

# Public Health Capstone Final Paper

Program Evaluation for the Food School: The making of an evaluation plan and assessment tools for an elementary school garden curriculum

May 11, 2016

## **Background**

Over the past few decades America has experienced an unprecedented increase in childhood obesity. A 2014 report from the Journal of the American Medical Association estimates that 1 in 3 U.S. children and youth between the ages of 2-19 are overweight or obese (Ogden et al. 2014). The health benefits of adequate fruit and vegetable consumption are well defined and universally understood among researchers and health practitioners, including preventing excess weight gain (Shay et al., 2012 and Bazzano et al., 2002). Despite the known benefits of fruits and vegetables, consumption is low among children and youth. Recent reports indicate that from 2007-2010, 60% of children did not eat enough fruit to meet daily recommendations and 93% percent of children did not eat enough vegetables to meet recommendations.

Fruit and vegetable consumption among children may be impacted by a variety of factors, including food preference. Eating behaviors and food preferences are developed early in childhood and often persist into adulthood. Because schools are tasked with comprehensive instruction of children and youth, and because schools have an active and nearly universal audience of children, schools may be a valuable venue to expose children to healthy foods in positive environments to impact food preference, and ultimately, consumption. Interactive gardening activities that are built into regular instruction have been shown to have positive results in increasing children's knowledge of and preference for fruits and vegetables (Morris et al. 2002; McAleese, 2007; Robinson-Obrien, 2009; Lineburger et al., 2000). These findings show promise for the efficacy of providing garden-based school instruction to improve food attitudes, preferences, and behaviors among school aged children.

## **Introduction to Project**

The present project worked with a Fort Collins community-based organization called Friends of Happy Heart Farm. Friends of Happy Heart Farm works to create a healthy community through increased

access to nutritional foods and through community food education. The Food School, a program of Friends of Happy Heart Farm, has recently developed an eight week school-based elementary garden curriculum which they are now piloting in a Fort Collins elementary school. Food School participants are predicted to increase their familiarity with vegetables, to have positive experiences growing them, and be more likely to consume them regularly after the program. In addition to writing the curriculum, the Food School has focused on building capacity within the school, especially through teacher training, to ensure the curriculum can be sustained independently by the school. As a pilot project, it is critical to assess the effectiveness of program activities on the desired outcomes. The purpose of my capstone project was to develop an evaluation plan and the necessary and supportive assessment tools for the Food School's pilot elementary school garden curriculum.

### **Investigation Questions**

To guide the development and execution this project, my capstone had three research questions.

- 1) Is the Food School meeting program objectives?
- 2) What methods are most *accurate and feasible* for the Food School in conducting evaluation of the school garden curriculum?
- 3) Is the Food School effectively preparing school staff for long-term garden curriculum instruction?

### **Methods**

I began this project with an informal group interview with Food School program staff and teachers from the pilot school to assess the evaluation feasibility of this program and to identify evaluation priorities. Determining if the program is meeting objectives and successfully engaging students were highlighted as priority areas for evaluation. Assessing any change in food and gardening knowledge, skills, and behaviors among students, as well as acceptability of the program were also priorities for

program and teaching staff. Through this process it was also determined that survey was the only *immediately* feasible method for program evaluation, and three stakeholder groups were important to survey: students, parents, and teachers.

### **Student Survey**

The Food School has not yet collected any evaluative information from students participating in the program. This project addressed this deficit by developing a participant 10 item, multiple choice survey that focuses on food and gardening attitudes, knowledge, and fruit and vegetable consumption.

Additionally, the student survey evaluated the translational effect of the program from school to student homes, particularly through measuring whether or not students garden at home, and if they would like to garden at home. Program acceptability was also measured through three survey items. The student survey was written at a 5<sup>th</sup> grade reading level, and then the survey was adapted to be age-appropriate for K-4<sup>th</sup> grade, respectively, and each adaptation was then analyzed by a content specialist at the pilot school for developmental appropriateness for each grade level.

The survey was administered to all participating students in late March before the start of the Food School programing. The survey was administered by teachers to their classes. Questions were read aloud to the class by their teacher and answer choices explained. Students completed the survey individually and surveys were collected and returned to Food School staff. The same survey will be administered again at the end of the program period.

The mean baseline response will be calculated and compared to the mean follow-up response to measure change in knowledge, attitudes, fruit and vegetable consumption, and actions, or desire, to garden at home. Analysis of changes from baseline to follow-up were not conducted as part of this project due to time restrictions prohibiting collection of follow-up data. Although the change from baseline to follow-up will be calculated to estimate program impact, only correlative relationships can

be determined without a randomly assigned comparison group.

