The Effect of the Macdonald Farm-to-School Summer Program on Children's Agricultural Knowledge

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ABSTRACT

As the world population continues to rise there is an increased movement of people to urban areas and a greater disconnect from rural life. Children living in urban centers may lack the opportunities to learn about agriculture, which affects their daily lives. Studies on elementary aged children's knowledge and understanding of agriculture demonstrate that children have a low level of agriculture literacy. Interestingly though, many of these same studies show that a great deal of children's information on agriculture is acquired outside of school. Consequently, many education researchers have advocated for the incorporation of informal (out-of-school) learning opportunities in agriculture into the science curriculum. In Canada, there is a growing trend of agriculture education programs at the elementary and higher education levels. However, most of the studies on the impact of these types of programs have been conducted on American (US) and European programs. It was, therefore, decided to evaluate a Canadian program: children's learning from the Farm-to-School summer program located at the McGill University Macdonald Campus Farm.

The study period consisted of four 5-day sessions during August, 2016. During this period two thematic programs were offered: Plate-to-Farm and Global Food Security. Both programs were offered in both languages, with one week in English and one week in French. Children and their parents from all four summer program sessions were invited to participate in the study. Five research questions asked were: 1 - Does participation in the 5-day Farm-to-School Program improve children's agricultural knowledge? 2 - Do family demographics impact children's knowledge of agriculture (age, maternal language, ethnicity, gender, etc.) 3 - Do children's agricultural background (previous Farm-to-School experience and family agricultural background) have an impact on their agricultural knowledge? 4 - What are the parents' perceptions on how the summer program improved (or not) their children's agricultural knowledge? 5-What are the parents' perceptions on how the summer program influenced (or not) their children's agricultural behaviours?

Children's knowledge was evaluated using a pre-and post-test design. Participants were separated into two age groups (6-8 years old and 9-12 years old), and administered a pre- and post-test using a clicker-based response system. Participants' parents provided demographic information, and completed a post-program survey on perceptions. All data was analyzed using SAS version 9.4.

Results for the first three questions, using generalized linear mixed-model (GLIMMX) analyses showed no significant difference between the overall pre- and post-test scores. However, English-speaking children were found to have significantly higher scores compared to French-speaking, bilingual and children who spoke other languages ($p<0.1$). In addition, 9-12-year-olds scored significantly higher than the 6-8-year-old for pre-and post-test scores ($p= 0.0562$ and $p=0.0628$, respectively). Perhaps not surprisingly, previous Farm-to-School summer program experience was also found to have a significant effect on children's test score ($p=0.012$). For the last two research questions, generalized linear model analyses were conducted via the Likert-scale, using demographic and background data. The results of this study demonstrate that children's demographic and background profile significantly impact their knowledge and understanding of agriculture. As well, the demographic and background data affected parents' perceptions of their children's learning and behaviour changes. These results should be useful for future planning of the Farm-to-School summer program.

RÉSUMÉ

L'augmentation de la population mondiale, ainsi qu'un plus grand déplacement des populations vers les zones urbaines amènent à un détachement de la vie rurale s'accompagnant d'une méconnaissance de l'agriculture. Les enfants qui vivent dans les villes n'ont pas la possibilité d'en savoir beaucoup sur l'agriculture. Des études sur la connaissance et la compréhension de l'agriculture par les enfants (école primaire) démontrent qu'ils ont un faible niveau de connaissances. Plusieurs de ces mêmes études montrent que la plus part des informations acquises par les enfants provient de l'extérieur de l'école. Par conséquent, de nombreux chercheurs ont proposé l'incorporation des opportunités d'apprentissage informel en agriculture dans le programme d'enseignement scientifique. Au Canada, il y a une tendance croissante d'inclure l'agriculture dans les programmes d'éducation aux niveaux primaires et supérieurs. Cependant, la plupart des études sur l'impact de ces programmes ont été réalisées aux États-Unis et en Europe. Le but de cette recherche était d'évaluer un programme au Canada : l'apprentissage des enfants au programme d'été « de la ferme à l'école » à la ferme de l'université McGill.

La période d'étude comprenait 4 sessions de 5 jours en août 2016. Pendant cette période deux programmes thématiques ont été offerts : *de l'assiette à la ferme* et *la sécurité alimentaire mondiale*. Les deux programmes ont été offerts dans les deux langues : une semaine en anglais et une semaine en français. Enfants et parents ont été invités à participer à l'étude. Cinq questions de recherche ont été posées : 1 – est-ce que la participation au programme 5 jours « de la ferme à l'école » améliore-t-elle les connaissances agricoles des enfants ? 2 – est-ce que la démographie familiale a un impact sur la connaissance de l'agriculture des enfants (âge, langue maternelle, l'origine ethnique, genre, etc.) 3 - est-ce que l'expérience préalable en agriculture (programme d'été, ferme familiale, etc.) a un impact sur la connaissance de l'agriculture des enfants ? 4 - Quelles sont les perceptions des parents sur l'amélioration (ou pas) des connaissances de leurs enfants après avoir participé dans le programme d'été ? 5 –

Quelles sont les perceptions des parents sur la façon dont le programme a influencé (ou non) les comportements de leurs enfants vis-à-vis de l'agriculture?

La connaissance d'un enfant a été évaluée à l'aide d'une évaluation pré- et post-participation au programme. Les participants ont été séparés en deux groupes d'âge (6-8 et 9-12 ans) et ont réalisé l'évaluation avant et après le programme à l'aide d'un système de réponse instantanée (cliqueurs). Leurs parents ont fourni des informations démographiques et ont répondu à une enquête post-participation sur leurs perceptions. Les données ont été analysées à l'aide du logiciel statistique SAS.

Les résultats pour les 3 premières questions n'ont montré aucune différence entre les notes globales pré- et post-participation au programme. Cependant, les enfants anglophones avaient des résultats plus élevés par rapport aux enfants francophones, aux enfants bilingues, et aux enfants qui parlaient d'autres langues ($p < 0.1$). De plus, les enfants plus âgés (9-12 ans) ont eu des notes plus élevées que les enfants plus jeunes (6-8 ans) pour les notes pré et post ($p = 0.0562$ et $p = 0.0628$, respectivement). Le fait d'avoir déjà participé dans un programme « de la ferme à l'école » a eu un effet positif sur les notes ($p = 0.012$). Les 2 dernières questions ont été analysées avec une échelle de Likert et démontraient que le milieu d'origine d'un enfant a eu un impact sur ses connaissances et sa compréhension de l'agriculture. De plus, les données démographiques ont influencé les perceptions des parents sur les changements de l'apprentissage et des attitudes de leurs enfants. Ces résultats vont être utiles pour la planification future du programme d'été.

DEDICATION

This thesis is dedicated to my step-father, Albert Solway, who taught me that hard work always pays off and to follow your dreams wherever they may take you.

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Chapter 1: Introduction

1.1 Background and Setting

As the world population continues to rise, we are seeing an increased movement toward urban life, with half of the population residing in city areas as of 2014 (United Nations, 2014, p.1). This trend towards urban living causes our youth to be disconnected from rural life, resulting in few opportunities to learn about agriculture and where their food comes from. Much research on youth's agricultural knowledge and understanding reveals that children lack exposure to farm life and have a low level of agricultural awareness (Brophy, Alleman, & O'Mahony, 2003; Meischen & Trexler, 2003; Trexler, 2000). Particularly, youth are uninformed of today's modern-day agriculture systems and its environmental connections. They have an old-fashioned view of farmer's duties, focusing on manual labour tasks without considering farming technology (Fröhlich, Goldschmidt, & Bogner, 2013) and do not make the association between food production and environmental impacts (Calabrese Barton, Koch, Contento, & Hagiwara, 2005). Given that our youth are significant consumers, and will be our future leaders, it is essential that they improve their agricultural conceptions to be able to make informed food choices, and influence future decision-making towards sustainable agriculture production.

Agriculture educators propose different methods of increasing elementary-aged children's agricultural knowledge; integrating agriculture education into the elementary science curriculum and connecting food with farming through hands on activities such as, cooking, gardening, and farm visits (Pense, Leising, Portillo, & Igo, 2005; Pratt, 2013). These educational opportunities can be provided within the school environment or out- of- school. Importantly, agriculture education programs provided in settings outside of school such as 4-H, farm exhibits, and farm safety camps, have been shown to improve youth's agricultural knowledge (Hughes & Hartley, 2000; Luckey, Murphrey, & Cummins, 2013; Radhakrishna, 2005).

For the past three years, McGill University's Macdonald Farm-to-School program has been providing educational opportunities for elementary aged children to improve their agriculture

awareness. Initially, in 2013 the organizers developed several learning opportunities for nearby elementary schools to learn about agricultural, environmental and nutritional related topics. The strategies included educational modules that could be incorporated into the Québec science curriculum and Macdonald campus farm activities such as gardening, farm tours and workshops (Chen, Braind-Racine, Malard, Toupin-Dubé, 2013). In 2014, the Farm-to-School program added a summer camp to their educational activities, which consisted of a 5-day camp on the origin of food. Two years later, the program expanded to offer children aged 6-12 years old, four 5-day summer sessions in two thematic areas, Plate-to-Farm and Global Food Security in both English and French. The Plate-to-Farm session is described as a way to:
"Showcase local agriculture as well as the journey our food takes in Quebec. Each day has a different theme and different modules that are carried out in the Mini-Farm, the dairy barn, and the ecological garden. Themes include food and animal production, including fruit and vegetable produce, insects and soil among others (Macdonald Farm-to-School, 2016)."

Whereas the Global Food Security session:

"Addresses food production throughout the world and addresses the different concepts that surround global food security around the world. The children participate in a hunger banquet at the beginning of the week and become ambassadors for different countries. Their responsibility is to feed their entire population by the end of the week, all whilst taking into consideration that Mother Nature is unpredictable and may affect food production around the world (Macdonald Farm-to-School, 2016)."

Both sessions provide program participants an opportunity to engage in hands on learning activities through gardening, cooking, team games, animal chores, and interactive workshops.

The educators of the Macdonald Farm-to-School program continue to strive to provide the participating students with up-to-date information on agriculture and related topics, with the hope of increasing their knowledge. However, there has never been an evaluation to determine the effect this program is having.

1.2 STATEMENT OF THE PROBLEM

The Quebec elementary science and technology curriculum provides few opportunities for children to learn about agriculture topics (Ministère de l'Éducation du Loisir et du Sport du Québec, 2009). The curriculum provides some learning objectives on agriculture technology and environmental impacts. However, these objectives start only in the upper elementary levels (grade 3-6), providing no agricultural education in the K-2 levels (p. 8, 11-13). According to the National Research Council (1988) all students, beginning in kindergarten and continuing through twelfth grade, should receive agriculture literacy instruction. In addition, in 2013 the Pan-Canadian Assessment Program, which tests students on different subjects, examined Canadian student's math, science and reading levels. The report revealed that "the average score of Quebec students in science was significantly lower than the mean score of their Canadian counterparts overall" (Branswell, 2014).

Education researchers advocate for the inclusion of agriculture education in the science curriculum, given that children can link many personal and societal significances to food, thereby providing a "real world" context to science learning with the expectation of increasing their interest in the field (Calabrese Barton *et al.*, 2005, p. 1164). In Canada, over 703 schools have developed food education programs that provide agriculture-based activities (Farm to Cafeteria Canada, 2015). However, much of the research into these types of programs is from American studies, non-peer reviewed, and on nutritional impacts (Joshi, Azuma, & Feenstra, 2008).

To address the gap in Canadian research literature, on the impact of agriculture education programs, the study reported here examined the effect of the Macdonald Farm-to-School summer program on elementary-aged participants' knowledge of agriculture.

1.3 STUDY PURPOSE

The primary purpose of this study was to evaluate the effect of the Macdonald Farm-to School Summer Program on the agricultural knowledge of elementary-aged children who attended the program in August 2016. The study also investigated the parents' perceptions of their children's agricultural knowledge and behavior changes after attending the summer program.

1.4 RESEARCH QUESTIONS

The questions that were asked in this study were:

1. Does participation in the five-day Macdonald Farm-to-School Program improve children's agricultural knowledge?

2. Do family demographics impact children's knowledge of agriculture (age, maternal language, ethnicity, family agricultural background, etc.)?

3. Does children's agricultural background (previous Farm-to-School experience and family agricultural background) have an impact on their agricultural knowledge?

4. What are the parents' perceptions on how the summer program improved (or not) their children's agricultural knowledge?

5. What are the parents' perceptions on how the summer program influenced (or not) their children's agricultural behaviours?

1.5 SIGNIFICANCE OF STUDY

This study will provide educators, curriculum planners, and researchers with increased knowledge on the impact that agriculture education programs have on participants, particularly on their agricultural knowledge, as well as providing valuable information to the Macdonald Farm-to-School educators for future program planning.

1.6 ASSUMPTIONS

This study was based upon several assumptions. The researcher assumed that:

1. All participating children answered the knowledge questions to the best of their ability when completing the pre-and post-test surveys.
2. All participating children had an equal opportunity to learn from the various education modules and hands-on activities.
3. All participating parents answered the demographic and perception questions truthfully when completing the surveys.

1.7 LIMITATIONS

This study was subject to the following limitations:

1. Only participants who submitted a parental and participant consent form were able to participate in the study.
2. The surveys designed to test children's agricultural knowledge included only one topic per education module. Therefore, test scores provided limited information about variation in agricultural knowledge.
3. The test design was tailored more for older children (9-12 years old), since a multiple-choice format was used with questions that required logical reasoning and memory recall, instead of simpler yes/no questions, thereby limiting the younger (6-8 years old) children's success rate.
4. The results from this study can only be generalized to the sample of Farm-to-School participants who completed the survey.

Chapter 2: Literature Review

2.1 Agricultural Literacy

The databases used for the literature review were, ERIC (ProQuest), Education Full Text, Google Scholar, Theses (Canada), ProQuest, ProQuest Dissertations and Theses Full Text, and McGill's WorldCat, with an initial date range of 2008-2018 and then modified to 2000-2018. Every effort was made to choose the most recent studies, however very little has been published in this area in recent years.

What is Agricultural Literacy?

The publication, *Understanding Agriculture: New Directions for Education* by the National Research Council in 1988 dedicates an entire first chapter to Agriculture Literacy and defines this term as, "the goal of education about agriculture". The author details that an agriculturally-literate person should have a broad understanding of the historical, current economic, social, and environmental significance of our food and fiber system. In addition, he/she should know about the production, processing and marketing of our food (p. 8-9). This knowledge would therefore assist individuals to make appropriate food choices and be good stewards of the natural environment.

The definition of Agricultural Literacy was further refined by Frick (1990) who states:

> Agricultural literacy can be defined as possessing knowledge and understanding of our food and fiber system. An individual possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture. Basic agricultural information includes: the production of plant and animal products, the economic impact of agriculture, its societal significance, agriculture's important relationship with natural resources and the environment, the marketing of agricultural products, the processing of products, public agricultural policies, the global significance of agriculture, and the distribution of agricultural products (p. 52).

This refined definition elaborates on what essential agriculture information individuals need to know and adds an important element: the ability to communicate one's understanding, thereby moving from being functionally literate to an operational or structural level of literacy. A functionally literate person understands the concepts, but at the structural literacy level he/she can explain these concepts in his/her own words, and at the operational literacy level can

provide an explanation based upon one's own personal experiences (Cardwell, 2005). Specific examples of all three literacy levels, as they relate to the understanding of food, are provided by Cardwell (2005)**;** functional literacy about food is "understanding that animals are beef or dairy" (p. 113); structural literacy about a food-related topic, such as free range chickens, would mean that one understands that it is the "husbandry where the animals are permitted to roam freely instead of being contained in corrals or barns"; and in operational literacy one could have an "understanding of crop and livestock systems from working on a farm" (p. 116). Meischen and Trexler (2003) add another level of literacy to the definition - cultural literacy – as "the ability to understand the significance that society attaches to cultural icons" (p. 116). An example of this would be the spiritual attachment of Native Americans to the land. All four definitions provide, to varying degrees, what an agriculturally literate person should know, and the different levels of communicating this knowledge.

Agricultural Literacy versus Agriculture Education

Aldrich (1988) differentiates agricultural literacy from agriculture education, by explaining that it is the "vocational component of agricultural education" (p. 8). On the other hand, Bellah, Dyer, and Casey (2004), view agriculture education and agricultural literacy as equal components in the equation (i.e., agriculture education = agricultural literacy). The authors justify this equivalence, by using simplified definitions of literacy and education, with literacy being defined as "being knowledgeable in a particular subject or field", and education as the "process of possessing that knowledge" (p. 23). Hence, agricultural education's aim is to develop agriculturally literate citizens. However, Bellah, Dyer, and Casey (2004) suggest that, for this to occur, several actions must be taken; agriculture teachers need to value and teach the importance of literacy in their agriculture education programs, educational institutions need to integrate agriculture literacy into the curriculum, and partnerships between schools and industry should be forged.

Why is Agriculture Literacy Important?

Aldrich (1988) provides evidence that most Americans have a low level of agricultural knowledge, particularly with respect to the economic and social significance of the industry, along with the connection to human health and environmental quality. This lack of agricultural knowledge is also present in school-aged children and does not improve greatly as they graduate high school (p.9), R. Birkenholz *et al.* (1992), while R. H. Birkenholz (1993) stress the importance of improving this knowledge, so that individuals can make more informed decisions on important food topics. In the report on *Understanding Agriculture: New Directions for Education* (Aldrich, 1988), recommendations are provided on how to improve agricultural literacy. Aldrich (1988) recommends including agricultural instruction at the elementary level and continuing it throughout high school, and that the instructional material could be incorporated into the existing curriculum. *The National Strategic Plan and Action Agenda for Agricultural Education: Reinventing Agricultural Education for the Year 2020*, goes beyond high school learning for agriculture literacy, in that people should have access to lifelong learning opportunities through the use of various educational materials and settings.

2.2 Elementary-aged Children's Understanding and Knowledge of Agriculture

The following studies were selected and reviewed based on the study's population age and the concepts being explored. In that studies which explored elementary aged student's knowledge of agricultural ideas, were selected. Therefore, the articles evaluated were children's understandings and knowledge of crop protection, meat and livestock, farmer's duties, and food from farm to plate, with the most recent study being 2013.

Trexler (2000) examined elementary-aged children's understanding of agricultural practices related to crop protection. Specifically, the author interviewed a small sample of 5th grade children, living in urban and sub-urban areas of the United States. The children answered questions associated with three pest-related benchmarks: crop loss due to pests, crop protection, and the impacts of using poisons to protect crop. Their answers were coded and

matched to the specific benchmarks. In addition, the relationship between their answers and their agriculture experiences was compared.

Based on the interview data, the author concluded that "elementary students were unable to convey an understanding of basic agricultural production" (Trexler, 2000, p. 99). The author highlights this by stating that "students held little knowledge of weeds, and the majority did not understand that weeds compete with crops for sun, soil nutrients, space, and water" (p. 100). More so, urban students who had never gardened before were unable to explain any concepts related to the three pest related benchmarks. The author links this inability to express pest related issues of crop production to the fact that the children did not have a strong foundation in fundamental biological concepts. Therefore, Trexler (2000) recommends that out-of-school experiences for urban students, such as gardening, be considered so as to learn core biology concepts, which in turn would provide them with a deeper understanding of agriculture.

Based on other research it appears that not only pest related topics are lacking in student's knowledge of agriculture. Meischen and Trexler (2003) tried to determine the understandings of science and agriculture education benchmarks as related to meat and livestock concepts by 5th grade students from a rural Midwestern school in the United States. In addition, they looked to evaluate if a relationship existed between children's understanding and their livestock experiences. The researchers first used concept mapping with the children to stimulate a conversation about the journey meat travels from farm to plate. This was followed by interview questions on their understanding of the origin of agricultural products and the journey of meat products. The children's responses were coded and matched to the specific benchmarks and their concept maps were used as confirmation of their answers. In addition, the student's answers were compared to their background and experiences.

The researchers found out that even though the children knew that certain foods for human consumption originated from animals, they lacked an understanding of many other animal products produced for human use. With respect to farming, students did not have an accurate picture of todays' modern and large-scale farming. However, they did understand what occurs as meat travels from farm to plate, but the language used in their explanations did not match

the specific benchmarks. As well, an important finding was that although the students lived in a rural area (but were not farmers), they still lacked an understanding of agriculture concepts.

From the results of this study, Meischen and Trexler (2003) provided important implications in agriculture education, regarding what educators need to know about what their student's do *not* know about agriculture, and how to apply appropriate materials to increase their understanding. Suggestions, provided by the authors with regard to educating children about animal by-products and modern scale farming, propose designing "activities that require students to discover the sources of ingredients in many everyday products, such as cosmetics and medicines, through research and discovery" and "taking students to modern, large-scale production facilities and allowing them to experience first-hand the structure of agriculture today" (p.53). In addition, a critical element to be considered in curriculum planning is the target population; the authors mention that in agriculture education we tend to focus on improving urban/suburban's agricultural understandings, but that perhaps this is a misjudgement and we should focus on all students, independent of where they reside.

A German study by Fröhlich, Goldschmidt, and Bogner (2013) took a different approach, in that they surveyed student's conceptions of a more general agricultural topic, -farmers' duties. Specifically, the authors compared 112, 5th and 6th grade students' ideas of farmers' duties to those of 73 high school students, also looking to see if their ideas varied based on their agriculture family background.

The authors surveyed the elementary and high school students by asking them to name two farmers' duties. Responses resulted in seven main categories: animals, processing, technology, plants, marketing, ecology and others. The most frequent duty for the younger and older students differed, in that elementary-aged students referred more frequently to animal ideas (85.7%) and the high-school students, to plant concepts (76%). Animal and plant concepts were further analysed into sub-concepts. The younger children tended to provide the following sub-concepts of animal related duties, milking, feeding, chickens and cows, more frequently than the older students. However, with respect to the plant sub-concepts, there was no significance with respect to the relationship of both age group's agricultural family background and their

conceptions of farmer's duties; it was found that the answers significantly differed based on their agricultural background. Younger students with an agricultural background named with the same frequency, animals and processing, and provided the idea of plant duties twice as frequently as those without a family background. Also, this group provided more varied answers than the group without agricultural experience (other, 25% vs. 6.3%), who had trouble providing a second duty. Looking at the high school group, the students with agricultural experience named animal-, plant- and ecology-related concepts more frequently than the other group and, as with the younger group without agricultural experience, a certain percentage (14%) of the students could not provide a second duty.

Based on these results the authors concluded that regardless of age, the students' ideas regarding farmers' duties, were simple in terminology, and did not provide a great amount of detail regarding farmers' activities. They concluded that, "students seem to have a very old-fashioned image of farmers and use stereotypic associations concerning the related duties. The students often focus on the manual labour of farmers and nearly completely miss the chemical, physical, economic or ICT-related tasks and/or competencies involved". (Fröhlich *et al.*, 2013, p. 65). This demonstrates that students are not knowledgeable of today's modern agriculture industry.

Overall, Fröhlich *et al.* (2013) recommend that the educational curriculum integrates fundamental agricultural concepts at the elementary stage and increases this depth of knowledge in higher levels of education. One approach of doing this is "to get the students actively involved with a farmer's work, possibly arranged as farm-stays on a modern farm with large-scale production facilities" (p. 65). This would provide them exposure to real life experiences of modern day agriculture, and possibly impact their agricultural knowledge. In addition, the authors suggest that teachers should also receive similar hands-on experiences on farms, in order to be able to transfer the appropriate concepts to students.

The next two studies by Calabrese Barton, Koch, Contento, and Hagiwara (2005) and Brophy, Alleman, and O'Mahony (2003) examine elementary-aged children's understanding of a similar agri-food system topic - the process food takes from farm to plate.

Calabrese Barton *et al.* (2005) explored urban students' understandings and beliefs about how food gets from the farm to our plates. More specifically, the authors conducted semi-structured interviews with 24 children from 4th and 5th grade that either attended schools in an impoverished or middle-class neighborhood of New York City. The interviewers first asked the children to develop food associations from the props provided, such as food items and word cards. These food pairings, allowed the researchers to ask more detailed questions on the concepts of farm to store. The interview data was analysed using a coding scheme, whereby they mapped these schemes onto two science education standards: *National Standards for Science Education* and *Science for All Americans.* The analysis of the children's responses, revealed three food-related themes: food transformations, food transportation, and food technological systems.

Under the theme of food transformation, the authors point out three main topics that were brought up by the students; the actual transformation process of food, mechanisms for transformation, and food as a commodity sold in the marketplace. With respect to food transformation, the authors observed two areas that the students' understanding of food processing was based on, the first being, on their experiences from home (for example the author recorded that, "one student talked about how she observed her mother cut potatoes to turn them into french-fries") (Calabrese Barton *et al.*, 2005, p. 1170). The second area was based on how the product tasted and looked. For example, a child explained how grain is transformed into cereals such as Fruit Loops™ or Cheerios™.

As for mechanisms for transformation, the authors point out that the factory was the focus point for the students with respect to the travel of food from farm to store. Interestingly, Calabrese Barton *et al.* (2005) noted that children believed that all food went to the factory to make changes to the taste and appearance, but that these alterations did not have an environmental or nutritional impact. As for food commodity, specifically the role of farmers, most children expressed the farmers' jobs as crop production, caring for animals and as businessmen. They did not explain a farmer's role in terms of providing consumers with food that will meet their nutritional needs. They did not explain a farmer's role in terms of providing consumers with food that will meet their nutritional needs.

For the second theme, food transportation, the authors recorded that the students consistently referred to trucks as the only method of food transportation. The authors attribute this to two factors, one being that the only prop provided on this subject, was a truck and that the children reside in an urban setting where trucks are commonly seen transporting commodities. Lastly for technological systems, the students' responses, as described by the authors, showed that they believed technology is sophisticated in food processing and replaced processes that people are not able to do. Still, as with the food-transformation study, the children made no connections to the environmental impacts of food technology.

Overall, this research study provides important information for educators, in that children used home experiences and television examples to illustrate their understanding of food systems, without any reference to what they learned in school, and that they provided generalized answers with very few links to the environment. Therefore, Calabrese Barton *et al.* (2005) suggest that food-system topics should be incorporated into the science curriculum, specifically in connection to the environmental and nutritional concepts related to food.

Brophy *et al.* (2003) also used the topic of food from farm to plate to test elementary children's knowledge of a variety of food subjects. The researchers conducted interviews with 96 children from kindergarten through Grade 3, who attended public school in a middle-class urban neighbourhood. The interview questions were based on food education topics from textbooks, used in elementary social-science instruction, and the researchers' personal ideas on important social topics.

The authors specifically tested children's knowledge of land-to-hand progressions, identification of products derived from farm animals, and identification of inventions which have helped modernize farming, among other issues related to agriculture. The children's responses to these topics were coded, in that their answers were matched to categories of core ideas. The results were analysed as an entire sample and not by age-specific responses to provide a more generalized pattern.

Overall, for all food topics tested, the children knew more about physical appearances and the uses of the finished products, than the processes involved in food transformation. With respect

to land-to-hand progressions of common food products, the authors describe the children as having a basic understanding, but lacked a "fundamental awareness of specific processes occurring on farms and in factories" (Brophy *et al.*, 2003, p. 22). Additionally, the authors state that "most of what they knew about cheese or hamburger meat began with purchase of these products in supermarkets, with little awareness of the processing involved in developing them from their bovine origins" (p. 23). Also, the children showed a lack of knowledge of the connection of food they eat and its origin: "students did not appear to have made the connection yet between the 'chicken' that they eat and the chickens in barnyards" and "typically implied images of small family farms with small numbers of animals, perhaps even known individually and treated as pets by family members" (p. 25-26). An interesting detail emerged when the interviewer asked the children questions on the topic of growing corn, in that "the most detailed knowledge had been acquired outside of school by students whose neighbors or relatives grew corn in gardens or on farms" (p. 31). Demonstrating that out-of-school experiences can influence children's agricultural knowledge.

The remaining topics questioned by the researchers revealed a variety of misconceptions by the children, mainly on the topic of farming. In the past compared to present day, the children believed that there are more types of animals now and that farmers produced products for self-sufficiency from a small size farmland. With respect to today's farm machinery, the students stated that they are steam-powered and there is more land for farming since it is abandoned by people moving to the city. However, the children believed that we need fewer farmers today since most produce is imported from abroad. The authors attributed the children's answers to fictional stories they might have read, which depicted farming in this way.

Based upon the results of this study the authors recommend a reshaping of the elementary curriculum to include more relevant connections to the earlier historical and cultural aspects of agriculture, and the use of food pyramids to engage in discussions about international nutrition and dietary alternatives (e.g., honey to replace sugar). Importantly, before any curriculum modifications occur, educators must determine what children know and put it into a relevant and meaningful context for learning to take place.

2.3 Informal and Experiential Learning in Youth

Informal Learning

"From the time a student begins schooling and finishes high school, each has spent approximately 11,000 hours in the classroom and 65,000 hours, outside" (Medrich, 1982, p. 229). This time outside of school is spent by children being on their own, with their parents, performing household chores and/or jobs, involved in extracurricular activities, and watching television (p. 232-238). Given the substantial amount of time children spend outside the classroom environment, it is worthwhile exploring what type of learning they are engaged in, and if they are gaining knowledge in these environments so that they can apply the knowledge in school or in their day-to-day lives.

The type of learning that children obtain outside the school environment, is known as informal learning. Crane, Nicholson, and Chen (1994) provide the following definition:

"Activities that occur outside the school setting are not developed primarily for school use, are not developed to be part of an ongoing school curriculum, and are characterized by voluntary as opposed to mandatory participation as part of a credited school experience. Informal learning experiences may be structured to meet a stated set of objectives and may influence attitudes, convey information, and/or change behaviour" (p. 3).

The authors continue this definition and take into consideration circumstances where informal learning activities can be incorporated into formal learning, for instance when being used as supplement to formal learning by the school and teachers. Examples of these supplemental informal learning activities can be, visits to: museum exhibitions and demonstrations, aquariums and zoos, and community-based programs (p. 3).

Informal learning is also often put into the context of science education, given that science is exploratory by nature. Several studies have examined the impacts of informal learning on children's scientific understanding and knowledge (Cainey, Bowker, Humphrey, & Murray, 2012; Gerber, Cavallo, & Marek, 2001; Turnbull, 2002; Wellington, 1990). Also, given that agriculture is often categorized as a type of science, agriculture researchers have also considered the role of informal learning in agriculture education (Ramsey & Edwards, 2004).

School visits to education centres are sometimes organized so that educators can teach certain learning concepts in a different environment with the hope of stimulating children's interest and improving their knowledge. In a study by Cainey *et al.* (2012) which examined the impact of visiting the UK National Marine Aquarium on elementary-aged children's understanding and knowledge of marine habits, the authors reported an improvement in children's understanding of the marine environment. Specifically, through observations, children on the guided tours revealed a high level of engagement, and the post-drawings (pictures drawn by children after visiting the aquarium) showed significant improvement in concepts related to marine habitats and marine species. From these results Cainey *et al.* (2012) state that "schools can be confident that not only is a visit to the Aquarium enjoyable and exciting but also results in significant learning" (p.279). Wellington (1990) examined another informal learning environment, hands-on interactive centres in science education. By observing and interviewing various people at hands-on interactive centres in the U.K, the author provides confirmation that these centres had a positive impact on three important educational goals: knowledge and understanding, fine motor skills, and interest in learning. With respect to informal science learning in agriculture education, both Ramsey and Edwards (2004) and Turnbull (2002) discuss the learning opportunities that exist. Ramsey and Edwards (2004) explore Supervised Agricultural Experiences, Future Farmers of America Clubs, and Summer Enrichment Programs in Agriculture Education, as informal science learning opportunities. The authors found that all these informal science educational programs provided opportunities for agri-food system experiences while improving student's understanding in science.

Experiential Learning

A type of learning that is associated with informal learning is experiential learning. Kolb (2014) provides a definition of learning with an experiential perspective as "learning in the process whereby knowledge is created through the transformation of experience" (p. 38). Adkins and Simmons (2002) use an alternative word, experiential education, which is defined by the Association for Experimental Education as "a process through which a learner constructs knowledge, skill, and value from direct experiences" (p. 3). Both consider the importance of the learner's experiences in improving one's knowledge.

The importance of student`s learning experiences is evident in the National Research Council`s 1996 Science Education Standards, where it states that "learning science is something that students do, not something that is done to them and hands-on activities, while essential, are not enough, students must have minds-on experiences as well". (National Research Council, 1996, p.2). Such "minds-on" activities in agriculture education programs are often implemented in the form of garden projects. Mabie and Baker (1996) explore the effect of two agriculture-related experiential instruction strategies (in-class projects and vegetable gardens) on children's science process skills. Specifically, 146 5th and 6th grade elementary students from two schools located in an urban region of California, U.S.A., were involved in either a ten-week garden project, in-class project, or the regular curriculum (control group). The students involved in the experiential instruction were taught the following science process skills: observing, communicating, comparing, ordering, relating, and inferring (p. 3). After the ten-week instruction period, the researchers observed students' written and verbal responses to activities that tested the same science processing skills. The results of the observations revealed that participation in these experiential activities improved students' abilities to observe, communicate, compare, relate, order and infer (p. 5).

