Afterschool Matters

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STEM Focus

How to Build a Robot: Collaborating to Strengthen STEM Programming in a Citywide System
Meghan Groome and Linda M. Rodríguez

Effective Practices for Evaluating STEM Out-of-School Time Programs
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Kimberley A. M. Boyer and Susan M. Tracz

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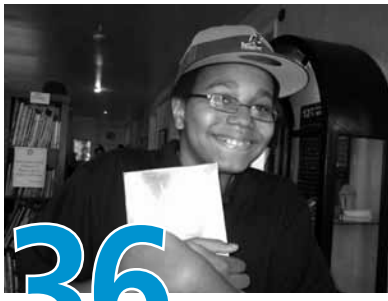

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WELCOME

"Youth Voice: The Right Choice." That was the headline on a newsletter I recently received from a church-based afterschool program in Boston.

Several years of data from a broad range of out-of-school time (OST) programs across the country reach a similar finding. OST program participants—particularly middle school youth—are thirsty for opportunities to make choices, inform decisions, and take at least some responsibility for their activities and programs. Results from NIOST's widely used Survey of Academic and Youth Outcomes (Youth Version) consistently show that, of all OST program features, youth rate their programs lowest in "opportunities for responsibility and leadership" and "choice and autonomy."

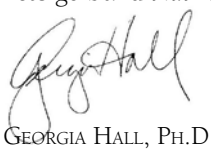
Investigation into these outcome domains shows what kinds of program practices youth want. They want to choose how to spend their time, spend time by themselves if they want, suggest new activities, help plan and lead activities, and make decisions about the program.

The resounding call for more youth voice and choice is lifted up in several of the papers in this issue of *Afterschool Matters.* Parsley and Ristvey's article notes that one of the aspects of Cosmic Chemistry that youth reported liking best was "having the flexibility to choose projects that were personally interesting." Ann Muno's program, Powerful Voices, used the Youth Program Quality Assessment (YPQA) for self-evaluation. The top level of the YPQA hierarchy of program characteristics centers on opportunities for youth to plan, make choices, and learn from their experiences. Similarly, the adults who inspire success at Mighty Writers, Rachel Loeper's program, do so by "giving students the freedom to choose genres, make process decisions, and decide when to share their work."

Youth are sounding a clear call to action—to make learning experiences and programs more youth-centered and youth-controlled. This is a challenge for OST professionals and classroom teachers alike. Making space in the daily curriculum or activity schedule for youth to give feedback, make decisions, or take charge can be risky. However, ignoring the research that has established the deep connection between youth voice and engagement in learning can be more risky yet.

We are fortunate to have papers in this issue from two Afterschool Matters Practitioner Research Fellows, Ann Muno and Rachel Loeper, and from the New York City Department of Youth and Community Development (DYCD), a partner with the NYC Afterschool Matters Fellowship. In "How to Build a Robot," Meghan Groome and DYCD colleague Linda Rodríguez provide inspiration that applies to our challenge of allowing youth voice and choice: "You have to stick with it. It takes time, patience, trial and error, failure, and persistence. It is almost never perfect or finished, but, with a good team, you can build something that works."

Let's go build *that* robot.



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How to Build a Robot

Collaborating to Strengthen STEM Programming in a Citywide System

by Meghan Groome and Linda M. Rodríguez

You have to stick with it. It takes time, patience, trial and error, failure, and persistence. It is almost never perfect or finished, but, with a good team, you can build something that works. These are the lessons youth learn when building a robot, as many do in the out-of-school time (OST) programs supported by the initiative described in this paper.

Similarly, implementing high-quality, sustainable programming in science, technology, engineering, and mathematics (STEM) across the largest publicly funded OST system in the country took time, teamwork, and persistence. The New York City Department of Youth and Community Development (DYCD) and the New York Academy of Sciences collaborated to develop a replicable program model for increasing the capacity of OST organizations to provide STEM learning opportunities. The process of developing this model and the lessons we learned provide a roadmap for other OST systems looking to enhance program capacity.

The importance of increasing the number of Americans entering STEM fields is well documented. The STEM workforce accounts for more than 50 percent of the nation's sustained economic growth (U.S. Department of Labor, 2007). Our nation's ability to develop this workforce is an issue of equity and economic vitality; workers and citizens with solid STEM skills are indispensable to our international competitiveness and ongoing innovation. In the next few years, 70 percent of all jobs created—not just those in technical fields—will require some STEM competency (Thomasian, 2011) and

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key 21st century skills such as critical thinking; active learning; and mathematical, inductive, and deductive reasoning. Individuals without these skills will effectively be shut out of many employment opportunities and, in many cases, relegated to low-wage, low-skill jobs (Thomasian, 2011).

OST programs are uniquely positioned to inspire and prepare youth to enter STEM fields by improving academic proficiency and building interest in STEM disciplines at an early age (New York State Afterschool Network & The After-School Corporation, 2012). Compared to traditional school structures, OST programs typically offer smaller class sizes, less focus on tests, and more fluid uses of time. OST programs can also play a significant role in increasing the staggeringly low numbers of students of color, women, and low-income youth in STEM disciplines (U.S. Department of Labor, 2007) because many programs are located in large urban school districts or community-based centers in low-income neighborhoods (Brisson et al., 2010). For example, most of the OST programs DYCD funds through contracts with community-based organizations (CBOs) across New York City are located in economically disadvantaged neighborhoods. Finally, OST programs can provide three elements that lead to persistence in a STEM career: engagement, continuity, and capacity (Jolly, Campbell, & Perlman, 2004).

Create a Frame

A solid foundation is required to ensure that a robot can maintain its structure over time. Selecting the right pieces—plates, beams, and gears—is an essential first step. Similarly, in its efforts to increase STEM learning across the OST system, DYCD needed to choose its area of focus and select the right partners. In 2006, DYCD embarked on a planning process to expand STEM programming in the OST system, which includes more than 530 programs located in public schools, Beacon Community Centers, CBOs, and public housing developments citywide.

A solid foundation is required to ensure that a robot can maintain its structure over time. Selecting the right pieces—plates, beams, and gears—is an essential first step.

Focus on Youth in Middle School

In 2009, the percentage of New York State students scoring at or above proficiency on the National Assessment of Educational Progress (NAEP) in fourth and eighth grade math and science assessments hovered within two points of the national average, while the top three states in each category scored an average of 10–16 points higher than the national average (National Center for Education Statistics, 2009). More distressingly, the percentages of Hispanic and Black students scoring at or above proficiency in fourth and eighth grade math and science on the NAEP in 2009 lagged 25–38 points behind that of their white peers (National Center for Education Statistics, 2009).

According to a 2009 study by the Educational Testing Service, middle school is a key age when students form identities as STEM learners and commitments to STEM subjects. As content becomes increasingly complex, middle school students—particularly girls and English language learners—lose interest in STEM (Braun, Coley, Jia, & Trapani, 2009). Implementing STEM in OST programs for middle school youth bolsters their engagement and exposes them to science before they transition to high school. Research shows that students who are interested in STEM in eighth grade are more likely to choose STEM careers than are peers who have no interest in science, even those who perform better in school (Afterschool Alliance, National Afterschool Association, & National Summer Learning Association, 2011).

Early Pilots

From 2006 to 2009, DYCD explored several options for building STEM capacity in the OST system, such as OST staff training and pilots in hydroponics and nutrition. Though they were committed to offering STEM programming, most CBOs did not have the staff or resources to provide STEM learning opportunities regularly. One challenge was a lack of multi-year funding for sustained planning and implementation. Another was that OST staff had limited capacity to lead STEM activities effectively due to their own lack of exposure to math and science. Like many adults, OST staff charged with leading STEM activities often had no positive STEM experiences on which to draw. In an interview, one OST program director noted that, for staff who may not have had positive experiences in science or math, "their own anxieties from failure in school come into play." As has been highlighted in numerous studies about the importance of training OST workers, "staff development for youth workers is the missing link to promoting STEM topics" (Coalition for Science After School, 2008, p. 3). In fact, in a national survey of more than 1,000 afterschool programs, 67 percent said they needed staff professional development to strengthen STEM program-

ming (Afterschool Alliance, S.D. Betchel, Jr., Foundation, & Time Warner Cable, 2011).

Over the last decade, leaders from the science and youth development communities have worked together to identify ways to increase informal science learning opportunities for youth. Strategies have included bolstering the knowledge and skills of OST staff to lead STEM activities, aligning OST content with school STEM content, building partnerships between science organizations and OST programs, mentoring, forming STEM-focused youth clubs, and integrating science into other program areas (Bevan et al., 2010). DYCD explored a number of different strategies, creating a foundation for the expansion of STEM programming in NYC's OST system. However, other pieces were needed to increase system capacity.

Making It Work

Adding the mechanical aspects of a robot, such as the motor and sensor, transforms the object—creating movement and new possibilities. As part of DYCD's exploration of strategies to complement its existing investments in STEM education, DYCD staff approached the New York Academy of Sciences to discuss opportunities to access the wealth of resources available in New York City's scientific community. For nearly 200 years, the Academy has promoted links between science and society. It has more than 25,000 members, including 27 Nobel laureates as well as CEOs, philanthropists, and leaders of national science funding agencies. Unlike many other scientifically rich institutions such as universities and museums, the Academy's main resources are its members—including scientists in training who come to the Academy for career advancement programming. The Academy's Science Alliance supports 8,000 graduate students and postdoctoral scientists, many of whom are looking for opportunities to learn to teach and mentor.

As in most promising collaborations, both DYCD and the Academy had something to gain and something to give. For DYCD and the city's OST system, the Academy offered a single point of contact for dozens of scientific institutions, including major universities such as Columbia University and Cornell Weill Medical College. For the Academy, access to a single point of contact for hundreds of CBOs meant an efficient means of reaching youth. Although capacity building through collaboration at this scale was not a new concept, it would represent a major accomplishment and provide a possible national model for tapping local expertise to strengthen youth STEM learning. Such collaboration, as Project Exploration and the Coalition for Science After School (2009) put it, can enable "professionals across projects and communities to generate and carry out creative solutions and strategies that maximize benefit beyond that which each entity could accomplish" (p. 21).

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The New York Academy of Sciences Afterschool STEM Mentoring Program, a partnership between DYCD and the Academy, was launched in late 2010. Then and now, this initiative matches OST programs with young scientists of the Academy's Science Alliance, who serve as STEM mentors in the programs. In this model, OST staff do what they do best—provide a "non-threatening, non-academic environment for hands-on learning that is collaborative, informal, and personal" (Chun & Harris, 2011, p. 1). The Academy's mentors add their knowledge of and enthusiasm for STEM fields.