### **Parent Survey**

Program impact will also be measured using a parent survey developed for the purposes of this program. During the 2014-2015 program year the Food School Education Director developed a parent survey that was modified in the current project to better reflect program objectives. Parents will be asked to report on key behaviors of their child which the Food School seeks to target, such as child's willingness to try new foods, fruit and vegetable consumption, home gardening behavior, and parent attitudes and values regarding a garden-based curriculum. Engaging the support of a school volunteer, the parent survey was translated into Spanish so that the parent survey can be available to all parents in both English and Spanish. The parent survey will be administered at follow-up. Analysis of this assessment was also not conducted during this project, given the planned time of administration.

### **Teacher Survey**

To date, the Food School has not conducted any form of evaluation that specifically targets teachers. Teachers are an important stakeholder group of the Food School because they are both the primary instructors of the Food School garden lessons and they also are the audience for training activities provided by the Food School. Furthermore, teachers offer a valuable perspective regarding program content, as well as any observed impact they have noticed among their students during the Food School lessons. Because of this, it is important to survey teachers about any changes to their knowledge or interest in using a garden for instruction, their level of preparedness to teach garden lessons, quality of their training experience, and relevance of content to the instruction of grade level competencies.

To assess the success of the Food School's teacher training I developed an exit survey. In addition to assessing the effectiveness in preparing teachers to instruct garden-based Food School

lessons, the teacher survey requests any adaptations to lessons made, in order to assess aspects of the implementation of this program in the pilot site.

A draft was shared with my preceptor for initial feedback and to ensure appropriate interpretation of program priorities, and changes were made according to recommendations from my preceptor. After a clean draft was approved by my preceptor, I requested a “pre-testing” with one grade team teaching staff. Teaching staff reviewed the survey for clarity of questions and ease of completion. Teacher feedback from the pre-tested survey was integrated to improve the clarity of the survey. Feedback was overwhelmingly positive, indicating that questions were relevant and clear and survey length was appropriate.

## **Evaluation Plan**

An evaluation plan was written to guide immediate and ongoing evaluation for the Food School's garden curriculum and to provide recommendations to strengthen evaluation procedures in the future. The evaluation plan includes detailed instructions for data collection, basic comparative analysis from baseline to follow-up, and best practices for sharing evaluation findings with program stakeholders.

Accompanying the evaluation plan are the tools necessary and helpful to carry out evaluation procedures, as described in the evaluation plan. These tools include all surveys uniquely developed for this program, as well as instructions and scripts for administering, or completing them. Additionally, a data collection time line was created and included in the evaluation plan to guide the Food School in continued program monitoring. Finally, an excel file was developed as a data entry template with itemized entry columns from each survey, and pre-programmed calculations for measuring the individual and mean difference from baseline to follow-up, and to score parent and teacher exit surveys for basic analysis, and comparison over time.

In addition to providing user instructions and necessary tools for following the procedures in the evaluation plan, I offer a series of recommendations for strengthening evaluation processes for the Food School in the future. The recommendations I elaborate on are described below.

- Include of additional data types, such as academic performance data
- Incorporate existing measures that have demonstrated high reliability and validity in similar populations in addition to the ones I developed explicitly for the purpose of this program
- Use a comparison school for more accurate estimate of program effect on changes observed
- Include longitudinal follow-ups

## **Results**

The results of this project include an evaluation plan detailed above. In addition to the evaluation plan, tools necessary to implement the evaluation plan were created. These evaluation tools include three student surveys that are scaled to be age and developmentally appropriate for various grades, an exit survey to be completed by parents, and an exit survey to be administered to teaching staff at the pilot school. In addition to the surveys, other tools were developed to aid the evaluation process, as outlined in the evaluation plan. These tools include detailed instructions and administrator scripts for each of the respective surveys, a time line for data collection, and a data entry template.

## **Challenges and Limitations**

This project had a series of strengths, including mixed quantitative-qualitative methods, a large sample size ( $n = 318$ ), good classroom response rates (survey was administered in 18 of 20 classes), high stakeholder engagement within the school, and a uniquely tailored evaluation plan to ensure feasibility.

In addition to the strengths of this project there were a number of functional and methodological limitations that should be considered when analyzing data collected and in planning for program

evaluation in the future. Functional challenges that this project faced included time restraints and poor alignment of project period with the program implementation. Given the alignment of the project to the school year and program period, I was not able to administer or analyze the results from the parent and teacher surveys, or look at changes from baseline to follow-up among students.