Mabie and Baker (1996) recommend that teachers at all education levels use experiential instruction within the science curriculum; however educators need to be comfortable to use this teaching strategy. Therefore, the authors advocate for more research into this form of teaching to help determine effective strategies in implementing experiential instruction.

2.4 Agriculture Literacy Program`s Impacts on Youth

This last section provides an overview of formal (in-school) and informal (out-of-school) programs in Agricultural Literacy, and their impacts on participants.

2.4.1 Formal (in school) programs:

National Farm-to-School

Farm-to-School is an American multi-partnership program among schools, farmers and communities with the objective of providing youth a better understanding of food, nutrition,

health and agriculture in order to make informed food choices. The first farm-to-school initiative began in 1996 by a concerned parent in California, by establishing a Farmer's Market Salad Bar at a local college, which offered local farmers' produce (Feenstra & Ohmart, 2012). The movement continued to grow, and in 2004, there were over 400 programs in 22 states (p.282). At the time, the National Farm-to-School Network was created, to be "an information, advocacy and networking hub for communities working to bring local food sourcing and food and agriculture education into school systems and early care and education settings". (National Farm-to-School Network, 2016).

Impacts of Farm-to-School Programs

Joshi, Azuma, and Feenstra (2008) summarized and evaluated the findings of 15 U.S. Farm-to-School assessment studies that were selected from evaluation reports of 38 Farm-to-Schools. The selection criteria was based on four specific conditions, 1) the study included quantitative data on behavioural outcomes, 2) the study was comprehensive in approach, 3) the study described the method of data collection, and 4) data were collected using standard approaches such as surveys, interviews, etc. The authors also proposed what type of future research would be required to better understand the impacts of the farm to school program.

The data findings from the 15 studies were categorized into three kinds of behavioural changes: individual changes, school food operational changes, and financial changes at the farm level. They also report on knowledge and changes in attitude, connected to the Farm-to School program. Also provided are the evaluation tools used in the 15 studies that assessed student (individual) changes. Of these studies, the evaluation methods used to assess student behaviour changes such as increase in fruit and vegetable consumption, increase in school meal participation, and positive lifestyle changes, were school food production records, school records, informal class polls, parent/student surveys, and observations of waste on salad-bar trays. Certain interesting findings, noted by the authors, included the fact that i) positive dietary changes occur when schools serve fresh, local and flavourful food, combined with educational activities; ii) schools that have Farm-to-School salad bar programs had a greater percentage of students making their own healthy meal choice when the salad bar was made available; and iii)

more students chose the farm to school meal as opposed to the other cafeteria food choices. As for lifestyle changes, these studies noted that positive changes occurred in students' social skills and self-esteem, responsible behaviours (saving money, improved work ethic) and physical activity. Together, these findings demonstrate that Farm-to School programs positively influence students' dietary choices, which could have an impact on children's health with the hope of reducing child obesity, which is a great concern worldwide.

The other student behaviour changes evaluated in these studies were student knowledge and attitudes, such as increased knowledge about local foods, nutrition and health, and positive attitudinal changes regarding new healthy foods. The authors note that certain studies found that farm to school programs in schools helped to increase students' knowledge of sustainable agriculture, food cycle, and local grown foods. As well, the programs provided information on how to read food labels, which allowed students to make healthier food choices when shopping at the supermarket. As for student's attitudes, the authors cite three studies that showed positive changes in student's approach to choosing healthy foods. Three studies referred to in this article, found that school teachers' and administrators' behaviours were also impacted, in that their participation showed an increased participation in the farm to school meal program. Also, six studies reported that food school service operations changed with schools buying more local foods and improving food preparation habits. As for behaviour changes in farmers, it was observed that, they participated more in farm to school programs, supplied more produce to schools, and provided more educational activities at their farm. This type of participation provides increased revenue and important community connections for farmers. Another participant behaviour change that was infrequently evaluated, but still cited by the authors, was the behaviour of the parents of the students in the program. Only three studies cited by the authors evaluated this change and showed that farm to school programs also have positive effects on this group of participants.

Based on (Joshi, Azuma, & Feenstra, 2008) evaluation of the 15 studies, they propose research areas that need to be investigated in more depth with respect to Farm-to-School programs, such as the role of school food service workers and teachers, the factors that assist in

maintaining participation, behaviour changes in home setting, long term impact on dietary changes, farmer impacts, best practices to influence policy changes, and community changes.

Food for Life Partnership Program

The Food for Life Program (FFLP) is a U.K. based charity established in 2007 and now a partnership of four other national charities, such as the U.K. organic certifying body, Soil Association, Garden Organic, Health Education Trust, and the Royal Society for Public Health. The aim of the FFLP is providing healthy food choices to youth and the community at large (Food, 2016). The FFLP provides support to schools by granting them various awards for implementing the Whole School Approach, a framework developed by the FFLP to create a healthy food culture in schools by implementing, food quality, food leadership, food culture, food education, community and partnerships.

Impacts of FFLP

Jones *et al.* (2012) evaluated student-behaviour changes in a Food for Life partnership (FFLP) program, established by elementary schools. The objective of this study, as stated by the authors, was to "examine the associations between the promotion of sustainable food issues in primary schools and student self-reported fruit and vegetable consumption and a range of associated student behaviours", by selecting 30 elementary schools that had the following characteristics: enrolled in the flagship program of FFLP in 2008, high socio-economic deprivation with free school meal plans, urban setting, high student population, track record of health promotion, and environmental activities. The study design and data collection method used by the authors was a control design whereby students in grades 5 and 6 (ages 9-11) at the start of enrollment in FFLP received a questionnaire measuring fruit and vegetable intake and, 18-24 months later, received the same questionnaire. The student questionnaire also measured implementation of program-related activities such as school meals, school garden growing, food preparation skills, and participation in farm activities. A second questionnaire was provided to school staff to assess the flagship school's exposure and fidelity to the program using the same study design.

Interesting findings of this evaluation study were the that the difference in the amount of fruit and vegetable consumed by the students was more noticeable for grade 5 students, program implementation affecting school changes showed that training, facilities, participation and student exposure to sustainable food issues increased over the course of the evaluation period and impacted the student's fruit and vegetable intake. The authors suggest that schools most loyal to the program and with a good program implementation show positive results in terms of student's food choice and consumption. Other positive effects of the FFLP observed by Jones *et al.* (2012) were increased take up of school meals, role of skilled based food preparation education and vegetable gardening in school.

Agriculture in the Classroom

Agriculture in the Classroom (AITC) has two significances, an agricultural education organization and a flexible education program that educators can incorporate into their existing curriculum to increase agricultural literacy among students in Kindergarten through grade 12 (AITC, 2015). Importantly, educators received support on the use and integration of AITC materials through training workshops (Pense *et al.* p.105).

The development of the AITC organization was the result of a 1981 United States Department of Agriculture lead workshop that invited agriculture, business, education and government agencies, to develop a program of information on agriculture and establish a central group (the resulting AITC). The initial goal of the AITC organization was to develop, distribute and coordinate agriculture education materials. Currently, there is an AITC in every state of the United States and a Canadian AITC organization that coordinates several provincial programs.

Impact of a U.S. Agriculture in the Classroom program

Pense *et al.* (2005) evaluated the effect that an Illinois Agriculture in the Classroom (AITC) program had on elementary children's agricultural knowledge. Specifically, they conducted a quasi-experimental study with 1,734 students in Kindergarten through grade 12. The authors used the AITC curriculum to teach agriculture knowledge and tested the students using a pre- and post-test. The post-test was administered 5 -6 months after the pre-test. These tests

assessed the five themes identified in the food and fiber systems literacy (FFSL) framework. The details of these themes are detailed in (Powell & Agnew, 2011), where they provide the five thematic standards of the framework: food and fiber systems; history, geography, and culture; science technology, and environment; business and economics; and food, nutrition and health.

Pense *et al.*, 2005 determined that AITC did increase students' agricultural literacy within the five benchmarks created by the Food and Fiber System Literacy Framework. Each grade level differed as to which benchmark was most present in the agricultural knowledge, acquired through the lessons. Grade K-1 was most knowledgeable in the food, nutrition and health benchmark; grades 2-3 in the understanding agriculture benchmark; grades 4-5 in the science, technology and the environment benchmark and grade 6 in the history, geography and environment benchmark (p. 116). The test results from the classes that received AITC were compared to the classes that did not receive any AITC and it was found that that the classes given AITC had the higher test scores (p. 116).

Based on these findings the authors make three recommendations on integrating this AITC curriculum at the Kindergarten through to grade 12 levels. The first was that educators should receive additional support, through training, to improve their teaching in the thematic areas and grade levels of the framework that obtained the lowest test scores. Second, a curriculum model of the FFLS framework should be integrated in all school grade levels to improve agricultural literacy, and third, continued research was needed into AITC state programs.

2.4.2 Informal (Out-of-School) Programs:

4H Program

The 4H program is a youth development organization that has clubs, programs, and camps throughout the United States and Canada. The goal of 4H is to provide children between 5-19 years old with the necessary skills to become active leaders in their communities, by offering hands on learning projects in science, health, agriculture and citizenship (National 4-H Council, 2016). With over 100 years of history, the 4H organization cooperates with a large extension

network of government agencies, universities, and state offices that provide expertise and resources to assist in the development of educational programs.

Long-term Impacts of 4H

In contrast to the previous two studies that examined short term impacts, Radhakrishna (2005) investigates how 4H influences its members over the long term. Specifically, the author seeks to examine a segment of 4H alumni, with a view to assessing the impact 4H membership had on their leadership development, personal development, agriculture subject knowledge, communications skills, community development, and later life experiences. In addition, the author also compares the impacts of 4H to other youth programs.

Radhakrishna (2005) randomly selected 289 former students from a database of 1,297 4H alumni to receive a mailed questionnaire. The questionnaire consisted of sections on demographic and participant information, and Likert-scale type statements on how 4H influenced their skills, knowledge development, and career and life experiences. As well as, questions that compared 4H with other youth programs.

An analysis of the 168 completed questionnaires revealed the following demographic and participant profile. A majority were female (74%), an average age of 48 years old, and 50% with a high school or college degree, and the remaining with university or professional degrees. A high percentage of respondents, 66%, lived on a farm or in a rural area, and 50% currently worked full-time. A substantial amount (82%) of participants were active members in the 4H program with over 8 years of membership service where they completed projects mainly in the subjects of animal science, and leadership and personal development. Based on the analysis of the questionnaire data, Radhakrishna (2005) determined that alumni felt that their 4H experiences greatly influenced developing skills in group interaction and decision making, and acquiring leadership skills. In terms of personal development, the main contributions of 4H experiences were to the development of personal pride, life enjoyment, and self-esteem/self-confidence (p.82). In terms of knowledge development, the alumni's experiences mainly provided a greater understanding and awareness of environmental stewardship, and agriculture and food safety. The experiences that most influenced their communication skills

were based on the development and acquisition of a sense of personal responsibility, and interpersonal communication abilities. In addition, their community development skills were gained through, learning heritage appreciation and citizenship skills (p. 83). In terms of impacts of 4H on career and life experiences, their experiences influenced their career in terms of the level of education attained, job/career selection, and the pursuit of higher degree continuing education. In the case of life experiences, it impacted leadership responsibilities, support in farming practices, and their residential community choice. Lastly, in comparison to other youth organizations the alumni members believed 4H to be superior in obtaining valuable skills and important subject knowledge. An overwhelming majority would recommend 4H to young people, believing that the benefits of membership would impact youth's parents and families, and continue to influence them personally in their adult lives.

Based on these findings Radhakrishna (2005) provides important recommendations in increasing 4H awareness and enrollment, improving program planning, and research. The author's recommendations are the following: to use the results of the positive assessment studies in 4H promotional materials and display them in target 4H arenas (Farm Shows, Ag Progress Days, etc.), to continue program assessments and utilize the research data to improve and/or modify 4H programs, and to demonstrate the research benefit to key stakeholders.

AgVenture

For over 80 years, the Houston Livestock Show and Rodeo™ (HLSR) has provided youth with opportunities to learn about agricultural practices through exhibitions and presentations (Rodeo, 2016). One such exhibition is the AgVenture program, which was developed in 1997 to provide the public with hands-on learning opportunities in animal breeding and behaviour, birthing, fisheries, honey, milk and poultry production, horticulture, and local agriculture.

Luckey, Murphrey, and Cummins (2013) evaluated the impact of the AgVenture program on elementary students. Specifically, the authors investigate the effect of the program's 10 hands on learning sites, on 4th grade elementary student's agricultural knowledge and perceptions. The participating students were from two elementary schools in an urban area of Houston, TX, U.S.A., and included mostly (78%) females of African-American or Hispanic descent with varied

agriculture experiences, such as, toured rodeos or contact with farm animals and/or crops (29.3% respectively), owned farm animals and/or grew their own crops with family (9.8%), and nearly half (43.9%) previously participated in AgVenture (p. 3.).

To answer the study's objectives, the researcher used a survey instrument to conduct pre- and post- tests that included questions on demographics, agricultural knowledge and perceptions. The data analysis revealed that the student's agricultural knowledge improved significantly, and certain agricultural perceptions were impacted after exposure to the AgVenture program. The agricultural perceptions that showed the greatest change was regarding student's appreciation of agriculture, with 61% perceiving agriculture affecting their daily lives (27% increase) and 73% believing that agriculture was important to their community (27% increase), (Luckey *et al.*, 2013, p. 4). Also, important findings were obtained with respect to learning environments. In that, the post-test results for the question on "which portion they had learned the most from as well as which portion of the program had been the most fun" (p. 5), indicated that students enjoyed and learned the most from two exhibits that had active hands-on involvement. Interestingly, there were certain agricultural perceptions that did not change after exposure to the program: "the awareness of agriculture through the AgVenture program did not stimulate interest in agriculture and actually caused participants to question whether they would want to work in agriculture. In fact, it is possible that this exhibit could have inadvertently perpetuated the stereotype of agriculture being limited to production agriculture" (p. 5)

Based on these findings, Luckey *et al.* (2013) provide recommendations for improving the AgVenture program, such as the addition of exhibits that demonstrate more than basic agricultural production, like agricultural technologies, alternative production methods, and local and urban agriculture, in the hope of providing a deeper agricultural awareness and understanding. In addition, the authors suggest extending the program to include in-school visits and follow-up materials and sessions, to provide opportunities to increase youth's interest in agriculture, and to consider careers in this field. Any improvements however, must ensure the "connection between agriculture and youth using interconnected examples that have relevance" (p. 6).

Georgia Healthy Farmers Farm Safety Camp

The Georgia Department of Public Health in the United States provides financial and instructional support in order to offer Farm Safety Day Camps, with the goal of reducing the number of farm-related injuries, and improving the health of farm communities (Health, 2016). One such camp, is the Georgia Healthy Farmers Farm Safety Camp that was developed in 1992 and, in 1994, became more formalized by offering two streams: a general one for 10 to 13-year olds; and a tractor certification program for 14 to 15 year olds. The camp curriculum consists of core courses in All-terrain Vehicle Safety, Combine and Harvesting Equipment, First-on-the-Scene, Pesticide Safety, Sun Sense, and Water Safety, in addition to First Aid and Introduction to CPR (Hughes & Hartley, 2000). However, elective courses are changed every year based on what farm safety education objectives need to be met for the community.

Immediate and Long- term Impacts of the Camp

Hughes and Hartley (2000) evaluated the impact of attending the Georgia Farmers Farm Safety Camp on campers' farm safety knowledge and practices. In more detail, to examine the impact on farm safety practices, the researchers mailed follow-up questionnaire, 6 months after attendance, to the 1992 campers' cohort, who attended either one of the two available 1-day camps. During the remaining years of the study, 1993-1997, the impact on farm safety knowledge was tested using pre- and post-tests for campers that attended either a 3 or 4-day camp. For the 1992 cohort, 111 campers were sent a follow-up questionnaire, and 14 were returned. Of the 417 pre-tests and 380 post-tests completed by campers aged 8-13 years old during 1993-1997, 253 tests matched and were used for analysis. Additional information on the camp's impacts on both variables (safety knowledge and practices) were obtained through observations by camp staff, anecdotal evidence from parents and administrators, requests for the Georgia Healthy Farmers Farm Safety Checklist to conduct farm safety audits, and 1992 Farm injury surveillance data.

For the analysis of the camp's impact on farm safety knowledge of campers, two data sets were created, immediate and long-term impacts. For immediate impacts, age and sex differences were assessed. The 1993 cohort, had a mean pre-test score of 64.7 and mean post-test score of

81.7, showing a significant (t= 7.1, p= 0.0001) improvement in test scores from the beginning of the camp. For all participants from years 1994, 1996, and 1997 the mean pre-test scores (range= 61.1%-84.6%) compared to the mean post-test scores (range=73.5%-89.4%) were significantly (p=0.001) higher. The relationship of age and gender in farm safety knowledge was evaluated for groups in 1996 and 1997, whereby age was significantly and positively correlated with pre- and post- test scores. In addition, the mean change in test scores did not differ significantly by age for years 1996 and 1997, therefore based on this result, the authors concluded that "younger and older children gained similar amounts of knowledge each year" and therefore "the camp was developmentally appropriate for this age range" (Hughes & Hartley, 2000, pp. 53-54). Regarding gender differences in farm safety knowledge, the authors report that the mean and mean change in test scores for boys and girls for 1995, 1996, and 1997 were similar, showing that they learned similar amounts of information. The long-term impact of the camp on participants' farm safety knowledge was seen by comparing the pre-test scores of participants from 1994 to 1997, who had and had not previously attended the camp. The results showed that for those years, the mean pre-tests scores were significantly higher (t=2.5) for those that had attended the camp (69.4% in 1994 and 83% in 1997) compared to those that had not (58.7% in 1994 to 85.1 % in 1997). Also, the mean pre-test score for 1994 participants who had attended the camp previously to those that had not was significantly higher (p= 0.05). Hughes and Hartley (2000) clarify these results in stating that "this means that respondents who had attended camp the year before had a higher level of farm safety knowledge entering their second year of camp than did respondents who had not attended camp previously." (p. 55.) Interestingly, through anecdotal evidence, there were also indications of a transfer of knowledge from the participating children to their parents, two examples being, the Director of Alumni Relations for a nearby college stated that "the three-day camp provides campers with hands-on experience in a wide variety of safety areas that I know from parental accounts have profoundly affected the participants once they return home. Many try to change the habits of their parents and other adults on the farm'' (p. 55) and the Director of the Georgia Health Farmers stated that "the most frequent report we received from

parents concerned the ride home from camp. Children told their parents everything 'wrong' or unsafe about their farm" (p. 55).

The impact on Farm Safety Practices was obtained from various sources of data, the follow-up questionnaires, anecdotal evidence and farm injury surveillance data. All sources of data revealed that the knowledge gained by the participants through the camp resulted in changed behaviours related to farm safety. The follow-up questionnaire data showed that respondents indicated an improvement in the following farm safety practices: farm animal safety, tractor safety and first aid. In addition, the Director of Georgia Healthy Farmers, and a parent of a child participant, recounted stories of a camp participant practicing tractor safety on their farm by wearing their seatbelt and another camper who successfully provided first aid to a relative with a bee sting. Importantly, the farm injury surveillance data also revealed decline in the reported farm injuries and the fatalities went from 3 to none after camp implementation. However, Hughes and Hartley (2000) do point out that "although it is not possible to ascertain the extent to which farm safety camp reduced the farm injury and fatality rates, it is likely that the information camp participants obtained and shared with family members and friends resulted in safer behaviors and contributed to the lower rates that have persisted through 1999 "(p.56).

Overall, based on these findings the authors concluded that the camp had a positive impact on participants' farm safety knowledge and practices. Importantly, the knowledge was transferred by the children to their family, which in turn resulted in behaviour changes that reduced farm injury risks.

2.5 Conclusions

There is a growing trend to provide children with educational programs to improve their agricultural literacy and this review looked at several of these programs. The agriculture education programs examined were a combination of informal (out-of-school) and formal (in-school) learning opportunities. Importantly, for any program to be successful, many factors must be considered, as Pense *et al.* (2005) concluded in the study on the Agriculture in the Classroom (AITC) program. For example, the authors recommended that teachers must be properly trained to deliver the program and have a desire to incorporate the material in their

classes. This enthusiasm to implement agriculture education programs in elementary schools has been successful in the United States with the Farm-to-School programs and in the U.K. with Food for Life Partnerships. As well, agriculture extension services are well-established in the United States, such as 4H-clubs, AITC, Ag-Venture, etc., which provide expertise in the field of agriculture for educators.

Canada is beginning to implement school initiatives to increase children's agricultural literacy, however these programs have different educational objectives and instructional methods (Farm-to-Cafeteria, 2015). Therefore, Canadian schools do not use standardized curriculums for agricultural education at the elementary-school level, such as the ones in the United States and Europe. Still, well known American agriculture extension programs such as AITC and 4H, do exist in Canada, which could provide formal and informal learning opportunities for children. None the less, there is still a need to develop a uniform agriculture education program in Canada that could be incorporated into the elementary-school curriculum, to ensure all children are receiving the same learning opportunities.

Any educational program that is implemented to educate children should be evaluated to determine if the program is meeting its' educational objectives. The programs reviewed in this chapter used a variety of methods to assess the impact of the curriculum on children's agricultural knowledge, such as interviews, questionnaires, and pre- and post- tests. Interestingly, these methods were used with students of various age-groups, which indicates that children's knowledge can be tested using several methodologies. Still, according to several authors Bell (2007); De Leeuw *et al.*(2004); and Owen *et al.* (1997), to effectively test young children's knowledge the researcher must consider children's developmental stages, such as those researched by the well-known child psychologist, Jean Piaget (Piaget, 1929). In that, "young children up to the age of seven display pre-operational thought, and thus, lack the ability to use causal reasoning. From the age of seven to 11 the child progresses to concrete operational thought and formal thought, which involves the use of logical reasoning" as stated by Owen *et al.* (1997). Therefore, for the test to effectively evaluate children's knowledge, the questions should be age appropriate. Certain age adaption methods for questioning young

children include using pictures to illustrate the questions and developing more simple questionnaires with answers that use, yes/no (p. 3).

Accordingly, this research study aimed at assessing the level of agricultural knowledge in young children in Canada, and to determine their learning abilities in the local Farm-to-School program.

Chapter 3: Methodology

3.1 STUDY DESIGN

To determine the impact of the Macdonald Farm-to-School summer program on children's agricultural knowledge, this study used a quasi-experimental design. Specifically, the pre-test post-test design was applied, since it allows the researcher to evaluate the effect of an educational curriculum on a specified group (Cohen, Manion, & Morrison, 2013, p. 322). In addition, the participants' parents were provided with a post survey to obtain supplementary information on the children's learning.

The research was carried out at the Macdonald Farm-to-School summer program located at McGill University's Macdonald Campus Farm. The study period consisted of four weekly (five-day) sessions during August, 2016. During this period two thematic programs were offered, Plate-to-Farm; and Global Food Security. Both programs were bilingual, with one week in English and one week in French. Children and their parents from all four summer program sessions were invited to participate in the study.

The population of this study consisted of children registered in any of the four 5-day summer program sessions and their parents. The participating children were aged between 6-12 years old (n= 81) both boys and girls. Most of the parents (n=77) were between 35 and 54 years old.

3.2 SURVEY DESIGN

Three surveys were developed to answer the study objectives. First, to determine the impact of the summer program on the agricultural knowledge of the children, pre- and post- tests were developed. Secondly, to determine the effect of the student's demographics on their agricultural knowledge, a demographic questionnaire was created; and lastly, to obtain information on the parents' perceptions of their children's learning improvement and experience, a parent survey was created.

Pre- and Post-Tests

Pre-post testing was used, since it is a widely applied technique to gather data on knowledge change of a population participating in an educational program (Dirks & Orvis, 2005; Luckey, 2012; Moss, Smith, Null, Long Roth, & Tragoudas, 2013). However, several features were taken into consideration when designing the tests, such as the curriculum content from both thematic programs of the Farm to School, participating children's age, and wording, format and delivery method of the tests.

Before developing the test questions, the researcher met with the Director and educators of the summer program to better understand the subjects taught during the two thematic programs, and to obtain the educational modules being covered. In addition, the age of the participants was carefully considered in the design of the questions, and the delivery of the tests. Given that some children were quite young, less than 7 years old, consideration of reading ability, attention span, and comprehension needed to be considered (Bell, 2007; Owen, Schickler, & Davies, 1997). Therefore, the questions were designed using images (to clarify concepts), short in length, relatively few in number (only 10 questions), and projected on a screen and read aloud. Importantly, the delivery method of the tests, used TurningPoint© Technology (see Figure 1.), which is a clicker based response system, whereby the participants use a small remote control-like device to answer the multiple-choice questions. This response system was used to facilitate the provision of answers by all ages.

Figure 1. Turning Technologies © Clickers

For each week, tests were developed, one for each age group, 6-8 years old and 9-12 years old, in English and French (Appendices A and B). The English and French tests evaluated the same educational content and were administered as shown in Figure 2. The only difference between tests for the two age groups was that 9-12-year-olds received questions with a higher level of difficulty, given that they have a memory and constructive capacity of adults (De Leeuw, Borgers, & Smits, 2004).

Theme	Week	Age	Pre-Test (Day 1)	Post-Test (Day 5)
Farm-to-Plate	Week 1 (French)	6-8 years		
		9-12 years		
	Week 2 (English)	6-8 years		
		9-12 years		
Global Food Security	Week 3 (French)	6-8 years		
		9-12 years		
	Week 4 (English)	6-8 years		
		9-12 years		

Figure 2. Structure of the program and corresponding tests of participant children.

In order to gather demographic data of the participating children and parents, a demographic questionnaire was created (Appendix C). Also, this questionnaire served as essential data to answer the research question regarding how children's and their parents' demographics influence their agricultural knowledge? The questionnaire included questions on the participating child's age, languages spoken at home, ethnicity, and previous day camp participation. The participating parents also provided information by completing questions on their average age, approximate household income, education level, and their rural/urban background.

Parent Survey

To be able to gather information on the parents' perceptions of their children's learning improvement and experience after attending the summer program, a parent survey was developed (Appendix D). There were four parts to the survey, the first section included eight questions on what the child had discussed in terms of the learning module topics. The second section included eight questions on what the child had expressed in terms of his/her learning experience. The first two sections, used a well-known rating scale for the responses, the Likert-

scale. This scale allows the researcher to build in a degree of sensitivity and differentiation in the answers (Cohen *et al.*, 2013, p. 386). The third section included three open-ended questions: the first, on what the child discussed with their parents regarding the educational activities of the summer program; the second on the parents' observations of their children's improvement in agricultural knowledge; and the last was an opportunity for the parents to provide the summer program administrators with other comments.

Validity

The validity of all tests and surveys was determined to ensure the quality of the research. This was done with a group of experts, the Farm-to-School educators, Ms. Joelle Lefebvre-Ouellet and Ms. Rebeca Esquivel, and agricultural and teaching professionals, Drs. Kevin Wade and Caroline Begg, who reviewed all data collection instruments. The Farm-to-School educators provided insight on the validity of the content and question construction. Given that the study involved a potentially-vulnerable population (i.e., minor children), it was not possible to administer a pilot test. Pilot testing would have involved distributing the surveys before the start of the actual research, to a small (5-10 people) target population. The population should resemble that of the research study, in that the children and their parents involved in the pilot test would have the same demographic and background characteristics of the study population.

Given that pilot tests were not conducted in this study, there was no opportunity to obtain feedback on the data collection instruments (tests, questionnaires, and survey) prior to the actual research.

3.3 DATA COLLECTION

A list of all children, involved in the 2016 Farm-to-School summer program, as well as their parents, was obtained by the Farm-to-School administrator. From this list, appropriate consent forms along with the demographic survey, were prepared for each parent and a Clicker ID assigned to each child. On the first day of each program session, the prepared documents were distributed to the parents, with an explanation of the research study. The parents who agreed

that they and their child(ren) would participate in the study, returned the signed consent forms and demographic surveys. Also, before each test was given, an oral script was read out loud to the children, so that they would understand the study and could provide their verbal consent to participate. All children participated in the tests; however, the data from non-participating children were excluded from the study.

The morning of the first day of each summer program session, the children were divided into two groups, 6 to 8 years old and 9 to 12 years old, with the younger group participating first. The tests were given in a nearby classroom on Macdonald Campus Farm. The children were each provided with an assigned Clicker to answer the questions and a trial test question was used for the children to learn how to use the response system. After all children were comfortable using the devices, the researcher read out loud from a projected screen, the questions and answers one at a time. The testing took approximately 20-25 minutes to complete, and all response data was collected through the TurningPoint© software.

In the afternoon, on the last day of the summer program session (5th day), after the children had received a review session by the Farm-to-School educators on the educational material learned throughout the week, the post-test was given. The post-test included the exact same questions and delivery format as the pre-test.

The parent survey was distributed to the parents who attended a final activity of their children in the afternoon, on the last day of the summer program session. All surveys were collected before the start of the activity.

3.4 DATA ANALYSIS

The data were analysed using SAS Version 9.4. The test score data, were the total correct answers out of the 10 test questions, which was exported to Microsoft® Excel from the TurningPoint© software. The test score data for week 2, group 9-12 were recalculated to a

score out of 9, since the material for one of the questions was not taught. All other survey data were entered in Microsoft® Excel, coded and then imported into SAS.

First, the study population number (N) of the participating children and parents to be used in the analysis was determined. There were 95 children from the four Farm-to-School Summer program sessions that participated in the pre-test and 79 parents or legal guardians that signed the participant consent form. The following data exclusion criteria were used to calculate the study population numbers of the children:

Data Exclusion Criteria (Children Study Population)
Parent and Oral consent forms not completed (CF)
Participation in another program session (PPS)*
Attended the same theme week in 2015**(SW)
Children < 6 years old(U6)***

* If children participated in more than one program session, only the data from their first participation was included in the analysis (to eliminate learning bias).

** Children who attended the same theme week in 2015 and 2016, were excluded from the analysis – also to eliminate learning bias.

***These children were removed since the tests were designed for age groups 6-8 and 9-12 years old.

Study Population Numbers:

1. Children study population number(N)= 95-CF(2)-)-10(PPS)-4(SW)-U6(3)=76
2. Parent study population number(N) for demographic data = 79-1(DS)= 78
3. Parent study population number (N) for Likert data=79-12(PS)-9(BPS)=58

DS= Did not complete Demographic Survey
PS= Did not complete Parent Survey
BPS= Both Parents Completed Survey*

* * In the case of 9 children, both parents completed the parent survey. Since only data from one survey per parent were needed for the Likert-data analysis, the data from the 18 individuals were randomly selected to determine which 9 to include in the analysis.

Data Analysis Models and Statistical Analysis:

Test Score data:

To answer the first three research objectives, a generalized linear mixed model (GLIMMIX) procedure in SAS 9.4 was used to analyse the data. The GLIMMIX procedure was used since the data were discrete and binomially distributed, with random and fixed effects. Specifically, three data sets were analysed using this procedure: Pre-scores only, Post-scores only, and Pre-and Post-scores, combined (to judge improvement).

The SAS statements below were first analysed using GLIMMIX procedure, and non-significant effects were sequentially removed from the statements until the best fit was obtained. The level of significance, was set at 10% ($p<0.1$), since this was exploratory research that had not been performed before. The statements are the test score results as the dependant variable and the demographic and background factors as the independent variables. In addition, descriptive analysis was performed on the pre, post, and post-pre-percentage test scores.

