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A New Model of 4-H Volunteer Development in Science, Engineering, and Technology Programs

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Abstract: New initiatives centered on science, engineering, and technology (SET) in 4-H may be moving away from the long-established adult volunteer delivery model. This shift in delivery may be due to a lack of availability of adult volunteers who possess the necessary SET competencies to effectively lead 4-H clubs. One way to offset this trend may be to blend traditional face-to-face training with continuous training efforts that include asynchronous on-line training modules, synchronous Web-based meetings, and self-directed learning. This new 4-H SET Volunteer Competencies Training Model is being tested in the Nebraska 4-H Robotics and GPS/GIS program.

Introduction

Nationally, 4-H has initiated the science, engineering, and technology (SET) mission mandate to help address the general shortage of new workers in the Science, Engineering, and Technology fields identified in the National Research Council's *Rising Above the Gathering Storm* publication (NRC, 2006). The stated goal of the 4-H SET mandate is to involve one million new youth in SET projects over the next 5 years (National 4-H Council, 2008).

Toward this goal, many individual states have undertaken SET initiatives with innovative programs dealing with relatively complex content topics. The National 4-H Headquarters has awarded eight 4-H SET programs with Programs of Distinction status, designating that they are high-quality 4-H programs (National 4-H Headquarters, 2008). The programs range from intensive summer programs, afterschool programs, to programs that are completely on-line. Three specific examples include the Terrapod program at Montana

State University, where students learn about science by creating short 2-3 minute films on science topics (Astroth, Bean, Baker, Holzer, & Kesner, 2008); the Union County 4-H Summer Science program from Rutgers Cooperative Research and Extension of Union County, where science day camps are offered to youth during the summer (Nichnadowicz, 2006); and the Corroboree 4-H across the Seas Science Education Website program, an on-line program for teachers, 4-H agents, and students to learn about scientific field-based data collection (Bourdeau, 2005).

What is interesting about these innovative programs of distinction is that they do not rely on the traditional 4-H adult volunteer to deliver the program. For example, the Union County Extension program stated that their program was unique because they do not rely on volunteers, but rather on paid staff, because of the intensity of the program. Other projects use Extension educators, classroom teachers, and university faculty to facilitate these 4-H programs. Overall, five out of the eight programs do not use adult volunteers in their delivery model. While this is not an exhaustive list of projects, it does suggest a general trend away from traditional 4-H volunteer-based delivery.

Traditional 4-H Delivery Model

4-H has traditionally relied on its cadre of adult volunteers to deliver programs (Smith, Meehan, Enfield, George, & Young, 2004; Schmiesing & Safrit, 2007; Smith, Dasher, & Klingborg, 2005; Boyce 1971; Kaslon, Lodl, & Greve, 2005; Culp, McKee, & Nester, 2007). Past research indicates that when adult volunteers receive appropriate and effective training they can more successfully lead 4-H clubs (Smith et al., 2004; Hoover & Connor, 2001; Richard & Verma, 1984; Rauner, 1980). Proper volunteer training can also benefit the program by an increased sustainability of the programs (Snider, 1985) and improved volunteer retention rates (Van Winkle, Busler, Bowman, & Manoogian, 2002). In some instances, adult volunteer training is conducted face-to-face (FTF) at the county level, or more recently there have been on-line volunteer training programs (Kaslon, Lodl, & Greve, 2005).

Traditional adult volunteer training is usually a one-time, short-duration and synchronous event that is delivered either face-to-face or on-line (Kaslon, Lodl, & Greve, 2005). Moreover, many times adult volunteers have prior knowledge and experience in the project area that they are leading. However, when the adult volunteer does not have the prior knowledge to build upon within the training, it requires a different training model both in terms of frequency and depth.

4-H SET Competency and Movement from Tradition Delivery Methods

So why are the 4-H SET initiatives moving away from the traditional 4-H volunteer delivery method? One theory is that traditional 4-H volunteers do not typically possess the competencies to lead clubs in SET areas. Developing competencies is an important aspect of volunteer training and includes the specific skills, knowledge, and attitudes needed to effectively lead 4-H clubs dealing with SET topics (Culp, McKee, & Nester, 2007). While there is very little research on SET volunteer training, Smith et al. (2004) found that adult volunteers could effectively train youth teen leaders who in turn taught upper elementary students an animal science curriculum. Moreover, Konan and Horton (2000) found that using the 4-H experiential model, the participating elementary school teachers felt more confident in teaching science topics after attending hands-on training.

A New Model for Volunteer Development

In situations where volunteers lack prior knowledge in a subject area, it may be difficult to use existing short-term training models. An alternative model that provides multiple training sessions and opportunities to explore content areas in depth may be more successful. For example, in Nebraska, 4-H volunteers are leading special-interest clubs that integrate many SET areas like robotics, global positioning system(s) (GPS), and geographic information systems (GIS) as they relate to natural resources and precision agriculture. At the onset of the project, we provided volunteers one-time face-to-face trainings lasting from 2 to 4 hours. Volunteers were also provided software tutorials to learn more about building and programming robots.

Next, we provided volunteers sample curriculum lessons to directly pilot with their clubs. It became apparent that the older training model was less than adequate when the participating youth began quitting the clubs and the adult volunteers said they would no longer meet. Therefore, we developed a new competency-based model, where volunteers are provided continuous opportunities to learn about the technologies (See Figure 1).

The new model includes face-to-face (FTF) trainings that are still relatively short in duration. In addition, however, volunteers can access on-line training modules that deal with specific topics, with the idea that they could view these modules as they prepare for their club meetings. Volunteers can also attend monthly Web-based synchronous Adobe Connect trainings, where they learn from other volunteers and project staff. Finally, volunteers are encouraged to engage in continuous self-directed learning. The Venn diagram below contains four training methods; the circular arrows represent continuous training efforts.

Figure 1.
4-H SET Volunteer Competencies Training Model



Summary and Recommendations

The current trend in SET programming delivery in 4-H appears to rely less on volunteers and more on Extension faculty. One possible explanation for this growing trend is that volunteers often lack the competencies needed to lead 4-H clubs effectively in these new program areas. Moreover, as the number of hours and complexity of subject matter in a SET program increases, it is becoming ever more challenging to develop the needed competencies in volunteers.

However, the traditional adult-volunteer delivery model is not dead. By providing a blended training model that combines face-to-face, asynchronous on-line, and synchronous Web-based training opportunities, the SET competencies can be addressed more incrementally. Another piece of the model is for volunteers to participate in their own self-directed learning that may in turn lead to a better understanding of the goals for youth in 4-H programs. For example, in a robotics program, the adult volunteer would build and program an example robot prior to teaching the club and experience the activity as a student, before leading the youth in building their own robots.

This blended training model is being tested as part of the Nebraska 4-H Robotics and GPS/GIS program and is appearing to be a small "glimpse" into the future of volunteer development in 4-H.

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