Engagement in Practice: The Boys & Girls Clubs as Community Partner for Engineering

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Rebecca Medina, Boys & Girls Clubs of Pueblo County

Becky began her career with Boys & Girls Clubs of Pueblo County in 1994 as a volunteer and became a staff member in 1995. As the Vice President of Operations & Assessment, Becky oversees all Clubhouse operations, including programming, partnership and evaluation of the Club’s five core program areas. Since beginning her career with Boys & Girls Clubs of Pueblo County in 1995, she has held the positions Career/Education Coordinator, Clubhouse Director, and Director of Operations.

Prior to that, she has held positions as an office manager with a truss manufacturing plant, a research biologist and as a research assistant with the Steadman Hawkins Foundation in Vail. In addition to working with BG CPC, she currently is the Chair of the Youth Employment Council, a member of One Community, member and past president of the Boys & Girls Clubs Professional Association, and past Vice President and current Secretary/Newsletter Editor for Southern Colorado Runners Club. She also was the past president for the Pueblo Parks and Recreation Advisory Commission and volunteers in numerous other community activities.

Becky earned her Bachelor of Arts in Environmental Population Organismic Biology from Colorado University – Boulder

She believes in BG CPC’s mission for several different reasons. Becky truly believes the Club offers the best experience for youth to grow and develop in a safe, supervised environment. The Club staff are mentors to youth and partners with parents and the community. She believes that every day she receives more than she can ever give and if you truly love what you do, you will never work a day in your life.
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Introduction

In their service activities, engineering faculty often seek opportunities to show STEM content to young people (especially underrepresented minorities) in order to generate excitement, to educate about STEM topics, and to influence some to pursue STEM careers.

In this paper, we describe a 16-year partnership between one department of engineering and its local Boys & Girls Clubs affiliate. We argue that (1) the Boys & Girls Clubs are an excellent partner for engineering faculty, offering advantages over other potential partners, and (2) such an ongoing collaboration offers clear benefits not obtainable by short-term or one-time activities.

We start by describing each partner. We then give a history of the partnership and present data on attitudes of Club members about science and math. Finally we describe lessons learned and make recommendations.

Background: The Boys & Girls Clubs

The Boys & Girls Clubs of America (BGCA) serve nearly 4 million young people each year at over 4,200 facilities in the US and at military bases overseas. The mission of the BGCA is “to enable all young people, especially those who need us most, to reach their full potential as productive, caring, responsible citizens.” This mission is pursued using programs in education and career, character and leadership, health and life skills, the arts, sports, fitness and recreation. Nationally, the population of members is 70% nonwhite. (The information in this paragraph is from www.bgca.org, the website of BGCA).

With a budget of $1.5 million and 14 staff, the Boys & Girls Clubs of Pueblo County (BGCPC) serve 900 young people each year at three facilities. The Club members are 66% Hispanic, 81% nonwhite.

All BGCA Clubs, including those in Pueblo County want to increase their STEM programming and want to expose their Club members to opportunities in STEM. The BGCPC functions with a degree of independence from the BGCA in that they can design and deliver their own programming. BGCPC has been successful in grant applications to several national organizations. BGCA has partnerships with national and regional companies and the local offices of such companies provide important support to BGCPC. While BGCPC was also connected with Girls, Inc., for many years and used their research-based STEM programming, that affiliation was dropped in 2003. The BGCPC staff still benefit from the philosophy and training they received during that time. Girls, Inc., teaches that a staff person shouldn’t jump in and save the girls; instead, empower them. As part of their culture now, the BGCPC staff believe you don’t need a STEM degree to help Club members get dirty and explore; let the kids figure it out.
BGCA is committed to closing the opportunity gap in STEM with innovative and creative programs, activity ideas and resources for Clubs and the youth they serve. BGCA has increased its STEM curriculum in the last 5 years, called DIY STEM. After-school and summer learning environments provide unique opportunities to advance STEM knowledge and increase interest in STEM-related careers. Using a cross-disciplinary approach that channels young people's natural curiosity into the design process inherent in the arts, BGCA’s STEM programs empower youth to create new solutions to real-world challenges. This project-based approach develops critical thinking, problem solving, and other 21st century skills critical to success in the STEM workforce and beyond.