1-Pre and Post Score

```
model r/n* = Theme + Week(Theme) + Pre_Post + Age_Group +  Matern_Lang + Ethnicity +
Child_Gender + Parent1_Educ + Parent2_Educ + Prev_F2S_Exp +  Fam_Agric_Exp + Avg_Parental_Age +
House_Income/dist=binomial link=logit;

random New_ID(Week Age_Group Matern_Lang Ethnicity Child_Gender Parent1_Educ Parent2_Educ
Prev_F2S_Exp  Fam_Agric_Exp Avg_Parental_Age House_Income;
```

2-Pre score

```
model r/n = Theme + Week(Theme) + Age_Group + Matern_Lang + Ethnicity + Child_Gender
  + Parent1_Educ + Parent2_Educ + Prev_F2S_Exp + Fam_Agric_Exp + Avg_Parental_Age +
House_Income/dist=binomial link=logit;
```

3- Post score

model r/n = Theme + Week(Theme) + Age_Group + Matern_Lang + Ethnicity + Child_Gender + Parent1_Educ + Parent2_Educ + Prev_F2S_Exp + Fam_Agric_Exp + Avg_Parental_Age + House_Income/dist=binomial link=logit;

where r = number of correctly-answered questions;

n = total number of questions asked;

Theme = session of the summer program, Global Security week or Local Food week

Pre_Post = The test scores before and after the five-day program session

Week = Calendar Weeks in 2016: 1 = Week of August 1st; 2 = Week of August 8th; 3 = Week of August 15th; 4 = Week of August 22nd

Theme = 1 = Local Food Week 2= Global Security Week

Age_Group = 1 = 6-8 years; 2 = 9-12 years of age

Child_Gender = 1 = Male; 2 = Female

Matern_Lang = Language most spoken at home; 1= English; 2 = French; 3 = English and French; 4 = Other

Ethnicity = 1 = Caucasian; 2 = Non-Caucasian

Prev_F2S_Exp = Previous Farm-to-School experience; 1 = F2S Experience in a previous year; 2 = No previous experience

Fam_Agric_Exp = 1 = Family Farming Background (any of last 3 generations); 2 = No recent Family Farming Background

Avg_Parental_Age = 1 = 25-34 years of age; 2 = 35-44 years of age; 3 = 45-54 years of age 4= > 55 years of age

House_Income = 1 = < $50K; 2 = $50K-$100K; 3 = > $100K

Parent1_Educ = Highest level of education of one parent; 1 = Highschool; 2 = CEGEP/Training College; 3 = University

Parent2_Educ = 1 = Highest level of education of second parent; 1= Highschool; 2 = CEGEP/Training College; 3 = University)

Parent_Gender = 1 = Mother; 2 = Father

Likert Scale Data:

The last two research questions were answered using the Generalized Linear Model (GLM), since the data were ordinal under the assumption of normal distribution.

The Likert scale data from each question of the parent survey were analysed. For the first 8 questions the data were separated by theme week (i.e. the data from the questions that corresponded to the two local theme weeks were grouped together and the same for the two global ones). In addition, the data from one local theme week question ("My child explained to me how to make cheese") were removed, since this learning objective was not taught. The data from the other 8 questions on learning experience were not separated by theme week, since the questions applied to all program sessions.

The SAS statements below are for the total scores of the local learning questions combined, global learning questions combined, and learning experience questions combined. The scores being the dependant variable and the demographic and background variables the independent. GLM analysis was performed for each question separately, the combined learning local and global questions, and the combined learning experience questions.

1-Local learning score:

```
model LearnL_Score = Week + Age_Group + Child_Gender + Matern_Lang + Ethnicity + Prev_F2S_Exp +
Fam_Agric_Exp +  Avg_Parental_Age + House_Income + Parent1_Educ + Parent2_Educ +
Parent_Gender;

lsmeans Week Age_Group Child_Gender Matern_Lang Ethnicity Prev_F2S_Exp  Fam_Agric_Exp
Avg_Parental_Age House_Income Parent1_Educ Parent2_Educ Parent_Gender LearnL_Score/stderr;
```

2-Global learning score:

```
model LearnG_Score = Week+  Age_Group + Child_Gender + Matern_Lang + Ethnicity + Prev_F2S_Exp +
Fam_Agric_Exp  + Avg_Parental_Age + House_Income +  Parent1_Educ + Parent2_Educ +
Parent_Gender;

lsmeans Week Age_Group Child_Gender Matern_Lang Ethnicity Prev_F2S_Exp  Fam_Agric_Exp
Avg_Parental_Age House_Income Parent1_Educ Parent2_Educ Parent_Gender LearnG_Score/stderr;
```

3-Learning experience score

```
model Exp_Score = Week + Age_Group +  Child_Gender +  Matern_Lang + Ethnicity +  Prev_F2S_Exp +
Fam_Agric_Exp  + Avg_Parental_Age + House_Income + Parent1_Educ + Parent2_Educ +
Parent_Gender;

lsmeans Week Age_Group Child_Gender Matern_Lang Ethnicity Prev_F2S_Exp  Fam_Agric_Exp
Avg_Parental_Age House_Income Parent1_Educ Parent2_Educ Parent_Gender Exp_Score/stderr;
```

The answers from the open-ended questions of the parent survey were analysed using the constant comparison method (Butler-Kisber, 2010, p. 31), whereby the data were categorized into similar themes, and the frequency count for each theme determined. Lastly, descriptive statistics were performed for each of the additional questions to determine the most frequent responses.

3.5 RESEARCH ETHICS BOARD

This study involved surveying of minors and competent adults, therefore all applicable rules and regulations of the McGill Research Ethics Board (REB) were followed to perform this research. Specifically, a research application, parental and participant consent forms (Appendices E and F), an oral script (Appendix G), and surveys (Appendices C and D), were submitted to the McGill REB III prior to the start of data collection, and approved. A *Certificate of Ethical Acceptability of Research Involving Humans* was issued with the REB File #: 36-0616 (Appendix H).

Chapter 4: Results and Discussion

4.1 Results and Discussion

4.1.1 Demographics and Background of Study Participants:

Children

The age distribution for all 76 children in the study is displayed in Figures 3 and 4 (Appendix I). Overall, for the four summer program sessions combined, the majority (72%) of children were between 6-7 years old and 9-10 years old (Appendix I, Figure 3). The age group that was least represented was the 8 (8%) and 11 (9%) year olds. However, the age distribution by theme week (Appendix I, Figure 4) had a different age profile. For the local weeks the 6-7 year olds were the most represented (22%) and 8 and 11 year olds were the least represented (7%). As for the Global weeks the 9-10 year olds were the most represented (23%) and the 6, 8 and 11 years olds, the least represented (9%).

For the pre- and post-testing, the 76 children were seperated into two age groups, 6-8 years old and 9-12 years old. Based on this grouping, there was a higher percentage of 9-12 years olds (Appendix I , Figure 5), and this is also observed in the global weeks, with 53% of 9-12 year olds vs 36% 6-8 year olds. Contrary, the local weeks had a majority of 6-8 year olds (64%) (Appendix I, Figure 6).

As for gender, all children participating in the study were predominantly female, with 65% female and 36 % male (Appendix I, Figure 7). However, in the local weeks there was a slightly higher percentage of male children (54% male vs 46% female) participating in the study (Appendix I, Figure 8).

The participating ethnicity was obtained for 70 of the 76 children and categorized into Caucasian and Non-Caucasian. The Non-Caucasian group consisting of African-American, Hispanic, Asian and Native American children. For all 70 participating children, the majority

were Caucasian (76%) (Appendix I, Figure 9), as well for the local and global weeks (Appendix I, Figure 10).

The participating children's parents were asked what is the predominant language mostly spoken at home. For the language data of 70 participating children it was categorized into English, French, English and French, and Other. The Other category consisted of Spanish, Japanese and Romanian speaking children. The majority (55%) of children spoke English at home (Appendix I , Figure 11), as well as for the local and global weeks (Appendix I, Figure 12). It was only the global weeks that had participating children who spoke Other languages at home.

The participating children's parents were also asked background information on their children's previous Farm-to-School summer program experience. For children whom their parents did not provide this information, the 2015 Farm-to-School summer program participant list was used to determine their previous participation. The previous experience data was categorized into yes or no. Of the 74 participating children, the majority (69%) had no previous summer program experience, and this was also seen in the local and global weeks (Appendix I, Figure 13& 14).

The family rural background data were obtained by asking the parents if they live on a farm, or their parent or grandparent grew up on a farm. The parents that selected one of these three choices, their answer was then categorized as a yes and those that answered "none" was categorized as a "no". Many parents left the question unanswered, which resulted in a large amount of missing data. From the 76 participating children, 36 responses were collected, with most of the children (69%) having family rural background (Appendix I, Figure 15). The local weeks also had most (83%) children with family rural background, but for the global weeks there was only a slight percentage difference between those children with (42%) and those without (58%) family rural background (Appendix I, Figure 16).

Parents

Most of the participating parents were on average between 35-44 years old (54%) and 45-54 years old (43%), with only a slight percentage (3%) between 25-34 years old (Appendix I, Figure 17). The same age distribution is observed in the local and global weeks (Appendix I, Figure 18). The approximate household income of the parents in the study was mostly (68%) in the higher income brackets, >$100 000 (Appendix I, Figure 19), as well as for local and global weeks (Appendix I, Figure 20). In addition, the level of education of both parents was asked, and from this data it is apparent that most parents have a higher level of education, university degree (Appendix I, Figures 21 & 23). The same can be observed in the local and global weeks (Figures 22 and 24).

4.1.2 Children's agricultural knowledge

The overall mean pre- and post-test scores for each demographic and background variable were calculated (Table 1). There were 76 children that completed the pre-test, with a mean score of 62.9% $\pm$ 17.667, and 72 children completed the post-test, with a mean score of 63.75% $\pm$18.551. This resulted in a mean test score increase of 2.36% $\pm$ 17.210 (Table 1), demonstrating that the children on average did improve their test score results from the beginning of the program session. However, the GLIMMIX analysis of all pre-test and post-test scores, showed that there was not a significant difference in the test scores ($p > 0.1$) (Table 2). Therefore, children participating in the Macdonald Farm-to-School Program did show improvement, but not a significant one. Even though there was not a significant overall learning improvement, children's demographic and background did have a significant impact on their agricultural knowledge, particularly with regard to children's age, and language most spoken at home, which both showed a significant impact on children's test scores (Table 3 and 4). Children in the 9-12-year group performed significantly better ($p<0.1$) on the pre-test (Table 3) and post-test (Table 4) than 6-8-year-olds, demonstrating that the older children learned more than the younger ones. The effect of age on children's agricultural knowledge was also observed by Luckey (2012) and by Hughes and Hartley (2000). Luckey (2012), showed that children 11 years and older who attended the AgVenture program, had a more significant increase in test scores

than the younger ones, while Hughes and Hartley (2000) noticed in certain years where children attended a farm-safety camp, age was significantly and positively correlated with pre- and post-test scores.

Table 1. The average Pre-Test Scores, Post-Test Scores and the Test Score change (Post-Pre) of the children participating in the Macdonald Farm-to-School Study. Presented by demographic and background variables.

	Pre-Score			Post-Score			Post-Pre-Scores		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation	N	Mean	Std. Deviation
Overall	76	62.09%	17.667	72	63.75%	18.551	72	2.36%	17.210
Variable									
Age Group:									
6-8 years old	33	55.76%	14.584	32	61.88	15.332	32	6.25%	12.889
9-12 years old	43	66.90%	18.372	40	65.22%	20.767	40	-0.75%	19.617
Child Gender:									
Male	27	61.32%	18.656	26	63.80%	22.406	26	3.96%	18.492
Female	49	62.47%	18.413	46	63.70%	16.163	46	1.46%	16.583
Ethnicity:									
Caucasian	53	62.73%	17.768	50	63.20%	19.076	50	1.46%	17.825
Non-Caucasian	17	61.90%	16.891	16	68.06%	17.757	16	6.06%	17.827%
Language Mostly Spoken at Home:									
English	39	62.68%	18.158	37	63.90%	17.632	37	2.92%	20.072
French	17	60.00%	15.590	17	59.54%	18.295	17	-0.47%	18.156
Bilingual	9	59.75%	21.551	8	59.58%	16.961	8	-1.38%	14.667
Other	5	60.00%	12.247	4	65.00%	19.159	4	5.00%	20.817
Previous F2S Experience:									
Experience	23	63.04%	18.439	20	69.17%	18.398	20	9.10%	13.738
No Experience	51	61.70%	17.311	50	61.71%	17.996	50	-0.24%	18.174
Family Farm Background:									
Background	25	63.42%	17.626	24	65.79%	16.568	24	1.75%	16.098
No Background	11	62.73%	24.547	11	50.10%	23.182	11	12.64%	22.313
Family House Incom									
< 50 000	9	65.06%	19.540	8	59.17%	19.660	8	-3.00%	19.176
50 000 – 100 000	11	62.93%	18.786	11	58.28%	19.647	11	-4.73%	22.109
<100 000	42	60.93%	16.497	40	63.83%	17.414	40	3.88%	15.329

Parent Education 1									
Highschool	3	66.30%	20.195	3	86.67%	23.094	3	20.33%	17.039
CEGEP/Training	7	55.40%	8.521	7	58.25%	10.079	7	2.71%	12.379
College	58	62.64%	17.596	54	64.38%	18.573	54	2.63%	16.780
University									
Parent Education 2									
Highschool	1	80.00%	-	1	80.00%	-	1	0.00%	-
CEGEP/Training	11	57.17%	19.603	10	60.11%	11.481	10	2.20%	18.238
College	53	61.70%	17.429	51	62.51%	19.536	51	1.53%	17.627
University									

Table 2. GLIMMIX Analysis for the Pre-Test and Post-Test Score Data

Gener. Chi-Square / DF	0.82				
Effect	Week(Theme)	Theme	Pre_Post	Matern_Lang	Prev_F2S_Exp
Num DF	2	1	1	3	1
Den DF	23	23	28	23	23
F Value	5.05	0.89	0.45	5.26	7.41
Pr > F	*0.0152	0.356	0.5067	*0.0065	*0.0122

Label	Post-Pre	Local-Global	English-French	English-Bilingual	English-Other	French-Bilingual	French-Other	Bilingual-Other	Previous F2S Exp - No previous F2S Exp
Estimate	0.1204	-0.2703	1.0395	1.007	1.3382	-0.0325	0.2988	0.3313	0.8394
Standard Error	0.179	0.2869	0.3064	0.3458	0.4242	0.318	0.4099	0.4009	0.3084
DF	28	23	23	23	23	23	23	23	23
t value	0.67	-0.94	3.39	2.91	3.15	-0.1	0.73	0.83	2.72

*P<0.1

Best fit model shown.

Table 3. The GLIMMIX analysis for the Pre-Test Score data.

Gener. Chi-Square / DF			1.07					
Effect	**Theme**	**Week(Theme)**	**Age_Group**	**Matern_Lang**				
Num DF	1	2	1	3				
Den DF	23	23	23	23				
F Value	0.28	2.74	4.04	2.98				
Pr > F	0.6012	*0.0858	*0.0562	*0.0523				
Label	**68 - 912**	**Local-Global**	**English-French**	**English-Bilingual**	**English-Other**	**French-Bilingual**	**French-Other**	**Bilingual-Other**
Estimate	-0.507	-0.1765	0.6562	0.4768	1.4311	-0.1794	0.7749	0.9542
Standard Error	0.2522	0.333	0.3449	0.3436	0.5048	0.3585	0.4906	0.4462
DF	23	23	23	23	23	23	23	23
t value	-2.01	-0.53	1.9	1.39	2.84	-0.5	1.58	2.14
Pr > |t|	*0.0562	0.6012	*0.0697	0.1785	*0.0094	0.6216	0.1279	*0.0433

*P<0.1

Best fit model shown.

Table 4. The GLIMMIX analysis for the Post-Test Score data.

Gener. Chi-Square / DF			0.98						
Effect	**Age_Group**	**Matern_Lang**	**Prev_F2S_Exp**	**Avg_Parental_Age**					
Num DF	1	3	1	1					
Den DF	22	22	22	22					
F Value	3.84	3.68	2.21	4.35					
Pr > F	*0.0628	*0.0274	0.1513	*0.0489					
Label	**68 - 912**	**English-French**	**English-Bilingual**	**English-Other**	**French-Bilingual**	**French-Other**	**Bilingual-Other**	**Previous F2S Exp - No previous F2S Exp**	**25-34 years of age-35-44 years of age**
Estimate	-0.578	0.9183	0.2078	1.0963	-0.7105	0.178	0.8885	0.497	0.9627
Standard Error	0.2949	0.3539	0.4547	0.4061	0.4288	0.4188	0.5239	0.3343	0.4618
DF	22	22	22	22	22	22	22	22	22
t value	-1.96	2.59	0.46	2.7	-1.66	0.43	1.7	1.49	2.08
Pr > |t|	*0.0628	*0.0165	0.6522	*0.0131	0.1117	0.675	0.104	0.1513	*0.0489

*P<0.1

Best fit model shown.

The effect of age on children's test scores, can be explained by considering children's cognitive development and test design. Piaget (1929) explained that children go through various stages of reasoning, pre-operational thought, concrete operational thought and formal thought. This refers to children progressing from lacking the ability to use causal reasoning to being able to

reason in a logical way. Importantly, at the age of 7, Piaget observed that children move from pre-operational thought to concrete operational thought, meaning that at this age they are better at logical and systematic thought and their language and reading skills are more developed (De Leeuw, Borgers, & Smits, 2004, p. 411). Therefore, the 6-year-old children included in this study may not have been developmentally prepared to take these tests, resulting in lower test scores for the 6-8-year-old group. In addition, the design of the test may have been more appropriate for the 9-12-year-olds. In that multiple-choice test answers with three choices, such as those used in this study, can be understood by young children, yet it is preferable to choose yes/no questions (Bell, 2007, p. 465). Hence, the children who were in the older age group may have understood the questions and answers more easily.

The other demographic variable, language mostly spoken at home (Matern_Lang in Tables 2, 3 and 4), also had an impact on children's test scores. Specifically, English-speaking children had significantly ($p<0.1$) higher pre- test and post-test scores (Table 2) compared to children who spoke French, another language or were bilingual. As well, children who spoke English performed better on the pre- test and post-test (Table 3 and 4) than children who spoke French or another language. A possible explanation why children who spoke English had higher test-scores than children speaking other languages, may be due to their demographic and background characteristics, as seen in the cross-tabulation analysis (Table 5) for each language mostly spoken at home. In that children who spoke English, had demographic and background characteristics that may have had a positive influence on their learning during the summer program and thus an impact on their test scores. Particularly, there were more English-speaking children that had agricultural family background (i.e. a family member who had/has farming experience), parents who were in a high-income bracket, and university educated, than children who spoke French, or another language. In a study by Fröhlich, Goldschmidt, and Bogner (2013), it was also observed that children's background impacted their knowledge. Specifically, children with agriculture family background provided more varied and detailed responses to farmer's duties than children without. Showing that children's demographics and background need to be considered when developing education programs.

In this study, the background variable, Family Agricultural Background, (i.e. family member with farming experience) did not have a significant (Table 2-4) ($p<0.1$) effect on children's agricultural knowledge. Still, on average children with a family member who had farming experience, had higher test scores (Table 1). Another background variable that was also found to significantly impact children's agricultural knowledge was previous Farm-to-School summer program experience (Table 2). Specifically, children with previous Farm-to-School summer program experience improved significantly ($p<0.1$) their test scores compared to those without experience. Hughes and Hartley (2000) also observed this in children attending a Farm Safety Camp, whereby children who attended previous years had higher test scores than those without previous camp experience. The authors explained that children with previous camp experience, start the next year with more knowledge than those without previous experience. Therefore, children's program experience should be considered when planning educational activities, since children with more experience may understand fundamental concepts more easily and can therefore participate in more complex activities.

Table 5. Crosstabulation of the demographic variable *language mostly spoken at home* with all other variables.

Effect	English	French	English and French	Other	English	French	English and French	Other
	Pre-Scores				Post-Scores			
Theme:								
Local	19	15	4	0	19	15	4	0
Global	**20**	2	5	5	**20**	2	5	5
AgeGroup:								
6-8 years old	15	7	4	3	15	7	4	3
9-12 years old	**24**	10	5	2	**24**	10	5	2
ChildGender								
Male	11	12	2	1	11	12	2	1
Female	**28**	5	7	4	**28**	5	7	4
Ethnicity								
Caucasian	**31**	15	6	1	**31**	15	6	1
Non-Caucasian	8	2	3	4	8	2	3	4
PrevF2SExp								
Yes	13	4	5	0	13	4	5	0
No	**25**	13	4	5	**25**	13	4	5
FamilyAgricBackgd								
Yes	**13**	6	4	2	**13**	6	4	2
No	1	4	4	2	1	4	4	2
Avg Age Parents								
25-34	1	1	0	0	1	1	0	0
35-44	**22**	8	3	4	**22**	8	3	4
45-54	**14**	8	6	1	**14**	8	6	1
HouseIncome								
> 50 000	3	3	0	3	3	3	0	3
50 000 - 100 000	4	5	2	0	4	5	2	0
>100 000	**25**	8	7	2	**25**	8	7	2
ParentEduc1								
Highschool	2	1	0	0	2	1	0	0
Cegep/Training College	3	1	1	2	3	1	1	2
University	**32**	15	8	3	**32**	15	8	3
ParentEduc2								
Highschool	1	0	0	0	1	0	0	0
Cegep/Training College	8	1	0	2	8	1	0	2
University	**27**	14	9	3	**27**	14	9	3

Note: Red numbers indicate the number of English speaking children for each demographic and background variable.

4.1.3 Parents' perceptions of their children's agricultural knowledge improvement and agricultural behaviour changes.

Parents' perceptions on what their children learned and what agricultural behaviours changed after attending the Farm to School summer program was also investigated. First, a frequency analysis was performed of the parents' responses for the seven learning improvement questions (Fig. 25 and 26) and the eight learning experience questions (Fig. 25) of the Parent Survey (Appendix D). Secondly, to determine which parents responded more favourably to the questions on learning improvement and learning experience, a Generalized Linear Model (GLM) analysis was conducted. Specifically, the data from the Likert-scale responses of the parents and the demographic and background data of the parents and their children were used. Given that the responses were from a reverse Likert-scale, the scale was reversed (i.e. 1=strongly disagreed through to 5= strongly agreed) for the GLM analyses, to interpret the results more easily. GLM analysis was also performed on the total Likert score for all seven learning improvement questions and all eight learning experience questions. (Table 15 &23.)

Based on the results of the frequency analysis of parents' responses to the parent survey questions on their children's learning, there was strong agreement that their children learned the common educational objectives for both theme weeks (Fig. 25 and 26), such as the origin of food (69% local,73% global), the type of animals that live on farms (81% local and 83% global), and how to grow food (combined strongly agreed and agreed: 86% local and 100% global). As for the objectives specific to each theme week, such as the importance of eating locally for the local theme weeks (Fig 25) and knowing how to make bread and why people eat insects for the global theme weeks (Fig 26), parents' answers were varied. Interestingly, when parents' responses to the learning improvement questions were combined with their demographic and background for analysis (Table 6-15), the profile of the parents that significantly agreed that their children learned the educational objectives of the summer program could be determined. For the local theme weeks (Table 6-9), the common demographic variables that had a significant effect on parents' responses were child gender and house income. In that high income (> 100 000) parents with female children enrolled in the summer program perceived

more significantly ($p<0.1$) that their children learned the local theme learning objectives, than parents with lower (>50 000) to average income (50 000-10 000) with male children. As for the global learning objectives, there was not the same pattern of common demographic variables effecting the parents' responses, as seen in local theme week. However, the common learning objectives for the local and global theme weeks such as the origin of food, the type of animals that live on farms, and how to grow food, did have similar demographic variables influencing the parents' responses, as seen in the local week. In that, child gender had a significant effect on parents' responses to the origin of food (Table 12) and house income for the type of animals that live on farms, and how to grow food (Table 13-14). This provides an indication that parents play an important role in the evaluation of the learning process of their children, therefore program planners should involve the parents in the evaluation of educational activities.
The parents' responses to statements on their children's learning improvement for both theme weeks and their children's agricultural behaviour changes (Figs 25-28) closely match the answers from the open-ended questions of the Parent Survey (Appendix I).

Most studies evaluating agriculture education programs, do not report parents' perceptions of children's learning (Jones *et al.*, 2012; Joshi, Azuma, & Feenstra, 2008; Luckey, 2012; Pense, Leising, Portillo, & Igo, 2005; Radhakrishna, 2005). Instead, researchers evaluate children's agricultural knowledge improvement after attending the program, by using only pre-test and post-test scores, and do not investigate their learning transfer at home. Therefore, this study provides a different perspective, the parents' observations of their children's learning improvement after attending the summer program. Which gives an indication if children are transferring their knowledge to their family members, with the hope of also improving the family's agricultural knowledge.

Based on the results of parents' perceptions on their children's agricultural behaviour change after attending the Farm-to-School summer program (Fig 27), it was the food behaviours that parents agreed (combined strongly agreed and agreed) most (51 %-70%) to having had an impact. These behaviours being, wanting to grow a garden, helping cook their own meals,

shopping for food with parents, and buying food at a farmer's market. Similar behaviour changes have been reported by Joshi *et al.* (2008), Jones *et al.* (2012), after children attended an agriculture education program. These authors described children having more of an interest in eating healthy and growing their own food after being involved in an agricultural education program. As for behaviours related to farming, such as wanting to work on a farm and raising chickens, in this study, parents responded favourably, with 48%-53% (combined strongly agreed and agreed) in agreement, that these behaviour changes of their children were impacted by the summer program. Radhakrishna (2005) also observed a similar trend, in that 4H alumni members responded that the program influenced their agricultural interests. In that a high percentage (66%) of the members surveyed decided to live on farms or in rural areas, supported family members in their agricultural practices, and assisted in community agricultural initiatives. This demonstrates that agricultural education programs can influence children's agricultural interests.

The responses of the learning experience statements (last eight statements of Parent Survey, Appendix D), were combined with parent demographics and agricultural background information. The analyses of this information are in Tables 16-21. Table 22 does not refer to a behaviour change, but to the children's interest in returning to the Macdonald Farm-to-School Program. The two first statements in Table 16 and 17 refer to children wanting to grow and make their own food, after attending the summer program. For these statements, the common demographic and background variables affecting the parents' responses, were children's age group and Language Most Spoken at Home. For the statement "My child wants to grow a garden", the parents of children who were between 6-8 years old and spoke English or another language other than English or French, agreed significantly ($p<0.1$) more than parents with children who were older (9-12 years -old) and spoke French, that their children wanted to grow their own garden after attending the summer program. As for "My child wants to help cook his/her own meals", it was parents with older children (9-12 years old) who spoke French or were Bilingual, who agreed significantly more that their children wanted to help make their own food after attending the summer program. The next three statements (Table 18, 19, and

20) were regarding behavioural changes related to food shopping. For the statements, “My child wants to go shopping for food with me” and “My child wants me to buy food at the Farmer’s Market”, the common variables were Theme, Week, Language Spoken at Home and Previous Farm-to-School Program experience. For the statement on wanting to shop with their parents, parents with children who attended the Global theme weeks (weeks 3 and 4) and who spoke French agreed significantly more than parents with children that attended the Local theme weeks (week 1 and 2) and spoke English or were Bilingual, that their children wanted to shop with them for food, after attending the summer program. As for wanting to buy food at the Farmer’s market, the parents with children who attended the local theme weeks and spoke French or were Bilingual, agreed significantly more that their children wanted to buy food at the Farmer’s market after attending the summer program. As for the statement “My child wants me to buy organic food”, Theme and Week were also common variables effecting the parents’ responses, in addition to age group and child gender. In that parents with children who attended the Global theme weeks, who were between 6-8 years old and male, agreed significantly more that their children wanted them to buy organic food after attending the summer program. The last two statements refer to the effect of the summer program on the children’s career and summer program interests. Specifically, Tables 21 and 22 asked parents if their child wants to work on a farm and if they want to return to the Farm -to-School summer program, after attending the summer program. The common variable for these statements was Household Income, in that parents with mid to upper level incomes agreed significantly more than parents with a lower level of income, that their children wanted to work on a farm and return to the summer program next year.

Also, in the parent survey (Appendix D) questions six to nine evaluated parents’ responses to their perceptions on the impact the summer program had on their children’s agricultural interests and awareness. These questions were not included in the research analysis, since they were not a part of the study objectives. However, a frequency count of parents’ responses for question six (Appendix L), shows that the summer program did create an interest in farming (34% of responses) and the environment (29% of responses). As for the questions seven

through nine (Appendix L) on behaviour changes related to eating, parents responded most favourably (49% yes) to their children showing more awareness of what they eat , since attending the summer program. Overall, this demonstrates that the Macdonald Farm-to-School summer program activities had an impact on children's agricultural behavioural changes, as well as their agricultural interests.

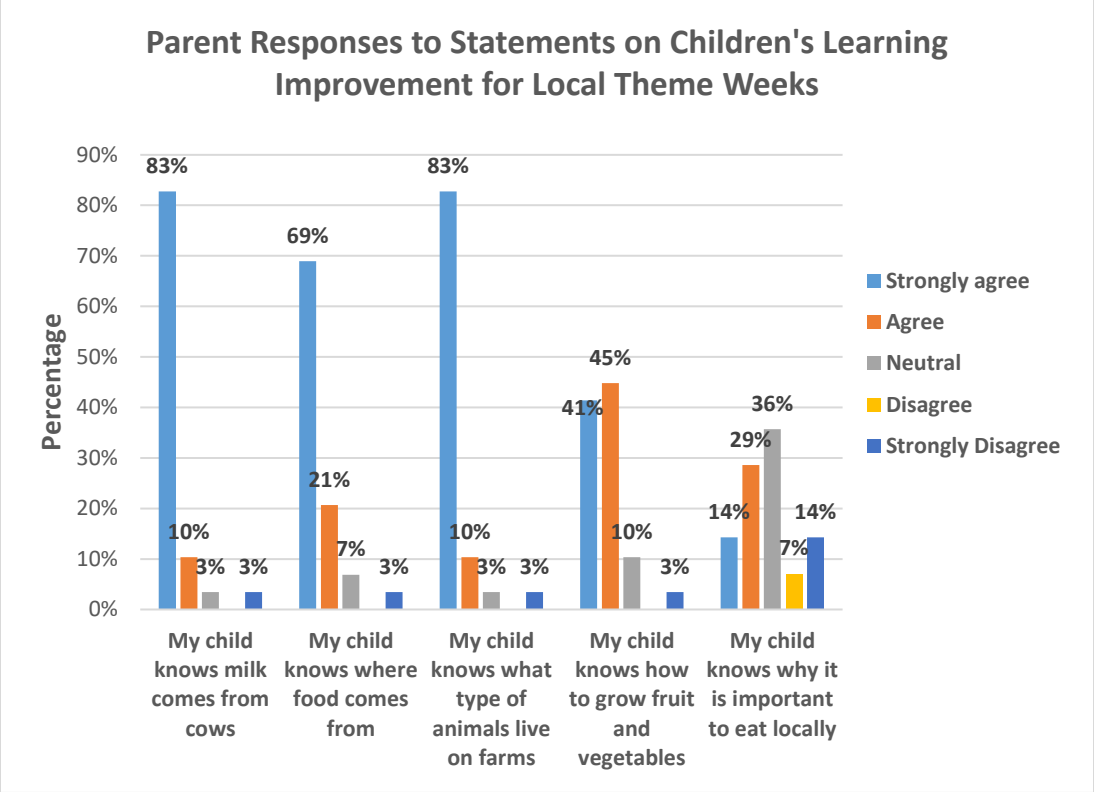


Fig 25. The percentage distribution of parent responses to statements 4 to 8 from the Parent Survey (Appendix D), which refer to the learning objectives of the local theme weeks. (n=29)

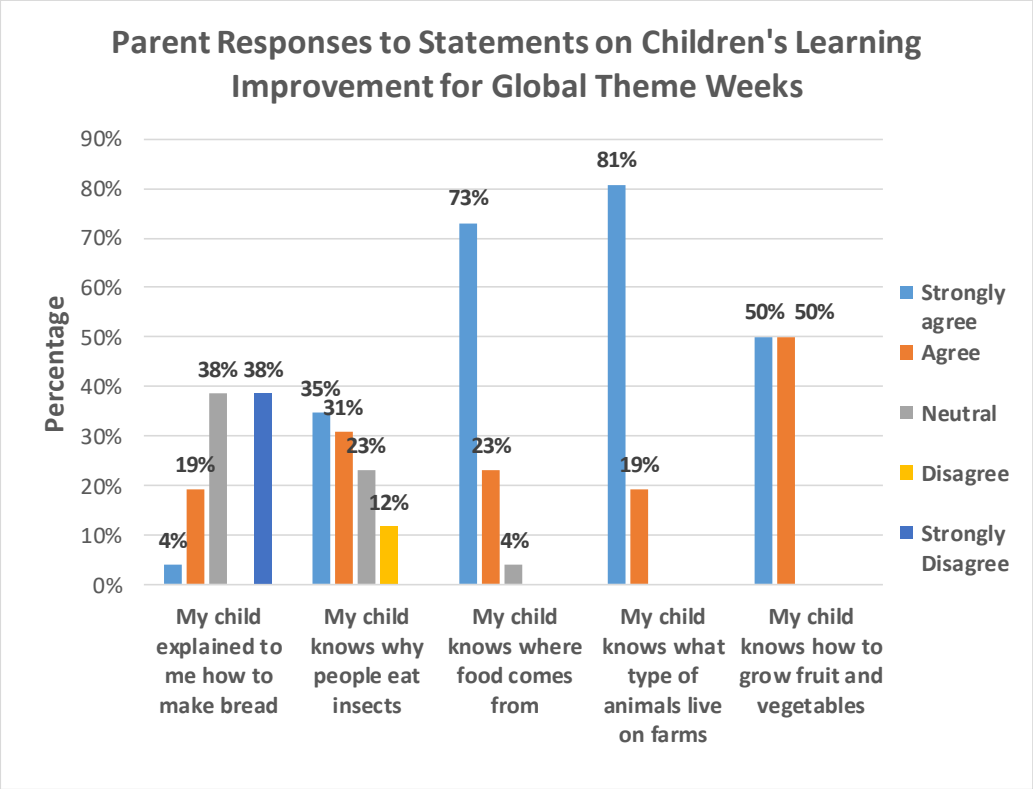


Fig 26. The percentage distribution of parent responses to statements 1,3,5,6 and 7 from the Parent Survey (Appendix D), which refer to the learning objectives of the global theme weeks. (n=26)

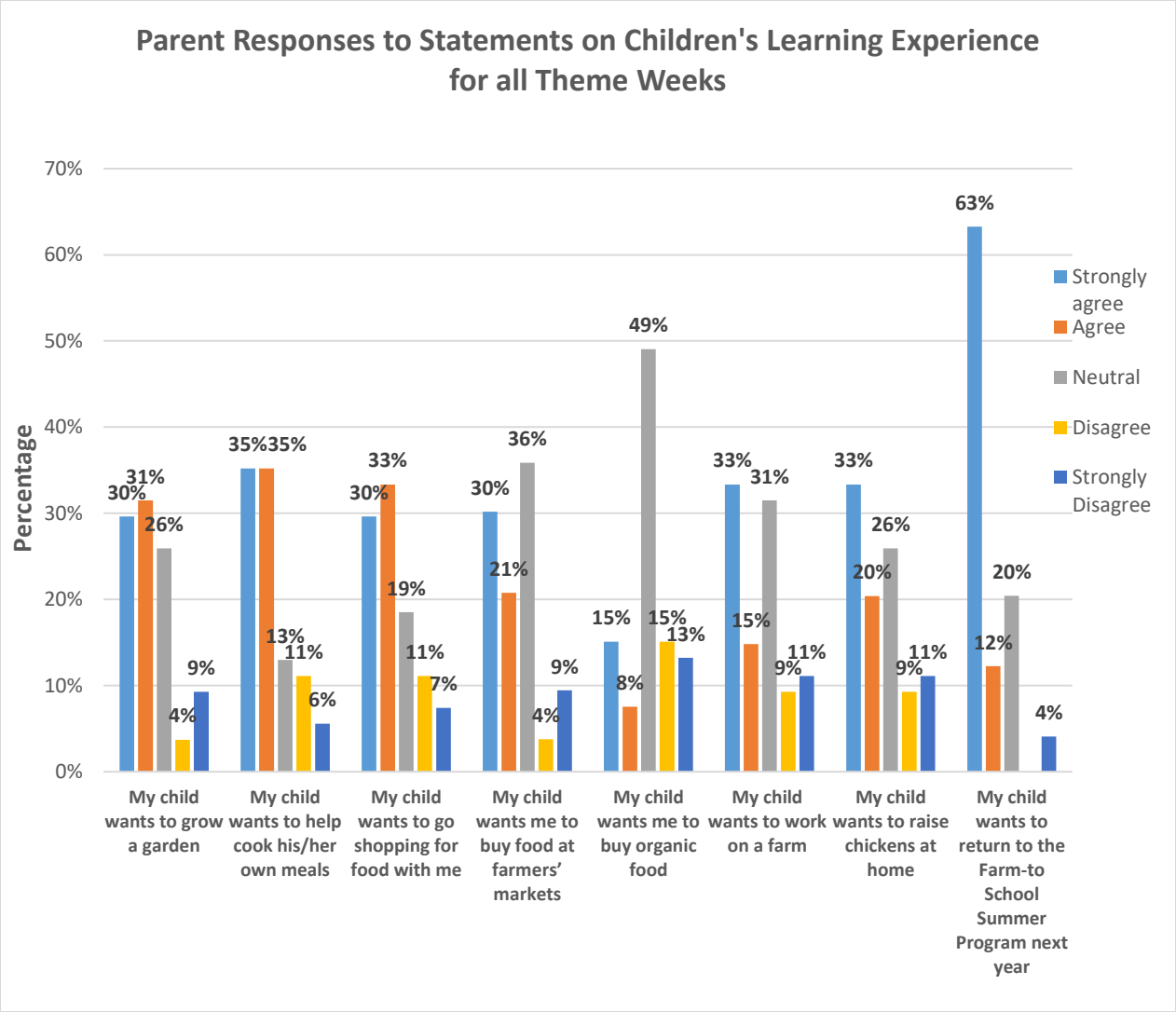


Fig 27. The percentage distribution of parent responses to statements 9 to 16 from the Parent Survey (Appendix D), which refer to the children's behaviour changes after each theme week.