Additional methodological limitations of this project include the possibility of several types of bias. By virtue of using self-reported data, reporting bias may be present in any findings from the Food School using these data collection measures. Students may be distracted or in a hurry when completing surveys. Similarly, teachers may be responding to surveys during times when they are rushed or multi-tasking. Therefore, the accuracy of the findings from this project is unknown. Response bias is not expected to have occurred in the student surveys, as completion of surveys will be built into the school day. However, parent survey completion was voluntary, which leaves the level of response bias unknown. Parents who are very supportive, or who may be adamantly opposed to the program are more likely to respond. There also may be an unrepresentative sample of parent respondents. For example, single-parent families may be less likely to respond due to a variety of competing priorities.

In addition to a degree of inherent bias present in data collected, there are additional methodological limitations to this project that should be noted. The reliability and validity of the measures created was unknown at the time of administration. Also, using a simple pre-post evaluation design, it is only possible to observe correlative relationships among the program and any observed changes in student outcomes.

## **Impact to Public Health**

### Integration of public health competencies

Through this project, I was able to both apply new competencies, as well as integrate competencies already gained through my public health training. Specific competencies brought to this project and



gained through it are detailed below.

### Competencies Brought Project

**CR CC 8:** *Define a public health problem and specify an analytic approach.* The Food School is working to improve the health of Larimer County children through improved dietary attitudes and behaviors by engaging elementary students in a garden-based food and health curriculum. This project sought to examine if a garden-based food and health curriculum might be effective in improving students' nutritional attitudes and behaviors, and developed an analytical processes for answering this question.

**CR CC 13:** *Integrate professional ethics, principles of cultural competence and accountability in all professional conduct, to the development and execution of this project.* Through this project I employed ethical considerations in the evaluation process and methods, cultural considerations in designing and administering evaluation measures through means such as Spanish translation of questionnaires. I also brought professionalism through program accountability in the form of evaluation for the program, as well as instituting regular check-ins with my preceptor to ensure my work met the program's needs and expectations.

**CR CBHS 6:** *Describe steps and methods for the planning, implementing and evaluating of evidence-based public health programs and policies.* As this project focused on evaluation of an existing program, I offered specific expertise in describing steps and methods for evaluating a public health program. Though time and resources did not permit implementation of best practices in evaluating all aspects of the Food School, this project provided a template for evaluating this program, resources to do so, and recommendations to improve evaluation procedures to more accurately estimate impact.

**CN PAHL 5:** *Assess the effects of physical activity on reducing chronic disease risk factors.* Although the Food School is not specifically a physical activity intervention, the program does seek to modify

eating behaviors which are strongly related to chronic disease risk. By having a background in physical activities and healthy lifestyles, I was able to bring a chronic disease risk reduction perspective to this project, and provide suggestions for how this program could include physical health indicators in their future evaluations.

**CN PHN 4:** *Apply principles of community engagement to develop effective interventions to improve nutritional status of specific populations.* The Food School is a program that heavily relies on collaboration and wants to increase community engagement. Overseeing the evaluation of this program allowed me to apply CN PHN 4 by collaborating with various stakeholders within the school and considering how the program can sustainably improve the evaluation methods and process by fostering external relationships and leveraging community assets.

#### Competencies Gained through Project

In addition to bringing a number of public health competencies to this project, I was able to become competent in other necessary functions of public health practice by undertaking this project.

**CR CC 2:** *Determine uses and limitations of quantitative and qualitative methods in research and public health practice.* The present project used both quantitative and qualitative methods throughout surveys, which allowed for considerations for the limitations and strengths of qualitative and quantitative methods. By researching best practices, discussion with project preceptor and advisor, I was able to effectively integrate CR CC 2 into my project.

**CN PHAL 7:** *Apply program design, implementation and evaluation strategies to promote, and address barriers to, adoption of healthy lifestyle behaviors.* Though the Food School is an existing program that promotes healthy lifestyles, I had ample opportunity to analyze the program design and implementation through the process of creating an evaluation plan for the program.

**CN PAHL 8:** *Translate appropriate scientific information and data of evidence-based strategies to recommend healthy eating and active living promotion strategies.* This competency was gained through this project by reviewing relevant literature of garden-based curricula to identify common measures, useful evaluation approaches, and to predict findings. By engaging the body of scientific research into this project, I was able to translate evidence-based approaches into the evaluation strategies used.

**CN PAHL 6:** *Utilize assessment tools to determine physical, social, cultural and environmental supports and barriers to physical activity.* This project allowed not only for the use of necessary assessment tools to determine supports and barriers to health promoting behaviors, but also allowed me to develop program specific assessment tools to evaluate the pervasiveness of various supports and barriers to engaging in a healthy lifestyle.