The STEM initiative uses strong curriculum partners—the mentors—to infuse STEM into community-based OST programs. Bypassing the constraints of the formal classroom structure, it provides relevant, hands-on curriculum; opportunities for youth to interact with young, diverse scientific role models; and content knowledge and resources—important characteristics of strong afterschool programs, according to the Coalition for Science After School (2007). It also gives mentors the invaluable opportunity to work outside university walls to impart their knowledge and enthusiasm to young people. They strengthen their communication skills, deepen their understanding of STEM content areas, and practice teaching in collaboration with CBO staff. Additionally, mentors benefit from opportunities to network with other scientists.

Roles

Early on, DYCD and the Academy established partner roles and responsibilities. The Academy agreed to lead the day-to-day operations of the initiative, including organizing an annual citywide family science day. The Academy:

- Recruits and trains mentors
- Selects STEM curricula that fit best practices in youth development and informal science education and are aligned with the New York State Scope and Sequence
- Assists mentors and OST programs with ongoing communication, builds successful site-level collaboration, and troubleshoots site-specific issues
- Collects data on the mentors' experience with the STEM initiative
- Organizes networking opportunities for mentors and OST staff
- Identifies and secures resources to support the initiative, including program supplies

Meanwhile, DYCD continues to encourage STEM programming and to support the OST programs it funds. Specifically, DYCD:

- Provides ongoing professional development to increase OST staff capacity to engage youth in STEM activities
- Identifies and selects programs that are a good fit for the initiative
- Continuously monitors OST programs, providing technical assistance and recommendations for improvement
- Promotes events like the citywide family science day
- Provides youth development training for mentors
- Facilitates appropriate NYC Department of Health volunteer screening

DYCD and the Academy assigned lead staff to coordinate partnership activities. These staff, who had access to the senior leaders of their organizations, played a pivotal role in promoting the STEM initiative, identifying opportunities to refine and enhance the model, and reaching out to new partners. While none of the lead DYCD staff were trained scientists, they shared a passion for STEM fields. Their personal interest was a major factor in the success of the partnership.

Program Elements

The concept of using local scientists as volunteers to build STEM content is simple and can be replicated in other settings. We found that four core elements were crucial:

1. Recruitment through partnerships with academic institutions
2. Training and curriculum
3. Site selection and mentor placement
4. Ongoing support

Recruitment Through Partnerships with Academic Institutions

The Academy has long-standing formal relationships with 40 universities and academic medical institutions in New York City. Young scientists from these institutions and their sponsoring faculty members are already engaged in Academy programming, so they are receptive when the Academy sends them recruitment materials advertising mentoring opportunities. In the universities, faculty, administrators, student activities leaders, and offices of career advancement also receive information to share with potential mentors. Prospective mentors complete an online application outlining their background, professional goals, experience with teaching and mentoring, and reasons for interest in mentoring. They must also provide a letter of support from their sponsoring faculty members.

Mentors are required to:

- Complete two full-day training sessions
- Work with OST staff to schedule the day and time of the weekly lessons
- Attend a kick-off mixer reception at the beginning of each semester
- Complete a fingerprinting and background check process

The Academy accepts about 100 mentors a semester, with about 30 percent returning from the previous semester. Most are drawn to the program to improve their teaching and mentoring skills, continue their involvement with community service, or serve as role models. Some need to fulfill an outreach requirement of their university. One doctoral student's application statement provides a typical reason for participation:

> Throughout grade school, I was blessed with phenomenal biology teachers. Their influence in my life has enabled me to enter a field that fascinates me every day. . . . I would like to become a mentor in the Academy's Education Program to help another young mind discover the wonder of science.

The Academy strives to identify STEM mentors from diverse backgrounds. Mentors are trained to facilitate an activity that addresses the issue of diversity in the STEM fields. This activity, Draw a Scientist, usually takes place on the first day of the mentoring program. The premise is simple: Ask youth to draw a picture of a scientist. When the youth compare their drawings, they usually discover that almost everyone has drawn an older

white man wearing a lab coat and glasses and carrying a beaker or another piece of equipment. The drawings are a great way to get youth talking about their assumptions about scientists. They also provide the mentors with a way to share their backgrounds. Programs that repeat this exercise after a few months often find that youth draw themselves or their mentors.

Training and Curriculum

Once chosen, mentors go through a two-part training process. First, they select a curriculum and attend a full-day workshop to learn to teach it. The curricula are all hands-on enrichment programs designed to be taught in OST settings. Mentors can choose one of seven 10–12-week modules, including robotics, human body systems, genetics, and others. The topics were selected because they fit the New York State Scope and Sequence and are of interest to middle school students. The curriculum providers, who include Cold Spring Harbor Laboratory, Cornell University, and New York University, lead the curriculum training. In addition, experienced mentors attending the workshops can describe how they implemented the curriculum. The Academy provides a deep library of lesson plans, all following the same basic structure. The lessons require supplies that can easily be purchased in local stores and provide enough variety to allow mentors to deepen their relationships with their students.

"I would like to become a mentor in the Academy's Education Program to help another young mind discover the wonder of science."

The mentors attend a second workshop focused on youth development, offered through DYCD. This workshop provides an overview of middle school youth development, pedagogy, and classroom management; it also outlines roles and expectations for working with youth. Afterschool staff often attend the workshop to help the mentors understand that the OST staff are the experts in working with children and to counteract any misconceptions mentors may have teaching about middle school children.

Site Selection and Mentor Placement

Every year, DYCD and the Academy select afterschool sites from among the DYCD-funded CBOs that submit applications. For the first two years of the STEM initiative, the Academy worked with approximately 90 of the 123 programs that applied.

In order to participate in the STEM initiative, CBOs must agree to meet certain requirements:

- CBOs assign a staff member—ideally one who has an interest in STEM—to support the mentor in such areas as classroom management.
- Staff participate in the kick-off mixer and a youth development workshop with their assigned mentor.
- Sites provide basic school supplies such as paper, pencils, cups, and so on. Mentors are supplied with scientific materials and have a small budget to buy additional items.
- Sites dedicate a consistent classroom-like space for STEM activities.

OST programs complete a simple application for the STEM initiative. In their applications and in staff interviews, CBOs cited these primary reasons for applying:

- To increase access to high-quality STEM education
- To meet parents' demands that the CBOs provide additional academic programs
- To provide expert support for existing STEM programs such as robotics
- To forge closer relationships with volunteer organizations and academic institutions

In selecting afterschool programs, DYCD staff balance a desire to create maximum opportunities for youth, especially those in economically disadvantaged communities, with realistic expectations about programs' capacity to work with mentors. Specific considerations include how long the program has been in existence, its accessibility by public transportation, its size, the number of middle school youth it serves, and the experience level of its staff.

Once mentors complete training, they are matched with OST programs based on geography and curriculum choice. Whenever possible, more than one mentor is assigned to each site. Though the mentors may teach different curricula, this duplication helps when a mentor has to leave the program. The mentors assigned to a site usually find ways to work together.

Mentors are expected to teach one hour each week for nine weeks; many mentors teach more hours and continue beyond nine weeks. Once matched with a program, each mentor is paired with at least one OST staff member in a co-teaching model; the pair go through training together and then collaborate to plan and ex-

ecute the lessons. OST staff and mentors are encouraged to integrate thematic learning, project-based learning, and skill-building into STEM activities.

Ongoing Support

DYCD and the Academy maintain lines of communication with the mentors and OST program staff to identify and solve problems when they arise. Common problems include changes in schedules, adaptation of lesson plans to meet the background and interest of the students, and communication between mentors and OST staff. Mentors experience the problems typical of new teachers. In addition, matches occasionally need to be dissolved due to schedule changes, lack of resources, and changes in a mentor's status. In this case, the Academy and DYCD staff work with the CBO to find a new mentor or supply activities to fill the dedicated time.

Costs

The estimated cost per mentor is about $800, which covers curriculum training, supplies for both training sessions and STEM classes, travel, and printing. In-kind contributions from the Academy, DYCD, and the CBOs include fingerprinting, support for mentors and OST staff, the time of the OST staff who co-facilitate STEM activities, activity space, youth development training, and supplies.

Assess, Refine, Test Again

Usually a robot design is tweaked a few times before it is complete to ensure that the robot is balanced and stable, that its sensors work, and that it can change direction as needed. DYCD and the Academy regularly collect data on partner institutions, mentors, and OST programs to evaluate the initiative: mentor and CBO application data, regular surveys, program site monitoring, and interviews. The numbers show that, through mid-2012, the STEM initiative recruited 20 university partners and placed more than 380 mentors in 90 OST program sites. More than 5,000 middle school students received nearly 80,000 student-hours of learning. Findings from analysis of the data collected yield insights into the experience of the partner institutions, mentors, and OST programs.

Perceptions of Partner Institutions and Mentors

In its first year, the pilot provided proof of concept for the initiative's value to the scientific community. The Academy recruited and trained 120 graduate students and postdoctoral fellows and then placed them at more than 90 DYCD-funded OST programs. Of these 120 mentors, 78 percent earned an Academy teaching credential, which requires 24 hours of teaching and training; 30 percent taught for more than one semester. Several independently approached the Academy to explore offering their support to new mentors.

Evaluation data indicate that the mentors felt well prepared to teach their curricula, emerged with more confidence in their ability to teach, and would recommend the program to a colleague. Interviews with university and college faculty who participated in the pilot demonstrate their satisfaction with the program: They said they would continue to send young scientists to the Academy as potential mentors and would recommend the program to other faculty members.

In Fall 2010, project staff surveyed the first cohort of mentors before and after they completed the curriculum training about their sense of preparedness to teach and their implementation of the curriculum. Of the 35 mentors surveyed, 65 percent felt well prepared to teach their curriculum. All 35 offered suggestions for improving the training and lesson plans; these suggestions were used to improve both in the next semester. Most (80 percent) reported that teaching was a positive experience, and 60 percent indicated that they wanted to teach again the next semester.

Project staff also interviewed with ten mentors from the first cohort at the end of the fall semester. Of these ten, six reported problems of logistics, including inappropriate room assignments, lack of supplies, and inconsistent scheduling. All ten mentioned positive experiences with their students, with eight reporting on specific student conversations. Nine out of ten reported that teaching was different from what they expected, but that they found it to be rewarding and enjoyable. None of the interviewees reported difficulties with classroom management. This finding may be attributed to the presence of the OST staff co-teachers.

At the end of the first year, the Academy conducted a survey of the mentors. Of the 46 respondents, 90 percent indicated that they enjoyed the program, and 95 percent said they gained confidence in their teaching skills. All of them said they would recommend the program to their peers. The survey showed that 53 percent of mentors felt that their students had a wide range of abilities and backgrounds in science or math. In order to better understand the barriers to success, the Academy asked the mentors to rank the problems they encountered at their sites; 65 percent said they had problems communicating with their sites to schedule classes or finding planning time, while 26 percent reported having inappropriate facilities, such as lack of a blackboard or consistent classroom space.

