PROGRAM DESCRIPTION

The Cache Makers 4-H club focuses on STEM content tailored around youth interest and leader expertise. Most often, the leader identifies a project or topic and develops six weeks of lesson plans around it. Topics include computer programming (Raspberry Pi, app development, Minecraft modding), robotics (LEGO EV3 and WeDo, drones, custom kits), digital design and production (CAD, Adobe Suite, CNC, laser, 3D printing, vinyl cutting), electronics (soldering, e-textiles, Arduino), and more general science projects (Chemistry, Biology, Physics). Most groups meet for a scheduled 1-2 hour block each week over six weeks at the makerspace, with most summer camps meeting 3 hours daily for five days. Youth select topics and meeting times that align with their interests and schedules. Volunteers serve as the main instructors, but staff assist and lead groups when volunteers cannot be recruited, as well as exclusively for summer camps, Saturday open hours, and outreach events at local schools, libraries, and other community organizations.

Targeted Participants

Club projects target all youth 8-18, but most participants have been junior or intermediate, and summer camps include Cloverbuds. Noches Latinas and cultural events have been held for Hispanic outreach, and several projects have purposefully targeted girls.

Program Outcomes

Primary outcome goals were to provide positive STEM experiences to increase knowledge and interest, with special focus on underrepresented groups, reaching 1000 youth in three years. Additional grant outcomes were positive experiences with mentors and interest in postsecondary education.

EVALUATION & FINDINGS

Roughly 300 youth participate each year in summer camps, and 100-150 participate in each six-week project cycle, in groups of up to 20. In total, over 1000 unique youth have participated in a six-week project or summer camp with at least two of our 100+ mentors, and 2000 additional youth have participated in outreach events at schools, libraries, churches, and other community organizations. Youth and parents were surveyed after the completion of each project regarding their satisfaction. Youth were asked to report what they learned, positive experiences with mentors, and interest in post-secondary education. An average of 93% rated their overall experience as positive (4 or 5 on Likert scale), 89% of youth indicated interest in post-secondary education, and 96% reported a positive experience with a mentor. Seven percent of program participants have been Latino, compared to 10% Latino population overall, and 25% of program participants have been female. The Youth Engagement, Attitudes, and Knowledge (YEAK) survey was given at 6 month intervals to measure changes in participants but did not show significant results.

RESEARCH BASE

Although making can bring great opportunities to youth, it is important that opportunities to make are shared equitably. “Make:” magazine, a leader in communicating maker projects, has received criticism for representing a lack of diversity in its imaging (Buechley, 2013). For this purpose, program design has carefully addressed imaging and offerings to be especially inclusive to females and minorities. Establishing a makerspace can be complex, so understanding the unique story behind the space in question can be helpful to others (Lee, King, & Cain, 2015). Additionally, understanding the variety of makerspace configurations and how to start was helpful in the formation of this space and will be to others (Francis, Hill, Swadley, & Esplin, 2017). Because the elements of positive youth development may be hard to establish in short-term programs, it is also important to connect these programs to the more complete 4-H system that can offer full opportunities for growth (Parent, 2018).

Reference List

Parent, V. (2018). Balancing your programs. Session presented at Western 4-H Institute, Fort Collins, CO.