

Identifying Impact Indicators for School Garden Programs: Using Delphi Methods to Inform Program Development and Evaluation

John M. Diaz
University of Florida
1200 N. Park Rd.
Plant City, Florida 33563
john.diaz@ufl.edu

Laura A. Warner
University of Florida
305 Rolfs Hall P.O. Box 110540
Gainesville, Florida 32611
lsanagorski@ufl.edu

Susan T. Webb
University of Florida
1200 N. Park Rd.
Plant City, Florida
styler0308@ufl.edu

Identifying Impact Indicators for School Garden Programs: Using Delphi Methods to Inform Program Development and Evaluation

Introduction

School gardens programs and garden-based education appear to be positioned to become fixtures in educational institutions given recent trends and the national interest in gardens at school sites (Hayden-Smith, 2006; Williams & Dixon, 2013). The literature shows (Berenguer, 2007; Bowker & Tearle, 2007; Koch, Waliczek & Zajicek, 2006; Mayer-Smith, Bartosh & Peterat, 2009; Williams & Dixon, 2013) that while there are specific curriculum links being made with science, language arts, mathematics, social studies and writing; school gardens programs exhibit a multitude of purposes and benefits.

Although the aforementioned literature outlines an extensive set of impacts that may result from a school garden program, they are grounded in a specific case or intervention. Those that are planning for and evaluating school garden programs are left to make connections based on case study results or intervention trials, which leaves plenty of room for error (Slavin, 2008). Educators and other key stakeholders would benefit from a set of impact indicators that cover a variety of school garden functions organized in the logical sequence of impacts following program engagement. By providing such results, they can better understand when and how to collect data to understand programmatic impacts (Israel, 2016).

Conceptual Framework

Logic models provide an effective framework for educators to develop program plans for the development and evaluation of school garden programs based on certain outcomes they intend to create (Israel, 2016). In the planning phases, the intended outcomes are integrated into a logic model in the form of impact indicators that theoretically would result in the programmer's vision of success (Israel, 2016). These impact indicators would be used to develop program objectives that would guide the overall evaluation framework and associated evaluation tools. By organizing the school gardens program in this manner, programs can measure, learn and improve based on intended outcomes and make proactive changes based on the deficiencies along the outcome chain.

Methodology

The purpose of this study is to use research methodology to bring together a large group of school garden experts with breadth of experience and expertise to help to effectively guide the development and evaluation of school garden programs. The objective of the study is to identify the most meaningful outcomes (short-term, intermediate and long-term) to include the evaluation of such programs as identified by key school garden program experts.

We used the Delphi technique to identify key outcomes that should be incorporated in evaluation frameworks across a variety of school garden programs. The Delphi technique is a research-based approach used to solicit, collate, and direct responses to achieve consensus among a group of experts and has been cited as an effective means from structuring a group communication process so that the process is effective in allowing a group of individuals to address a complex situation (Delp, Thesen, Motiwalla & Seshadri, 1977; Linston & Turoff, 2002; Warner, 2015). The Delphi technique is frequently used in the educational context to

develop consensus for program priorities and objectives that can help guide planning and evaluation efforts of programs.

The population for this study consisted of key school garden experts that held various roles in school garden programs across the state of Florida. The group of experts was purposively selected in alignment with best practice for the Delphi technique (Stufflebeam, McCormick, Binkerhoff & Nelson, 2012). In selecting the expert panel members, an advisory committee was developed that included representatives from the state agencies, non-profits, institutions of higher education and various school systems for a total of 74 panel members. This study utilized three online surveys to move the panel towards consensus.

Results

The results of this study identified 14 immediate outcomes (knowledge, attitudes, skills and aspirations) 13 intermediate outcomes (behavior change or adoption of best practice) and 11 conditional outcomes that the expert panel felt were most important to include in developing and evaluating a successful school garden program. Table 1 outlines some of the outcomes 38 that the group came to consensus on.

Immediate Outcomes	Intermediate Outcomes	Long-Term Outcomes
Increased knowledge and awareness of where food comes from (foods systems)	Students engage in nature through outdoor activities	Improved quality of outdoor school environment
Students exhibit an increase in knowledge of healthy eating habits	Students are more engaged (participate, listen and pay attention to lesson)	Increased access to fresh fruits and vegetables
Fosters love of gardening among students that increases their enthusiasm for learning	Students share knowledge about gardening	Sustainable school gardens (sustained for multiple years)
Students exhibit increased knowledge about nutrition and understand the importance of eating healthy to promote wellness	Adults positively engage with students in garden	Students are connected to nature and their food
Increased life skills including leadership, accountability, teamwork/cooperation, social skills, responsibility, focus and patience.	Students, parents and teachers make healthier food choices (i.e. expanding palate, eating more fruits and vegetables, trying new healthy foods/drinks)	Healthier garden participants (physical and mental health)

Conclusion and Implications

This Delphi Study utilized the input of a panel of key experts across the state of Florida to develop a set of the perceived most important outcomes for the inclusion into associated planning efforts for school garden programs to ensure successful development and evaluation. Agricultural education professionals and other stakeholders connected to school gardens can use the results of this study to provide a solid foundation for an outcome-driven school garden program. We recommend those associated with school garden programs consult this list and select the most important and relevant outcomes for their local context and students' needs.

References

- Berenguer, J. (2007). The effect of empathy in pro-environmental attitudes and behaviors. *Environment and Behavior, 39*, 269-283. doi:10.1177/0013916506292937
- Bowker, R., & Tearle, P. (2007). Gardening as a learning environment: A study of children's perceptions and understanding of school gardens as part of an international project. *Learning Environments Research, 10*, 83-100. doi:10.1007/s10984-007-9025-0
- Delp, P., Thesen, A., Motiwalla, J., & Seshadri, N. (1977). *Delphi: System tools for project planning*. Columbus, OH: National Center for Research in Vocational Education, Ohio State University.
- Hayden-Smith, R. (2006). *Soldiers of the soil: A historical review of the United States school garden army*. Davis, CA: University of California, 4-H Center for Youth Development.
- Israel, G. D. (2001). Using logic models for program development (No. AEC 360). *Gainesville, FL: Agricultural Education and Communication Department. Florida Cooperative Extension Service. Institute of Food and Agricultural Sciences. University of Florida.*
- Koch, S., Waliczek, T. M., & Zajicek, J. M. (2006). The effect of a summer garden program on the nutritional knowledge, attitudes, and behaviors of children. *HortTechnology, 16*, 620-625.
- Linston, H. A., & Turoff, M. (Eds.). (2002). *The Delphi method: Techniques and applications* [Electronic version]. Newark, NJ: New Jersey Institute of Technology.
- Mayer-Smith, J., Bartosh, O., & Peterat, L. (2009). Cultivating and reflecting on intergenerational environmental education on the farm. *Canadian Journal of Environmental Education (CJEE), 14*, 107-121.
- Slavin, R. E. (2008). Perspectives on evidence-based research in education—What works? Issues in synthesizing educational program evaluations. *Educational researcher, 37*(1), 5-14.
- Stufflebeam, D. L., McCormick, C. H., Brinkerhoff, R. O., & Nelson, C. O. (2012). *Conducting educational needs assessments* (Vol. 10). Springer Science & Business Media.
- Warner, L. A. (2015). Using the Delphi Technique to Achieve Consensus: A Tool for Guiding Extension Programs.
- Williams, D. R., & Dixon, P. S. (2013). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. *Review of Educational Research, 83*(2), 211-235.