Perceptions of CBOs and Their OST Programs

In 2011, DYCD conducted site visits to 24 participating CBOs. Site visitors reported that the children seemed to enjoy and value the program, were engaged in the hands-on lessons, and had come to expect science to be part of their OST experience. The researchers also reported that three sites previously considered to have low capacity to implement academic programs and maintain external partnerships greatly benefited from having a mentor. Leaders at these three sites reported that participation in the STEM initiative built their capacity to implement an academically focused curriculum, that their co-teaching staff gained confidence in teaching STEM, and that they could envision themselves implementing similar programs in the future.

In Summer 2012, DYCD surveyed program directors who had mentors at their sites. Of the 44 directors who received the survey, 12 responded. Program directors were generally satisfied with the mentors; in fact, 11 out of 12 requested to have a mentor again the following school year. The CBO that did not request a mentor had raised enough funding to hire STEM specialists of its own. The challenges directors cited related to the logistics of mentor coordination. A robotics team coach discussed the importance of the support of the OST staff member. He observed that, while mentors sometimes lacked experience with youth, they "will always evolve and learn from the process. They were hesitant at first but gradually interacted more, engaging and learning from the students."

The researchers also reported that three sites previously considered to have low capacity to implement academic programs and maintain external partnerships greatly benefited from having a mentor. Leaders at these three sites reported that participation in the STEM initiative built their capacity to implement an academically focused curriculum, that their co-teaching staff gained confidence in teaching STEM, and that they could envision themselves implementing similar programs in the future.

In the surveys and subsequent follow-up interviews, the 12 program directors discussed the value of this approach to increasing the capacity of OST programs to offer STEM programming. For example, one director said:

> The mentors are passionate about what they are teaching, knowledgeable, and willing to adapt their material for the specific population. The activities are engaging and hands on, so the learning is "disguised" for the participants.

Another noted:

> The mentors in our program did everything—they were very hands on, including organizing trips and even bringing in animals for activities. Having mentors involved in the OST program demonstrated to staff that youth actually like science, because the attendance rates were very high on the days when mentors joined the program.

Adaptation and Replication

DYCD and the Academy are experimenting with components of the model, using key lessons to adapt practices or test new theories. Both organizations understand that "there is a need to bring greater complexity to the notions of sustainability and scale-up; rather than expanded replication, there is a need to consider isolating features or elements that are transportable and scalable" (Bevan et al., 2010, p. 18).

The Academy has done two major adaptations to date. In 2011, the Academy and DYCD adapted the model into the Summer Matters Program, a six-week, full-day summer enrichment program for 2,000 middle school students. This program was part of a public-private partnership led by DYCD. Each 10–12-week school year curriculum was adapted into a three-week module that met twice a week for 2.5 hour blocks. The Academy provided stipends to the mentors, who were recruited from its pool of experienced mentors. Curriculum partners, experienced mentors, and Academy staff collaborated to make curriculum changes including creating longer lab activities, adding activities with more kinesthetic elements, and finding affordable field trips related to the content.

The second adaptation came when the Academy partnered with Citizen Schools to bring the initiative to Newark, New Jersey. Citizen Schools runs extended learning day programs, often funded by a school improvement grant that holds the organization responsible for student performance. Although the spirit and everyday activities of the STEM initiative remain the same, the additional accountability measures have led to an emphasis on more rigorous lesson planning and the addition of a capstone project

designed by the mentor. The curricula also shifted to reflect New Jersey standards rather than those of New York.

The Academy and the State University of New York (SUNY) have developed a plan to take the STEM initiative statewide. The ambitious plan includes mechanisms that will allow the Academy to conduct the program across a large geographic area. These include distance learning techniques and a hub-and-spoke model in which SUNY campuses support local CBOs. A formal outline of required staff supports and funding will establish a versatile blueprint for implementing the program in other regions.

DYCD has also engaged in replication of the model. In partnership with the Academy and the New York University (NYU) Center for Mathematical Talent, DYCD-funded OST programs participated in a summer math pilot in 2012. OST staff received training and support from DYCD and NYU to use the NYU *Finding Math* curriculum, which uses lessons with games and puzzles to give youth opportunities to consider how math factors into everyday life.

In 2012, DYCD expanded STEM programming across NYC's OST system by adding a new funding requirement that required grantees to provide at least two hours of STEM or literacy programming every week. Activities were to be, in the language of the RFP, "designed to build basic literacy and math skills as well as 21st century skills, such as teamwork, problem solving, and critical thinking." A technical assistance provider offers ongoing support to CBOs, focusing on increasing OST staff capacity to facilitate high-quality STEM and literacy activities. In addition, building on lessons from the mentor initiative, DYCD and the Academy work with CBOs to develop partnerships with academic and other STEM-related institutions in their neighborhoods. Investments in OST staff development improve staff capacity to facilitate STEM activities but cannot make up for a lack of expertise or access to resources, such as museums, parks, and universities, that can enrich STEM learning. Identifying local resources is thus a key strategy for OST programs that want to improve their STEM offerings.

As youth learn when building a robot, creating a strong foundation and making the key components work are the most important steps in the process. OST programs have positive youth development principles as their foundation; they are designed to promote inquiry-based, hands-on learning. The STEM initiative provided the key components; it allowed CBOs to leverage the tremendous resources available in NYC's scientific community to increase STEM learning opportunities for youth. Although this type of partnership builds CBOs' capacity by bringing in content experts, staff development is also needed to ensure that both OST staff and STEM mentors have a deep understanding of one another's fields and can fully capitalize on partners' experience and resources.

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Effective Practices for Evaluating STEM Out-of-School Time Programs

by Stephanie B. Wilkerson and Carol M. Haden

Science, technology, engineering, and mathematics (STEM) programs in out-of-school time (OST) are designed to supplement school work, ignite student interest, and extend STEM learning. From interactive museum exhibits to summer-long science camps, opportunities for informal student engagement in STEM learning abound.

What difference do these programs make, and how can we improve them? These questions preoccupy educators and funders alike. OST program developers and providers can benefit from understanding why evaluation is critical to the success of STEM OST programs, what data collection methods are appropriate, and how to effectively communicate and report findings. In this article, we share lessons from our experience in each of these areas and provide examples of how effective practices play out.

Why Evaluate?

OST programs operate under funding constraints, with tight budgets and ever-increasing calls for accountability. In the past, the results of evaluations commissioned to satisfy the accountability requirements of funding agencies or supervisory organizations often went unread and unused. Now, program staff increasingly understand the value of incorporating evaluation into program design, from inception through delivery. Including evaluation in program planning in early stages allows for adaption and improvements along the way (Frechtling, 2010). As described below, "utilization-focused" evaluations (Patton, 2008) provide planners with valuable information

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to guide program development: Formative evaluations can inform program improvements, while summative evaluations indicate whether programs are meeting their intended outcomes.

Define Activities and Expected Outcomes

In our experience evaluating STEM programs, we have collaborated with scientists, engineers, program developers, educators, and public outreach providers who bring unique knowledge, talents, and perspectives to the design and delivery of OST programs. Invariably, these individuals are united in their vision: They want to share the excitement of scientific discovery with the people, young and old, who participate in their programs. Using evaluation tools early in program planning enables them to transform that vision into clearly articulated and attainable outcomes for target audiences.

In the development phase, evaluators work with program planners to develop SMART goals: outcomes that are specific, measurable, attainable, realistic, and timely. Bodilly and Beckett's (2005) meta-analysis of OST programs found that programs with clearly defined goals and outcomes had greater success than those whose goals and outcomes were poorly articulated. Success also depends on aligning program planning and activities with goals and outcomes (Huang et al., 2009). This coherence provides a clear line of sight from program purpose to actualization.

In our experience, common short-term outcomes include increasing participants' awareness of and interest in STEM and STEM careers, knowledge of STEM concepts, and program-related skills. Common intermediate outcomes include improving participants' STEM self-efficacy and their application of their new or enhanced knowledge and skills, as shown in such behaviors as continued program participation, enrollment in STEM courses, and choice of STEM majors. Long-term outcomes often include increasing academic learning and achievement in STEM content areas and, ultimately, encouraging STEM career choices. These outcomes reflect the priorities of STEM funding agencies such as NASA (National Aeronautics and Space Administration, 2011) and the National Science Foundation (2011). With well-articulated outcomes, evaluators can develop an evaluation plan and data collection methods that align with these outcomes and corresponding program activities.

During program planning, logic models provide a road map of intended program outcomes so that activities are coherent, focused, and aligned. A logic model depicts a program's theory of change through:

- Inputs: funding, facilities, and resources
- Activities: what and when
- Outputs: numbers of participants, sessions, events, and materials developed
- Outcomes: short-term, intermediate, and long-term effects on target audiences (W. K Kellogg Foundation, 2004)

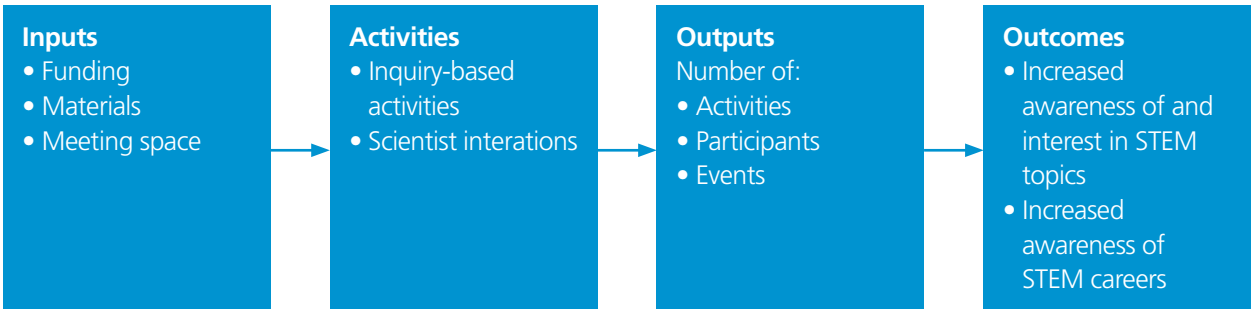
Figure 1 shows a simplified logic model based on NASA Goddard Space Flight Center's Big Explosions and Strong Gravity (BESG) program, a one-day event that engages Girl Scouts in activities with astronomers in the Washington, DC, area. The BESG's theory of change posits that, *if* Girl Scouts engage with scientists in inquiry-based activities and conversation, *then* they will increase their awareness of and interest in STEM topics and careers.

As they develop the logic model, OST program developers must clarify processes for program development and implementation and make cause-and-effect connections about how the program moves from activities to outputs and outcomes. Once the theory of change is laid out, evaluators can decide on the best design and methods to answer questions about program delivery and outcomes (Chen, 1990; Rossi, Lipsey, & Freeman, 2003; Weiss, 1995).