**CN PHN 6:** *Monitor and evaluate the effectiveness of nutrition interventions, and modify interventional approaches as needed to improve nutritional outcomes.* My capstone involved creating resources needed to monitor and evaluate program effectiveness and to make recommendations according to the degree to which the program is meeting the desired nutritional outcomes.

### **Preparation for Future Public Health Practice**

My capstone project has helped prepare me for future public health practice and research. Through this project I have gained technical experience in determining best processes and measures to evaluate a program's outcomes. Though the necessity of evaluation is a topic that is often emphasized in public health studies, I have had limited exposure and technical skill development necessary to plan and conduct appropriate program evaluation. This project not only provided hands-on experience, but also exposed me to various methods, challenges, and processes important for accurate and meaningful evaluation. Public health is a field that is continually being improved and informed by monitoring interventions for impact and cost-effectiveness. With evaluation being central to public health

innovation, my capstone will be influential in my future practice by providing direct experience in program evaluation.

Additionally, this project has prepared me for public health practice through my learned dependency on relevant literature to guide program hypothesis, through the identification of useful measures and tools, and through determining meaningful analysis procedures to define impact. As the field of public health seeks to translate science into practice and rely on evidence, this dependency on literature to guide practice and policy will be not only useful, but obligatory in my work in public health.

As obesity, nutrition, and food access are pressing public health concerns, and as garden-based interventions increase in public interest, funding, and evidence of success, there will be substantial need for accurate and meaningful evaluation and resources for programs like the Food School. Through hands-on experience, my capstone has prepared me to contribute to this emerging area of public health.

And finally, this project has helped me understand some of the real world limitations that I may face in my work in public health. Time, money, and stakeholder buy-in are all critical aspects of successful interventions, yet take tremendous work to acquire. My capstone has helped prepare me for the reality of competing priorities that will be inevitable in any community-based work. Furthermore, this project has challenged me to continually balance text book empirical methodology with real world feasibility, which is not uncommon in public health practice. This project has therefore, not only enabled me to practice public health competencies, but has forced me to do so within the context of a community setting, which I believe to be the most valuable asset of this project in preparing me for public health practice.

## Sources Cited

- Lineberger S. E., Zajicek, J.M. (2000) .School Gardens: Can a Hands-on Teaching Tool Affect Students' Attitudes and Behaviors Regarding Fruit and Vegetables? *HortTechnology*. 10 (3): 593-596.
- Mcaleese, J.D., and Rankin, L.L. Garden-Based Nutrition education affects fruit and Vegetable Consumption in sixth-grade adolescents. *Journal of the American Dietetic Association*. 107 (4): 662-665.
- Meinen, A., Friese, B., Wright, W., & Carrel, A. (2012). Youth gardens increase healthy behaviors in young children. *Hunger and Environmental Nutrition*, 7(2-3): 192-204.
- Morris, J., Briggs, M., Zidenberg-Cherr, S. (2002). Development and evaluation of a garden-enhanced nutrition education curriculum for elementary school children. *Journal of Child Nutrition & Management*. Volume 2.
- Robinson-O'Brien, R., Story, M., & Heim, S. (2009). Impact of Garden-Based Youth Nutrition Intervention Programs: A Review. *Journal of the American Dietetic Association*. 109 (2): 273-280.
- Utter, J., Denny, S., Dyson, B. (2016). School gardens and adolescent nutrition and BMI: Results from a national, multilevel study. *Preventative Medicine*. 83: 1-4.
- Ogden CL, Carroll MD, Kit BK, Flegal KM. (2014). Prevalence of Childhood and Adult Obesity in the United States, 2011-2012. *Journal of American Medical Association*. 311(8):806-814.  
doi:10.1001/jama.2014.732
- U.S. Department of Agriculture, U.S. Department of Health and Human Services. (2010). *Dietary guidelines for Americans*. 7th ed. Washington, DC: U.S. Government Printing Office.
- Shay CM, Stamler J, Dyer AR, Brown IJ, Chan Q, Elliott P, et al. (2012). Nutrient and food intakes of middle-aged adults at low risk of cardiovascular disease: The International Study of Macro-/Micronutrients and Blood Pressure (INTERMAP). *European Journal of Nutrition*. 51 (8): 917–26.
- Bazzano LA, He J, Ogden LG, Loria CM, Vupputuri S, Myers L, Whelton PK. (2002). Fruit and vegetable intake and risk of cardiovascular disease in US adults: The first National Health and Nutrition Examination Survey Epidemiologic Follow-up Study. *American Journal of Clinical Nutrition*. 76 (1): 93–9.
- Centers for Disease Control. Fruit and Vegetable consumption. CDC Press Release. Retrieved April 8, 2016 from: <http://www.cdc.gov/media/releases/2014/p0805-fruits-vegetables.html>