While in-school STEM programs contribute greatly to STEM education, out-of-school programs have great potential also. Such programs attract many minority students, and girls participate at similar rates to boys. “These participation data provide evidence that the afterschool setting reaches students from populations that are underrepresented in STEM fields and provides enrichment opportunities that can bring STEM alive for them.” [2]

**Background: Colorado State University-Pueblo**

Colorado State University-Pueblo (CSU-Pueblo) is a regional comprehensive university and a Hispanic Serving Institution. The Department of Engineering offers the BS in Engineering (with mechatronics specialization), the BS in Industrial Engineering, and MS degrees in Industrial and Systems Engineering, Mechatronics, and Railroad Engineering. The Department has seven faculty members (with degrees in electrical, industrial, mechanical, and systems engineering), approximately 200 students, and several labs (including a foundry, machine shop, measurement equipment, 3D printing, robotics, and 3D visualization).

All engineering programs, including those at CSU-Pueblo, want to help youth be exposed to STEM opportunities and want to encourage their faculty and students to engage in service activities.

**History of our partnership**

In 2000 a staff member at BGCPC approached the CSU-Pueblo Department of Engineering, asking for help in providing BGCPC members with more opportunities in STEM; the staff member suggested a Science Day. From 2000 through 2012, Science Day (later renamed STEM Day) was held on the CSU-Pueblo campus on a Saturday in April. Faculty and students from CSU-Pueblo STEM departments gave 15-25 minute presentations or hands-on labs, with groups of Club members moving from location to location in various buildings. Events have included (listed with department or student club who organized the event)

- Engineering: robotics, solar power,
- Medical Science Club: corn starch sound wave, fossil dig, slime polymers, germ experiment, lava lamp density
- Pueblo rocketry club: rockets,
- Biology Club: respiratory system,
- Nursing: the effect of smoking on lungs, patient care simulation with manikins.
- Math and physics department: math fun (cryptography, etc.)
• BGCPC: Silly putty, mystery powders
• US Weather Service: tornado in a bottle

The day started with a kickoff event (e.g. a chemistry magic show). After the rotations among events, Club members ate lunch and then participated in a competition; one competition was selected each year from egg drop, bridge building, edible car, kite making, and solar cars. The designs were judged on performance, but also sometimes on design and art, with judges asking questions typical of a science fair (for example, why did you design it that way?). In the weeks before STEM day, BGCPC staff used thematic units that built up to the competition.

While originally STEM Day was limited to the Club members, in later years participation was opened to the Girl Scouts and then to the general community. Faculty and staff at the University were especially pleased to bring their children to the event. Attendance was regularly above 60 students and over 80 in several years.

Over time we learned:
• It is good to repeat events from year-to-year. The Club members like to show what they learned before.
• Student groups at the university come and go (as does their enthusiasm), but faculty and staff are consistent. However, faculty and students working together offer an effective program and the University students benefit from involvement.
• Drawing in other community partners (the local rocketry club, the US Weather Service) was easy, since they could integrate into an existing framework without a big commitment of time.

**Measures of impact**

The Afterschool Alliance states that STEM programs have three types of benefits: improved attitudes toward STEM fields and careers, increased STEM knowledge and skills, and higher likelihood of graduation and pursuing a STEM career [2]. In their annual survey of a sample of Club members, BGCA has only recently added questions that can measure these impacts, so we cannot document any effect of our activities over time, but the data do suggest that the BGCPC members have positive outcomes in these areas. The following data are for a sample of students from the specific Club targeted for our activities; not all those surveyed participated in events.

<table>
<thead>
<tr>
<th>I like to participate in science projects.</th>
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<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>Total</td>
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<td>2</td>
<td>3</td>
<td>15</td>
<td>12</td>
<td>32</td>
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<td>6.3%</td>
<td>9.4%</td>
<td>46.9%</td>
<td>37.5%</td>
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<tr>
<td>I enjoy learning new things in math.</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
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<tr>
<td>9.4%</td>
<td>6.3%</td>
<td>34.4%</td>
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<tr>
<th>I sometimes think of myself as a science person.</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<td>9</td>
<td>8</td>
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<td>13.3%</td>
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<th>I would like to have a science or computer job in the future.</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
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<th>Strongly Agree</th>
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<tr>
<th>I want to take advanced science courses in high school.</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Total</th>
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<td>9.4%</td>
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<td>21.9%</td>
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<tr>
<th>I know the steps a student needs to take if they want to be in a science-related career.</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Total</th>
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<td>22.6%</td>
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We find these results encouraging.

