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Angela S. Gupta

University of Minnesota Extension, agupta@umn.edu

Samantha Grant

University of Minnesota Extension, samgrant@umn.edu

Andrea Lorek Strauss

University of Minnesota Extension, astrauss@umn.edu



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4-H and Forestry Afterschool Clubs: A Collaboration to Foster Stewardship Attitudes and Behaviors in Youth

Angela S. Gupta

Extension Educator-Forestry

agupta@umn.edu

Samantha Grant

Extension Educator-4-H

samgrant@umn.edu

Andrea Lorek Strauss

Extension Educator-Environmental Science Education

astrauss@umn.edu

University of Minnesota Extension
Rochester, Minnesota

Abstract: *The University of Minnesota Extension's 4-H and Forestry Afterschool program combined the 4-H structure and various forestry curricula to foster positive attitudes towards the environment and stewardship-related behaviors as these may serve as precursors to later choices that benefit the environment. Evaluation of third through fifth grade club members revealed statistically significant changes in attitudes and behavior. Recommendations for implementing this model are provided.*

Rationale

A recent decrease in the numbers of graduates in fields of science, engineering, and technology threatens to jeopardize the United States' position as an international leader in these fields. The National Center for Education Statistics (2005) reported that only 18% of high school seniors are proficient in science. Interest in science at the middle school level and earlier grades is an important factor in a child's aspiration to a career in science (Tai, Liu, Maltese, & Fan, 2006). Youth must be oriented and prepared if they are to excel as professionals in scientific fields. In response to these concerns, 4-H initiated a national program mandate to support youth development in science, engineering, and technology. Similarly, the Society of American Foresters identified youth engagement in forestry careers as a major concern, citing a decreasing number of graduates in forestry-related careers coupled with a high retirement rate among forestry professionals (Canadian Institute of Forestry/Institut forestier du Canada and Society of American Foresters, 2004).

The National Research Council (Bell, Lewenstein, Shouse, & Feder, 2009) summarized multiple evaluation studies showing that out-of-school-time programming can support improvements in participants' grades, attitudes towards science, specific science knowledge, and interest in science careers, even producing interest in science that is sustained long after participation. Chawla and Cushing (2007) also suggested that adults who choose actions that benefit the environment, like an environmentally related career, tend to have had direct experience in nature in their youth, and their interest in nature was likely fostered by an adult mentor.

In addition, various models of behavior (Ajzen & Fishbein, 1980), citizenship behavior (Hungerford & Volk, 2005), and responsible environmental behavior (Hines, Hungerford, & Tomera, 1987) indicate that a positive attitude towards a behavior is a necessary precursor to

the behavior. A variety of studies also support the idea that outdoor experiences tend to foster positive attitudes towards the environment and conservation activities (Larson, Green, & Castleberry, 2008; Cachelin, Paisley, & Blanchard, 2009; Ballantyne & Packer, 2002). Thus, educators decided to focus on fostering positive attitudes towards the environment and stewardship-related behaviors through outdoor experiences with the belief that these may serve as precursors to later choices that would benefit the environment, including career choices.

Program

Extension educators in Forestry and 4-H collaborated to develop the 4-H & Forestry Afterschool program to engage youth in outdoor forestry education as a means to fostering positive attitudes towards the environment and increased stewardship-related behaviors.

After a pilot session in the 2007-2008 school year, programs in 2008-2009 served 4th and 5th graders in three schools: 1) a school in a large urban district, 2) a rural charter school, and 3) a school in a small rural district. In that school year, 10-15 students in each school attended 12-18 afterschool club meetings. A special effort was made to target underserved and diverse students who do not often participate in 4-H or natural resource activities. The program attracted low-income, rural, and ethnically, culturally, and racially diverse students by having club meetings at school immediately after school, providing snacks to the students, and offering the program without charge. This eliminated most barriers to entry for these target students.

Students explored natural resources on or near the school grounds for 1 ½ - 2 hours after school. Program content centered on forestry concepts and activities such as tree identification, GPS introduction and usage, wildlife habitat exploration, paper making, and a tree climbing demonstration. Curriculum drew from a variety of existing environmental education resources, including Project Learning Tree and National 4-H's Forestry curriculum. Natural resource professionals with experience teaching youth were provided stipends for fulfilling the role of club leaders to ensure forestry content expertise as well as leadership stability in the after school time period. High school 4-H or Woodland Advisor volunteers helped club leaders during most meetings.