The last eight statements of the Parent Survey tried to determine the parents' perceptions on how the summer program influenced (or not) their children's agricultural behaviours. The first two statements in Table 16 and 17 refer to growing and making one's own food. For these statements, the common demographic and background variables effecting the parents' responses were children's age group and Language Most Spoken at Home. For the statement "My child wants to grow a garden", the parents of children who were between 6-8 years old and spoke English or another language other than English or French agreed significantly ($p<0.1$) more than parents with children who were older (9-12 years -old) and spoke French, that their children wanted to grow their own garden after attending the summer program. As for "My

child wants to help cook his/her own meals", it was parents with older children (9-12 years old) who spoke French or were Bilingual who agreed significantly more that their children wanted to help make their own food, after attending the summer program. The next three statements (Table 18, 19, and 20) are regarding behavioural changes related to food shopping. For the statements "My child wants to go shopping for food with me" and "My child wants me to buy food at the Farmer's Market", the common variables were Theme, Week, Language Spoken at Home and Previous Farm-to-School Program experience. For wanting to shop with their parents, parents with children who attended the Global theme weeks (weeks 3 and 4) and spoke French, agreed significantly more than parents with children that attended the Local theme weeks (week 1 and 2) and spoke English or were Bilingual, that their children wanted to shop with them for food after attending the summer program. As for wanting to buy food at the Farmer's market, the parents with children who attended the local theme weeks and spoke French or were Bilingual agreed significantly more that their children wanted to buy food at the Farmer's market after attending the summer program. As for the statement "My child wants me to buy organic food", Theme and Week were also common variables effecting the parent's response, and in addition, age group and child gender were also factors. Parents who had children who attended the Global theme weeks, who were between 6-8 years old and male, agreed significantly more that their children wanted them to buy organic food after attending the summer program. The last two statements refer to future work and summer program interest. Specifically, Tables 21 and 22 is the analysis of the data from the statements that asked parents if their child wants to work on a farm and if they want to return to the Farm -to-School summer program, after attending the summer program. The common variable for these statements was Household Income, in that parents with mid to upper level incomes agreed significantly more than parents with a lower level of income, that their children wanted to work on a farm and return to the summer program next year.

Tables 6, 7, 8 and 9. GLM analyses of the learning improvement statements (# 4, 7, and 8) for the local theme weeks of the Parent Survey (Appendix D). The statement is indicated for each analysis. Note: Statements 5 and 6 for the local theme weeks are not shown, since no variables showed significance.

Table 6. My child knows milk comes from cows

Dependant Variable	NewCow_Milk			
Independent Variable	**Child_Gender**	**House_Income**		
DF	1	2		
Type III SS	1.04989141	1.12692222		
Mean Square	1.04989141	0.56346111		
F Value	5.65	3.03		
Pr > F	*0.0266	*0.0687		
Parameter	**M-F**	**<50K - 50K-100K**	**<50K - >100K**	**50K-100K - >100K**
Estimate	-0.40873635	-0.73478939	-0.59438378	0.14040562
Standard Error	0.17194176	0.30613044	0.27345831	0.20524089
t value	-2.38	-2.4	-2.17	0.68
Pr > |t|	*0.0266	*0.0253	*0.0408	0.5011

*P<0.1

Best fit model shown.

Table 7. My child knows how to grow fruit and vegetables

Dependant Variable	NewFruitVeg_Grow						
Independent Variable	**Matern_Lang**	**Ethnicity**	**House_Income**				
DF	2	1	2				
Type III SS	4.37229934	0.276918	1.57401				
Mean Square	2.18614967	0.276918	0.78701				
F Value	7.59	0.96	2.73				
Pr > F	*0.0035	*0.3384	*0.0892				
Parameter	**Caucasian-Non-Caucasian**	**English-French**	**English-Bilingual**	**French-Bilingual**	**<50K - 50K-100K**	**<50K - >100K**	**50K-100K - >100K**
Estimate	-0.30991736	-0.7128099	-1.05992	-0.3471074	0.553719	-0.214876	-0.768595
Standard Error	0.31601023	0.2445069	0.31601	0.3351933	0.4726211	0.3449238	0.3375146
t value	-0.98	-2.92	-3.35	-1.04	1.17	-0.62	-2.28
Pr > |t|	*0.3384	*0.0086	*0.0032	0.3128	0.2551	0.5403	*0.0339

*P<0.1

Best fit model shown.

Table 8. My child knows why it is important to eat locally

Dependant Variable	NewEat_Local						
Independent Variable	**Child_Gender**	**Avg_Parental_Age**	**House_Income**				
DF	1	2	2				
Type III SS	9.48394861	13.72490809	6.23727638				
Mean Square	9.48394861	6.86245405	3.11863819				
F Value	16.66	12.06	5.48				
Pr > F	0.0006	0.0004	0.0127				
Parameter	**M-F**	**25-34 years of age-45-54 years of age**	**25-34 years of age-35-44 years of age**	**35-44 years of age-45-54 years of age**	**<50K - 50K-100K**	**<50K - >100K**	**50K-100K - >100K**
Estimate	-1.29000812	0.04676802	1.67494488	1.6749449	-0.3624231	-1.2705118	-0.9080887
Standard Error	0.31602834	0.80874497	0.80579931	0.8057993	0.5665892	0.4941014	0.3676232
t value	-4.08	0.06	2.08	2.08	-0.64	-2.57	-2.47
Pr > |t|	0.0006	0.9545	0.0507	0.0507	0.5297	0.0182	0.0226

*P<0.1

Best fit model shown.

Table 9. The sum of statements 4-8.

Dependant Variable	NewLearnL_Score						
Independent Variable	**Child_Gender**	**Matern_Lang**	**House_Income**				
DF	1	2	2				
Type III SS	10.1993122	25.19955421	24.22864248				
Mean Square	10.1993122	12.5997771	12.11432124				
F Value	2.31	2.85	2.74				
Pr > F	0.1442	0.0812	0.0885				
Parameter	**M-F**	**English-French**	**English-Bilingual**	**French-Bilingual**	**<50K - 50K-100K**	**<50K - >100K**	**50K-100K - >100K**
Estimate	-1.60865253	-0.60095405	-2.95583998	-2.35488594	0.99135692	-1.3472347	-2.3385916
Standard Error	1.05843228	1.14912038	1.25760494	1.33217062	1.51499021	1.351751	1.02479721
t value	-1.52	-0.52	-2.35	-1.77	0.65	-1	-2.28
Pr > |t|	0.1442	0.6067	0.0291	0.0924	0.5203	0.3308	0.0336

*P<0.1

Best fit model shown.

Tables 10, 11, 12, 13, and 14. GLM analyses of the learning improvement statements (# 1, 3, 5, 6, and 7) for the global theme weeks of the Parent Survey (Appendix D). The statement is indicated for each analysis.

Table 10. My child explained to me how to make bread

Dependant Varibale	NewBread			
Independent Variable	**Ethnicity**	**Avg_Parental_ Age**		
DF	1	2		
Type III SS	14.93492063	10.97777778		
Mean Square	14.93492063	5.48888889		
F Value	15.62	5.74		
Pr > F	*0.001	*0.0124		
Parameter	**Caucasian-Non-Caucasian**	**35-44 years of age-45-54 years of age**	**35-44 years of age - >55 years of age**	**45-54 years of age - >55 years of age**
Estimate	-2.15555556	-0.6	-2.32222222	-1.72222222
Standard Error	0.54542396	1.07119138	1.18872395	0.51537719
t value	-3.95	-0.56	-1.95	-3.34
Pr > |t|	*0.001	*0.5827	*0.0674	*0.0039

*P<0.1

Best fit model shown.

Table 11. My child knows why people eat insects

Dependant Variable	NewInsects					
Independent Variable	**Matern_Lang**	**Prev_F2S_Exp**				
DF	3	1				
Type III SS	7.17413127	3.5027027				
Mean Square	2.39137709	3.5027027				
F Value	3.51	5.14				
Pr > F	0.0397	0.0375				
Parameter	**English-French**	**English-Bilingual**	**French-Bilingual**	**English-Other**	**French-Other**	**Previous F2S Exp-No previous F2S Exp**
Estimate	-0.91351351	-1.1027027	-0.18918919	0.4864865	1.4	-0.97297297
Standard Error	0.89174446	0.45405405	0.9201899	0.5003432	0.904045	0.42904075
t value	-1.02	-2.43	-0.21	0.97	1.55	-2.27
Pr > |t|	0.3209	0.0273	0.8397	0.3454	0.141	0.0375

*P<0.1

Best fit model shown.

Table 12. My child knows where food comes from

Dependant Varibale	NewFood_Orig				
Independent Variable	**Age_Group**	**Child_Gender**	**Prev_F2S_Exp**	**Avg_Parental_Age**	
DF	1	1	3	2	
Type III SS	3.51942228	12.02484743	7.11914633	3.53144339	
Mean Square	3.51942228	2.00414124	2.37304878	1.7657217	
F Value	19.68	11.21	13.27	9.87	
Pr > F	*0.0022	*0.0016	*0.0018	*0.0069	
Parameter	**68 - 912**	**M-F**	**35-44 years of age-45-54 years of age**	**35-44 years of age - >55 years of age**	**45-54 years of age - >55 years of age**
Estimate	0.51724138	0.74432296	-0.31791421	-0.87636669	-0.5584525
Standard Error	0.28531939	0.33245813	0.60443313	0.68065611	0.25206604
t value	1.81	2.24	-0.53	-1.29	-2.22
Pr > |t|	*0.0899	*0.0408	0.6066	0.2174	*0.0426

*P<0.1

Best fit model shown.

Table 13. My child knows what type of animals live on farms

Dependant Variable	NewFarm_Anim				
Independent	**Week**	**Matern_Lang**	**Prev_F2S_Exp**	**Avg_Parental_Age**	**House_Income**
DF	1	3	1	2	2
Type III SS	0.26369	0.72563	0.49251	1.13814	1.1646
Mean Square	0.26369	0.24188	0.49251	0.56907	0.5823
F Value	2.71	2.49	5.06	5.85	5.99
Pr > F	0.1279	0.1148	0.0458	0.0186	0.0174

Parameter	**English-Bilingual**	**French-Bilingual**	**English-Other**	**French-Other**	**Bilingual-Other**	**Previous F2S Exp-No previous F2S Exp**	**35-44 years of age-45-54 years of age**	**35-44 years of age - >55 years of age**	**45-54 years of age - >55 years of age**	**<50K - 50K-100K**	**<50K - >100K**	**50K-100K - >100K**
Estimate	-0.4621	-0.2974	-0.5601	-0.3955	-0.098	0.50724	1.43776	1.91231	0.47455	-0.5116	-0.9567	-0.4451
Standard Error	0.19156	0.38991	0.28863	0.41698	0.2924	0.22539	0.4886	0.56745	0.20537	0.38792	0.30879	0.25574
t value	-2.41	-0.76	-1.94	-0.95	-0.34	2.25	2.94	3.37	2.31	-1.32	-3.1	-1.74
Pr > |t|	0.0345	0.4616	0.0783	0.3633	0.7437	0.0458	0.0134	0.0063	0.0413	0.214	0.0101	0.1097

*P<0.1

Best fit model shown.

Table 14. My child knows how to grow fruit and vegetables

Dependant Variable	NewFruitVeg_Grow							
Independent Variable	**Week**	**Matern_Lang**	**Ethnicity**	**House_Income**				
DF	1	3	1	2				
Type III SS	0.64345276	1.53644962	1.321626	1.72971116				
Mean Square	0.64345276	0.51214987	1.321626	0.86485558				
F Value	3.36	2.67	6.9	4.51				
Pr > F	0.0899	0.0909	0.0209	0.0325				
Parameter	**Caucasian-Non-Caucasian**	**English-French**	**English-Bilingual**	**French-Bilingual**	**English-Other**	**French-Other**	**<50K - >100K**	**50K-100K - >100K**
Estimate	-1.05527469	1.0586451	0.5859454	-0.4726997	0.6258847	-0.4327604	-1.1931244	-0.6132457
Standard Error	0.40186154	0.49688031	0.2686768	0.49306299	0.3421256	0.5373537	0.4258974	0.3101892
t value	-2.63	2.13	2.18	-0.96	1.83	-0.81	-2.8	-1.98
Pr > |t|	0.0209	0.0528	0.0482	0.3552	0.0904	0.4351	0.015	0.0696

*P<0.1

Best fit model shown.

Tables 16 -22. GLM analyses of the learning experience statements (# 9-16) for all theme weeks of the Parent Survey. The question is indicated for each analysis. Note: Statement 15 is not shown, since no variables showed significance.

Table 16. My child wants to grow a garden

Dependant Variable	NewGarden							
Independent Vari	**Age_Group**	**Matern_Lang**	**Ethnicity**					
DF	1	3	1					
Type III SS	1.621163	4.1282051	0.60707837					
Mean Square	1.621163	1.3760684	0.60707837					
F Value	4.33	3.68	1.62					
Pr > F	*0.0919	*0.0975	0.2589					
Parameter	**68 - 912**	**English-French**	**English-Bilingual**	**English-Other**	**French-Bilingual**	**French-Other**	**Bilingual-Other**	**Caucasian-Non-Caucasian**
Estimate	0.858974	1.7307692	1.03846154	-0.1923077	-0.6923077	-1.923077	-1.2308	0.525641
Standard Error	0.412773	0.5691788	0.51611124	0.81824607	0.4489743	0.831339	0.77765	0.4127727
t value	2.08	3.04	2.01	-0.24	-1.54	-2.31	-1.58	1.27
Pr > |t|	*0.0919	*0.0287	0.1004	0.8235	0.1837	*0.0686	0.1743	0.2589

*P<0.1

Best fit model shown.

Table 17. My child wants to help cook his/her own meals

Dependant Variable	NewCook									
Independent Variable	**Week**	**Age_Group**	**Matern_Lang**	**Prev_F2S_Exp**	**Fam_Agric_Exp**	**Parent1_Educ**				
DF	3	1	3	1	1	2				
Type III SS	7.2567	3.2309129	9.14295582	2.25764	2.7936179	4.8648232				
Mean Square	2.4189	3.2309129	3.04765194	2.25764	2.7936179	2.4324116				
F Value	5.17	6.9	6.51	4.82	5.97	5.19				
Pr > F	0.0206	0.0253	0.0102	0.0528	0.0347	0.0284				
Parameter	**68 - 912**	**English-French**	**English-Bilingual**	**English-Other**	**French-Bilingual**	**French-Other**	**Bilingual-Other**	**Highschool-CEGEP/Training College**	**Highschool-University**	**CEGEP/Training College-University**
Estimate	-0.878	-2.5410458	-1.95356742	0.4234469	0.5874784	2.9644927	2.3770144	-1.37309945	1.1101332	2.4832327
Standard Error	0.3342	0.6800464	0.65767474	1.1004848	0.4470833	1.0294714	0.9158509	1.21239228	0.8132005	0.867335
t value	-2.63	-3.74	-2.97	0.38	1.31	2.88	2.6	-1.13	1.37	2.86
Pr > |t|	0.0253	0.0039	0.014	0.7085	0.2182	0.0164	0.0267	0.2838	0.2021	0.0169

*P<0.1

Best fit model shown.

Table 18. My child wants to go shopping for food with me

Dependant Variable	NewGroceries								
Independent Variable	**Theme**	**Week(Theme)**	**Matern_Lang**	**Ethnicity**	**Prev_F2S_Exp**				
DF	1	2	3	1	1				
Type III SS	5.1542976	0.94122807	5.73952739	0.74123	0.457895				
Mean Square	5.1542976	0.47061404	1.9131758	0.74123	0.457895				
F Value	45.2	4.13	16.78	6.5	4.02				
Pr > F	0.0067	0.1376	0.0223	0.084	0.1388				
Parameter	**Local-Global**	**English-French**	**English-Bilingual**	**English-Other**	**French-Bilingual**	**French-Other**	**Bilingual-Other**	**Caucasian-Non-Caucasian**	**Previous F2S Exp-No previous F2S Exp**
Estimate	-2.1710526	-2.15789474	-0.13157895	-0.7895	2.026316	1.3684211	-0.6579	-0.68421	0.76316
Standard Error	0.3229274	0.36337395	0.34210526	0.57974	0.324087	0.5367389	0.43481	0.268369	0.38085
t value	-6.72	-5.94	-0.38	-1.36	6.25	2.55	-1.51	-2.55	2
Pr > |t|	0.0067	0.0095	0.7262	0.2665	0.0083	0.084	0.2275	0.084	0.1388

*P<0.1

Best fit model shown.

Table 19. My child wants me to buy food at farmers' markets

Dependant Variable	NewFarm_market								
Independent Vari	**Theme**	**Week(Theme)**	**Age_Group**	**Matern_Lang**	**Prev_F2S_Exp**				
DF	1	2	1	3	1				
Type III SS	1.142857	2.0513699	0.81666667	2.71	6.0357143				
Mean Square	1.142857	1.0256849	0.81666667	0.90333333	6.0357143				
F Value	9.14	8.21	6.53	7.23	48.29				
Pr > F	0.0942	0.1086	0.125	0.124	0.0201				
Parameter	68 - 912	Local-Global	English-French	English-Bilingual	English-Other	French-Bilingual	French-Other	Bilingual-Other	Previous F2S Exp-No previous F2S Exp
Estimate	-0.875	1	-2.125	-1.625	-1.75	0.5	0.375	-0.125	-3.25
Standard Error	0.342327	0.3307189	0.49212549	0.42389562	0.6373774	0.353553	0.70156	0.5519851	0.46770717
t value	-2.56	3.02	-4.32	-3.83	-2.75	1.41	0.53	-0.23	-6.95
Pr > |t|	0.125	0.0942	0.0497	0.0618	0.111	0.2929	0.6464	0.8419	0.0201

*P<0.1

Best fit model shown.

Table 20. My child wants me to buy organic food

Dependant Variable	NewOrganic_Food			
Independent Variable	Theme	Week(Theme)	Age_Group	Child_Gender
DF	1	2	1	1
Type III SS	2390.65759	1635.218776	794.043077	1930.043077
Mean Square	2390.65759	817.609388	794.043077	1930.043077
F Value	53.74	18.38	17.85	43.39
Pr > F	0.0007	0.005	0.0083	0.0012
Parameter	**M-F**	**68 - 912**	**Local-Global**	
Estimate	30.4615385	19.5384615	-36.0384615	
Standard Error	4.6244569	4.6244569	4.91586511	
t value	6.59	4.23	-7.33	
Pr > |t|	0.0012	0.0083	0.0007	

*P<0.1

Best fit model shown.

Table 21. My child wants to work on a farm

Dependant Variable	NewFarming				
Independent Variable	**Theme**	**Week(Theme)**	**Avg_Parental_Age**	**House_Income**	
DF	1	2	1	2	
Type III SS	0.12002674	0.7605155	0.26171024	1.16911765	
Mean Square	0.12002674	0.38025775	0.26171024	0.58455882	
F Value	1.81	5.75	3.95	8.83	
Pr > F	0.2359	0.0506	0.1034	0.0229	
Parameter	Local-Global	25-34 years of age-35-44 years of age	<50K - 50K-100K	<50K - >100K	50K-100K - >100K
Estimate	-0.24632353	-0.45588235	-0.80147059	-0.95588235	-0.15441176
Standard Error	0.1829021	0.22924202	0.26744902	0.22924202	0.21948252
t value	-1.35	-1.99	-3	-4.17	-0.7
Pr > |t|	0.2359	0.1034	0.0302	0.0087	0.5131

*P<0.1

Best fit model shown.

Table 22. My child wants to return to the Farm-to School Summer Program next year

Dependant Variable	NewReturn												
Independent Variable	Matern_Lang	Ethnicity	House_Income	Parent1_Educ									
DF	3	1	2	2									
Type III SS	8.88376453	2.188987	5.669602	5.1428									
Mean Square	2.96125484	2.188987	2.834801	2.5714									
F Value	8.52	6.3	8.16	7.4									
Pr > F	0.0027	0.0274	0.0058	0.0081									
Parameter	Caucasian-Non-Caucasian	English-French	English-Bilingual	English-Other	French-Bilingual	French-Other	Bilingual-Other	<50K - 50K-100K	<50K - >100K	50K-100K - >100K	Highschool-CEGEP/	Highschool-Univer	CEGEP/Training
Estimate	1.60394537	-1.95144	-1.649469	-3.958	0.301973	-2.00607	-2.30804	-3.27010622	-1.59787557	1.6722307	1.4097	2.0455	0.6358
Standard Error	0.63906206	0.467514	0.452614	0.9301	0.381493	0.862879	0.780749	0.82603693	0.5692372	0.7072142	0.9142	0.5964	0.5911
t value	2.51	-4.17	-3.64	-4.26	0.79	-2.32	-2.96	-3.96	-2.81	2.36	1.54	3.43	1.08
Pr > |t|	0.0274	0.0013	0.0034	0.0011	0.444	0.0384	0.012	0.0019	0.0158	0.0358	0.149	0.005	0.3032

*P<0.1

Best fit model shown.

Chapter 5: Conclusion, Recommendations and Implications

5.1 Conclusion

This research examined the effect of the Macdonald Farm-to-School summer program on children's agricultural knowledge. The study site was the Macdonald Campus Farm of McGill University, where the summer program took place. Children registered in the Macdonald Farm-to-School summer program and their parents were invited to participate in the study. To answer the research objectives of this study, the participating children were given a pre-test and a post-test, and the participating parents completed a demographic and parent survey.

Based on the results of the pre-test and post-test scores of the 72 children who participated in the study it was determined that there was no statistically significant increase in test scores after attending the summer program. However, when the children's demographics and agricultural background were added to the statistical model there were specific groups of children that did improve their agricultural knowledge at the end of each summer program session. Particularly interesting, was that initially language most spoke at home appeared to be an influencing factor on agricultural knowledge (i.e., English-speaking children improved their agricultural knowledge significantly more than French or Bilingual-speaking children.). However, the demographic and background profile of English-speaking children revealed that other factors influenced their scores. Specifically, the children who spoke English at home had family members who had farming experience or who currently live on a farm, and parents with high incomes and university educated. All these factors combined possibly influenced the agricultural knowledge of English-speaking children. The fact that these children were more exposed to agricultural information or opportunities, provided them an advantage when learning material during the Farm-to-School summer program. Also, another factor that influenced children's agricultural knowledge was children's previous experience at the Macdonald Farm-to-School program. In that children who attended the program previously, improved their agricultural knowledge significantly more than those who did not have previous

experience. Overall, this demonstrates that it is essential when evaluating the impact of children's agriculture education programs to include their demographics and agricultural background. As well, this helps educators appropriately plan educational activities that are targeted to the program population.

Also, parents' role in the evaluation process of children's agricultural education programs should be considered. In this study, parents provided important perceptions of their children's learning improvement and behaviour changes after attending the program. Parents' perceptions indicated that children were transferring their knowledge to the home environment and demonstrated certain food related behaviour changes as a result of attending the summer program. Also, parent demographics and agricultural background in combination with their responses to the survey questions, helped determine which parents perceived that their children improved their learning and changed their agricultural behaviours. This also helps program planners target their educational activities to specific groups of children.

Overall, this study provided an important factor to consider when conducting evaluations of children's agricultural programs, children's demographics and agricultural background, as well as the role of parents.

5.2 Recommendations

Macdonald Farm-to-School summer program

Given the time and resources that are invested into the Macdonald Farm-to-School summer program it is important to investigate the educational impacts of the program, to ensure successful learning opportunities for participating children. Based on the conclusions of this study, it is suggested that the demographics and background of children attending the summer program be considered in program development. For instance, age was a factor that impacted children's agricultural knowledge, therefore the division of children by age group for educational activities, which is currently implemented (Calves 6-8, Heifers 9-10, Cows 11-12) is appropriate. Still, learning instruction may need to be adapted for children less than 7 years old, given that they do not have the same cognitive understanding. Also, given that English-speaking children's knowledge of agriculture appeared to be influenced by their parents' background, it

is suggested that parents' background profile be taken into consideration when designing activities. For example, children with parents that have farming experience may understand concepts more easily than those without family agricultural background. Therefore, activities that involve group interaction and information sharing may allow children to share their knowledge with their peers. As well, children with previous Farm-to-School experience, have more knowledge of agriculture than those without previous experience. So, the Ag-Connect program that is aimed at children with more Farm-to-School experience should continue to be offered to this population. As well, it is suggested that children with more experience be involved in leading or assisting in certain activities.

Parents provided valuable information to this research, which demonstrates that parents take an active role in their children's learning and program experience. Therefore, it is recommended to involve parents in the summer program activities. For example, educators can include continuing certain activities at home and have the children return the next day with their home experience. As well, since certain parents have different knowledge of agriculture, as seen in the background profile of the parents, it would be interesting to ask these parents if they would be interested in leading or teaching an educational activity for the summer program.

Lastly, given that there is a need in the Quebec educational system to increase children's agricultural knowledge, the Farm-to-School summer program should continue to develop the educational link with the surrounding schools. This will also ensure that agricultural educational opportunities are available to all school-aged children.

5.3 Future Research

It is recommended that additional research be conducted on the Macdonald Farm-to-School summer program, in order to continue to provide valuable information to the educators. For one, this study could be replicated with suggested improvements in methodology. For example, additional questions could be added to the pre-and post-tests and pilot testing conducted using all data collection instruments (tests and surveys) with a sample population, to increase the reliability and validity of the tests. As well, the testing environment should be set-up so that

each child sits at their own desk as opposed to shared seating. This is to ensure that children cannot share information while performing the tests.

In addition, it would be valuable to use qualitative methods to examine in more depth the effect of the summer program on children's agricultural knowledge and behaviour changes. For instance, interviews with the parents and their children could be conducted to ask their perceptions of specific content of the summer program. This would allow for improvements in specific areas of the Farm-to-School summer program curriculum. Another method called photovoice, whereby participants use pictures to record and describe their perceptions about a certain topic (Wang & Burris, 1997), could be integrated into the program activities and the photos displayed for public education purposes.

As well, it would be valuable to track the impacts of the summer program on children's knowledge and behaviour changes over the short and long-term. Whereby the same tests are given over consecutive years and the results compared over time to determine if the program is meeting its educational objectives. Also, parent and children questionnaires on behaviour changes could be distributed to participants, 6 months, 1 year, and 5 years after attending the summer program.

5.4 Implications

Based on the findings of this study the children participating in the Macdonald Farm-to-School summer program did not significantly improve their agricultural knowledge. However, in various studies that used pre-test and post-test design to assess children's agricultural knowledge, there was a significant improvement in children's knowledge (Luckey, 2012); Pense, *et al.* (2005); and Hughes and Hartley (2000). These three studies used tests that evaluated the entire program curriculum content and administered the tests to children in a specific elementary-grade level. Therefore, the tests used in this study may not have been appropriately designed in curriculum content and for the younger age group (6-8 years old). Hence, consideration in age appropriateness, question formulation, and Farm-to-School educator's involvement should be considered in future test development.

The significant findings that were obtained from this study imply that demographic and background data have an impact on how the summer program influences children's agricultural knowledge. Therefore, this type of information should continue to be collected by the organizers to plan programs appropriately. As well, data collected on parents' perceptions of their children's learning and behaviour changes after attending the program, provides valuable information on what program content children are transferring to their home environment. Suggesting, that the summer program has the potential to have long-term impacts on the participants and their parents, which should be further investigated.

Importantly, this was the first of evaluation of the Macdonald Farm-to-School program which provides an initial insight into the impacts of this program on children's agricultural knowledge and adds to the research literature on the effects of agricultural education programs.

REFERENCES

Aldrich, D. G. (1988). Committee on agricultural education in secondary schools. Understanding Agriculture: New Directions for Education: Washington, DC: National Academy Press.

Adkins, C., & Simmons, B. (2002). Outdoor, Experiential, and Environmental Education: Converging or Diverging Approaches? ERIC Digest.

Bell, A. (2007). Designing and testing questionnaires for children. *Journal of Research in Nursing, 12*(5), 461-469.

Bellah, K. A., Dyer, J. E., & Casey, G. R. (2004). Agricultural education= agricultural literacy. *Agricultural education magazine, 77*, 23-24.