Promote Continuous Learning and Reflection on Practice

Once programs are underway, evaluation creates a feedback loop that guides program decisions and improvements, thereby engaging STEM OST program developers and pro-

Figure 1. Logic Model for the BESG Program



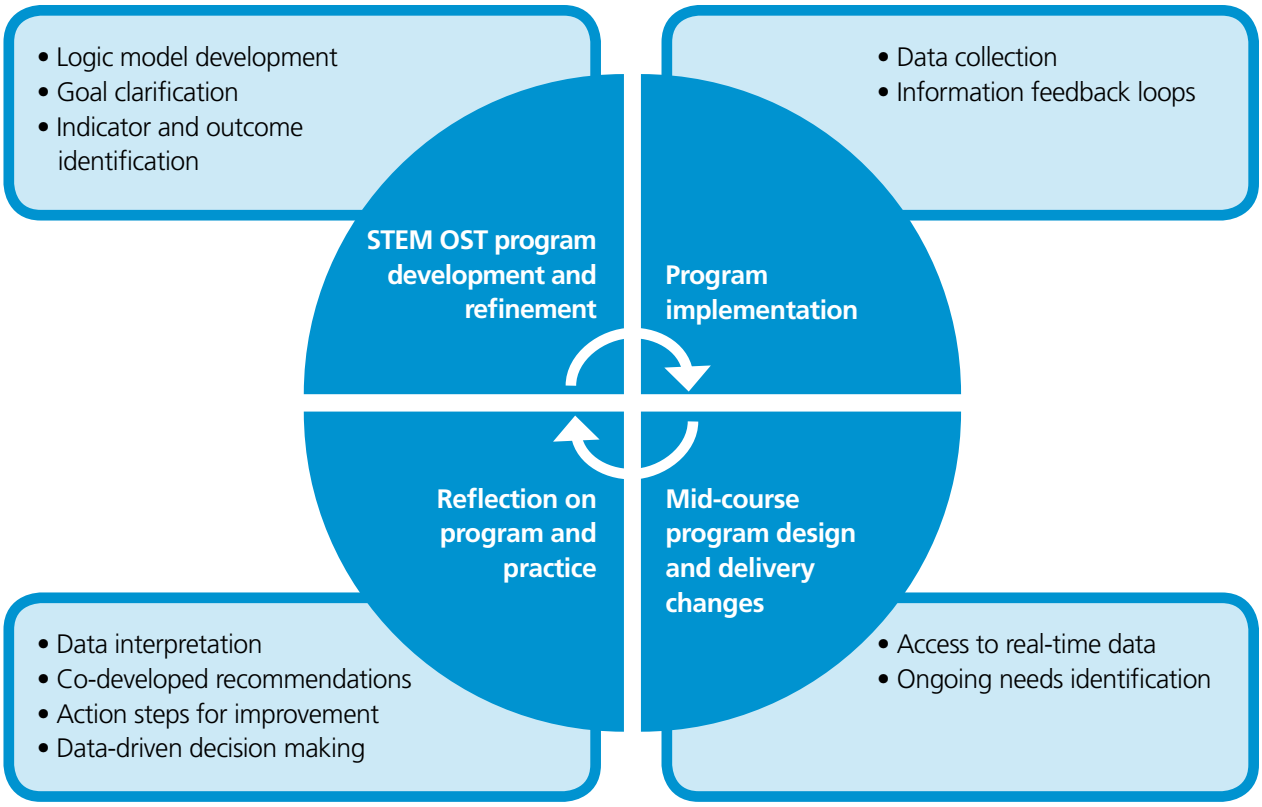


Figure 2. Evaluation as a Continuous Learning Process

viders in a continuous learning process, illustrated in Figure 2. At this stage, evaluators have developed or selected data collection instruments, such as surveys, interview and observation protocols, and assessment tools, that align with intended program outcomes. Data collection is ongoing, with formative data providing timely information to inform program modifications (Gray, 1993; Reisner, 2005). Real-time data provide information on program implementation "from the trenches," tapping the perspectives of those who deliver and participate in the STEM program.

For example, Mid-continent Research for Education and Learning (McREL) collaborated with a team of evaluators to develop the two-week Cosmic Chemistry summer program, which aims to improve interest and achievement in chemistry among rising ninth- and tenth-grade students. During two summers, facilitators implemented hands-on activities and interactions with scientists focused on the engaging context of NASA's Genesis mission. To understand how Cosmic Chemistry was implemented and how well its lessons reflected the intended OST best practices, we observed the program in action during both weeks of implementation each summer. Our observations, together with daily facilitator logs, gave evaluators and program developers real-time data, which suggested mid-course modifications to help facilitators implement the program as intended. For example, based on facilitator feedback from the first summer, the developers revised the facilitator's guide to include tips on differentiating instruction and on sense-making activities. The changes were implemented and evaluated during the second summer.

Provide Evidence of Impact and Recommend Improvements

During the last stage of the continuous learning process shown in Figure 2, summative evaluation findings provide information on how well the STEM OST program has achieved its objectives; the findings also document any unintended outcomes. Evaluators analyze data, interpret findings, and work with program planners to develop actionable recommendations for program improvement. Because program developers and providers sometimes bring specialized STEM content knowledge to OST programs, they should be involved in interpreting evaluation findings so that recommendations are relevant, feasible, and specific enough to guide improvement. Evaluation becomes a critical reflective tool for informing the next cycle of program delivery. Summative evaluations can provide evidence of effectiveness to justify continued funding or support proposals for new funding.

Effective Practices for Designing STEM OST Evaluations

Program developers, providers, and evaluators must consider several factors that influence which evaluation designs and data collection methods will be most appropriate for particular STEM OST programs. Effective evaluation practices take into account a program's intended outcomes, phase of development, duration, and budget. These considerations are relevant whether the program is small or large, with evaluation methods being scaled accordingly.

Align Evaluations with Intended Outcomes

As previously described, a logic model is a tool that helps program providers clearly define intended outcomes representing a program's theory of change. It articulates the changes that should result if program providers implement the program as intended. Evaluators use this causal chain ("If we do *x*, then *y* will result") to design evaluations that will support program providers in showing that the program is the cause of any outcomes achieved. Evaluators use logic models to develop evaluation questions that align with a program's intended implementation process and with its short-term, intermediate, and long-term outcomes. Taking into account a program's phase of development and duration, the evaluator frames evaluation questions so they are feasible to answer. The evaluation questions then drive the data collection methods and analytical approach.

STEM OST programs often have long-term outcomes that cannot realistically be measured during the evaluation period. Sometimes they anticipate outcomes that cannot be attributed solely to the OST program. Student outcomes associated with the school day provide a good example. Based on a research review of OST programs, a panel of experts funded by the U.S. Department of Education recommended that OST programs should address content and skills that align with school-day instruction (Beckett et al., 2009). Research suggests that students have a greater potential for experiencing significant learning outcomes and achievement when OST programs connect to school goals (Beckett, 2008; Cooper, Charlton, Valentine, & Muhlenbruck, 2000; McLaughlin & Phillips, 2008).

In our experience, STEM OST program developers align much of their content with what students are expected to know and be able to do as part of their school learning. For example, focusing on short-term outcomes such as students' STEM interest and attitudes is expected to motivate students to enroll in more STEM courses, explore science careers with guidance counselors, and engage in additional learning opportunities. By aligning content with standards, such as the Common Core State Standards for mathematics or the Next Generation Science Standards, OST programs intend for students to apply their learning to coursework during the school day in order to enhance academic achievement, a long-term outcome. When feasible and appropriate, evaluation can serve an important role in measuring the extent to which short-term student outcomes from STEM OST programs transfer to the school day.

Consider a Program's Phase of Development

STEM OST programs that are just beginning will have different evaluation needs than will well-established programs. An effective evaluation design supports a program's growth through various phases from development to refinement to completion (Rossi et al., 2003). Programs cannot be expected to attain longer-term outcomes during development or early implementation.

Before a STEM OST program is even implemented, a variety of evaluation practices can help with program development. During the development phase, evaluation questions ask, "What do you want to do, with whom, and to what end?" Logic models provide a road map to help ensure that activities are coherent and align with program goals (Chen, 1990; McLaughlin & Jordon, 2005). While program materials are in development, program staff might use evaluation methods such as focus groups and interviews to get immediate feedback from target users. This "proof of concept" activity allows developers to make design changes before a program is rolled out. The development phase is also an appropriate time to conduct an informal or formal needs assessment to ensure that program activities will meet the needs of those who stand to benefit (Davidson, 2005). Once a full version of the program is developed, evaluators can facilitate expert review or quality assurance processes by establishing review criteria and feedback forms. These processes help developers to ensure that STEM program content is accurate and consistent with current thinking and practice.

Before a STEM OST program is even implemented, a variety of evaluation practices can help with program development. During the development phase, evaluation questions ask, "What do you want to do, with whom, and to what end?"

Effective evaluation practices for relatively new STEM OST programs involve conducting a pilot study that measures program implementation, creates information feedback loops to inform ongoing revisions, and assesses initial participant reactions and short-term outcomes. Evaluation questions during the implementation phase include "How are providers implementing the program? What additional support do they need? How do participants perceive the quality and utility of the program? What could be changed to better align the program with the intended outcomes?" At the beginning, evaluators and providers focus on building capacity to deliver the program. Data collection methods such as training feedback forms and observations provide information on the consistency of training delivery across multiple sites; whether the training was delivered as intended; and attendees' perceptions of the quality and utility of the training, their level of preparation to implement what they learned, and their recommendations for improvement (Carroll et al., 2007).

From this point, evaluations move into measuring how providers implement STEM OST programs using such data collection methods as online implementation logs, surveys, observations, focus groups, and interviews. These methods can provide program developers with continuous descriptive feedback on variations in implementation, barriers and supports to implementation, implementation fidelity, additional training needs, and perceptions of effects on students (Century, Rudnick, & Freeman, 2010). Student interviews, focus groups, and surveys can provide formative information on how students are responding to the program, how it is affecting them, and what they think would make the program better.

After pilot studies, programs are often revised before scaling up for wider implementation or undergoing another round of small-scale implementation, sometimes referred to as field testing. At this point, the emphasis shifts from measuring implementation to measuring intended outcomes. Evaluation focuses on collecting baseline and post-participation data related to short-term, intermediate, and long-term student outcomes. Implementation measures assess whether STEM OST programs are implemented with fidelity and whether students receive the intended dosage.

Once a program shows promising evidence of student outcomes and has been finalized, it is ready for more rigorous evaluation designs that measure differences in outcomes between students who participate in the STEM OST program and those who participate in a comparison program or receive no intervention at all. Evaluation questions in this phase ask, "Did the program meet its goals? To what degree, and for which participants?" In assessing OST outcomes, particularly academic outcomes, measures must focus on both specific and more general components (Geiger & Britsch, 2003). For example, the evaluation of the Cosmic Chemistry summer program during feasibility testing included an assessment of student understanding of the specific standards addressed in the program. For an outcome evaluation of Cosmic Chemistry, we would use both an assessment of standards aligned with the program and a more general measure of chemistry achievement to understand the program's broader effects on participant learning.