Evaluation

To determine whether youth developed positive attitudes about the environment and stewardship behaviors, an evaluation was designed to measure changes in attitudes and behavior over the course of the program. The evaluation included indicators of attitudes and behavioral intentions, adapted from other peer-reviewed tools (Mayer & Franz, 2004; Vadala, 2004). Assessments of changes in attitudes and behaviors before and after the program were administered using a five-point Likert scale- from strongly disagree (1) to strongly agree (5). We used a retrospective pre-then-post test because it was appropriate for our goals and the setting (Hill & Betz, 2005; Rochkwell & Kohn, 1989).

Twenty-eight youth completed the survey, a 70% response rate. Parents provided consent for their child's participation, and youth also completed assent forms. Surveys were read aloud to program participants to minimize inaccurate responses due to literacy skills.

T-tests were conducted to investigate attitudes towards the environment and stewardship behaviors before and after participation in the club environment. Analysis revealed statistically significant results on all items in the retrospective pre-then-post test (Table 1). These findings indicate that youth grew in their stewardship attitudes and behaviors after taking part in a quality youth development program. The greatest changes for youth came from two behavioral measures of identifying trees and sharing their learning with family members. These findings support the strength of the 4-H model that emphasizes hands-on discovery and sharing learning as part of the experiential learning process.

Table 1.
Descriptive Statistics & t Values for Stewardship Dimensions

	Before		After		t
	Mean	SD	Mean	SD	

I can identify different types of trees.	3.08	1.22	4.31	.88	- 6.13*
I talked to my family or friends about the importance of trees.	2.96	1.26	4.07	1.2	- 5.14*
I think all kids should know about the environment.	3.96	.90	4.74	.53	-5.5*
I like nature.	4.26	.86	4.93	2.67	- 4.22*
I try not to harm trees.	4.19	.96	4.8	.8	- 4.65*
I think trees are important.	4.48	.75	4.96	.19	- 3.61*
I would like to help plant a tree.	4.07	1.17	4.46	1.07	- 3.12*
I think it's good to conserve forests.	4.48	.64	4.85	.36	- 3.08*
N= 28, * p < .01					

Recommendations

From the program and evaluation, the authors suggest the following recommendations.

- Although it is appropriate to begin by targeting attitudes of youth in order to build stewardship, subsequent evaluations should look further into the pathways that lead to future stewardship behavior. The 4-H experience has long been known to influence career choices (Rockwell, Stohler, & Rudman, 1984), but further investigation into specific career aspirations in natural resource professions or future stewardship actions taken by youth participants is warranted.
- Youth may enroll in a program like the one described here because they have an interest in the environment; however, this does not prevent them from growing and making improvements in stewardship attitudes and behavior. Many of the youth in our program reported high levels of stewardship attitudes and behavior even before their participation, yet they reflected that they grew through their experience in the club.
- Program content should be taught through outdoor exploration. It is our belief that the positive findings from this evaluation were contingent on youth using hands-on methods outdoors, and the literature supports the importance of outdoor experiences in building positive attitudes towards the environment and stewardship-related activities (Chawla & Cushing, 2007; Larson, Green, & Castleberry, 2008; Cachelin, Paisley, & Blanchard, 2009; Ballantyne & Packer, 2002).

Conclusion

The 4-H & Forestry program established an innovative pairing of content experts with youth audiences to foster change in attitudes towards the environment and stewardship-related behaviors in youth. The study did not directly assess the career interests of youth, but the authors consider the predisposition toward the environment and stewardship behaviors to be an important precursor to interest in natural resource careers, though the connection requires further study. The literature indicates that positive experiences outdoors with significant adults are important to children's intellectual, emotional, social, spiritual, and physical development (Kahn & Kellert, 2002; Kellert, 2005), thus setting them up for taking action to benefit the environment as adults (Chawla & Cushing, 2007).

Extension educators addressed a need identified by the Society of American Foresters and 4-H to stimulate interest in natural resource careers and science. This project serves as a model for engaging youth in outdoor forestry activities in order to create positive attitudes toward the environment and stewardship-related behaviors.

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