Birkenholz, R., Frick, M., Gartin, S., Hoover, T., Jewel, L., Terry, R., Steward, B. (1992). Strategies to promote agricultural literacy. *American Association for Agricultural Education, Agricultural Literacy Work Group*.

Birkenholz, R. H. (1993). Pilot Study of Agricultural Literacy. Final Report.

Branswell, B. (2014). Quebec students top in math, below Canadian average in other areas, Web. *Montreal Gazette*. Retrieved from http://montrealgazette.com/news/local-news/quebec-students-top-in-math.

Brophy, J., Alleman, J., & O'Mahony, C. (2003). Primary-grade students' knowledge and thinking about food production and the origins of common foods. *Theory & Research in Social Education, 31*(1), 10-50.

Butler-Kisber, L. (2010). *Qualitative inquiry: Thematic, narrative and arts-informed perspectives*: Sage Publications.

Cainey, J., Bowker, R., Humphrey, L., & Murray, N. (2012). Assessing informal learning in an aquarium using pre-and post-visit drawings. *Educational Research and Evaluation, 18*(3), 265-281.

Calabrese Barton, A., Koch, P. D., Contento, I. R., & Hagiwara, S. (2005). From global sustainability to inclusive education: Understanding urban children's ideas about the food system. *International Journal of Science Education, 27*(10), 1163-1186.

Cardwell, V. B. (2005). Literacy: What Level for Food, Land, Natural Resources, and Environment? *Journal of natural resources and life sciences education, 34*, 112.

Cohen, L., Manion, L., & Morrison, K. (2013). *Research methods in education*: Routledge.

Crane, V., Nicholson, H. J., & Chen, M. (1994). *Informal Science Learning: What the Research Says About Television, Science Museums, and Community-Based Projects* (1st ed.): Research Communication.

David Chen, Clémence Braind-Racine, Julien Malard, Valérie Toupin-Dubé (2013). *Sustainability Project Fund Application: Farm to School Project*. Application. McGill University. Montreal,Quebec. Retrieved from https://www.mcgill.ca/sustainability/files/sustainability/farm_to_school_application.pdf.

De Leeuw, E., Borgers, N., & Smits, A. (2004). Pretesting questionnaires for children and adolescents. *Methods for testing and evaluating survey questionnaires*, 409-429.

Dirks, A. E., & Orvis, K. (2005). An evaluation of the junior master gardener program in third grade classrooms. *HortTechnology, 15*(3), 443-447.

FAO, R. (2002). World Agriculture: Towards 2015/2030 Summary Report: FAO Rome, Italy.

Farm-to-Cafeteria Canada. (2015). Canada's School Food Map. Retrieved from http://www.farmtocafeteriacanada.ca/school-food-map/.

Feenstra, G., & Ohmart, J. (2012). The evolution of the School Food and Farm to School Movement in the United States: connecting childhood health, farms, and communities. *Childhood Obesity (Formerly Obesity and Weight Management), 8*(4), 280-289.

Food, L. f. (2016). Transforming food culture for all: About Us. Retrieved from http://www.foodforlife.org.uk/about-us

Frick, M. J. (1990). A definition and the concepts of agricultural literacy: A national study.

Fröhlich, G., Goldschmidt, M., & Bogner, F. X. (2013). The effect of age on students' conceptions of agriculture. *Studies in Agricultural Economics, 115*(2), 61-67.

Gerber, B. L., Cavallo, A. M., & Marek, E. A. (2001). Relationships among informal learning environments, teaching procedures and scientific reasoning ability. *International Journal of Science Education, 23*(5), 535-549.

Health, G. D. o. P. (2016). Georgia Healthy Farmers Program. Retrieved from https://dph.georgia.gov/georgia-healthy-farmers-program

Hughes, W. J., & Hartley, J. (2000). Georgia Healthy Farmers Farm Safety Camp: description and evaluation of a model program. *Journal of Agromedicine, 6*(3), 43-59.

Jones, M., Dailami, N., Weitkamp, E., Salmon, D., Kimberlee, R., Morley, A., & Orme, J. (2012). Food sustainability education as a route to healthier eating: evaluation of a multi-component school programme in English primary schools. *Health education research, 27*(3), 448-458.

Joshi, A., Azuma, A. M., & Feenstra, G. (2008). Do farm-to-school programs make a difference? Findings and future research needs. *Journal of Hunger & Environmental Nutrition, 3*(2-3), 229-246.

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*: FT press.

Luckey, A. N., Murphrey, T. P., & Cummins, R. L. (2013). Assessing Youth Perceptions and Knowledge of Agriculture:The Impact of Participating in an AgVenture Program. *Journal of Extension, 51*(3), 1-7.

National Agriculture in the Classroom. (2015). History of Agriculture in the Classrom. Retrieved from http://www.agclassroom.org/get/history.htm

National 4-H Council. (2016). What is 4-H? Retrieved from http://4-h.org/about/what-is-4-h/

National Research Council. (1996). *National science education standards*: National Academy Press.

Mabie, R., & Baker, M. (1996). A comparison of experiential instructional strategies upon the science process skills of urban elementary students. *Journal of Agricultural Education, 37*, 1-7.

Medrich, E. A. (1982). *The serious business of growing up: A study of children's lives outside school*: Univ of California Press.

Meischen, D. L., & Trexler, C. J. (2003). Rural Elementary Students'understandings Of Science And Agricultural Education Benchmarks Related To Meat And Livestock. *Journal of Agricultural Education, 44*(1), 43-55.

Ministère de l'Éducation du Loisir et du Sport du Québec, (2009). *Progression of Learning in Elementary School:Science and Technology*. Quebec Retrieved from http://www1.education.gouv.qc.ca/progressionPrimaire/science/index_en.asp.

Moss, A., Smith, S., Null, D., Long Roth, S., & Tragoudas, U. (2013). Farm to school and nutrition education: Positively affecting elementary school-aged children's nutrition knowledge and consumption behavior. *Childhood Obesity, 9*(1), 51-56.

Owen, S., Schickler, P., & Davies, J. (1997). Food choice: how to assess attitudes of pre-adolescent children. *Nutrition & Food Science, 97*(1), 5-11.

Pense, S. L., Leising, J., Portillo, M., & Igo, C. (2005). Comparative assessment of student agricultural literacy in selected Agriculture in the Classroom programs. *Journal of Agricultural Education, 46*(3), 107.

Piaget, J. (1929). The child's concept of the world. *Londres, Routldge & Kegan Paul*.

Pratt, B. (2013). Eating our way to the farm: How food can teach agricultural literacy. *The Agricultural Education Magazine, 85*(4), 17.

Powell, D. V., & Agnew, D. M. (2011). Assessing Agricultural Literacy Elements of Project Food Land and People in K-5 Using the Food and Fiber Systems Literacy Standards. *Journal of Agricultural Education, 52*(1), 155-170.

Radhakrishna, R. B. (2005). Influence of 4-H program on former 4-H members' career and life experiences. *Agricultural Education, 42*(2), 46-55.

Ramsey, J. W., & Edwards, C. (2004). Informal learning in science: Does agricultural education have a role. *Journal of Southern Agricultural Education Research, 54*(1), 86-99.

Rodeo, H. L. S. a. (2016). Agventure. Retrieved from http://www.rodeohouston.com/Visit-the-Show/Attractions-Activities/AGVENTURE

Searchinger, T., Hanson, C., Ranganathan, J., Lipinski, B., Waite, R., Winterbottom, R., Chemineau, P. (2014). Creating a sustainable food future. A menu of solutions to sustainably feed more than 9 billion people by 2050. World resources report 2013-14: interim findings.

Trexler, C. J. (2000). A qualitative study of urban and suburban elementary student understandings of pest-related science and agricultural education benchmarks. *Journal of Agricultural Education, 41*(3), 89-102.

Turnbull, S. M. (2002). Agricultural Literacy at the Country Fair. *The Agricultural Education Magazine, 75*(2), 20.

United Nations (2014). World Urbanization Prospects: The 2014 Revision, Highlights. Retrieved from http://www.un.org/en/development/desa/publications/2014-revision-world-urbanization-prospects.html.

Wellington, J. (1990). Formal and Informal Learning in Science: The Role of the Interactive Science Centres. *Physics Education, 25*(5), 247-252

APPENDIX A – Children's Tests (Farm to Plate)

McGill
ANIMAL SCIENCE

Macdonald Farm-to-School Day Camp

Local Food Survey

Ages 6-8 (Grades 1-2)

FARM to SCHOOL

Why do we plant onions and strawberries together?

A. To make the garden colourful

B. To grow bigger strawberries

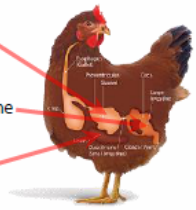
C. To keep pests away from the onions

In which of these places does the chicken's food get broken down?

A. Gizzard

B. Large Intestine

C. Liver



Which plant is part of the bean family (a legume)?

A. Peanut Plant 

B. Strawberry Plant 

C. Pumpkin Plant 

Which animal has the largest eggs?

A. Chicken 

B. Duck 

C. Ostrich 

Which one of the following is *not* an insect?

A. Mosquito 

B. Spider 

C. Beetle 

Which of the following insects has a lapping-type mouth and eats nectar from flowers?

A. Butterfly 

B. Bee 

C. Beetle 

Which one of the following farm animals does *not* produce milk?

A. Chicken 

B. Goat 

C. Cow 

When you eat a carrot, what *part* of the plant are you eating?

A. Root

B. Stem 

C. Seed

What do plants need in order to grow?

A. Water, sunlight, mineral salts, and weeds 

B. Water, sunlight, mineral salts, and air 

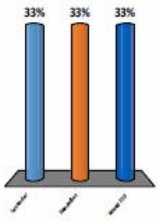
C. Water, sunlight, mineral salts, and insects 

Which of these plants is a weed?

A. Lavender 

B. Quack Grass 

C. Ferns 



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ANIMAL SCIENCE

Programme d'été Macdonald « Farm-to-School »

Sondage « Local Food »

Âges 6-8 (Grades 1-2)

FARM TO SCHOOL

Pourquoi est-ce que nous plantons les oignons et les fraises ensemble ?


A. Pour faire coloré le jardin

B. Pour faire pousser des plus grandes fraises

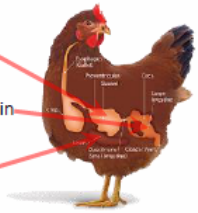
C. Pour empêcher les pestes des oignons

La digestion de la nourriture se fait dans quel endroit pour un poulet ?

A. Le gésier

B. Le gros intestin

C. Le foie



Quelle plante est une légumineuse (fait partie de la famille des haricots) ?

A. L'arachide 

B. La fraise 

C. La citrouille 

Quel animal ci-dessous pond les plus grands œufs ?

A. La poule 

B. Le canard 

C. L'autruche 

Lequel des suivants n'est pas un insecte ?

A. un maringouin 

B. Une araignée 

C. Un scarabée 

Lequel des insectes suivants a une bouche (comme a droit) et mange le nectar des fleurs ?

A. Le papillon 

B. L'abeille 

C. Le scarabée 

Quel animal de ferme ne produit pas de lait ?

A. La poule 

B. La chèvre 

C. La vache 

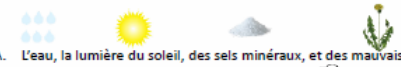
Quand tu manges une carotte, quelle partie de la plante manges-tu ?

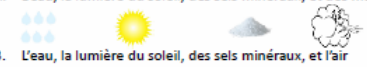
A. La racine

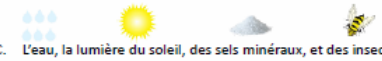
B. La tige 

C. La graine

Les plantes ont besoin de quoi pour pousser ?

A. L'eau, la lumière du soleil, des sels minéraux, et des mauvaises herbes 

B. L'eau, la lumière du soleil, des sels minéraux, et l'air 

C. L'eau, la lumière du soleil, des sels minéraux, et des insectes 

Quelle plante ci-dessous est une mauvaise herbe ?

A. La lavande 

B. Le chiendent 

C. Des fougères 

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Local Food Survey

Ages 9-12 (Grades 3-6)

FARM to SCHOOL

What are two advantages of companion planting?

A. Healthier and more diverse crops

B. Healthier and smaller crops

C. Healthier and taller crops

Which food is a good source of energy for chickens?

A. Wheat 

B. Crickets 

C. Egg Shells 

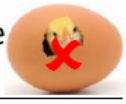
What part of the plant root is this?

A. Rhizobium

B. Root hair 

C. Nodule

Why do eggs from the store *not* contain a chick?



A. The store eggs are kept in cold refrigerators

B. The store eggs are too old

C. The store eggs are not fertilized

What makes these corn cobs have different colours?

A. The corn's phenotype

B. The corn's genes

C. The corn's environment

Which is an example of biological pest control?

A. Ladybugs eating aphids 

B. Spraying plants with chemicals 

C. Ants digging holes 

How do we make cheese? 

A. Heating, curdling, and separating proteins

B. Bubbling, curdling, and adding proteins

C. Melting, curdling, and removing proteins

What are the names of the three pigments in Pumpkin, Peas, and Banana?

A. Carotenoid, Chlorophyll, and Anthoxanthin

B. Carotenoid, Anthoxanthin, and Chlorophyll

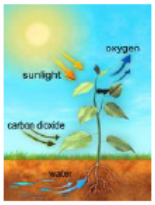
C. Chlorophyll, Carotenoid, and Anthoxanthin

What is the name of this plant process?

A. Recycling

B. Composting

C. Photosynthesis



What do weeds compete for with other plants? 

A. Water, nutrients, and sunlight

B. Water, nutrients, and air

C. Water, nutrients, and shade

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Sondage « Local Food »

Âges 9-12 (Grades 3-6)

FARM TO SCHOOL

Deux avantages du compagnonnage sont…

A. Des cultures plus sains et plus diverses

B. Des cultures plus sains et plus petites

C. Des cultures plus sains et plus grandes

Quel aliment est une bonne source d'énergie pour les poulets?

A. Du Blé 

B. Des criquets 

C. Des coquilles d'œuf 

Quelle partie de la racine d'une plante est représentée ci-dessous ?

A. Le rhizobium

B. Le poil absorbant 

C. Le nodule

Pourquoi les œufs achetés au magasin ne contiennent pas de poussin ?

A. Les œufs du magasin sont conservés dans le réfrigérateurs froids

B. Les œufs du magasin sont trop vieux

C. Les œufs du magasin ne sont pas fécondés

Pourquoi ces épis de maïs sont de couleurs différentes ?

A. Le phénotype du maïs

B. Les gènes du maïs

C. L'environnement du maïs

Quel exemple ci-dessous représente la lutte biologique contre les insectes nuisibles ?

A. Les coccinelles qui mangent des pucerons 

B. L'arrosage des plantes avec des produits chimiques 

C. Les fourmis qui creusent des trous 

Comment fait-on le fromage ?

A. Le chauffage, la coagulation enzymatique, et la séparation des protéines

B. L'ébullition, la coagulation enzymatique, et l'ajout des protéines

C. Le dégel, la coagulation enzymatique, et l'élimination des protéines

Quels pigments se retrouvent dans les citrouilles, les pois, et les bananes ?

A. Le caroténoïde, la chlorophylle, et l'anthoxanthine

B. Le caroténoïde, l'anthoxanthine, et la chlorophylle

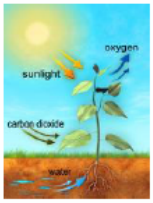
C. La chlorophylle, le caroténoïde, et l'anthoxanthine

Comment nomme-t-on le processus de la plante représenté ci-dessous ?

A. Le recyclage

B. Le compostage

C. La photosynthèse



Les mauvaises herbes sont en compétition avec les autres plantes pour…

A. L'eau, les nutriments et la lumière solaire

B. L'eau, les nutriments et l'air

C. L'eau, les nutriments et l'ombre

APPENDIX B – Children's Tests (Global Food Security)

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Macdonald Farm-to-School Day Camp

Global Food Survey

Ages 6-8 (Grades 1-2)

FARM TO SCHOOL

What can you add to bread to make it healthier to eat?

A. Insect Powder 

B. Yeast 

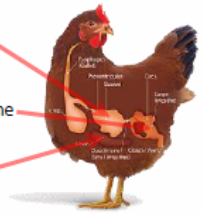
C. Sugar 

In which of these places does the chicken's food get broken down?

A. Gizzard

B. Large Intestine

C. Liver



Which one of the following is *not* an insect?

A. Mosquito 

B. Spider 

C. Beetle 

Which one of the following farm animals does *not* produce milk?

A. Chicken 

B. Goat 

C. Cow 

When you eat a carrot, what *part* of the plant are you eating?

A. Root

B. Stem 

C. Seed

What type of worms are used in Vermicomposting?

A. Blue worms 

B. Earthworms 

C. Red wiggler worms 

What is the name of the soil diagram below?

A. Soil Profile

B. Soil Horizon

C. Soil Layer

What do plants need in order to grow?

A. Water, sunlight, mineral salts, and weeds

B. Water, sunlight, mineral salts, and air

C. Water, sunlight, mineral salts, and insects

What is the name of these storage containers for corn?

A. Silos

B. Grain elevators 

C. Towers

What do Rainbow Trout eat?

A. Insects and Shrimp  

B. Frogs and Snails  

C. Insects and Snails  

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Programme d'été Macdonald « Farm-to-School »

Sondage « Global Food »

Âges 6-8 (Grades 1-2)

FARM to SCHOOL

Qu'est-ce qu'on peut ajouter au pain pour le rendre plus sain à manger ?

A. La poudre des insectes 

B. La levure 

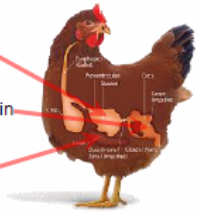
C. Le sucre 

La digestion de la nourriture se fait dans quel endroit pour un poulet ?

A. Le gésier

B. Le gros intestin

C. Le foie



Lequel des suivants n'est pas un insecte ?

A. un maringouin 

B. Une araignée 

C. Un scarabée 

Quel animal de ferme ne produit pas de lait ?

A. La poule 

B. La chèvre 

C. La vache 

Quand tu manges une carotte, quelle partie de la plante manges-tu ?

A. La racine

B. La tige 

C. La graine

Quel vers se trouve dans le lombricompostage ?

A. Des vers bleus 

B. Des vers de terre 

C. Des vers rouges du fumier 

Comment s'appelle le diagramme du sol ci-dessous ?

A. Un profil du sol

B. Un horizon pédologique

C. Une couche de sol

Les plantes ont besoin de quoi pour pousser ?

A. L'eau, la lumière du soleil, des sels minéraux, et des mauvaises herbes

B. L'eau, la lumière du soleil, des sels minéraux, et l'air

C. L'eau, la lumière du soleil, des sels minéraux, et des insectes

Comment appellent-on ces réservoirs de stockage pour le maïs ?

A. Des silos

B. Des élévateurs à grains

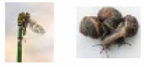
C. Des pylônes

Les truites arc-en-ciel mangent quoi ?

A. Les insectes et les crevettes

B. Les grenouilles et les escargots

C. Les insectes et les escargots



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Macdonald Farm-to-School Day Camp

Global Food Survey

Ages 9-12 (Grades 3-6)

FARM to SCHOOL

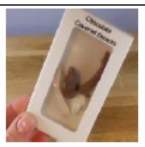
Why, in certain countries, do people eat insect bread?

A. It makes the bread taste better

B. It is part of their culture

C. It is a sustainable alternative to meat

What are two environmental benefits to eating insects compared to beef or pork?



A. Less fertilizer and soil is used to grow insects

B. Less heat and housing is used to grow insects

C. Less land and water is used to grow insects

Which food is a good source of energy for chickens?

A. Wheat 

B. Crickets 

C. Egg Shells 

Which is an example of biological pest control?

A. Ladybugs eating aphids 

B. Spraying plants with chemicals 

C. Ants digging holes 

What type of fish is a Rainbow trout?

A. Carnivore

B. Omnivore

C. Herbivore

What do aquariums and fish farms have in common?


A. They both provide special food for fish

B. They both have the same amount of water

C. They both have the same temperature

Why is vermicomposting good for the environment?

A. It reduces the amount of greenhouse gases

B. It reduces the amount of water needed for gardens

C. It reduces the amount of garbage in landfills

Which part of the soil carries nutrients and minerals to plants?

A. Water

B. Gases

C. Organic matter

What type of natural adaptation is shown here?

A. Masking

B. Camouflage

C. Hiding

Which of these products does *not* contain corn?

A. Toothpaste

B. Ethanol

C. Sugar

What is this farm machine doing?

A. Threshing

B. Seeding

C. Fertilizing

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ANIMAL SCIENCE

Programme d'été Macdonald « Farm-to-School »

Sondage « Global Food »

Âges 9-12 (Grades 3-6)

FARM TO SCHOOL

Pourquoi, dans certains pays, les gens mangent-ils du pain fait d'insectes ?

A. Le goût du pain est amélioré

B. Cela fait parti de leur culture

C. C'est une alternative durable pour la viande

Si on mange plus des insectes par rapport au bœuf et au porc, quels sont les deux avantages environnementaux ?

A. On utilise moins d'engrais et moins de sol

B. On utilise moins de chaleur et moins de logement

C. On utilise moins de terres et moins d'eau

Quel aliment est une bonne source d'énergie pour les poulets ?

A. Du blé 

B. Des criquets 

C. Des coquilles d'œuf 

Quel exemple ci-dessous représente la lutte biologique contre les insectes nuisibles ?

A. Les coccinelles qui mangent des pucerons 

B. L'arrosage des plantes avec des produits chimiques 

C. Les fourmis qui creusent des trous 

La truite arc-en-ciel fait partie de quelle catégorie de poisson ?

A. Carnivore

B. Omnivore

C. Herbivore

Quels sont les points en commun entre les aquariums et les exploitations piscicoles ?


A. Ils fournissent tous les deux de la nourriture spéciale aux poissons

B. Ils contiennent tous les deux la même quantité d'eau

C. Ils ont tous les deux la même température

Pourquoi le lombricompostage est bon pour l'environnement ?

A. Il réduit la quantité de gaz à effet-de-serre

B. Il réduit la quantité d'eau nécessaire pour les jardins

C. Il réduit la quantité des ordures dans les sites d'enfouissement

Quelle partie du sol transporte les nutriments et les minéraux aux plantes ?

A. L'eau

B. Les gaz

C. Les matières organiques

Quelle classification d'adaptation naturelle est montrée ici ?

A. L'effet de masquage

B. Le camouflage

C. L'effet de se cacher

Quel produit ci-dessous ne contient pas de maïs ?

A. Le dentifrice 

B. L'éthanol carburant 

C. Le sucre 

Cette machine agricole est en train de faire quoi ?

A. Le battage

B. L'ensemencement

C. La fertilisation

APPENDIX C – Demographic Information Forms

Demographic Information

Thank you for helping us with this research project on the ability of the Day Camp to improve your child's knowledge of agriculture. If you have any questions about the research itself and the methodology, please do not hesitate to contact us (EMAIL or Phone)

Please complete as many of the following questions *as you wish* (more is better for our analyses) ☺

1. Details for participating child:

_____ _____ BOY GIRL Plate to Farm ☐
LAST NAME, First name of child — Age — Circle one — Global Food Security ☐

2. Average age of parent(s)

< 25 | 25 - 34 | 35 - 44 | 45 – 54 | > 55
Circle one

3. Approximate household income

< $50,000 | $50,000 - $100,000 | > $100,000
Circle one

4. Language mostly spoken at home

English | French | Other
Circle one — Please specify

5. Family Ethnicity

Caucasian | African-American | Hispanic | Asian | Native-American | Other:
Circle one — Please specify

6. Level of Household Education

Parent 1: High school | CEGEP / Training College | University
Circle all that apply

Parent 2: High school | CEGEP / Training College | University
Circle all that apply

7. Rural/Urban Background

We now live on a farm | at least one Parent grew up on a farm | at least one Grand-Parent grew up on a farm
Circle all that apply

8. Previous Day Camp participation (tick all that apply) – REALLY IMPORTANT FOR THE STUDY!

This child already participated here *in a previous year* in "Plate to Farm"..... ☐
This child already participated here *in a previous year* in "Global Food Security"..... ☐

A sibling already participated here *in a previous year* in "Plate to Farm"..... ☐
A sibling already participated here *in a previous year* in "Global Food Security"..... ☐

9. Follow-up information

_____
Email where we can send a follow-up survey and results

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Informations démographiques

Nous vous remercions de nous aider avec ce projet de recherche sur la capacité du Camp de jour à améliorer les connaissances de votre enfant en agriculture. Si vous avez des questions concernant la recherche elle-même et la méthodologie, s'il vous plaît n'hésitez pas à nous contacter (E-mail ou téléphone)

Veuillez remplir autant de questions suivantes que vous le souhaitez (plus est mieux pour nos analyses) ☺

1. Des détails sur votre enfant:

_____ _____ GARÇON FILLE

NOM, Prénom de l'enfant | Âge | Veuillez encercler une réponse

Plate to Farm ☐
Global Food Security ☐

2. Âge moyen des parent(s)

< 25 | 25 - 34 | 35 - 44 | 45 – 54 | > 55

Veuillez encercler une réponse

3. Revenu de la famille approximatif

< 50 000$ | 50 000$ - 100 000$ | > 100 000$

Veuillez encercler une réponse

4. Langue prédominante à la maison

Anglais | Français | Autre

Veuillez encercler une réponse | Veuillez préciser

5. Ethnicité de la famille

Caucasien | Afro-américaine | Hispanique | Asiatique | Amérindienne | Autre:

Veuillez encercler une réponse | Veuillez préciser

6. Niveau scolaire

Parent 1 : École secondaire | CEGEP / École de formation | Université

Veuillez encercler toutes les réponses qui s'appliquent

Parent 2 : École secondaire | CEGEP / École de formation | Université

Veuillez encercler toutes les réponses qui s'appliquent

7. Milieu rural ou urbain

Nous habitons actuellement sur une ferme | Au moins un Parent a grandi sur une ferme | Au moins un Grand parent a grandi sur une ferme

Veuillez encercler toutes les réponses qui s'appliquent

8. Participation antérieure au camp d'été (SVP cochez toutes les réponses qui s'appliquent) – TRÈS IMPORTANT POUR L'ÉTUDE!

Cet enfant a déjà participé ici dans le programme « Plate to Farm » dans une année précédente..... ☐

Cet enfant a déjà participé ici dans le programme « Global Food Security » dans une année précédente..... ☐

Un frère ou une sœur a déjà participé ici dans le programme « Plate to Farm » dans une année précédente..... ☐

Un frère ou une sœur a déjà participé ici dans le programme «Global Food Security » dans une année précédente.... ☐

9. Information de suivi

_____

Courriel où nous pouvons envoyer un sondage de suivi ainsi que les résultats

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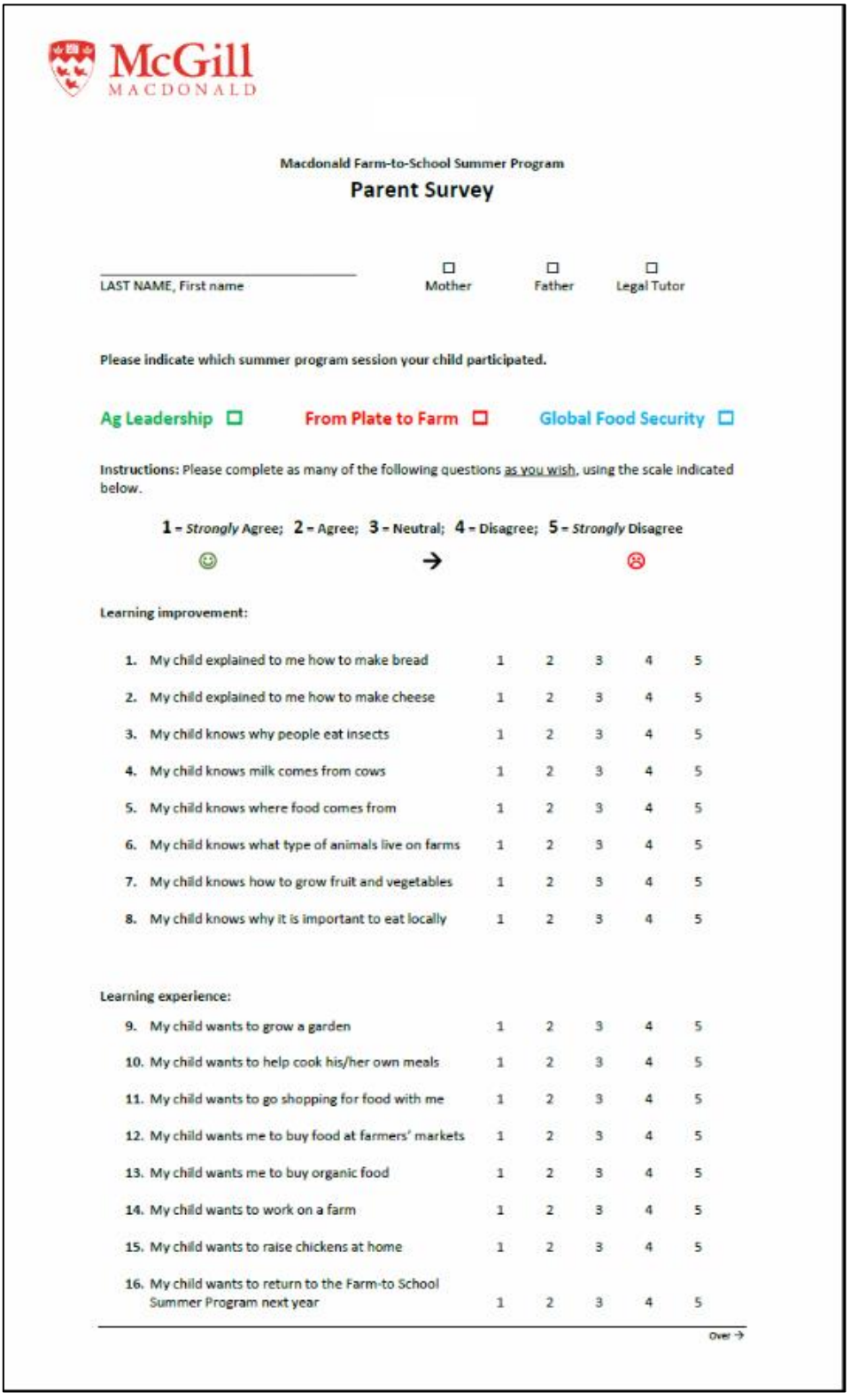
APPENDIX D – Parental Survey Forms



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Macdonald Farm-to-School Summer Program

Parent Survey

_____ ☐ Mother ☐ Father ☐ Legal Tutor
LAST NAME, First name

Please indicate which summer program session your child participated.

Ag Leadership ☐ From Plate to Farm ☐ Global Food Security ☐

Instructions: Please complete as many of the following questions as you wish, using the scale indicated below.

1 = *Strongly* Agree; **2** = Agree; **3** = Neutral; **4** = Disagree; **5** = *Strongly* Disagree

☺ → ☹

Learning improvement:

1.	My child explained to me how to make bread	1	2	3	4	5
2.	My child explained to me how to make cheese	1	2	3	4	5
3.	My child knows why people eat insects	1	2	3	4	5
4.	My child knows milk comes from cows	1	2	3	4	5
5.	My child knows where food comes from	1	2	3	4	5
6.	My child knows what type of animals live on farms	1	2	3	4	5
7.	My child knows how to grow fruit and vegetables	1	2	3	4	5
8.	My child knows why it is important to eat locally	1	2	3	4	5

Learning experience:

9.	My child wants to grow a garden	1	2	3	4	5
10.	My child wants to help cook his/her own meals	1	2	3	4	5
11.	My child wants to go shopping for food with me	1	2	3	4	5
12.	My child wants me to buy food at farmers' markets	1	2	3	4	5
13.	My child wants me to buy organic food	1	2	3	4	5
14.	My child wants to work on a farm	1	2	3	4	5
15.	My child wants to raise chickens at home	1	2	3	4	5
16.	My child wants to return to the Farm-to School Summer Program next year	1	2	3	4	5

Over →

Please answer as many of the following questions <u>as you wish</u> in as much detail as possible.

1. What (if anything) did your child discuss with you regarding the educational activities of the Farm-to-School Summer Program?

_____
_____
_____

2. How (if any) has the Farm-to-School Summer Program`s educational activities improved his/her understanding of agriculture?