Select Evaluation Methods Appropriate for the Program's Duration

STEM OST developers and providers should clearly define outcomes that are feasible and appropriate given a program's scope and expected reach. In many respects, these expectations relate directly to the amount of time intended audiences spend in the program. For example, the BESG single-day event for Girl Scouts aims to affect student awareness of and interest in science and science careers, whereas the two-week Cosmic Chemistry program is designed to affect student science interest and academic learning. More intensive programs, such as a yearlong afterschool program, might be designed to affect students' science understanding and ultimately their achievement on a state science test.

Figure 3 illustrates the relationship between program duration and common STEM OST program outcomes. As program duration increases, so does the likelihood that the program can achieve longer-term outcomes. Research on summer school programs shows that programs lasting 60–120 hours are more effective at achieving academic outcomes than programs lasting less than 60 hours (Cooper, et al., 2000). A meta-analysis of OST math and reading programs found positive effects on outcomes for programs ranging from 44 to 210 instructional hours (Lauer et al., 2003). Obviously, a program that exposes students to STEM content for 44 hours or more does not alone increase student achievement unless it also provides high-quality, engaging, and developmentally appropriate instruction. However, when deciding which outcomes can reasonably be expected and measured, evaluators should consider program duration.

Effective evaluation practices include selecting appropriate data collection methods for the program's duration and intended outcomes. The following examples from our own experience illustrate how effective evaluation practices can be applied to STEM OST programs of various durations. We find that, irrespective of duration, program developers and providers want both formative feedback to guide improve-

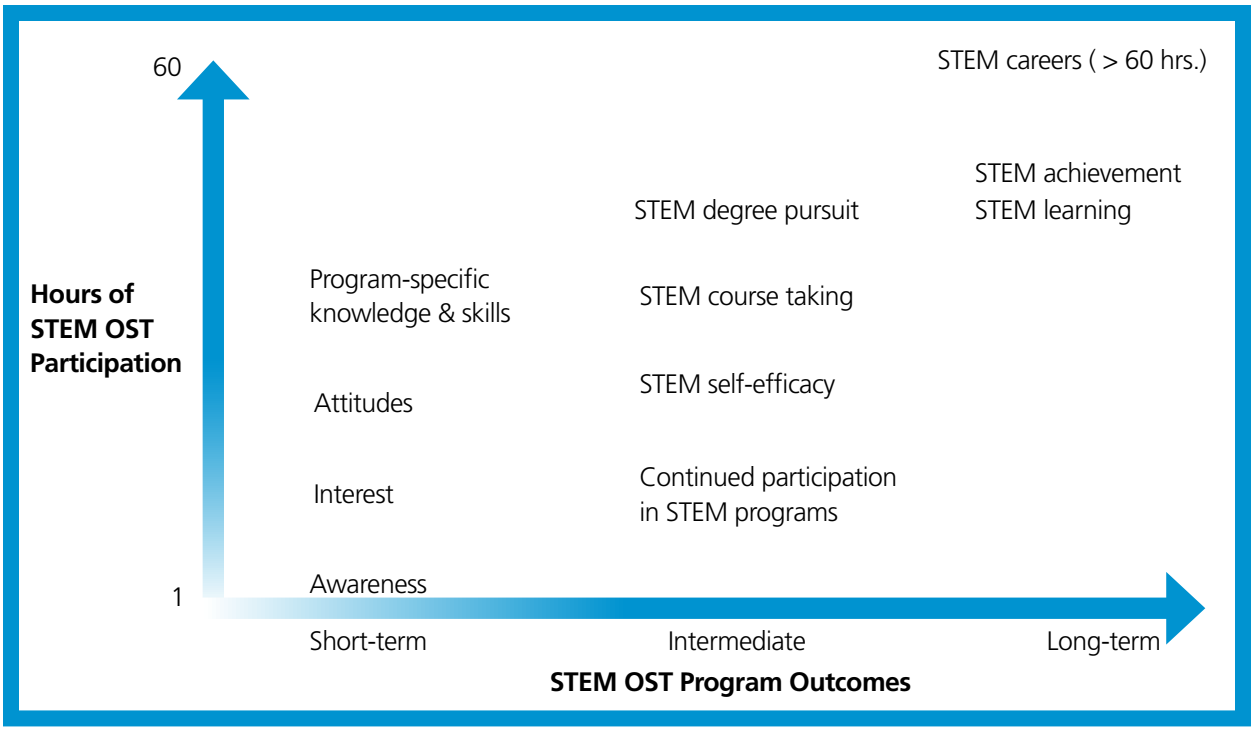


Figure 3. Relationship Between STEM OST Program Duration and Program Outcomes

ments and summative feedback on outcomes. Accordingly, we tailor evaluation designs and data collection methods to yield both types of feedback and take into account how program duration influences the nature of that feedback.

Short Duration and Single-Day Events

In our experience, most short-duration STEM OST events focus on increasing participant awareness of and interest in STEM-related content or careers. Involving participants in data collection activities can be challenging because of the limited time. Data collection tools must be easily accessible and brief. Depending on the purposes of the evaluation, the methods might include short event surveys or postcards, participant exit polls, or event observations.

One short-duration event we evaluated is the Family Science Night (FSN) series at the Smithsonian's National Air and Space Museum, coordinated and presented by the Universities Space Research Association. FSN invites students and their families to attend evening events lasting a few hours that feature talks by scientists and engineers, an IMAX movie on space exploration, and an after-hours tour of the museum. FSN's intended outcomes include increasing participant interest in space science and raising awareness of space science topics, the work of NASA scientists, and NASA careers. With a limited budget, our evaluation included short, paper-based surveys for students and adults. The surveys allowed us to collect participants' demographic data, their perceptions of the quality of the event, its effect on their interest and learning, their interest in related follow-up activities, and, for adults only, their reason for attending the event. Because the events were promoted through and supported by schools, we conducted follow-up telephone interviews with school liaisons to understand how FSN was integrated into school activities or curricula and to learn how the liaisons perceived the program and its effects on students. Combined, the student surveys, adult surveys, and telephone interviews gave program planners useful formative data for improving the events and relevant summative data on participants' space science awareness and interest outcomes.

The evaluation of the BESG one-day events, whose logic model is depicted in Figure 1, involved brief paper-based student and adult leader surveys, which included items on awareness and interest outcomes, participant demographics, the perceived quality of activities, and suggestions for improvement. Underpinning these efforts was the intention of Goddard Education and Public Outreach (EPO) providers to transition the program away from conducting local events and toward providing materials so groups outside the DC area could conduct their own BESG events with local scientists and resources. As the intent and reach of the program evolved, the evaluation evolved

with it to encompass new questions addressing how well new BESG facilitators could plan for and conduct their own events. To understand to what extent BESG was portable, we created one facilitator survey to measure the effectiveness of the training and another on event planning and implementation. We conducted telephone interviews with scientists, educators, and Girl Scout liaisons to understand how well the materials provided by the Goddard EPO team helped them conduct successful events. Over the course of two years, the evaluation provided useful information to BESG planners, who modified the schedule and activities based on evaluation findings. The continuous learning process and a final report enabled program planners to compare findings from early events to those from later events, which had been modified in response to the earlier findings.

Longer Programs

STEM OST programs that engage students for longer periods of time, such as afterschool, Saturday, or summer programs, hold greater potential for affecting intermediate and long-term outcomes than do short-duration programs (Cooper et al., 2000). The intensity or frequency of delivery among longer-duration programs can vary: Afterschool delivery is distributed over weeks or months during a school year, while summer programs are condensed into a few consecutive weeks. Compared to evaluations of short-duration programs, evaluations for longer programs can employ more rigorous designs with a greater variety of data collection methods. These methods might include longitudinal student surveys, implementation logs, student journals, case study interviews and observations, and student achievement measures.

Compared to evaluations of short-duration programs, evaluations for longer programs can employ more rigorous designs with a greater variety of data collection methods. These methods might include longitudinal student surveys, implementation logs, student journals, case study interviews and observations, and student achievement measures.

As part of our ongoing work with Goddard EPO, we conducted an evaluation of the A.C.E. (Astronomical Cosmic Exploration) of Space afterschool club for Girl Scouts. A.C.E. of Space engages girls in hands-on learning opportunities, "girl-given" group presentations, "girl-driven" activities, meetings with successful female scientists and professionals, and tours of NASA facilities. Because the program met once a month for an academic year, we were able to measure changes in girls' interest in space science and STEM careers, their vision of themselves as scientists, and their understanding of STEM topics. Girls completed a pre- and post-participation interest survey containing 23 items—some ranking statements on a Likert scale and some open-ended—to measure intended program outcomes and participant perceptions. Additionally, girls kept journals on their club activities and responded to reflection questions each month on what they had learned, what they found exciting about the month's event, how A.C.E of Space activities related to their own lives, and how interested they were in space science and space science careers. The surveys and journal reflections allowed us to examine gains in space science interest and skills over an extended period of time. With a modest budget, the evaluation provided abundant formative feedback to improve program design and delivery throughout implementation, as well as summative feedback on measurable outcomes.

A summer program like Cosmic Chemistry also allows for study of longer-term outcomes, in this case students' understanding of chemistry and their motivation to study science. Evaluation team members at McREL and Magnolia Consulting assessed Cosmic Chemistry students with a pre- and post-participation chemistry assessment aligned with the standards covered by the program. We also administered a survey of motivation and perceived competence before and after the program, and then again during the following school year, to examine effects on student interest, motivation, and self-efficacy in science and chemistry. In addition to assessing specific chemistry content objectives, we also administered daily facilitator implementation logs and conducted daily observations to measure implementation of best OST practices, including setting high expectations, motivating students, and building background knowledge. The condensed program delivery—60 hours over a two-week period—allowed us to increase the intensity of our data collection. Had the program been delivered in non-consecutive sessions, the cost of traveling to sites to conduct the same number of observations would have been prohibitive. Findings from the pilot study provided formative data to the development team for program modification, while findings from the subsequent field test during the second summer provided summative information on program effects.

Provide the Most Rigorous Designs Possible Under the Allocated Budget

Taking into account stakeholder information priorities, intended outcomes, phase of program development, and program duration, evaluators develop evaluation designs that give STEM OST program providers the most "bang for the buck." This is no easy task, as there are trade-offs between design and budget. Typically, the more rigorous the evaluation study—that is, the more the evaluation design allows providers to make *causal* claims about program effectiveness—the more expensive it is. Done right, providing this level of rigor usually involves costly randomized control trials or quasi-experimental designs that include a control group to measure whether differences between treatment and control group outcomes can be attributed to the program. This type of design, with its corresponding budget, is most appropriate for well-established STEM OST programs of long duration that have already used evaluation for planning, feedback, and improvement (Rossi et al., 2003).

