UF IFAS Extension UNIVERSITY of FLORIDA

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Key Program Outcomes for K-12 School Gardens Identified Through Expert Consensus[1]

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National trends indicate that school gardens are positioned to become fixtures in primary and secondary education. Garden-based learning and curricula are aligned with school standards and reinforce educational activities in diverse subjects, including science, language arts, math, and social studies. Extension faculty and staff are often called upon by clientele to provide technical expertise on these efforts within schools. An estimated 1 in 5 Extension agents are involved in school gardens (Benson, 2014). Extension professionals and their volunteers support school garden initiatives in various ways, including providing horticulture, nutrition, and food safety expertise and instruction (Black, Haynes, Schrock, Duerfeldt, & Litchfield, 2016; Dzubak, Shaw, Strohbehn, & Naeve, 2016). However, there is a clear lack of an outcome-driven framework to support organizations, including Extension, to use to determine and evaluate the short-, medium-, and long-term outcomes for program activities. This paper outlines key outcomes identified through expert consensus that can be used by Extension professionals to develop a logic model for the school garden program.

The Delphi Process

To create a set of agreed-upon program indicators, the Delphi technique was used by the authors to gather the experiences of an expert panel of Florida school garden stakeholders (N=74), including participants from state agencies, non-profits, institutions of higher learning, and various school systems across the state. The Delphi technique is an iterative research process that elicits consensus among a group of stakeholders (Warner, 2015). Participants responded to three waves of a survey. In Round 1, participants listed all the outcomes that come from a successful school garden program, including short (changes in knowledge, attitudes, skills, and aspirations), medium (behavioral change/adoption of practices), and long-term (social, economic, and environmental) outcomes. The authors assessed the results from round one line-by-line and recoded them into well-defined categories. These were then organized into short-term, medium-term, and long-term outcomes. In Round 2, participants rated their agreement using a Likert-scale on how meaningful they felt each outcome is in the evaluation of a successful school garden program. Two-thirds of participants had to strongly agree or agree that the item was meaningful in order for consensus to be reached. Only the items that two-thirds agreed upon were included in Round 3. The same process was used for Round 3. Participants reached consensus on 18 short-, 13 medium-, and 11 long-term outcomes in Round 3.

Findings and Implementation

Participants' identification of short-term, medium-term, and long-term outcomes can be used by Extension faculty and staff in program planning and evaluation to develop logic models and measurable objectives (Israel, 2001).

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You must consider if your program is more focused on the professional development of teachers or youth education when developing your logic model. Figure 1 below illustrates short-term, medium-term, and long-term outcomes appropriate for an agent who offers a workshop on garden-based learning to teachers. Extension agents can select outcomes from the Delphi study results based on local needs that they can adapt into measurable objectives for reporting. Outlining these aspects of their program first, Extension agents can select curricula that align with the intended outcomes of their program and create evaluation tools that can measure the attainment of each outcome. In this example, the short-term outcome "increased knowledge and skills among teachers for cross-curricular integration at gardens" and the medium-term outcome "teachers develop and implement garden-based curriculum that leverages real world application" assess and report knowledge and behavior change. The same process would be evoked for a youth education program, taking the appropriate outcomes and organizing them within the logic model structure. Further, these Delphi study results can be used by school garden professionals to create a logic model for a program with several activities that are all intended to achieve the same objectives. See Figure 2 for an example of a basic logic model for a major program.

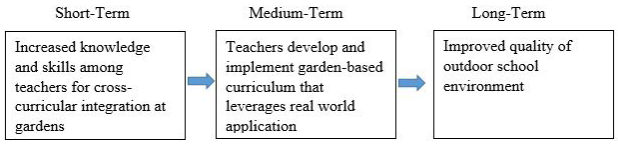

Figure 1. Example of logic model outcomes for an activity based on Delphi study results.

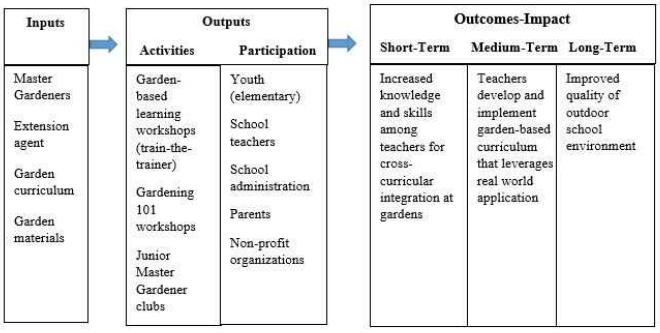

Figure 2. Example of a full logic model that connects program inputs, activities, participants, and outcomes to the Delphi study results.