_____
_____
_____

3. Is there anything else you would like to share about your child's Farm-to-School Summer Program experience?

_____
_____
_____

Additional Questions: Farm-to-School Summer Program (Please tick all that apply)

4. How did you learn about the Farm to School Summer program?
   - ☐ Word of mouth
   - ☐ Elementary school of my child
   - ☐ Website
   - ☐ Internet
   - ☐ Colleague at University

   Other: Please specify_____

5. Why did you register your child for the Farm-to-School Summer Program?
   - ☐ Convenience
   - ☐ Timing was right
   - ☐ Proximity to home
   - ☐ Food education
   - ☐ Agriculture education
   - ☐ To learn about international agriculture
   - ☐ To learn where food comes from

6. In which topic has the Farm-to-School Summer Program created an interest for your child? Tick all that apply or the strongest interest?
   - ☐ Farming
   - ☐ Nutrition
   - ☐ Cooking
   - ☐ Environment

Since completing the Farm-to-School Summer Program:

7. Does your child show more awareness of what they eat?

   ☐ Yes ☐ No ☐ Maybe

8. Does your child want to eat more vegetables?

   ☐ Yes ☐ No ☐ Maybe

9. Does your child show an interest in wanting to eat insects?

   ☐ Yes ☐ No ☐ Maybe

Thank you for taking the time to complete this survey.

Over →

McGill

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MACDONALD

Programme d'été Macdonald « Farm to School »

Sondage auprès des parents

_____ ☐ Mère ☐ Père ☐ Tuteur légal

NOM, Prénom

Veuillez indiquer le programme d'été dans lequel votre enfant a participé

Ag Leadership ☐ From Plate to Farm ☐ Global Food Security ☐

Instructions : Veuillez remplir autant de questions suivantes que vous le souhaitez, à l'aide de l'échelle indiquée ci-dessous.

1 = ***fortement*** d'accord ; **2** = d'accord ; **3** = neutre ; **4** = pas d'accord; **5** = ***fortement*** en désaccord

☺ → ☹

Amélioration de l'apprentissage :

1.	Mon enfant m'a expliqué comment faire le pain	1	2	3	4	5
2.	Mon enfant m'a expliqué comment faire le fromage	1	2	3	4	5
3.	Mon enfant sait pourquoi les gens mangent des insectes	1	2	3	4	5
4.	Mon enfant sait que le lait provient des vaches	1	2	3	4	5
5.	Mon enfant sait d'où vient la nourriture	1	2	3	4	5
6.	Mon enfant sait quels animaux vivent sur des fermes	1	2	3	4	5
7.	Mon enfant sait comment faire pousser des fruits et des légumes	1	2	3	4	5
8.	Mon enfant sait pourquoi il est important de manger localement	1	2	3	4	5

Expérience d'apprentissage :

9.	Mon enfant veut cultiver un jardin	1	2	3	4	5
10.	Mon enfant veut aider à préparer ses propres repas	1	2	3	4	5
11.	Mon enfant veut faire les courses pour la nourriture avec moi	1	2	3	4	5
12.	Mon enfant veut acheter la nourriture aux marchés des producteurs	1	2	3	4	5
13.	Mon enfant veut que j'achète la nourriture biologique	1	2	3	4	5
14.	Mon enfant veut travailler sur une ferme	1	2	3	4	5
15.	Mon enfant veut élever des poulets à la maison	1	2	3	4	5
16.	Mon enfant veut retourner au programme d'été « Farm to School » l'année prochaine	1	2	3	4	5

Verso →

Veuillez s'il vous plaît répondre à autant de questions suivantes que vous le souhaitez de manière la plus détaillée.

1. Si votre enfant a discuté les activités pédagogiques du programme d'été avec vous quels étaient les sujets ?

_____
_____
_____

2. Comment (le cas échéant) les activités pédagogiques ont contribué à sa compréhension de l'agriculture ?

_____
_____
_____

3. Est-il autre chose que vous aimeriez partager concernant le séjour de votre enfant au programme d'été ?

_____
_____
_____

Questions supplémentaires : Programme d'été Macdonald « Farm to School »

4. Comment est-ce que vous avez vous informé du programme d'été « Farm to School » ?
   - ☐ « Bouche-à-oreille »
   - ☐ L'école primaire de mon enfant
   - ☐ Site web
   - ☐ Internet
   - ☐ Collègue à l'Université

   Autre : SVP préciser_____

5. Pourquoi vous avez inscrit votre enfant au programme d'été « Farm to School » ?
   - ☐ Commodité
   - ☐ Timing était bon
   - ☐ Proximité à domicile
   - ☐ Éducation alimentaire
   - ☐ Éducation agricole
   - ☐ Pour en savoir plus sur l'agriculture internationale
   - ☐ Pour apprendre d'où provient la nourriture

6. Dans quel sujet est-ce que le programme d'été « Farm-to-School » a crée un intérêt pour votre enfant ?
   - ☐ L'exploitation agricole
   - ☐ La nutrition
   - ☐ La cuisine
   - ☐ L'environnement

Depuis avoir suivi le programme d'été « Farm-to-School » :

7. Est-ce que votre enfant est plus conscient de ce qu'il mange ?

   ☐ Oui ☐ Non ☐ Peut-être

8. Est-ce que votre enfant mange plus de légumes ?

   ☐ Oui ☐ Non ☐ Peut-être

9. Est-ce que votre enfant montre un intérêt pour manger des insectes ?

   ☐ Oui ☐ Non ☐ Peut-être

Merci d'avoir pris le temps de compléter ce sondage.

Verso →

APPENDIX E – Parental Consent Forms

McGill MACDONALD

Department of Animal Science
Faculty of Agricultural and Environmental Sciences

Département des science animales
Faculté des sciences de l'agriculture et de l'environnement

Parental Consent Form

Title of Study: Exploring the Effect of the Macdonald Farm-to-School Summer Program on Children's Agricultural Knowledge.

Investigators:

Student Researcher
Ms. Naomi Shalit, MSc Candidate
Department of Animal Science
McGill University
514-668-8983
naomi.shalit@mcgill.ca

Supervisor
Prof. Kevin Wade, Chair
Department of Animal Science
McGill University
514-398-7973
kevin.wade@mcgill.ca

Your child has been invited to participate in a research study to determine the effect of the Macdonald Farm-to-School Summer Program on children's knowledge of agriculture. The study will be the first evaluation of the educational impact of the Summer Program on participants.

What would my child have to do?

On the first and last day of the Summer Program at the Macdonald farm, your child will participate in a fun and interactive activity of approximately 30 minutes. The activity will be a survey of 10 questions on what your child knows about agriculture. The questions will be multiple-choice and projected on a screen and read out loud one question at a time. Each child will be given a Clicker, which is a small portable device, to select their answer.

Anything else?

Participation in the study is completely voluntary. Your child may withdraw from the activity at any time, for any reason. Risks to participants are minimal, and should be no greater than those experienced in everyday social situations. However, there is a very small chance that your child may experience some stress in answering the questions. To relieve any stress or anxiety your child might have at any point during the activity, myself and/or the instructors of the Summer Program will ensure that your child is aware that this is not a test and it is meant to be fun. Your child is free to withdraw from the study at any time and if you do not give consent for your child to participate he/she will still be able to take part in the activity; however, his/her responses will not be used in the study.

All information and data collected will be protected for confidentiality by assigning a random identification code to each participant. The code key numbers will be stored in a reference file separate from the data set used to analyze survey results. We will only report aggregate data in the graduate thesis and your child's identity will be kept confidential in all reporting; only the investigators will have access to the identifiable data. All data will be saved on password protected media and stored in a locked office.

The potential benefit of your child participating in this study is that he/she will be part of a fun activity and perhaps see how their learning has changed from the beginning of the Summer Program.

If you have any concerns or questions please contact Prof. Kevin Wade in the Dept. of Animal Science at McGill University, by email at kevin.wade@mcgill.ca.

If you have any ethical concerns or complaints about your child's participation in this study, and want to speak with someone not on the research team, please contact the McGill Ethics Manager at 514-398-6831 or lynda.mcneil@mcgill.ca.

Please feel free to contact Naomi Shalit at 514-668-8983 if you have any questions about the study. Thank you in advance for your help.

Sincerely,

Naomi Shalit

Ms. Naomi Shalit
Student Researcher

Prof. Kevin Wade
Academic Supervisor

Please sign below if you have read the above information and give consent that your child participates in this study. Agreeing that your child participates in this study does not waive any of your rights or release the researchers from their responsibilities. A copy of this consent form will be given to you and the researcher will keep a copy.

Parent/Legal Guardian's Name (please print): _____

Child's Name (please print): _____

Parent's or Legal Tutor's Signature: _____

McGill MACDONALD

Department of Animal Science
Faculty of Agricultural and Environmental Sciences

Département des science animales
Faculté des sciences de l'agriculture et de l'environnement

Formulaire de consentement parental

Titre de l'étude: L'exploration de l'effet du programme d'été Macdonald « Farm-to-School » sur la connaissance des enfants en agriculture.

Investigateurs:

Chercheur Étudiant
Mme Naomi Shalit, Candidate 2e cycle
Département des sciences animales
Université McGill
514-668-8983
naomi.shalit@mcgill.ca

Superviseur
Prof. Kevin Wade, Directeur
Département des sciences animales
Université McGill
514-398-7973
kevin.wade@mcgill.ca

Votre enfant est invité à participer à une étude de recherche afin de déterminer l'effet du programme d'été Macdonald « Farm-to-School » sur sa connaissance de l'agriculture. L'étude sera la première évaluation de l'impact éducatif du programme sur les participants.

Comment s'impliquerait mon enfant ? / Qu'est-ce que mon enfant devrait faire ?

Votre enfant participerait lors de la première et la dernière journée à une activité amusante et interactive d'environ 30 minutes. L'activité consistera en un sondage de 10 questions sur ce que votre enfant connaît de l'agriculture. Les questions seront à choix multiples, projetées sur un écran et lu à haute voix, une question à la fois. Chaque enfant recevra un « Clicker », qui est un petit appareil portatif, pour choisir sa réponse.

Quoi d'autre ?

La participation à l'étude est entièrement volontaire. Votre enfant peut se retirer de l'activité à tout moment, pour n'importe quelle raison. Les risques pour les participants sont minimes et ils ne doivent pas être supérieurs à celles vécues dans les situations sociales quotidiennes. Cependant, il y a une très petite chance que votre enfant éprouve un certain stress à répondre aux questions. Pour soulager ce stress ou anxiété potentiel, que votre enfant pourrait vivre à n'importe quel moment au cours de l'activité, moi-même ou les instructeurs du programme vont s'assurer que votre enfant est conscient que ce n'est pas un test et que l'activité est supposée être amusante. Votre enfant peut se retirer de l'étude à tout moment. De plus si vous ne donnez pas le consentement pour qu'il participe il/elle sera toujours en mesure de prendre part à l'activité ; Cependant, ses réponses ne serviront pas inclues dans l'étude.

Toutes les informations et les données recueillies seront protégées confidentiellement en attribuant un code d'identification aléatoire à chaque participant. Les codes d'identification seront sauvegardés dans un fichier de référence distinct de l'ensemble des données utilisées pour analyser les résultats de l'enquête. Nous rapporterons seulement des données agrégées dans la thèse, et l'identité de votre enfant sera gardée confidentielle dans tous les rapports. Seuls les chercheurs auront accès aux données dénominatives. Toutes les données seront sauvegardées sous mot de passe et hébergées dans un bureau verrouillé.

L'avantage potentiel de la participation de votre enfant à cette étude est principalement la participation à une activité amusante ainsi que la possibilité de voir son progrès d'apprentissage depuis le début du programme.

Si vous avez des préoccupations ou des questions veuillez contacter Professeur Kevin Wade par courriel (kevin.wade@mcgill.ca).

Si vous avez des préoccupations d'ordre éthique ou des plaintes concernant la participation de votre enfant dans cette étude, et vous avez envie de parler avec quelqu'un qui ne soit pas de l'équipe de recherche, veuillez communiquer avec le gestionnaire d'éthique de l'Université McGill au 514-398-6831 ou par courriel (lynda.mcneil@mcgill.ca).

N'hésitez pas à contacter Mme Naomi Shalit au 514-668-8983 si vous avez des questions au sujet de l'étude. Merci d'avance de votre aide.

Sincèrement,

Naomi Shalit

Mme Naomi Shalit
Chercheure étudiante

Prof. Kevin Wade
Superviseur

S'il vous plaît signez ci-dessous si vous avez lu les informations précédentes et autorisez que votre enfant participe à cette étude. Cette autorisation ne vous fait pas renoncer à vos droits ni aux responsabilités des chercheurs. Vous recevrez une copie de ce formulaire de consentement et le chercheur gardera une copie.

Nom du parent ou tuteur légal (en lettres moulées) : _____

Nom de l'enfant (en lettres moulées) : _____

Signature du parent ou tuteur légal : _____

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APPENDIX F – Participant Consent Forms

McGill

Department of Animal Science
Faculty of Agricultural and Environmental Sciences

Département des science animales
Faculté des sciences de l'agriculture et de l'environnement

Participant Consent Form

Title of Study: Exploring the Effect of the Macdonald Farm-to-School Summer Program on Children's Agricultural Knowledge.

Student Researcher
Ms. Naomi Shalit, MSc Candidate
Department of Animal Science
McGill University
514-668-8983
naomi.shalit@mcgill.ca

Supervisor
Prof. Kevin Wade, Chair
Department of Animal Science
McGill University
514-398-7973
kevin.wade@mcgill.ca

This is an invitation to participate in a research study to determine the effect of the Macdonald Farm-to-School Summer Program on children's knowledge of agriculture. The study will be the first evaluation of the educational impact of the Farm-to-School Summer Program on participants. The purpose of the parent`s participation in this research is to obtain their perception of their children`s learning experiences.

What is involved?

It will involve the completion of a demographic questionnaire and a paper-based survey. The survey questions will be on what you observed at home with respect to your child`s Farm-to-School Summer Program learning experiences. The survey will need to be completed on the last day of the Summer Program week.

Anything else?

Participation in the study is completely voluntary. You may decline to answer any of the questions if you so wish. Further, you may decide to withdraw from this study at any time by advising the student researcher. Your responses to the survey questions will be kept confidential. All information and data collected will be protected for confidentiality by assigning a random identification code to each participant. The code key numbers will be stored in a reference file separate from the data set used to analyze survey results. We will only report aggregate data in the graduate thesis.

Your name or any other personal identifying information will not appear in the data from this study. All information and data collected will be protected for confidentiality by assigning a random identification code to each participant. We will only report aggregate data in the graduate thesis and your identity will be kept confidential in all reporting; only the investigators will have access to the identifiable data. All data will be saved on password protected media and stored in a locked office.

All data collected during this study will be retained for 7 years in a secure location in Prof. Wade's office and then destroyed. There are no known or anticipated risks to you as a participant in this study.

There may be no benefits to you as a participant in this study, but the information you contribute to this study will assist us in learning if and how the Farm-to-School Summer Program has an effect on participating children's agricultural knowledge. Also, this information you provide may potentially assist the Farm-to-School Summer Program organizers in program planning.

If you have any concerns or questions please contact Prof. Kevin Wade in the Dept. of Animal Science at McGill University, by email at kevin.wade@mcgill.ca.

If you have any ethical concerns or complaints about your participation in this study, and want to speak with someone not on the research team, please contact the McGill Ethics Manager at 514-398-6831 or lynda.mcneil@mcgill.ca.

Please feel free to contact Ms. Naomi Shalit at 514-668-8983 if you have any questions about the study. Thank you in advance for your help.

Sincerely,

Naomi Shalit

Ms. Naomi Shalit
Student Researcher

Prof. Kevin Wade
Academic Supervisor

Pease sign below if you have read the above information and consent to participate in this study. Agreeing to participate in this study does not waive any of your rights or release the researchers from their responsibilities. A copy of this consent form will be given to you and the researcher will keep a copy.

Participant's Name (please print): _____

Participant's Signature: _____

McGill | Department of Animal Science | Département des science animales
Faculty of Agricultural and Environmental Sciences | Faculté des sciences de l'agriculture et de l'environnement

Formulaire de consentement du participant

Titre de l'étude: L'exploration de l'effet du programme d'été Macdonald « Farm-to-School » sur la connaissance des enfants en agriculture.

Investigateurs:

Chercheur Étudiant
Mme Naomi Shalit, Candidate 2e cycle
Département des sciences animales
Université McGill
514-668-8983
naomi.shalit@mcgill.ca

Superviseur
Prof. Kevin Wade, Directeur
Département des sciences animales
Université McGill
514-398-7973
kevin.wade@mcgill.ca

Ceci est une invitation à participer à une étude de recherche afin de déterminer l'effet du programme d'été Macdonald « Farm-to-School » sur la connaissance de l'agriculture acquise par votre enfant. L'étude sera la première évaluation de l'impact éducatif du programme sur les participants. Le but de la participation des parents est d'obtenir leur perception sur l'expérience d'apprentissage de leur enfant.

Qu'est que cela implique ?

Votre participation impliquera la réalisation d'un questionnaire démographique et un sondage sur papier. Les questions du sondage seront basées sur ce que vous avez observé à la maison concernant les expériences d'apprentissage de votre enfant. Le sondage devra être rempli le dernier jour du programme d'été.

Autre chose ?

La participation à l'étude est entièrement volontaire. Vous pouvez refuser de répondre à toutes les questions si vous le souhaitez. De plus, vous pouvez décider de vous retirer de cette étude en tout temps en avisant la chercheure étudiante. Vos réponses aux questions du sondage vont rester confidentielles. Toutes les informations et les données recueillies seront protégées confidentiellement en attribuant un code d'identification aléatoire à chaque participant. Les codes d'identification seront sauvegardés dans un fichier de référence distinct de l'ensemble des données utilisé pour analyser les résultats de l'enquête. Nous rapporterons seulement des données agrégées dans la thèse.

Votre nom et toute autre information d'identification personnelle n'apparaitront pas dans les données de cette étude. Toutes les informations et données recueillies seront protégées pour confidentialité en attribuant un code d'identification aléatoire à chaque participant. Nous rapporterons seulement des données agrégées dans la thèse de deuxième cycle et votre identité sera gardée confidentielle dans tous les rapports. Seuls les chercheurs auront accès aux données identifiables. Toutes les données seront sauvegardées sous mot de passe et hébergées dans un bureau verrouillé.

Toutes les données recueillies au cours de cette étude seront conservées pendant sept ans dans un endroit sécuritaire dans le bureau du Professeur Wade et ensuite détruites. Il n'y a aucun risque connu ou prévu quant à votre participation à cette étude.

Il se peut qu'il n'y ait aucun avantage directement pour vous à votre participation à cette étude, mais les informations que vous contribuerez à apporter par votre participation à cette étude nous aideront à apprendre si et comment le programme d'été a un effet sur les connaissances agricoles des enfants qui y participent. Aussi, les informations que vous fourniriez peuvent potentiellement aider les organisateurs avec la planification du programme future.

Si vous avez des préoccupations ou des questions veuillez contacter Professeur Kevin Wade par courriel (kevin.wade@mcgill.ca). Si vous avez des préoccupations d'ordre éthique ou des plaintes concernant la participation de votre enfant dans cette étude, et vous avez envie de parler avec quelqu'un, qui ne soit pas de l'équipe de recherche, veuillez communiquer avec le gestionnaire d'éthique de l'Université McGill au 514-398-6831 ou par courriel (lynda.mcneil@mcgill.ca).

N'hésitez pas à contacter Mme Naomi Shalit au 514-668-8983 si vous avez des questions au sujet de l'étude. Merci d'avance de votre aide.

Sincèrement,

Naomi Shalit

Mme Naomi Shalit
Chercheure étudiante

Prof. Kevin Wade
Superviseur

S'il vous plaît signez ci-dessous si vous avez lu les informations précédentes et autorisez que votre enfant participe à cette étude. Cette autorisation ne vous fait pas renoncer à vos droits ni aux responsabilités des chercheurs. Vous recevrez une copie de ce formulaire de consentement et le chercheur gardera une copie.

Nom du participant (en lettres moulées) : _____

Signature du participant : _____

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APPENDIX G – Oral Script Presented to Children

McGill

Department of Animal Science
Faculty of Agricultural and Environmental Sciences

Département des science animales
Faculté des sciences de l'agriculture et de l'environnement

Hi. My name is Naomi. I'm a student here at McGill University. Right now, I'm trying to learn if the Farm-to-School Summer Program helps you know more about agriculture. I would like to ask you to help me by being in a study, but before I do, I want to explain what will happen if you decide to help me.

I will do an activity with you, today and again on the last day of the Farm-to-School Summer Program.

This will be a fun activity where I will ask you 10 questions about agriculture and you choose what you think is the right answer. You get to use a Clicker, like a remote control for a TV to choose the answer. I want you to know that it is okay if you do not get the right answer. Only myself and my professors will see the answers, no one else. By being in the study, you will help me understand how the Farm-to-School Summer Program helps you learn about agriculture. Also, you will be able to see if you are learning, by seeing how many questions you answer correctly on the first day compared to the last day.

Your Mom/Dad says it's okay for you to help me with my study. But if you don't want to be in the study, you don't have to be. I won't be upset, and no one else will be upset, if you don't want to be in the study. If you want to be in the study now but change your mind later, that's okay. You can stop at any time. If there is anything you don't understand you should tell me so I can explain it to you.

You can ask me questions about the study. Do you have any questions for me now?

Would you like to be in my study and start this fun activity!?

Name of Child: _____
Parental Permission on File: ☐ Yes ☐ No

Child's Voluntary Response to Participation: ☐ Yes ☐ No

Signature of Researcher: _____ **Date:** _____

Macdonald Campus
21111 Lakeshore Road
Ste. Anne de Bellevue, Quebec, Canada H9X 3V9

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Faculty of Agricultural and Environmental Sciences | Faculté des sciences de l'agriculture et de l'environnement

Version 1.0 May 13, 2016

Bonjour. Mon nom est Naomi. Je suis étudiante ici à l'Université McGill et j'essaie de savoir si ce programme vous aide à apprendre des choses en agriculture. J'aimerai que tu m'aides avec une étude pour répondre à cette question mais, avant ça, je vais t'expliquer comment ça va se passer si tu es d'accord pour m'aider.

Je réaliserai une activité avec vous aujourd'hui et encore une autre fois lors de la dernière journée du programme.

L'activité va être le fun : je vous poserai 10 questions concernant l'agriculture et vous choisirez ce que pensez être la bonne réponse. Vous allez utiliser un « clicker » qui est une télécommande pour répondre. Il faut savoir que ce n'est pas grave si vous n'avez pas la bonne réponse. Les seules personnes qui vont voir les réponses sont moi et mes professeurs - personne d'autre. Votre participation va m'aider à comprendre comment le programme vous aide à apprendre sur l'agriculture. De plus, vous serez capables de voir ce que vous avez appris en comparant les réponses d'aujourd'hui avec celles de la dernière journée.

Tes parents sont d'accord que tu m'aides avec l'étude mais, si tu ne veux pas participer il n'y a pas d'obligation. Personne ne sera fâché. Même si tu veux participer maintenant et que tu changes d'idée plus tard, il n'y a pas de problème. Tu peux arrêter n'importe quand. S'il y a quelque chose que tu ne comprends pas tu peux toujours me demander et je t'expliquerai.

Vous pouvez me poser des questions sur l'étude. Avez-vous des questions pour moi pour l'instant ?

Aimerais-tu participer à mon étude ? Si oui commençons !

Name of Child: _____

Parental Permission on File: ☐ Yes ☐ No

Child's Voluntary Response to Participation: ☐ Yes ☐ No

Signature of Researcher: _____ **Date:** _____

Version 2.0 July 6, 2016

APPENDIX H – Research Approval Certificate

McGill

Research Ethics Board Office
James Administration Bldg.
845 Sherbrooke Street West. Rm 325
Montreal, QC H3A 0G4

Tel: (514) 398-6831
Fax: (514) 398-4644
Website: www.mcgill.ca/research/researchers/compliance/human/

Research Ethics Board III
Certificate of Ethical Acceptability of Research Involving Humans

REB File #: 36-0616

Project Title: Exploring the effect of the Macdonald farm-to-school summer program on children's agricultural knowledge

Principal Investigator: Naomi Shalit

Department: Animal Science

Status: Master's student

Supervisor: Prof. Kevin Wade

Approval Period: June 15, 2016 – June 14, 2107

The REB-III reviewed and approved this project by delegated review in accordance with the requirements of the McGill University Policy on the Ethical Conduct of Research Involving Human Participants and the Tri-Council Policy Statement: Ethical Conduct For Research Involving Humans.

Lynda McNeil
Associate Director, Research Ethics

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* All research involving human participants requires review on at least an annual basis. A Request for Renewal form should be submitted 2-3 weeks before the above expiry date. Research cannot be conducted without a current ethics approval.
* When a project has been completed or terminated, a Study Closure form must be submitted.
* Unanticipated issues that may increase the risk level to participants or that may have other ethical implications must be promptly reported to the REB. Serious adverse events experienced by a participant in conjunction with the research must be reported to the REB without delay.
* Modifications must be reviewed and approved by the REB before they can be implemented.
* The REB must be promptly notified of any new information that may affect the welfare or consent of participants.
* The REB must be notified of any suspension or cancellation imposed by a funding agency or regulatory body that is related to this project.
* The REB must be notified of any findings that may have ethical implications or may affect the decision of the REB.

APPENDIX I – Demographic and Background Data on Children and Parents Participating in the 2016 Macdonald Farm-to-School Study

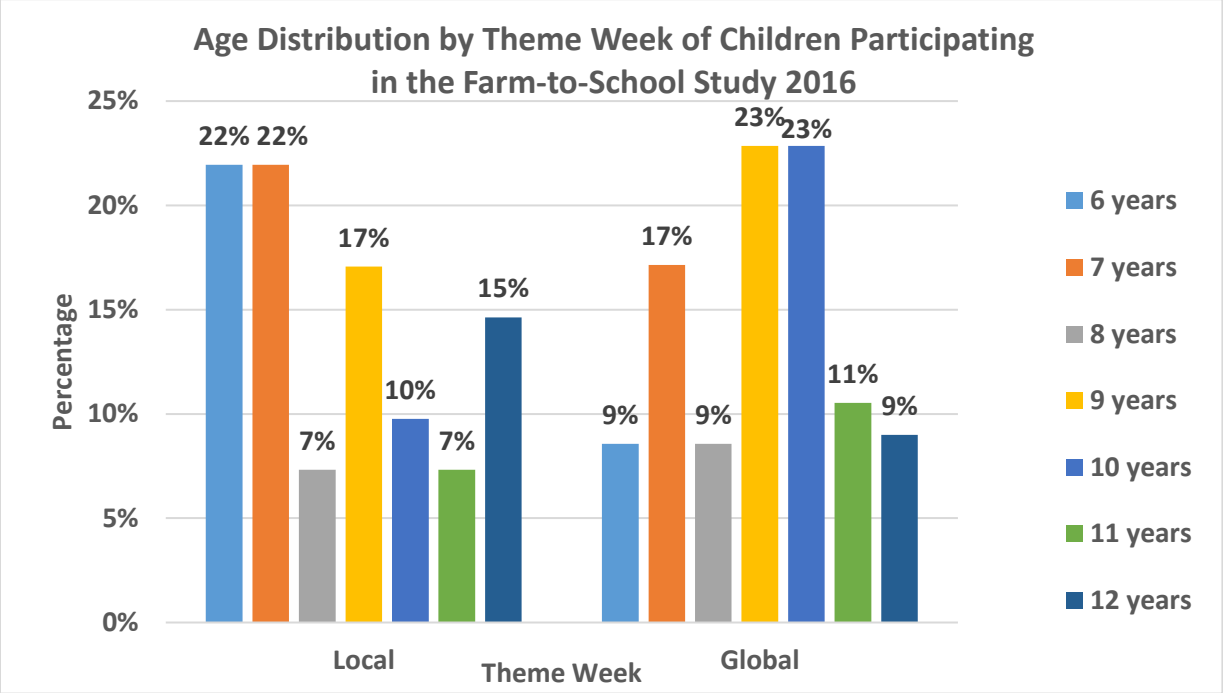

Figure 3. The percentage age distribution of 76 children participating in the study of the Macdonald Farm-to-School Summer Program in 2016. (6 years old n=12, 7 years old n= 15, 8 years old =6, 9 years old n=15, 10 years old n=12, 11 years n=7, 12 years old n=9)

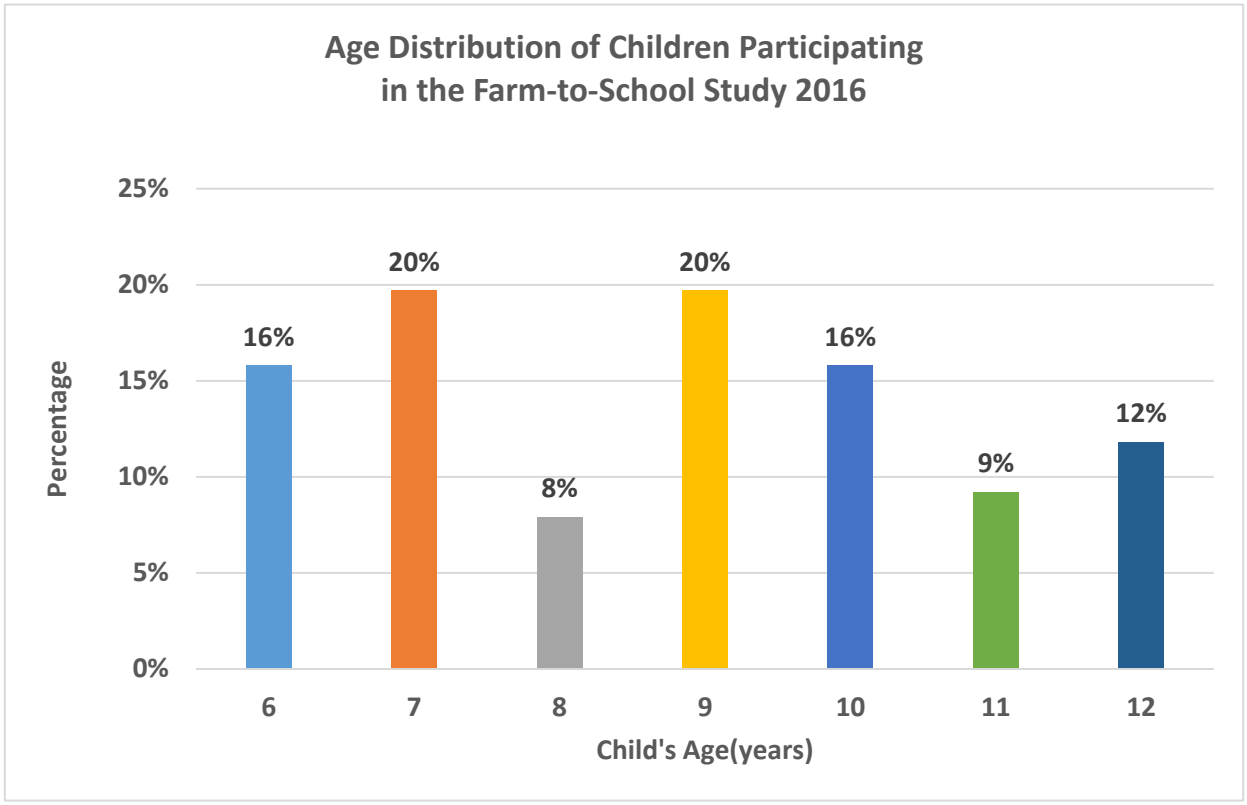

Figure 4. The percentage age distribution of 76 children participating in the study for each theme week of the Farm-to-School Summer Program in 2016. Local (n=41) and Global (n=35).