More often than not, evaluation budgets for STEM OST programs are meager at best, yet the programs come with the same information needs and priorities as programs with larger evaluation budgets. So how do program providers get the information they need, given their limited funds?

More often than not, evaluation budgets for STEM OST programs are meager at best, yet the programs come with the same information needs and priorities as programs with larger evaluation budgets. So how do program providers get the information they need, given their limited funds? Using the following recommendations, STEM OST program providers can become better-informed consumers, working with evaluators to maximize evaluation offerings and minimize costs.

- Prioritize which program outcomes are most appropriate and important to evaluate based on the phase of program development and funder information needs (Stecher & Davis, 1987).
- Create a long-term evaluation plan that identifies how program outcomes will be measured over time, rather than all at once. Use logic models to justify prioritizing short-term outcomes over intermediate or long-term outcomes (Reisner, 2005).
- Use data collection methods, such as online surveys and social media, that are less expensive to implement than site interviews, focus groups, and observations. Instead of site visits, conduct phone interviews or focus groups to collect in-depth formative feedback about user perceptions.
- Keep survey instruments brief. The longer the survey, the more time is required for data analysis and reporting, thus increasing the budget.
- Learn from evaluations of similar programs (Geiger & Britsch, 2003). Identify existing instruments that align closely with program outcomes, such as those provided through the Harvard Family Research Project OST Program Research and Evaluation Database (Wimer, Bouffard, & Little, 2008).
- Collect data from small samples of participants during early phases of program development, and then expand to include larger numbers as the program matures.
- Use informal data reports to give developers access to pertinent, timely data for program improvement without having to expend resources on formal implementation reporting.

Effective Practices for Communicating Results

A utilization-focused approach to evaluation emphasizes how stakeholders will use the findings (Patton, 2008). Program developers and providers, participants, and funders might each have different needs for information about the STEM OST program being evaluated; effective evaluation reporting should address these needs (Torres, Preskill, & Piontek, 2005). As with curriculum development, evaluators often use a sort of backward-mapping technique that begins with the end in mind, determining how evaluation findings will be used, for what purposes, and by whom.

Comprehensive evaluation reports can address the needs of many stakeholders. Reader-friendly reports include an executive summary; provide visual representations of data, such as charts, graphs, and summary tables; omit technical jargon; are well-organized and concisely written; include recommendations for improvement; and append supporting and detailed technical information (Torres et al., 2005). However, evaluators can also provide more tailored information based on specific stakeholders' intended use of the results.

Program developers are interested in recommendations for improvement and data that will drive decision making. They also want to know if they have achieved the outcomes they set out to accomplish. Data reports generated from online surveys and informal debriefs (in person or by phone) can provide real-time feedback

to guide mid-course decisions during implementation of STEM OST programs. This information not only provides timely formative feedback, but also can function as a tool for monitoring student progress toward intended outcomes. One way to increase the likelihood that program developers will use evaluation results is to engage them in interpreting findings and co-developing recommendations or responding to evaluators' recommendations (Cousins, 2003; Patton, 2009). Engaging program developers in the reporting process will help them identify action steps in response to recommendations. Verbal presentations of study results allow for meaningful dialogue about data interpretation, recommendations, and program improvements.

STEM OST practitioners, the ones who deliver the programs, seek how-to information and methods for ensuring successful implementation. They want reports that emphasize lessons learned and implications for future practice. Additionally, reports that capture the experiences, perceptions, and voices of participants can tell a compelling story about the importance of effective practices. For example, vignettes or descriptive narratives based on qualitative data can be an effective way to help facilitators to "see" important nuances in implementation and instructional pedagogy.

Funders want to know if their investment results in expected outcomes. Future funders seek evidence of effectiveness or promising practices that are worth funding. Various presentations of evaluation findings can help connect funders to the people who benefit from their investment. A concise description of evaluation findings, such as an executive summary or oral presentation, can be an effective way of highlighting program effects and outcomes. Videos of participants sharing how their STEM OST experience affected them are also compelling. Younger participants might show how a STEM OST experience affected them by drawing, for example, what they understand about plant life cycles or how they feel about science.

Effective evaluations meet the needs of STEM OST program stakeholders. They take into account a program's intended outcomes and purpose, phase of development, duration, information priorities, and budget limitations. The more funders and consumers of STEM OST evaluations understand effective evaluation practices, the more relevant, timely, and useful the evaluation results will be in helping programs to achieve their goals. Evaluations designed with these considerations in mind ensure that programs operate in an information-rich environment, to the benefit of all who participate.

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Cosmic Chemistry

A Proactive Approach to Summer Science for High School Students

by Danette Parsley and John Ristvey

Though school is out for the summer, ninth- and tenth-grade students at Union Intermediate High School are burning off energy playing a game of tag on the soccer field. But that's not all they're doing. They're also synthesizing and applying key chemistry concepts they've just learned related to the conditions of the early solar system. They are acting out concepts including the fundamentals of matter—atoms, ions, and isotopes—while deepening their understanding of how the solar nebula transformed into our present solar system about 4.6 billion years ago.

These students are engaged in Cosmic Chemistry—a two-week summer learning program focused on chemistry with an astronomical twist. Why do districts, including Union Public Schools in Tulsa, Oklahoma, choose to implement summer programs that, like Cosmic Chemistry, address science concepts? Some districts use summertime to help reinforce or remediate learning from the previous year. Others, like Union, hope to *accelerate* future learning by providing young people with engaging, high-quality learning that builds a foundation of essential knowledge and skills for next year's science content. Cosmic Chemistry engages ninth and tenth graders to prepare them to take chemistry in school the following year. This proactive approach to summer learning provides rigorous, relevant science experiences to help the students who need it most *before* they fall behind. Cosmic Chemistry was developed by educators at McREL

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International and Education Northwest. Our process of designing, implementing, and evaluating Cosmic Chemistry offers lessons that may be useful to designers of other academically oriented out-of-school time (OST) programs.

Research-Based Recommendations on Designing OST Programs

Over the last decade, the number of schools, districts, and community-based organizations implementing academically oriented OST programs like Cosmic Chemistry has increased dramatically (Stonehill et al., 2009). To respond to these programs' need for research-based guidance, the Institute of Education Sciences (IES) convened an expert panel to review existing research and generate recommendations for designing, delivering, and evaluating high-quality OST programs (Beckett et al., 2009). The IES panel, comprising OST program and research experts, reviewed the best available research, ranging from rigorous program evaluations to expert analyses of OST strategies and practices. To identify replicable practices, the panel paid particular attention to experimentally and quasi-experimentally designed studies.

The review began with a comprehensive search of studies conducted in the previous two decades. Of just over 1,000 studies found, 130 met the criteria for further review. Of these, 22 studies of 18 different OST programs met the What Works Clearinghouse evidence standards as randomized controlled trials, regression discontinuity studies, or quasi-experimental studies with no design flaws. These studies were therefore used as the foundation for five recommendations on designing OST programs to improve academic performance:

- Align the out-of-school time program academically with the school day
- Maximize student participation and attendance
- Adapt instruction to individual and small-group needs
- Provide engaging learning experiences
- Assess program performance and use the results to improve the quality of the program (Beckett et al., 2009, p. 11)

Acknowledging that the OST research is not yet robust enough to provide definitive best practices, the panel recommended more rigorous research. Even so, the recommendations reflect the current theory and practice of designing and implementing academically oriented OST programs.

When these researchers interviewed recent high school dropouts, they found that a majority reported making C grades or better at the time they quit school. These students in the middle of the academic spectrum reported that they felt ignored, invisible, and forgotten.

Program Description

Using the IES recommendations, we led the project team that designed a two-week summer learning experience based on NASA educational materials originally developed for use during the school day. We intentionally sequenced the learning to promote a coherent content storyline that allows students to engage with the content many times and in different ways.

Cosmic Chemistry was designed for "middle-of-the-road" students. Sometimes referred to as "the forgotten middle," these students are easily identified by their academic, behavioral, and attendance records. Their classroom grades are typically Cs, with occasionally a few Bs and Ds; they generally score solidly in the middle on state assessment tests. They rarely are singled out for disruptive or even non-cooperative behavior; generally they listen in class but do not speak up without prompting. Most attend school consistently. They are neither failing nor excelling. Since they don't have expressed or obvious problems, their parents and teachers seem content to pass them along (Swanson, 2005). This silent majority constitutes a large part of the middle two quartiles of U.S. students. By default, these millions of "average" students are consigned to low expectations. According to Bridgeland, Dilulio, and Morison (2006), they could be at risk of dropping out. When these researchers interviewed recent high school dropouts, they found that a majority reported making C grades or better at the time they quit school. These students in the middle of the academic spectrum reported that they felt ignored, invisible, and forgotten. The researchers speculate that perhaps these students would have remained in school and graduated had someone taken notice (Bridgeland et al., 2006).

Before launching Cosmic Chemistry, the project team provided professional development for facilitators and developed instruments to evaluate the program using multiple data sources. During the summers of 2010 and 2011, science teachers at Union Intermediate High School delivered Cosmic Chemistry to eager students who were hoping to get a boost for chemistry class the following year.

A week before the start of the two-week summer program, students and parents attended a kickoff event at the Tulsa Air and Space Museum. Teachers met with Cosmic Chemistry students in an informal environment, and students and their families were introduced to the context of the program: NASA's Genesis mission. The Genesis spacecraft launched in 2001 on a mission to collect pieces of the sun in order to learn more about the conditions of the early solar system. When the spacecraft returned in 2004, the parafoil on the sample return capsule did not deploy. As a result, the capsule crashed into the desert in Utah with its precious cargo, amounting to just a few grains of salt's worth of solar wind (charged particles from the sun). During a keynote address at the kickoff event, parents and students learned that, even though the mission had suffered a huge setback, scientists were able to meet all of the mission objectives through hard work and perseverance. The Genesis mission is a real-life example of science as a human endeavor. During the kickoff event, students were encouraged to strive for excellence throughout the summer and the upcoming school year.

During the first week of Cosmic Chemistry, students learned more about the Genesis mission from engineers and scientists who either were directly involved in the mission or came from the local community. Hands-on and virtual activities wove the story of Genesis together with chemistry fundamentals. For example, students developed models of the structure of the atom, with its protons, neutrons, and electrons. One popular activity at the conclusion of the first week introduced students to the standard solar model by modeling the fusion reaction in the core of the sun. In "Proton Smasher," blindfolded students threw Velcro balls representing protons at a Velcro target ball, trying to make their balls stick to the target. (See Figure 1. Videos of this and similar activities are available on YouTube; search on "Cosmic Chemistry.") In the core of the sun, the average solar proton takes 14,000 million years to find a "hot partner" with which to fuse. Protons in the sun's core not only travel for long periods without colliding, but may also collide many times without fusing. In the modeling activity, students noticed that the "protons" had to collide at the right speed, at the right angle, and with enough energy for "fusion" to occur. Later, students learned about the different types of solar wind, using actual data taken from the Genesis spacecraft. Each day in the Cosmic Chemistry program, students had ample time in small groups to explore key concepts through structured sense-making activities. Student groups spent time talking, writing, and drawing as they prepared a museum exhibit-style presentation on a topic of their choice, which they delivered to their peers, their parents, and members of the community during the last day of the program.

