plate.

The Effects of the Graduate Experience

I anticipate that the journey of this graduate experience will affect my professional career by changing how I deliver the courses that comprise the Foods program at our school. I would like to present Seed to Table 11 to the local school board as a proposed BAA course and hopefully see it offered to students interested in food beyond simply its preparation. I also anticipate introducing units to current Foods courses to emphasize local and seasonal food and the food system of Vancouver Island. The principles of ecoliteracy are likely to permeate the learning culture I establish in all my classes.

My commitment to reinvigorating the school garden is also renewed and resolute. I once heard an administrator at our school say that no garden is better than a garden that looks disorganized. My response now is that any garden is better than no garden, regardless of its size, components, or appearance if it allows students to participate in the processes of producing food. Nonetheless, I would like to produce a garden that supplies the foods program with fresh fruits, herbs, and vegetables and can be used as an example for other schools. In my readings of school gardens that are successful in that they sustain beyond a few years and do not rely solely on one passionate teacher, gathering a team of dedicated groups and individuals will be vital. As such, I hope to collaborate with school and district administrators, colleagues, students, parents, and members of the community. When the bones of our school garden were first put in place very little consultation occurred with staff and there remains some resentment and ample disengagement. With the resources and literature I am now familiar with, I hope to encourage

and support other members of our staff in utilizing the garden as a teaching tool that can be employed in a number of courses.

Key Recommendations

For other educators who may be interested in engaging with food, ecoliteracy, and school gardens, I have three recommendations. The first is in regards to school gardens and ensuring their longevity. Integrating a garden into the culture of a school is key. A garden's design, implementation, and general upkeep is far too formidable a task for one teacher to carry out in isolation. For a greater chance of success that the garden may still be flourishing in two, four, or six years' time, it is crucial that there is consultation and engagement from staff and students prior to the installment. The formation of a Garden Club with particularly keen students can be helpful. Ideally, this also extends to parents who can provide important support for those times when school is out of session. By collaborating with other departments such as biology, chemistry, and art the 'work' of the garden can be divided while the benefits are shared.

Secondly, one does not have to learn all the lessons of using gardens in schools oneself. There are numerous places in the world that have embraced the concept of gardens as teaching tools and these can serve as informative models. For instance, California is recognized for embarking with earnest on campaigns to have gardens in schools with numerous aims and applications. Australia and England have also developed ambitious school garden projects. A simple Google search will supply foundations and organizations that collaborate with schools to install and support these gardens. Often, the websites of these organizations are ripe with resources and recommendations that can be transferable to one's own situation. For instance, the Edible Schoolyard Project website contains a resources section that allows users to search according to a very wide range of garden-applicable subjects ranging from culinary to math and for target ages

Kindergarten to adult. The resources are of high quality and many can be used as off-the-shelf curriculum.

Finally, think local. Connect with the organizations, farmers, markets, and growers of all kinds in the surrounding area that have expertise in the local food system. There are many points within the food system to draw upon including marketing, production, processing, and distribution. Find these points and utilize them as destinations for field trips or case studies. Collaborate with their facilitators. Contact the local garden club, visit the compost centre, investigate the hothouse grower's greenhouses, volunteer at the berry farm. Engaging students with guest speakers to discover locally produced food can provide some of the best support and educational opportunities for teaching about the food system and encouraging a passion for good food.

To value one's food is to value where it comes from. School gardens allow students to connect with their food in an immediate and interactive way. By participating in school gardens, food and the systems that support its production, processing, marketing, and distribution are separated from the abstract and brought down to earth. The notion that gardens belong in schools should be encouraged to take root.

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