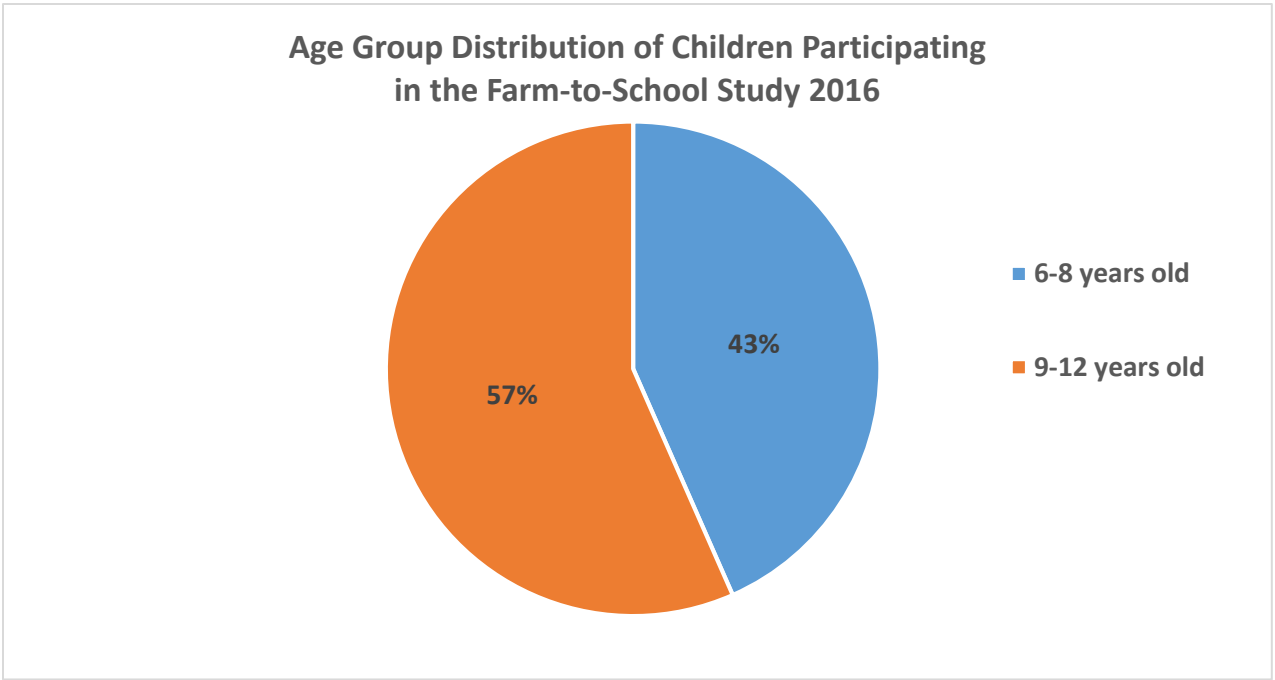

Figure 5. The percentage age group distribution of 76 children participating in the study of the Macdonald Farm-to School Summer Program in 2016. 6-8 years old n= 33, 9-12 years old n=43.

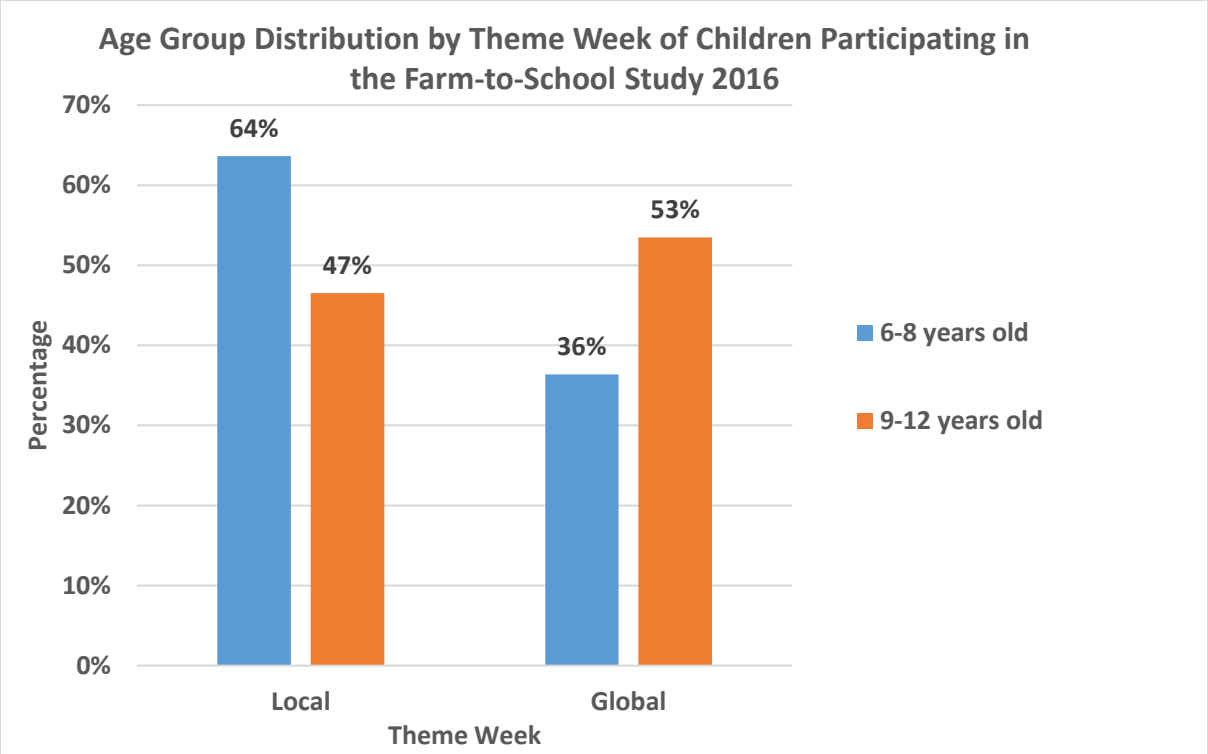

Figure 6. The percentage age group distribution of 76 children participating in the study for each theme week of the Farm-to-School Summer Program in 2016. Local weeks:6-8 years old (n=21) ;9-12 years old (n=20) Global weeks: 6-8 years old (n=12); 9-12 years old (n=23).

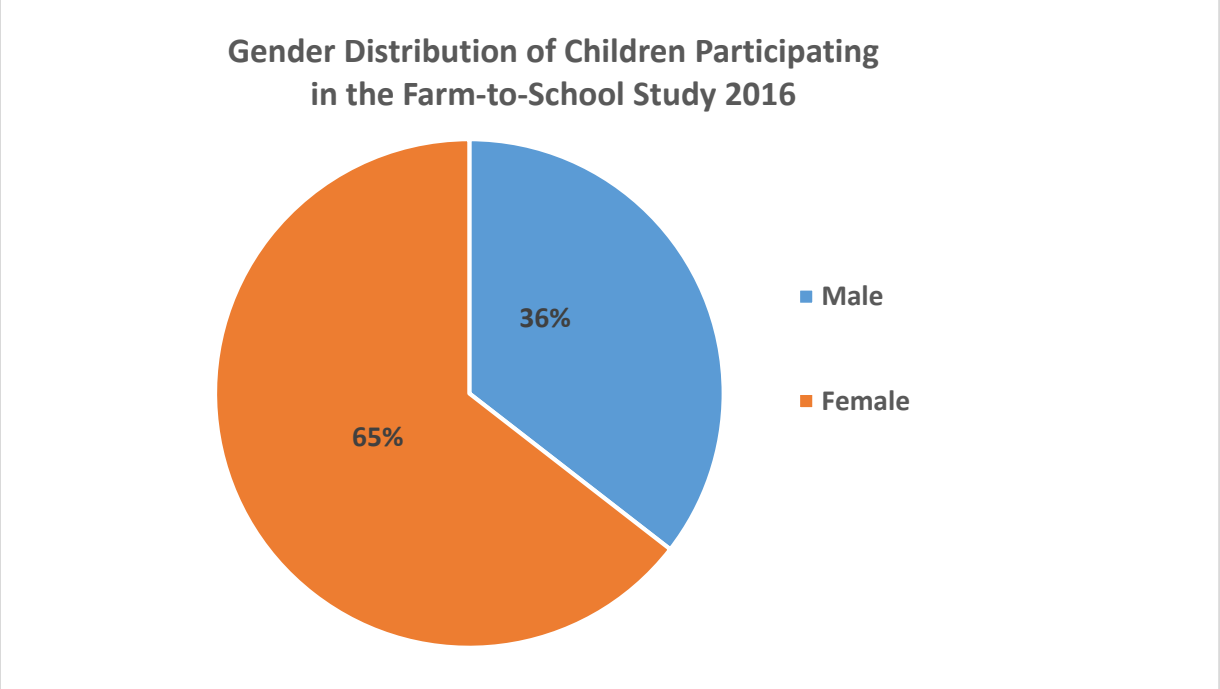

Figure 7. The percentage gender distribution of 76 children participating in the study of the Macdonald Farm-to School Summer Program in 2016. male (n=27), female (n=49).

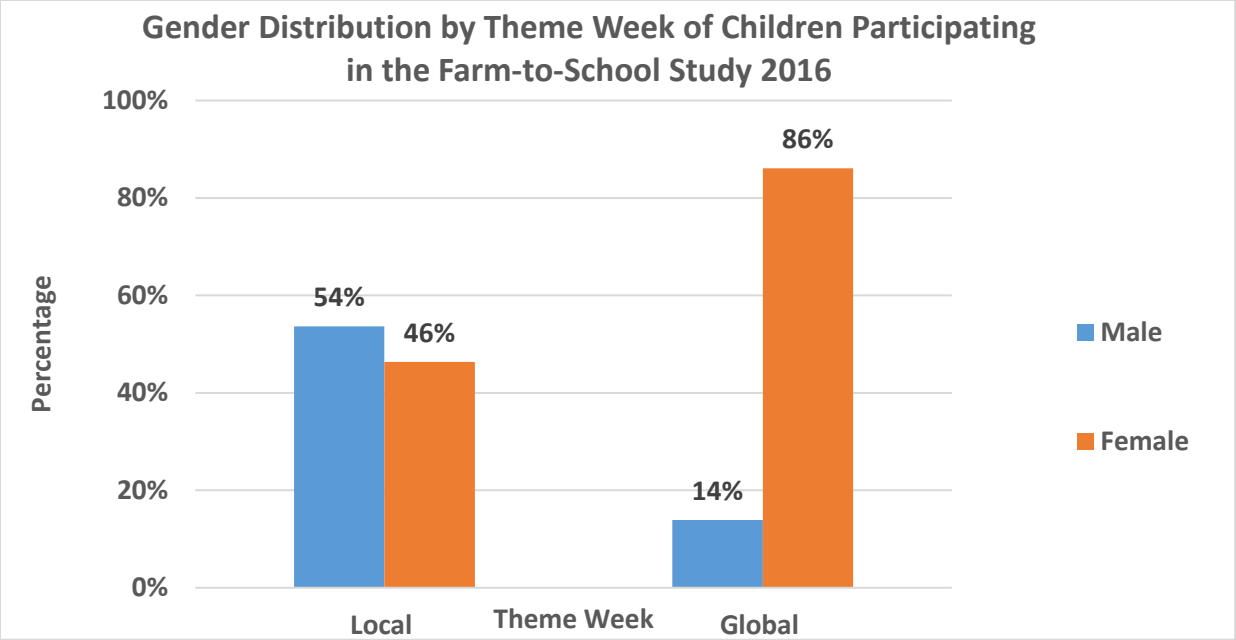

Figure 8. The percentage gender distribution of the 76 children participating in the study for each theme week of the Farm-to-School Summer Program in 2016. Local weeks:males (n=22) and females (n=19) Global weeks: males (n=5) ;females (n=30).

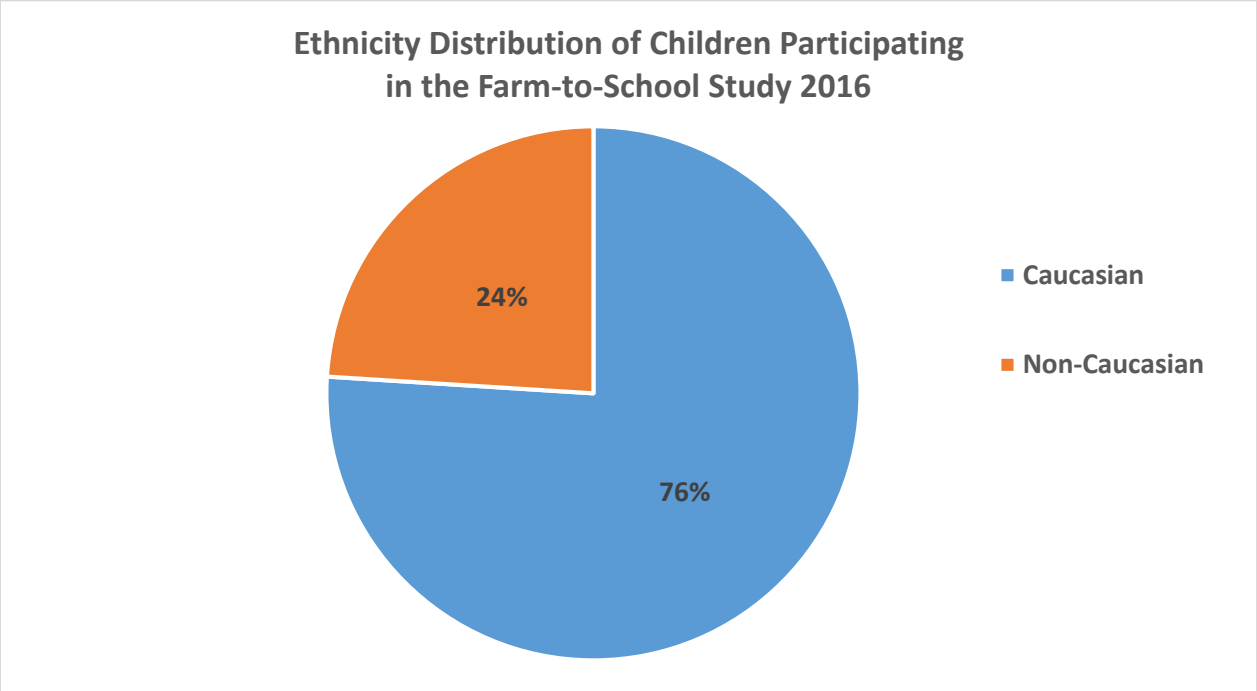

Figure 9. The percentage ethnicity distribution of 70 children participating in the study of the Farm-to School Summer Program in 2016. Caucasian (n=53) Non-Caucasian (n=17). Non-Caucasian refers to African-American, Hispanic, Asian, or Native-American children.

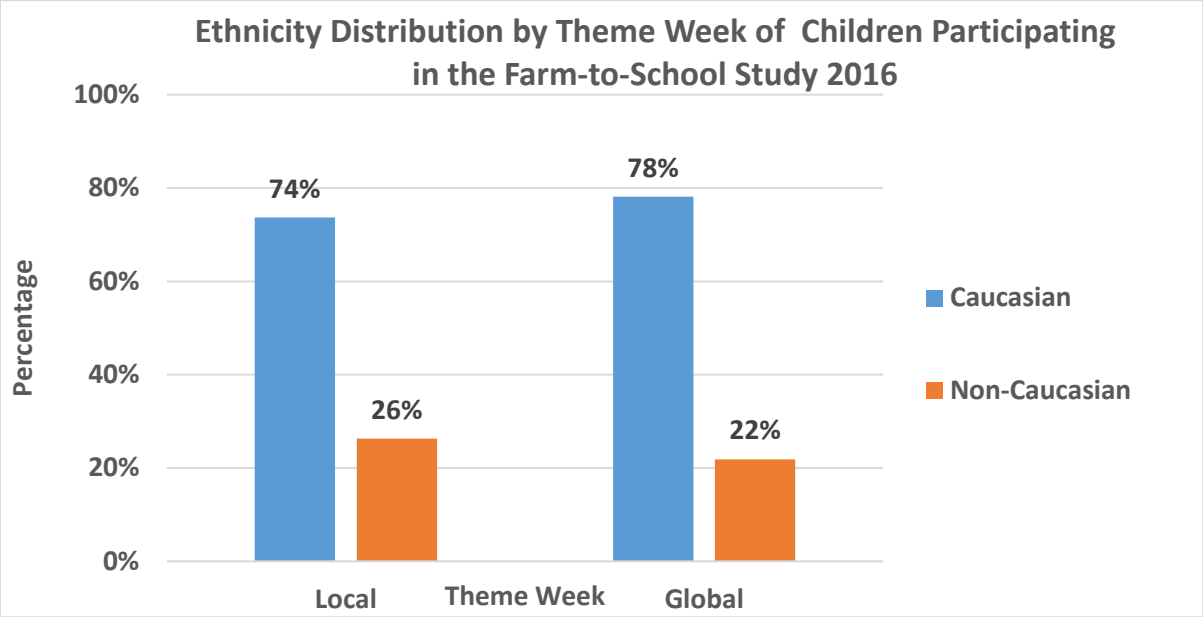

Figure 10. Percentage ethnicity distribution of 70 children participating in the study for each theme week of the Farm-to-School Summer Program in 2016. Local weeks:caucasian (n=28); non-caucasian(n=10) Global weeks: caucasian (n=25) ;non-caucasian(n=7).

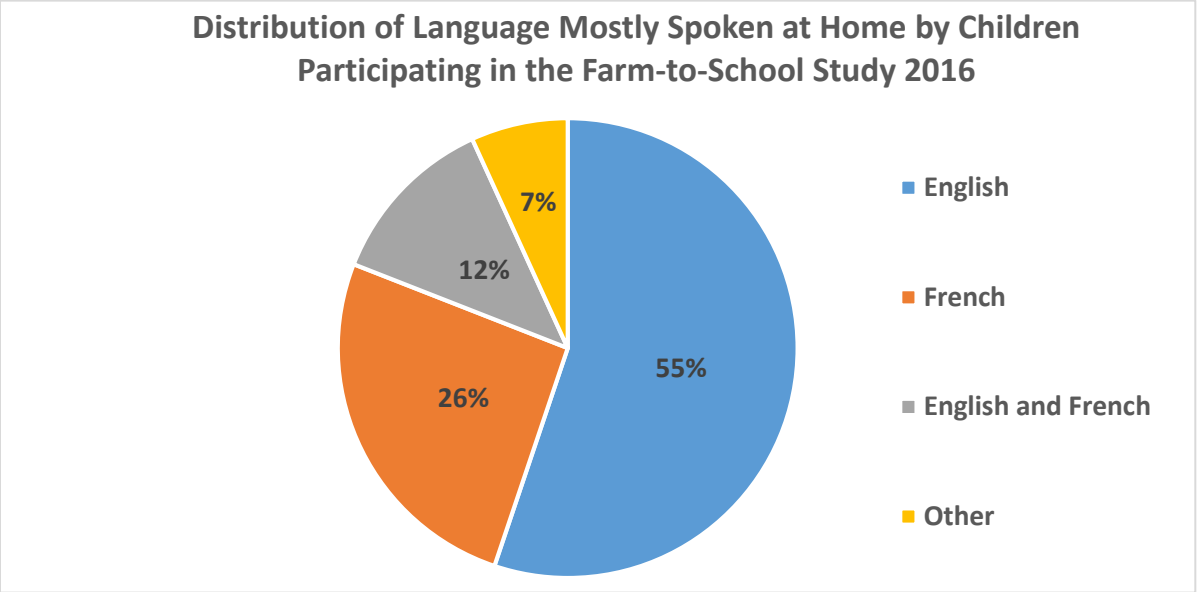

Figure 11. The percentage distribution of language mostly spoken at home of 70 children participating in the study of the Farm-to School Summer Program in 2016. English (n=39),French(n=17), English and French (n=9) and Other (n=5). Other refers to Spanish, Japanese and Romanian speaking children.

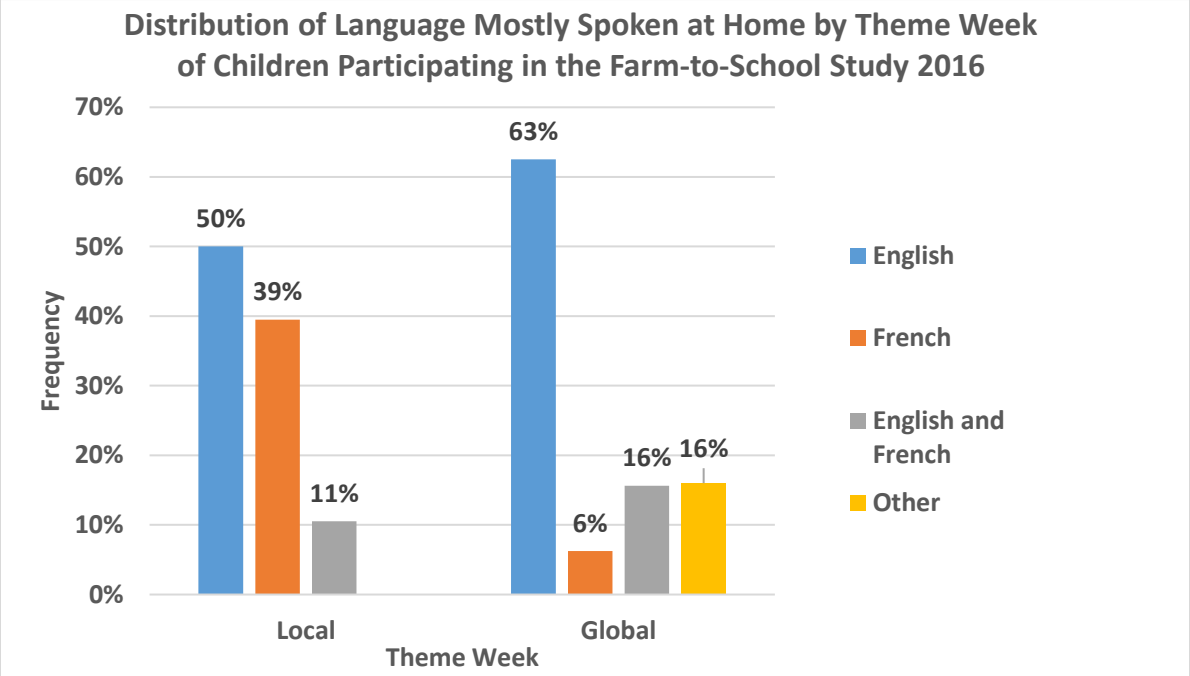

Figure 12. The percentage distribution of language mostly spoken at home of 70 children participating in the study for each theme week of the Farm-to School Summer Program in 2016. Other refers to Spanish, Japanese and Romanian speaking children. Local weeks: English n=19, French n=15, English and French n=4; Global weeks (English n=20, French n=2, English and French=5, Other=5).

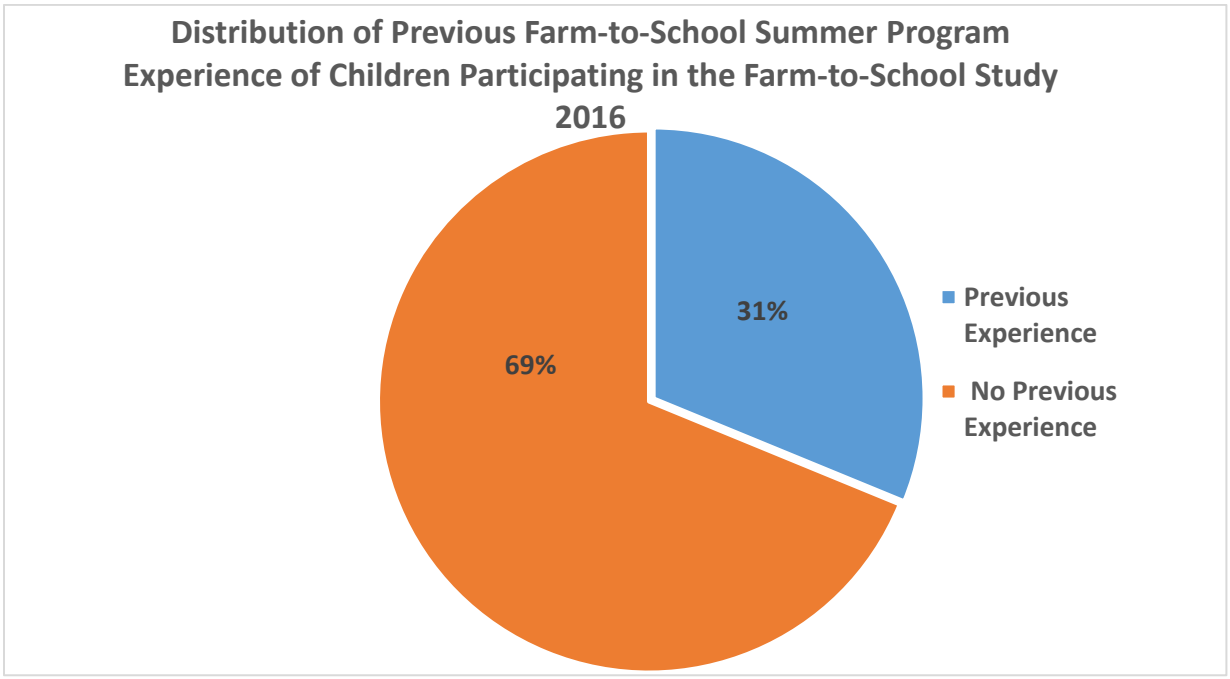

Figure 13. The percentage distribution of previous Farm-to-School experience of 74 children participating in the study of the Farm-to School Summer Program in 2016. previous experience n= 23, no previous n= 51

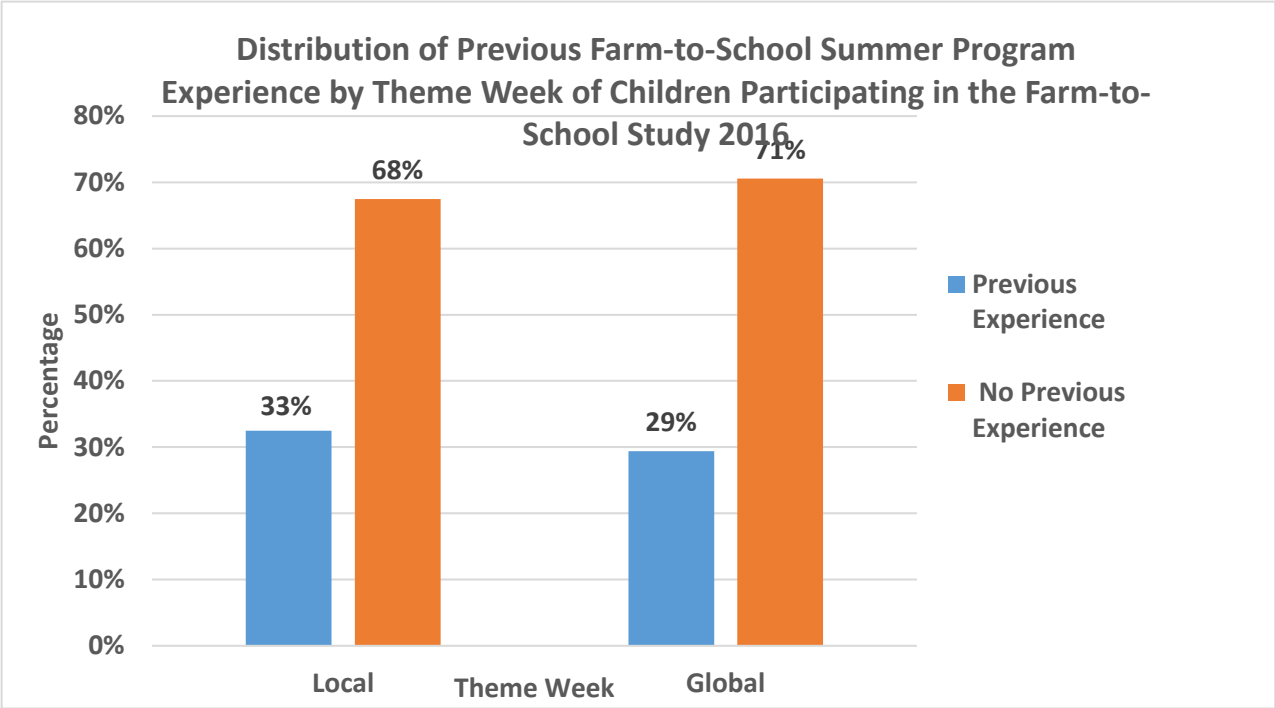

Figure 14. The percentage distribution of previous Farm-to-School experience of 74 children participating in the study for each theme week of the Farm-to School Summer Program in 2016. Local weeks: previous experience n=13 , no previous experience n=27; Global weeks previous experience n=10 , no previous experience n=24.

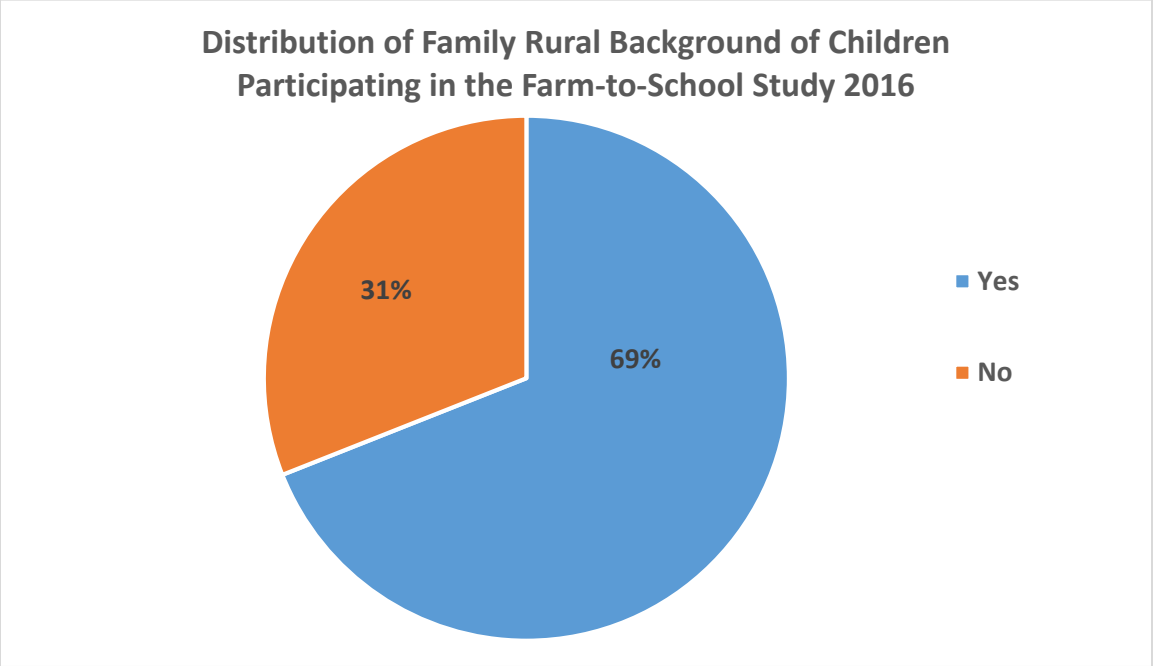

Figure 15. The percentage distribution of family rural background of 36 children participating in the study of the Farm-to School Summer Program in 2016. Yes(n=25), No (n=11)

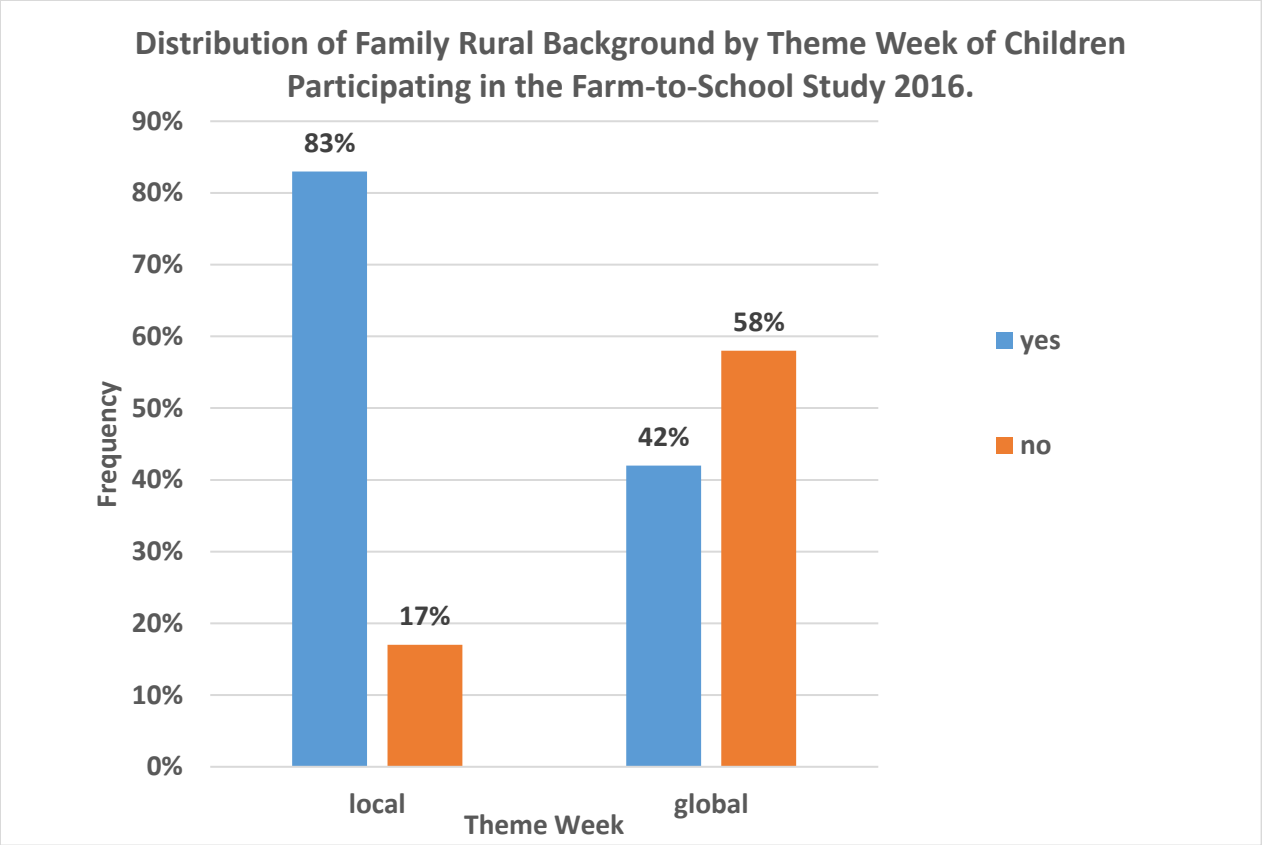

Figure 16. The percentage distribution of family rural background of 36 children participating in the study for each theme week of the Farm-to School Summer Program in 2016. Local Weeks: Yes (n=20), No (n=4); Global Weeks: Yes (n= 5) , No (n=7).