Figure 1. Proton Smasher activity

Most of what Union students said in interviews and surveys that they liked best about Cosmic Chemistry could be offered in any science program: having the flexibility to choose projects that were personally interesting, developing both the skills and the confidence to present in front of people, doing science instead of just reading about it, learning things that are relevant to the classes they will be taking, and believing that they could understand an authentic science endeavor.

Designing and Delivering High-Quality Summer Science Programming

Cosmic Chemistry is grounded in research-based OST best practices that are associated with increased student achievement and are conducive to implementing dynamic programs (Beckett et al., 2009; Fairchild, McLaughlin, & Brady, 2006). Research suggests that summer is a particularly important time to engage students in high-quality learning experiences (Beckett, 2008; Bell & Carrillo, 2007; Fairchild et al., 2006; McCombs et al., 2011; McLaughlin & Pitcock, 2009; Terzian, Moore, & Hamilton, 2009). High-quality summer programming that follows the IES practice guide is characterized by alignment with academic content standards and the school year curriculum, maximum student participation and attendance, tailored and engaging learning experiences, and evaluation of outcomes (Beckett et al., 2009).

Aligning with the School Day

According to IES panel recommendation 1, designing and delivering high-quality OST programs requires aligning the program academically with the school day—without

repeating content. To ensure alignment with typical high school chemistry classes, Cosmic Chemistry developers centered the curriculum on the National Science Education Standards (National Research Council, 1996), which are foundational for student success in chemistry. The standards include both core concepts—the structure of atoms, the structure and properties of matter, the interactions of energy and matter—and core skills necessary for scientific inquiry, such as the ability to use technology and mathematics to investigate and communicate.

Even when the OST curriculum is standards-based, as is the case with Cosmic Chemistry, program coordinators and school and district staff still play a key role in aligning it to the school day. The program coordinator should work with a school contact person, such as the district science coordinator or the science department chair, to ensure program alignment and make any necessary adjustments. The program coordinator must develop strong relationships and maintain ongoing communication with the school-day staff. Effective communication and collaboration between the program coordinator and school contact can facilitate important tasks, such as:

- Collecting student data
- Identifying and intentionally recruiting students who would benefit from program participation
- Identifying and recruiting staff who can serve as summer program facilitators, assist with professional development, or both
- Identifying community-based and business partners to support the program, including guest speakers

The Cosmic Chemistry curriculum is highly interactive. Students frequently work in small groups to conduct experiments, interact with scientists and engineers, use virtual and hands on simulations, make sense of content, and prepare for the museum exhibit presentation.

Maximizing Participation

IES recommendation 2 is about maximizing student participation and attendance. To help maximize student attendance and participation in summer STEM programs, schools should promote the programs widely using a variety of communication mechanisms. They should identify multiple strategies for recruiting students who might benefit from an academic jumpstart. Program planners should take into account the needs and preferences of students and parents, including transportation, location, and hours of operation. Districts might also consider extending the program to offer additional enrichment or recreational activities, depending on family needs and preferences.

When preparing to run Cosmic Chemistry, the Union Intermediate High School program coordinator identified incentives for and potential barriers to participation on the part of the middle-of-the-road students for whom the program was designed. Incentives included an optional extension to allow students to earn half a credit on completion and presentation of a capstone project. The program was scheduled for half days during the first few weeks of summer to allow students both to participate in the program and to work a summer job. Based on expressed needs of participating students and their parents, Union arranged to provide breakfast and lunch each day as well as transportation to and from the program for any student who needed it. While the program was running, the program coordinator and facilitators at Union carefully tracked attendance and worked with individual families to solve problems when students had trouble attending.

Tailored and Engaging Learning Experiences

Recommendations 3 and 4 from the IES panel focus on instructional delivery. To meet students' specific learning needs, programs should provide targeted, intentionally designed learning experiences that are engaging and active and that maximize the flexibility OST environments offer.

The Cosmic Chemistry curriculum is highly interactive. Students frequently work in small groups to conduct experiments, interact with scientists and engineers, use virtual and hands-on simulations, make sense of content, and prepare for the museum exhibit presentation. The curriculum fosters high expectations, focusing on ways that facilitators can personally communicate and demonstrate these high expectations throughout the program. Cosmic Chemistry also incorporates several activities to encourage families to set high expectations as well: the family kickoff event, which promotes shared ownership of program goals and expectations; daily student sense-making and wrap-up activities that include family communication; and involvement of family members in final project presentations.

In Cosmic Chemistry, students practice the collaboration and presentation skills that they will ultimately need in

daily life but that are often neglected in modern chemistry classrooms. They interact with practicing scientists in ways that connect to real, cutting-edge science currently under study and that promote thinking about future careers. The program culminates with students presenting their new knowledge to an audience made up of their peers, community members, and families. This level of interactivity and personal empowerment, combined with standards-based content and research-based instructional strategies, helps increase the engagement, confidence, and voice of students who fall into the otherwise forgotten majority of middle-performing students.

OST programs often offer larger blocks of time for learning than schools can. This extra time can be used to vary instructional strategies and to provide hands-on learning opportunities to engage students and deepen their understanding and retention. The selection of strategies should be based on timely information about students' knowledge and skills. Cosmic Chemistry uses specific OST science practices recommended by the National Partnership for Quality Afterschool Learning (n.d.).

Investigating science through inquiry is the process of exploring scientific questions and proposing explanations by making observations, conducting investigations, and using data. In Cosmic Chemistry, students conduct a guided inquiry to investigate the question, "What is the sun made of?" Students analyze a model of solar wind retrieved by the Genesis spacecraft to understand how the elemental composition of the sun is measured.

Exploring science through projects and problems involves real-world learning experiences that interest and engage young people, make science relevant, and encourage them to solve problems. Cosmic Chemistry students work in small groups to learn about real-world chemistry applications, such as career opportunities or cleanroom technology. They work on their selected project throughout the two-week program; on the final day of the program, they present what they learned to program facilitators, peers, and family members.

Integrating science across the curriculum means that science projects incorporate content or skills from other subject areas such as math, reading, writing, social studies, and the arts. In Cosmic Chemistry, students practice essential math skills such as graphing, calculating ratios and proportions, and working with logarithms. They hone writing and speaking skills as they engage in sense-making activities, build models, and prepare presentations. Students learn a historical perspective of science as they encounter early ways in which scientists organized elements. They see how technology was used to design, build, and implement a real NASA mission by interacting with scientists and engineers and by experiencing a virtual field trip.

Engaging families and communities in science means involving parents and community partners in fostering positive attitudes, enhancing science literacy, and making science relevant. Cosmic Chemistry engages families in science through the kickoff event, daily opportunities for students to share what they've learned through their social networks, and participation in the museum exhibit on the final day of the program. The program engages community members in science by having students interact with practicing scientists in ways that promote thinking about future careers.

Evaluating and Improving the Program

Recommendation 5 from the IES panel focuses on program evaluation. Program leaders should use formative and summative evaluation to assess program performance. They can improve the program by collecting, analyzing, and acting on data on program implementation, stakeholder satisfaction, and student outcomes.

To ensure that evaluation activities are feasible and relevant, evaluation instruments to monitor implementation and tools to measure student outcomes are built right into the Cosmic Chemistry program coordinator guide. Some instruments were developed specifically for Cosmic Chemistry, while others were adapted from existing tools. For example, the classroom observation protocol used 14 items from *Inside the Classroom Observation and Analytic Protocol* (Horizon Research, 2000), while individual facilitator logs were specific not only to Cosmic Chemistry but even to each day's lessons.

The observation protocol and facilitator logs help with assessing how the program is being implemented. Program coordinators or district personnel can use observation data to evaluate program activities, while facilitators and program coordinators can use the daily logs to reflect on how they teach and manage the program.

In the 2010–2011 pilot, observations by project evaluators provided a measure of implementation fidelity. The daily logs provided insight on facilitators' perceptions of how well the program promoted chemistry knowledge, motivation, and high expectations. We found the observation and log data to be especially helpful in determining adjustments that needed to be made to student learning experiences and to facilitator professional development. For example, observations during the first pilot test led to several revisions to both the curriculum and the professional development for instructors. We

adjusted the daily pacing, reordered and reduced some of the content, and added many structured student-led sense-making opportunities. We also incorporated into the facilitator materials a more robust set of strategies for communicating and demonstrating high expectations.

To measure student outcomes, the team developed or adapted instruments for specific purposes:

- A chemistry foundations assessment was developed to align with the National Science Education Standards addressed in Cosmic Chemistry.
- A high expectations questionnaire based on the IES practice guide explores students' perceptions of whether facilitators provide challenging work, encourage goal setting and doing one's best, and expect student participation.
- A questionnaire on student motivation and perceived competence includes three scales from two established instruments in the field: the Attitude Toward Science in School assessment (Germann, 1988) and the Perceived Competence Scale (Williams, Freedman, & Deci, 1998).

During the second year of implementation, we found that students improved in all three areas, most notably in the area of background knowledge. Data from the chemistry knowledge assessment were aggregated and reviewed by instructors during a professional development session. Based on the data, facilitators discussed which concepts to emphasize and any implications for planned activities. Students scored an average of 34.8 percent correct on the pre-test and an average of 59.5 percent correct on the post-test. In response to the interview question, "Was Cosmic Chemistry what you expected?" one student said:

> I felt like this was going to be a class in which we studied from textbooks, but I like this instead of what I expected. It's a lot better to remember, and every bit of the activities and projects were very interesting.

On the high expectations questionnaire, which students completed at the end of the two-week Cosmic Chemistry program, students reported that the teachers held high expectations of them. The confidence and motivation assessment showed that students' motivation was higher on the post-test than on the pre-test, though the difference was not statistically significant. Another indicator of motivation and confidence is the fact that 82 percent of students in the second year of the program went on to take pre-AP chemistry. In open-ended feedback, one student expressed enthusiasm in response to the question about whether students would recommend Cosmic Chemistry to others:

> Yes, yes, yes. A million times yes. Cosmic Chemistry was so fun and hands on and just all around exciting that I absolutely loved it, and I'm pretty sure anyone else will too.