**Lessons learned**

From the viewpoint of the Department of Engineering, the Boys & Girls Clubs are great partners to work with for various reasons, including the following reasons not related to the STEM programming.
• Club staff ensure appropriate behavior.
• Club members have already signed photo releases.
• The Clubs arrange transportation and lunch.

These seemingly small factors are, in fact, important and are not always present with other potential partners. For example, recently imposed rules for schools in our state make difficult the transportation of school children to out-of-school events. Since the Club staff handle these details, University faculty and students can concentrate on the programming to deliver an effective experience in STEM. A larger factor, but still administrative in nature, is that BGCA and BCGPC emphasize the safety of the children; we never like to think about people doing harm to children, but Universities must be vigilant.

Because the Clubs strongly want to provide STEM programming, they will make time for our events. In the experience of the Department of Engineering, other partners, such as local schools, have many time consuming obligations, such as those related to test preparation and actual testing, that make the scheduling of events sometimes difficult.

From the standpoint of the University, especially since CSU-Pueblo is an HSI, the demographics of Club members are important. The University can reach minority and low income students through the Clubs.

The STEM activities the University provides to Club members should not duplicate school, nor necessarily even teach, but rather should generate and reinforce interest and enthusiasm. “Youth are not coming to these spaces to rehash school. The OST [out-of-school time] space can complement or supplement school, but it cannot be ‘School 2.0.’ We must ensure that OST learning environments are spaces to inspire and engage youth.” [1]

From the viewpoint of BGCPC, access to STEM content, mentors, and role models is very important. The layers of STEM day (presentations and competitions) enable the Clubs to devise thematic units in which the students learn and apply concepts. Club members are exposed to competitions in an arena besides sports. Not all Clubs may have staff with STEM knowledge; they may seek volunteers with such knowledge, but the use of University faculty and students adds credibility to the STEM programming.

A dilemma we have faced is the trade off in choosing the site for events. For many years, STEM Day was held on the University campus. In more recent years, STEM Day has been held at one of the Clubs. Having the event on campus has the advantages of exposing the Club members to the University, allowing themselves to think about being at a University, and interacting with many faculty and students, but transporting Club members to the University and arranging for lunch presents logistical issues for the Club staff. Having the event at one of the Clubs has the advantages of being able to involve many more students and to integrate the Day into Club activities over more than a day, but means that fewer of the University staff and faculty will be involved and the demonstrations are more limited since not all equipment can be moved easily.

Both sides now strongly assume the relationship will continue; the BGCPC are an assumed partner of the Department of Engineering, and vice versa. This assumption has strong benefits for both partners. For each side, the long standing nature of the partnership makes easier every
future collaboration. Each side knows the other side well, including organizational structure and people. The partnership is mainly managed by the two authors of this paper, but many people in both organizations are involved. At the University, an event planned with the BGCPC needs little explanation; at BGCPC, the University will often be suggested as a possible collaborator. University students and student groups have a ready partner for proposed activities without our needing to recruit partners.

This continuity has the benefit that each partner has learned how to be flexible, responsive, and fluid but also consistent. We are willing to try new ways of delivering content (STEM Day has evolved considerably), to admit mistakes, but to always assume that we will continue to work together.

Recommendations

We recommend that University STEM programs looking for community partners seek out their local BGCA affiliate and work with them. The over 4,200 BGCA affiliated clubs include clubs in cities, rural areas, military bases, schools, public housing, and Native lands. Because of the large number of Clubs and because of the strong desire to provide STEM opportunities, a call to any Club, or to the BGCA, is likely to be answered with enthusiasm to collaborate. One Engineering faculty, with no other introduction, called a Club affiliate in another city in connection with a professional meeting and arranged for the attendees to provide hands on service; the Club affiliate responded immediately and positively to the initial contact.

We recommend that engineering department be prepared to offer ideas for STEM programming and be prepared to fit into STEM programming already being offered at the Clubs. Over the years, our collaboration has varied on that dimension. Engineering faculty are domain experts, of course, but Club staff know their members.

We believe that building a long-term relationship such as the one we reported here will be rewarding for University faculty, staff, and students. We have described the benefits that come from an assumption that a partnership is ongoing, and we believe those benefits would be possible with other partners than BGCPC.

References