Summary

As interest and implementation of school gardens grows across the nation, there is a need to demonstrate the outcomes of these efforts by the organizations that support school gardens. In Extension, faculty and staff contribute significant time and resources to work with teachers, school staff and administration, and volunteers to see these efforts succeed. A robust set of tools is needed to document the outcomes from such activities. The Delphi technique provided a methodology to bring a group of experts together to achieve consensus on the outcomes most meaningful to school garden programming. The results of this Delphi study indicate there is a wide breadth of outcomes that Extension faculty and staff can utilize to plan, implement, and evaluate programs. The study results are the first step in developing a comprehensive set of intended outcomes that can be used to create measurable objectives and evaluation tools.

References

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Table 1. Summary of the Delphi Study Round 3 results showing the percentage of participants who chose *strongly agree* or *agree* for the importance of the inclusion of each item in the evaluation of school garden programs.

Outcome	%
Short-Term Outcomes (18)	
Increased knowledge and awareness of where food comes from (food systems)	94.9
Students exhibit an increase in knowledge of healthy eating habits	86.4
Fosters love of gardening among students that increases their enthusiasm for learning	86.4
Students exhibit increased knowledge about nutrition and understand the importance of eating healthy to promote wellness	84.7
Increased life skills including leadership, accountability, teamwork/cooperation, social skills, responsibility, focus, and patience	84.7
Students exhibit an increased willingness to eat more nutritious foods (i.e., fresh fruits and vegetables)	83.1
Increased knowledge and skills among teachers for cross-curricular integration at the gardens	83.1
Students, parents, and teachers demonstrate increased knowledge, skills, interest, and confidence for growing their own food	81.4
Students demonstrate increased ability to identify various plants and produce (i.e., fruits and vegetables)	81.4
Students demonstrate an increase in knowledge and appreciation for the natural environment	81.4
Increasing knowledge, skills and confidence for planning and carrying out gardening best practices	81.4
Students demonstrate increased knowledge of the value of a garden	81.4
Increased knowledge and skills through cross curricular integration in topics associated with gardening (i.e., science, technology, engineering math, social sciences, history, language arts, etc.)	79.7
Students exhibit an increase in knowledge and appreciation for the value of local food systems (i.e., local foods, local agriculture, local farmers, etc.)	69.5
Medium-Term Outcomes (17)	
Students engage in nature through outdoor activities	86.4
Students are more engaged (participate, listen, and pay attention to lesson)	78.0
Students share knowledge about gardening	76.3
Adults positively engage with students in garden	76.3
Students, parents, and teachers make healthier food choices (i.e., expanding palate, eating more fruits and vegetables, trying new healthy foods/drinks)	76.3
Teachers incorporate nutrition education into garden instruction	74.6
Create a plan and structure to collaboratively manage the gardens	74.6
Students will protect their environment by using sustainable gardening practices (water conservation, composting, re-use of materials, etc.)	74.6
Teachers develop and implement garden-based curriculum that leverages real-world application of multiple disciplines (i.e., math, science, history, etc.) that connects to state standards	72.9
Students increase their physical activity	72.9
Increased parent and community engagement in the garden	72.4
Students take home produce for cooking/consumption at home	71.2
Administrators designate the garden as an outdoor classroom to be incorporated in the regular school	69.5
Long-Term Outcomes (12)	
Improved quality of outdoor school environment	83.1
Increased access to fresh fruits and vegetables	79.3
Sustainable school gardens (sustained for multiple years)	78.0
Students are connected to nature and their food	78.0
Healthier garden participants (physical and mental health)	76.3
Increase in the number of school, community, and home gardens	74.6
Students and teachers become environmental stewards	74.6
Increase in the number of partnerships for school gardens	74.6
A productive edible garden that provides produce for students to bring home	69.5
Future generations participate in sustainable agricultural practices	69.5