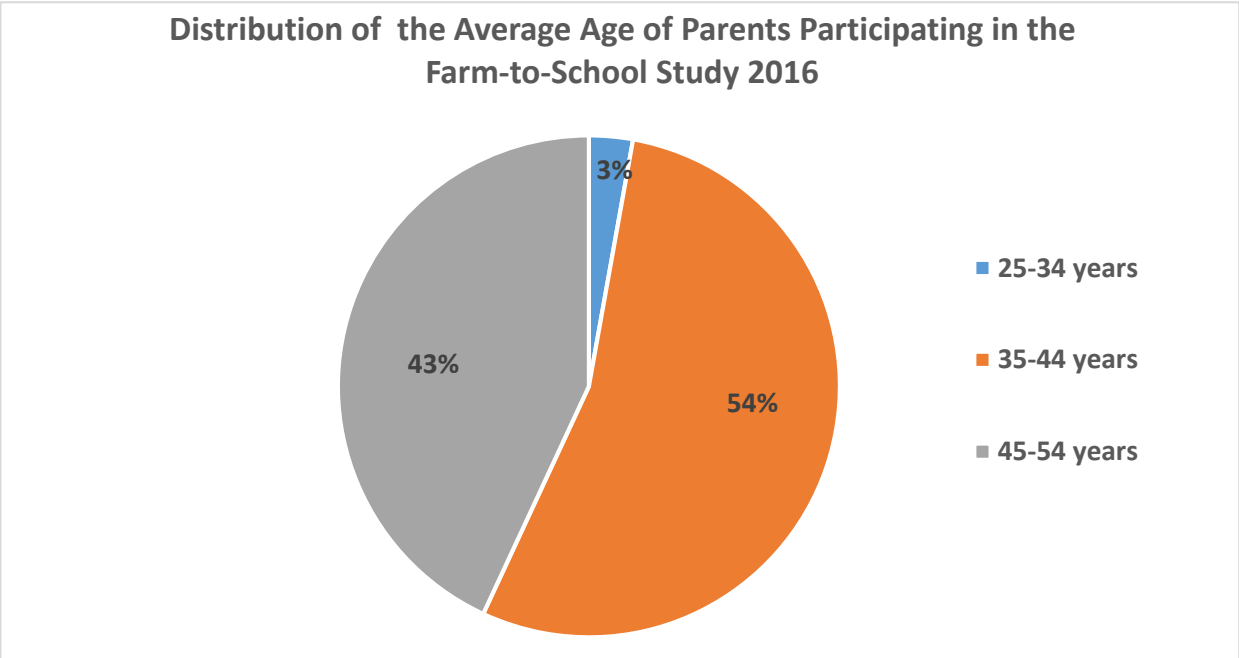

Figure 17. The percentage distribution of the average age of 68 of the parents participating in the study of the Farm-to School Summer Program in 2016. 25-34 (n=2), 35-44 (n= 37), 45-54 (n= 29).

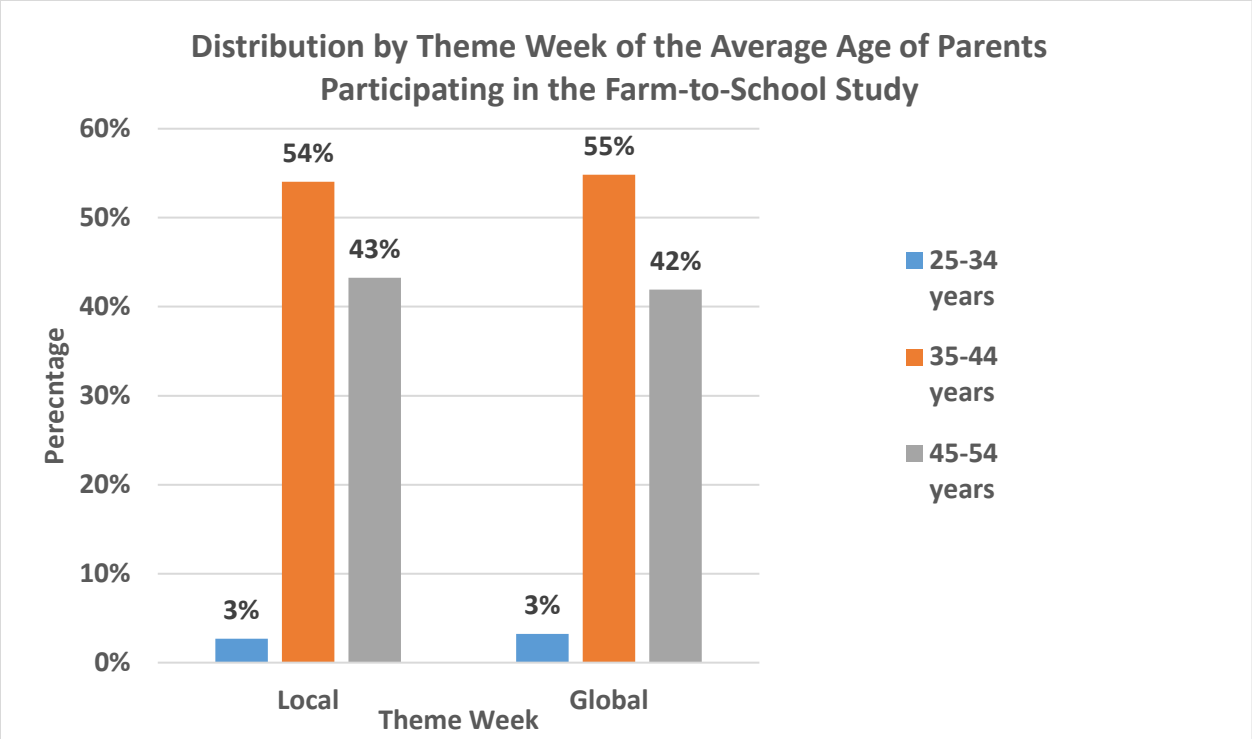

Figure 18. The percentage distribution of the average age of 68 of the parents participating in the study for each theme week of the Farm-to School Summer Program in 2016. Local Weeks: 25-34(n=1), 35-44 (n= 20), 45-54 (n= 16); 25-34 (n=1), Global Weeks:35-44 (n= 17), 45-54 (n= 13).

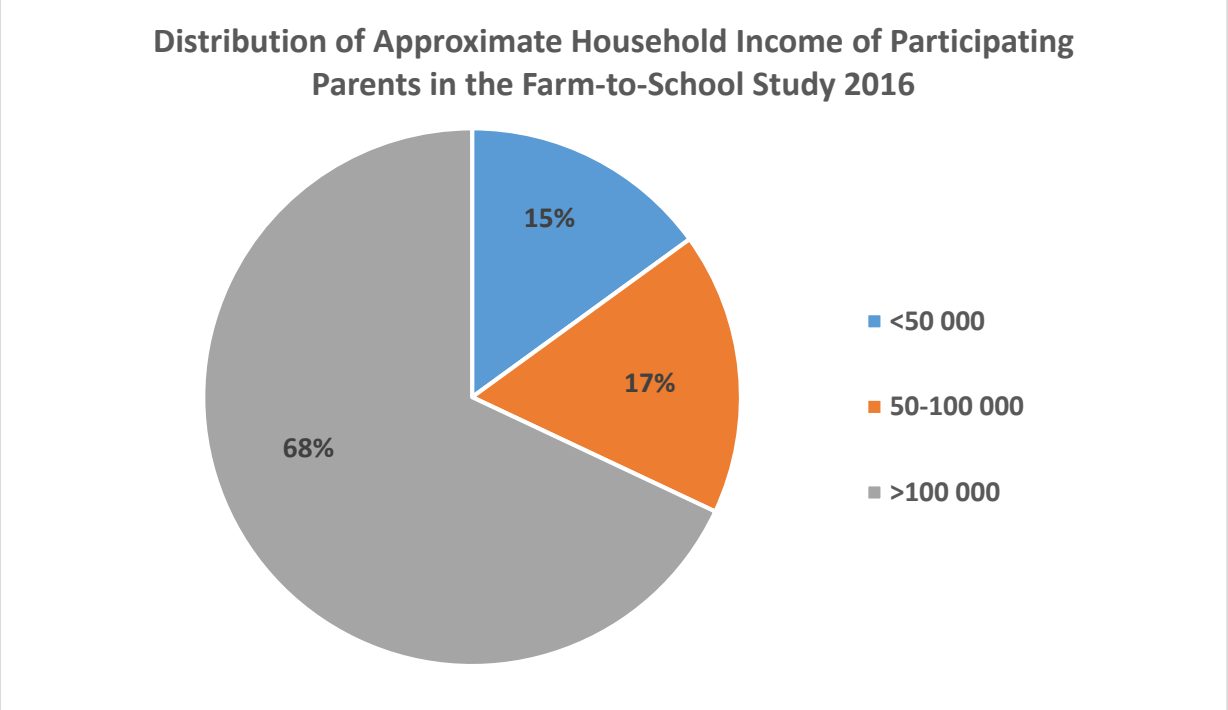

Figure 19. The percentage distribution of approximate household income ($) of 62 parents participating in the study of the Farm-to School Summer Program in 2016.
<50 000 (n=9),50-100 000 n(=11), >100 000 (n= 42).

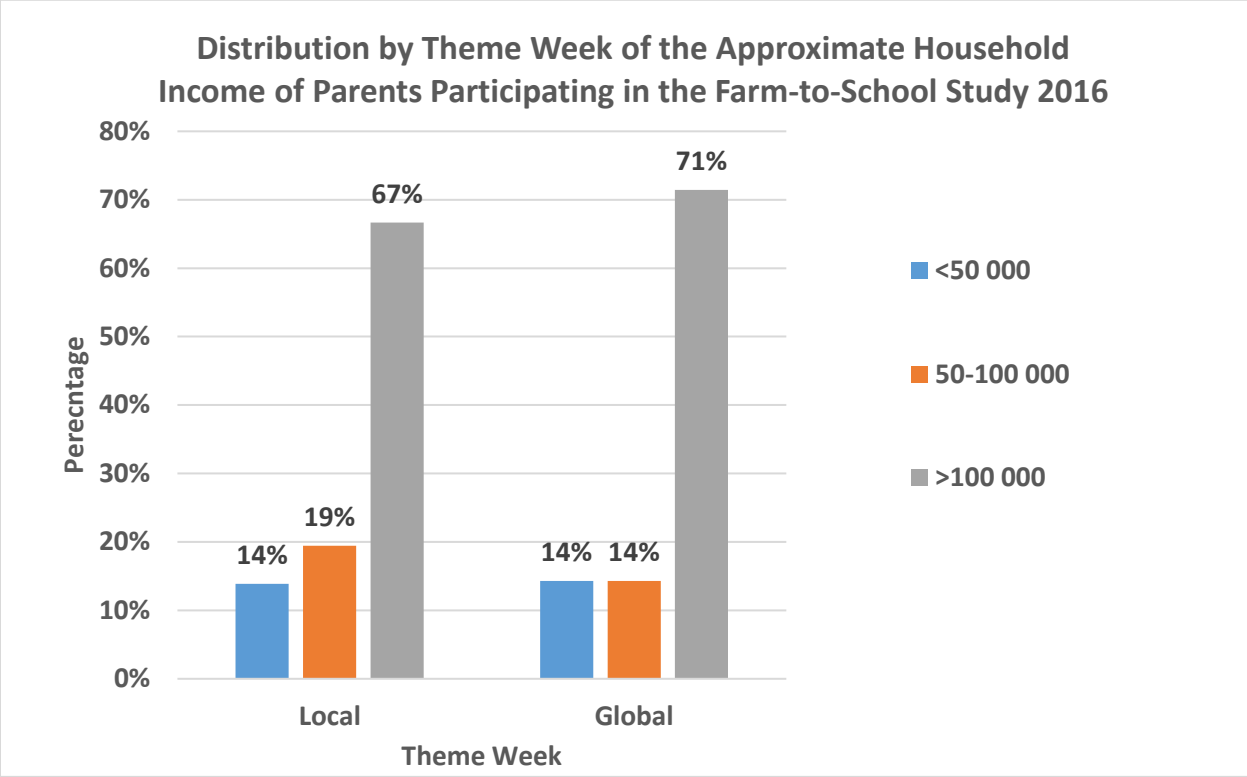

Figure 20. The percentage distribution of approximate household income of 62 parents participating in the study for each theme week of the Farm-to School Summer Program in 2016 Local Weeks: <50 000 (n=5),50-100 000 n(=7), >100 000 (n= 24);Global Weeks: <50 000 (n=4),50-100 000 n(=4), >100 000 (n= 18).

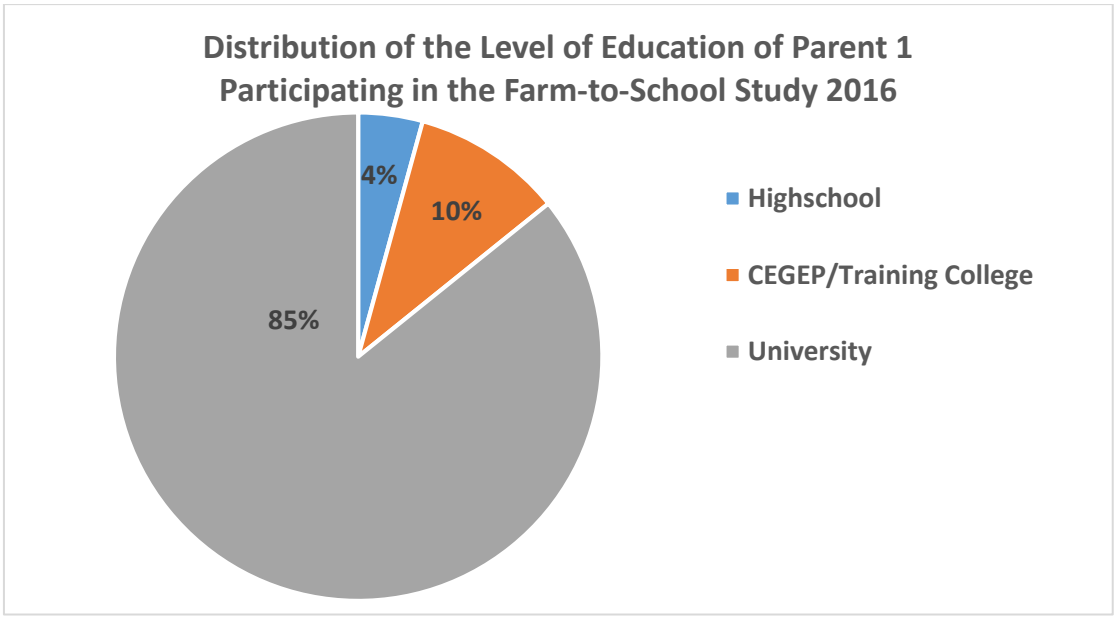

Figure 21. The percentage distribution of the level of education of parent 1 for the 68 parents participating in the study of the Farm-to School Summer Program in 2016. Highschool (n=3), CEGEP/Training College(n= 7), University (n=58).

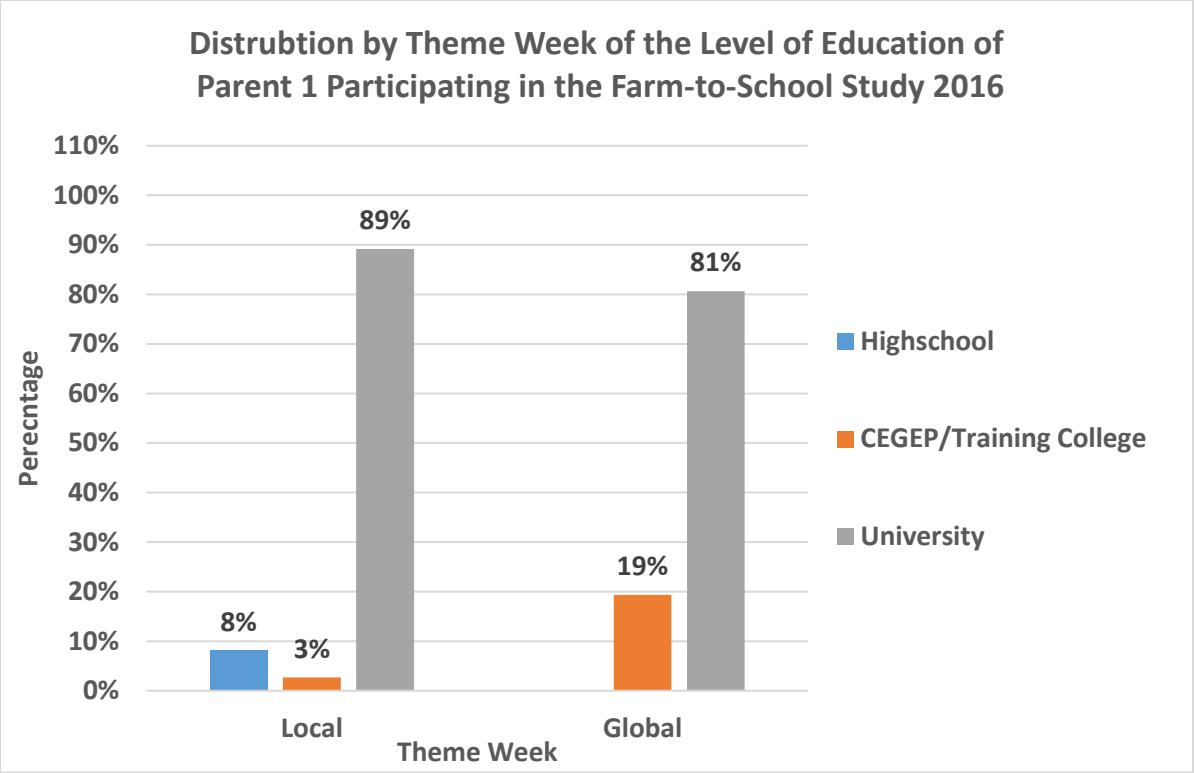

Figure 22. The percentage distribution of of the level of education of parent 1 for the 68 parents participating in the study for each theme week of the Farm-to School Summer Program in 2016 Local Weeks: . Highschool (n=3), CEGEP/Training College(n= 1), University (n=33); Global Weeks: . Highschool (n=0), CEGEP/Training College(n= 6), University (n=25).

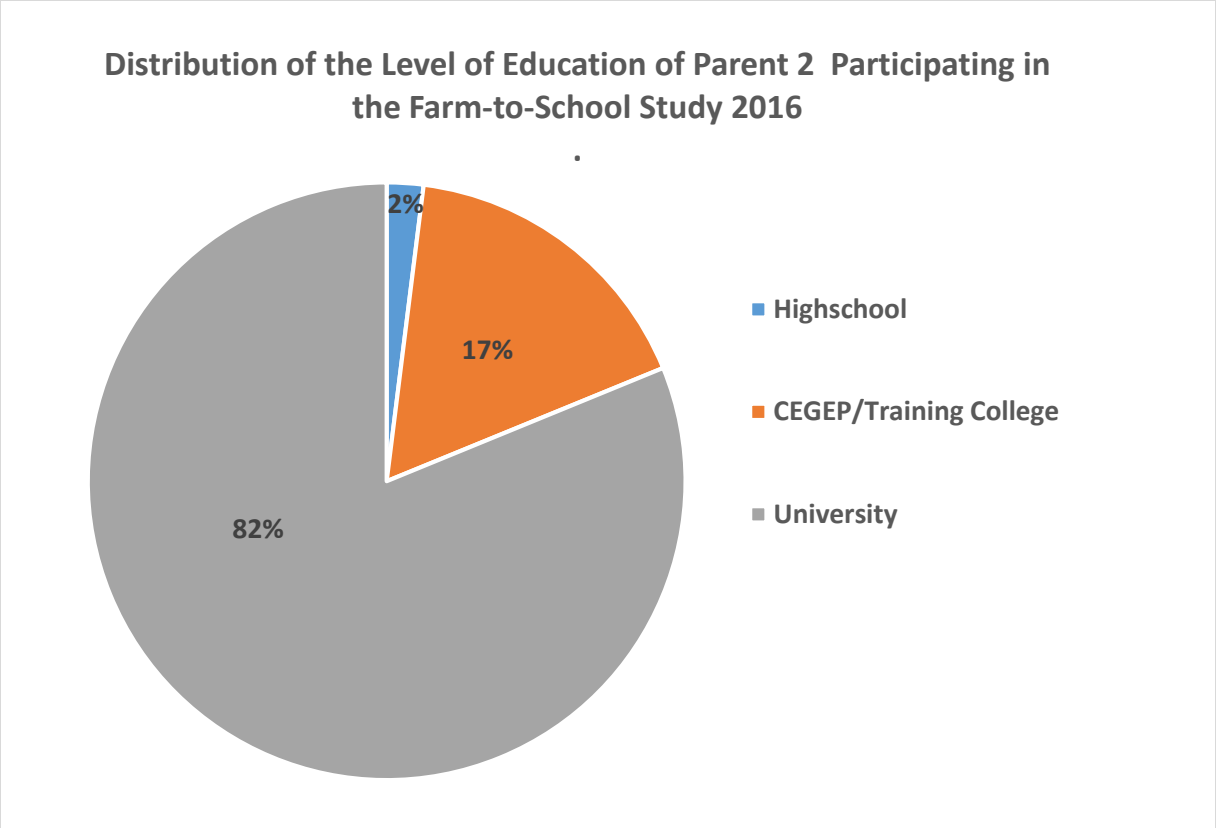

Figure 23. The percentage distribution of the level of education of parent 2 for the 65 parents participating in the study of the Farm-to School Summer Program in 2016. Highschool (n=1), CEGEP/Training College(n= 11), University (n=53).

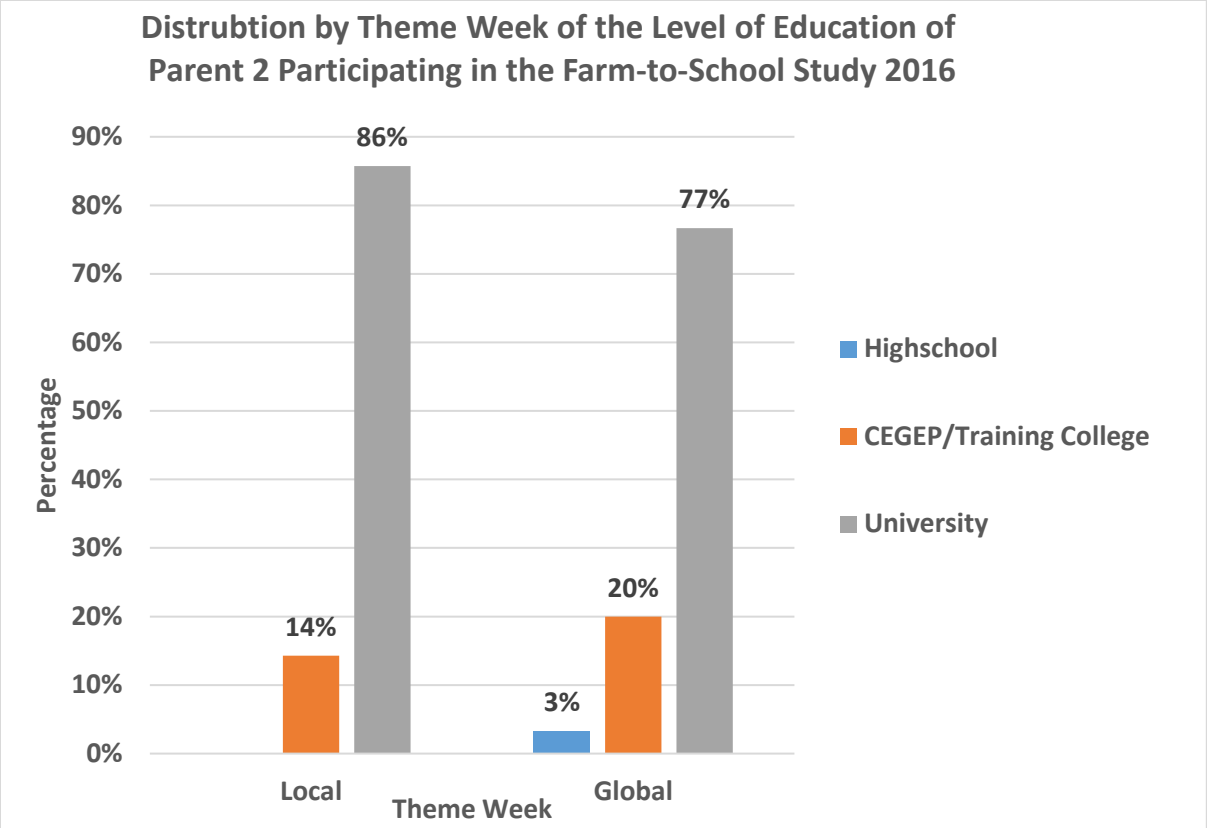

Figure 24. The percentage distribution of of the level of education of parent 2 for the 65 parents participating in the study for each theme week of the Farm-to School Summer Program in 2016 Local Weeks: . Highschool (n=0), CEGEP/Training College(n= 5), University (n=30); Global Weeks: . Highschool (n=1), CEGEP/Training College(n= 6), University (n=23).

APPENDIX J – GLM Analyses of the Sum of the Learning Improvement Statements (# 1-8) of the Parent Survey

Table 15. Sum of statements #1, 3, 5, 6 and 7.

Dependant Variable		NewLearnG_Score					
Independent Variable	**Ethnicity**	**Avg_Parental_Age**	**House_Income**				
DF	1	2	2				
Type III SS	40.65315315	37.79370042	25.37537538				
Mean Square	40.65315315	18.89685021	12.68768769				
F Value	13.8	6.42	4.31				
Pr > F	*0.0021	*0.0097	*0.0332				
Parameter	**Caucasian-Non-Caucasian**	**35-44 years of age-45-54 years of age**	**35-44 years of age - >55 years of age**	**45-54 years of age - >55 years of age**	**<50K - 50K-100K**	**<50K - >100K**	**<50K - >100K**
Estimate	-5.13513514	3.66666667	0.77477477	-2.89189189	-3.42342342	-4.90990991	-4.90990991
Standard Error	1.38220631	1.98169804	2.19454726	0.94282052	1.6771023	1.6771023	1.6771023
t value	-3.72	1.85	0.35	-3.07	-2.04	-2.93	-2.93
Pr > |t|	*0.0021	*0.0841	0.729	*0.0078	*0.0592	*0.0104	*0.0104

*P<0.1

Best fit model shown.

Table 23. Sum of statements #9-16

Dependant Variable	NewExp_Score												
Independent Variable	**Week**	**Age_Group**	**Matern_Lang**	**House_Income**	**Parent1_Educ**								
DF	3	1	3	2	2								
Type III SS	187.6066106	55.014601	182.386	67.376	69.2396								
Mean Square	62.5355369	55.014601	60.7952	33.688	34.6198								
F Value	6.29	5.53	6.11	3.39	3.48								
Pr > F	0.0114	0.0405	0.0124	0.0753	0.0712								
Parameter	**68 - 912**	**English-French**	**English-Bilingual**	**English-Other**	**French-Bilingual**	**French-Other**	**Bilingual-Other**	**Highschool-CEGEP/Training College**	**Highschool-University**	**CEGEP/Training College-University**	**<50K - 50K-100K**	**<50K - >100K**	**50K-100K - >100K**
Estimate	-3.5330821	-9.741768	-10.274	-14.382	-0.5318	-4.640072	-4.1082405	3.2405688	8.0942265	4.8536577	-6.85611	-8.445	-1.58936
Standard Error	1.50231197	2.8967697	2.56972	4.1013	2.13631	3.7760074	3.2650139	5.6174976	3.7897696	3.740344	3.20477	3.2488	2.073483
t value	-2.35	-3.36	-4	-3.51	-0.25	-1.23	-1.26	0.58	2.14	1.3	-2.14	-2.6	-0.77
Pr > |t|	0.0405	0.0072	0.0025	0.0057	0.8084	0.2473	0.2369	0.5768	0.0584	0.2235	0.0581	0.0265	0.4611

*P<0.1

Best fit model shown.

APPENDIX K – Summary of Responses to the Open-ended Questions (#1, 2 & 3) from the Parent Survey (English and French Versions)

1. What (if anything) did your child discuss with you regarding the educational activities of the Farm-to-School Summer Program?

Category	Sub-Category	Frequency
Animal	Cows	8
	Caring for animals	7
	Calves	5
	feeding animals	4
	chicken eggs	4
	petting zoo	3
	animal behaviours	2
Plants	Planting and Seeding	6
	Vegetables	5
	Edible weeds	2
Insects	Bee Pollination	1
Food production	Butter	5
	Yogurt	2
	Solar Oven	2
	Bread	1
	Cheese	1
	Cricket flour and pie	1
Other	Last year's activities	2
	Arboretum	1
	Fish	1
Total		63

Si votre enfant a discuté les activités pédagogiques du programme d'été avec vous quels ét
sujets ?

Category	Sub-Category	Frequency
Animaux	Prendre soins des animaux	4
	Nourrir les animaux	3
	Identification d'especes	2
	Vaches	1
Plantes	Salade de mauvaises herbes	4
	Planter des legumes	3
Insectes	Farine et tarte de criquet	3
	Insectes nuisibles	3
Production des aliments	Beurre	7
	Four solaire	4
	Yogurt	2
	Pain	1
	Lait	1
Aquatique	Aquaponique	1
Total		39

2. How (if any) has the Farm-to-School Summer Program's educational activities improved his/her understanding of agriculture?

Category	Sub-Category	Frequency
Farm	Animals	8
	Life on Farm	5
Food	Growing food(vegetables)	6
	Food Waste	3
	New foods	2
Plant	Plant identification	2
	Plant growth	2
Other	Stimulated interest	3
	Deeper understanding	4
	New concepts	4

2. Comment (le cas échéant) les activités pédagogiques ont contribué à sa compréhension de l'agriculture?

Category	Sub-Category	Frequency
Animaux	Mini-ferme	3
	Tâches de la ferme	2
Camp	Bonne expérience	11
	Activités	4
Autres	Apprendre l'anglais	1

3. Is there anything else you would like to share about your child's Farm-to-School Summer Program experience?

Category	Sub-Category	Frequency
Animal	Mini-farm	2
	Caring for animals	2
Food	New food	6
	Eating healthy	4
Plants	Identification	1
Camp	ProgramExperience(Good)	12
	Hands-on activities	4
	Improvements	1

3. Est-il autre chose que vous aimeriez partager concernant le séjour de votre enfant au programme d'été ?

Category	Sub-Category	Frequency
Animaux	Mini-ferme	3
	Tâches de la ferme	2
Camp	Bonne expérience	11
	Activités	4
Autres	Apprendre l'anglais	1

APPENDIX L – Farm-to-School Summer Program Question Results

PARENT SURVEY QUESTION #4		Responses	
		N	Percent
How did you learn about the Farm-to-School Summer Program?	Word of mouth	40	50.0%
	Website	14	17.5%
	Elementary school of my child	12	15.0%
	Colleague at University	10	12.5%
	Other	4	5.0%

PARENT SURVEY QUESTION #5		Responses	
		N	Percent
Why did you register your child for the Farm-to-School Summer Program?	Agriculture education	56	23.4%
	Food education	54	22.6%
	To learn where food comes from	40	16.7%
	Proximity to home	31	13.0%
	To learn about international agriculture	20	8.4%
	Convenience	19	7.9%
	Timing was right	19	7.9%

PARENT SURVEY QUESTION #6		Responses	
		N	Percent
In which topic has the Farm-to-School Summer Program created an interest for your child?	Farming	57	34.3%
	Environment	45	27.1%
	Nutrition	34	20.5%
	Cooking	30	18.1%

PARENT	YES		NO		MAYBE	
SURVEY QUESTION	N	Percent	N	Percent	N	Percent
7.Does your child show more awareness of what they eat?	34	49%	6	9%	29	42%
8.Does your child want to eat more vegetables	19	28%	32	47%	17	25%
9. Does your child show an interest in wanting to eat insects?	9	14%	40	62%	16	25%