Cosmic Chemistry evaluation instruments were developed to align with program goals. They not only give program facilitators and coordinators the information they need to make mid-course adjustments as necessary but also provide summative data to assess how the program affects student outcomes. The facilitator guide provides guidance for administering the instruments, summarizing the data, and discussing results. Involving program staff in using evaluation data helps them tailor instruction and improve the experience for students each time the program is delivered.

Limitations

Because Cosmic Chemistry was primarily a development project, our study has several limitations. First, we were limited to one district for the pilot and field testing. Limiting the scope in this way allowed us to work closely with the program coordinator and summer facilitators and to focus on aligning the program with just one in-school science curriculum. In subsequent studies, we hope to test the efficacy of Cosmic Chemistry in a wider set of districts and schools. Second, only 27 students completed the field test program and provided data, mostly because middle-of-the-road high school students have other time commitments during the summer such as sports camps, jobs, and family vacations. Finally, we did not compare our sample of students with a control group who did not complete the program. Nor did we collect data, other than anecdotal information, from Cosmic Chemistry students during the school year, when they were enrolled in chemistry classes. Future research will focus on more comprehensive study of these conditions.

Mission Accomplished

A primary goal of Cosmic Chemistry is to prepare students to enroll and succeed in high school chemistry by building their foundational chemistry knowledge and increasing their motivation to pursue higher-level science courses. We hypothesized that realizing this goal would require setting and demonstrating high expectations in an engaging OST experience based on real-world experiences in space science. Our findings from the classroom observations and

facilitator logs revealed that Cosmic Chemistry can accomplish this goal and that facilitators can implement it with fidelity on a daily basis. Students' achievement in basic chemistry concepts increased significantly from pre-test to post-test, with large effect sizes. Following Cosmic Chemistry, almost all of the students chose to go into chemistry or pre-AP chemistry classes.

Based on these findings and our experience, we are confident that programs like Cosmic Chemistry can have a positive effect on student learning and prepare students for future opportunities to study science. Such programs are designed and implemented using the recommendations from IES; they intentionally integrate best instructional practices appropriate for the content area. OST program designers might consider using some or all of the specific practices that we used in the design and delivery of Cosmic Chemistry, as summarized in Table 1.

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Table 1. IES Recommendations and Corresponding Program Practices

IES RECOMMENDATION	COSMIC CHEMISTRY PRACTICES
1. Align the OST program academically with the school day.	Identify a small number of core concepts in the content standards that are aligned with school curriculum.
2. Maximize student participation and attendance.	Create incentives for participation. Remove or minimize barriers to participation.
3. Adapt instruction to individual and small-group needs. 4. Provide engaging learning experiences.	Provide a real-world context for learning. Use various grouping strategies, including small groups. Demonstrate high expectations for students. Use a variety of content-specific instructional practices, such as: • Investigating science through inquiry • Exploring science through projects and problems • Integrating science across the curriculum • Engaging families and communities in science
5. Assess program performance and use the results to improve the quality of the program.	Use instruments specifically tailored to program goals and strategies. Collect, analyze, and use program implementation data to monitor and make adjustments to program design and delivery. Collect, analyze, and use stakeholder satisfaction and student outcome data to assess program impact.

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And Girl Justice for All

Blending Girl-Specific & Youth Development Practices

by Ann Muno

She sent a single photograph taken in front of her college sign with the boldfaced caption, "I made it!" I thought back to when I first met Lara seven years earlier in our middle school girls' program. As she developed skills and encountered new opportunities, Lara began to dream of college and to feel worthy to be the first in her family to attend. Now, against many odds, her dream had come true.

At a time when academic gains are elusive for many girls of color who grow up in poverty (Corbett, Hill, & St. Rose, 2008), Lara's defiance of the statistics reflects both her sheer determination and the support of a high-quality, girl-specific youth development program. The program was offered by Powerful Voices, a Seattle-based nonprofit I co-founded to help girls realize their dreams, engage their communities, and shape a better world. One among many efforts to address the equity gap for girls of color, Powerful Voices intertwines gender- and race-specific practices with evidence-based youth development practices. Using a skills- and strengths-based approach, it combines group meetings and one-on-one mentoring to build trust, communication skills, and goal-setting while exploring the roots of societal injustice through media literacy and anti-racism curricula. Girls use their newly acquired activism skills to develop a culminating project that champions a meaningful issue and fosters positive girl culture. Powerful Voices integrates best practices in girl-specific programming with those of the broader youth development field. Program evaluation results suggest that integrating the two approaches is a winning strategy for promoting academic gains among low-income girls of color.

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Academic Trends for Girls of Color

Davis Guggenheim's controversial documentary *Waiting for Superman* (2010) suggests several reasons that the educational system puts low-income students of color at a disadvantage. A main conclusion is that low expectations are institutional; these students fall further behind as each school year passes (Chilcott & Guggenheim, 2010). Despite the fact that girls' academic performance has *improved* in the last quarter century, serious inequalities persist for low-income girls of color (Corbett et al., 2008). The gap in college graduation rates among non-white females is telling: In 2006, 37 percent of white women had earned a bachelor's degree or higher, compared with 22 percent of African-American women and only 13 percent of Hispanic women in the same age group (Corbett et al., 2008). High school dropout rates hover around 25 percent for all girls but spike to 50 percent for Native American girls and 40 percent for Latinas and African Americans. Factors that put girls uniquely at risk—beyond the individual, family, and school characteristics that influence all students—include pregnancy, the responsibilities of parenting, sexual harassment and lack of safety, school disciplinary policies, and some families' gender-based rules (National Women's Law Center, 2007).

Since the early 1990s, reformers have steadily documented the nation's failure to educate and socialize girls for the opportunities that the civil rights and women's movements have opened for them (Brown & Gilligan, 1992; Orenstein, 1995; Sadker & Sadker,1994). *Shortchanging Girls, Shortchanging America* (American Association of University Women, 1991) sparked a national conversation on how gender bias hurts girls' self-esteem, school achievement, and career aspirations. Another study on adolescent girls' self-esteem, though based primarily on the experiences of middle-class white girls, found that girls' desire to please others and maintain relationships demands that they silence their own needs and capitulate to gender-based societal expectations (Brown & Gilligan, 1992). More recent research explores the confounding differences *among girls* by race and class. For example, self-confidence, resilience, and views of themselves as leaders are stronger among African-American and Hispanic girls than among white girls (Girl Scouts Research Institute [GSRI], 2008). One study suggests that girls of color may feel more effective because they are better skilled at advocacy on behalf of themselves and others. Influential factors in this study included positive self-concepts, positive relationships with parents and family, and supportive environments (GSRI, 2011).

A little bit of intentionality goes a long way. There are strategies youth development programs—girl-specific or not—can use right now to fortify relationships and foster identity development as a way to help girls of color improve academically.

What Youth Development Programs Can Do

This research signals the important role out-of-school time (OST) program practitioners can play in supporting academics *and* self-confidence by providing a safe environment where girls can develop healthy identities and relationships. Infusing girl-specific practices into high-quality youth development programs need not be difficult or costly. A little bit of intentionality goes a long way. There are strategies youth development programs—girl-specific or not—can use right now to fortify relationships and foster identity development as a way to help girls of color improve academically.

For example, OST programs can adjust program content or pull girls out for special workshop modules as a way to address how violence, internalized oppression, and low self-efficacy undermine girls' academic achievement and motivation to do well in school. A conflict resolution curriculum, for instance, might aim to build emotional and physical safety in girl-to-girl and mother-daughter relationships. A media literacy and structural racism curriculum could help girls shape an empowered gender and racial identity. Projects can promote social change and activism as critical to girls' struggle for identity.

Another strategy is for program practitioners to use interpersonal practices that empower girls of color and youth in general. Recognizing that healthy female adolescent development hinges on supportive relationships, practitioners must encourage girls to explore their own experiences, rather than projecting some adult version onto them. Unexamined use of adult power can keep girls from developing vitally important life skills. In addition, girls must be able to see their life experiences reflected in the adults who lead the program. Staff, interns, and others involved in running the program should be racially diverse.

Girl-Specific Program Practices

These "what-you-can-do-now" suggestions reflect current understanding, but it's important to note that girl-specific programs have been around for more than a century. Legacy heavyweights such as Girl Scouts USA and YWCA, who have paved the way for the rest of us, are still going strong. The Ms. Foundation's Collaborative Fund for Healthy Girls/Healthy Women deserves much of the credit for using research to forge a common understanding of effective girl-specific practices. In the mid-1990s, the fund made a hefty investment in girls' programs. It conducted rigorous evaluations to define effective practices and build an infrastructure for evaluating all-girl programming (Ms. Foundation, 2001). The fund involved dozens of girl-specific programs and funders in working together for several years to evaluate program effectiveness. Evaluation efforts by the now-defunct Girl's Best Friend Foundation, based in Chicago, were also invaluable in shaping a growing understanding of best practices for working with girls (Phillips, 2002). The girl-specific practices that evolved from these foundations' work include providing:

- Safe spaces in which to form trusting relationships
- Support in developing leadership skills
- Opportunities to create social change (Ms.Foundation, 2001; Phillips, 2002)

Safe space as a girl-specific practice reflects an environment that shapes positive, intergenerational relationships among girls and women as a strategy to counter internalized oppression and girl-on-girl aggression that can lead to school expulsion or dropping out. Developing girls' *leadership skills* requires an understanding of gendered elements of leadership. It involves helping girls to develop voice, take action characterized by socio-cultural critique and advocacy, and create opportunities for new experiences (Ms. Foundation, 2001). Essentially, girl-specific programs develop leaders by teaching girls about themselves in relation to the dominant culture and building individual girls' competencies so they can negotiate the education system and other institutions. Providing *social change* opportunities empowers girls to challenge inequities they experience, such as sexual harassment or school rules that seem unreasonable or exclusionary.

Powerful Voices, like other high-quality girl-specific programs, actively employs these practices. Although there is little empirical evidence to tie these practices to academic gains, girl-specific programs aim to improve academic achievement by helping girls to value themselves and create social change while instructing them in "codes of power" (Delpit, 1988), including the classroom behaviors teachers expect from them.

Choosing a Youth Development Practice Model

A girl-specific practice framework delivers a vital lens for viewing effective practice with girls. In addition, Powerful Voices was interested in the youth development evidence base on academic outcomes. To assess our current practice, we had a choice from among several research-validated, age-appropriate quality assessment tools (Yohalem, Wilson-Ahlstrom, Fischer, & Shinn, 2009). When we won a grant in 2008 to participate in a quality improvement initiative launched by the Seattle-based Raikes Foundation, the Youth Program Quality Assessment (YPQA, HighScope Educational Research Foundation, 2007) was the tool used by the inaugural cohort of grantees, so that became our choice.

The YPQA is based on Maslow's hierarchy of needs, as shown in Figure 1 (Smith et al., 2012). *Safe environment*, defined in terms of the physical and emotional safety youth experience, forms the base of the pyramid. *Supportive environment* reflects the practices adults use to support youth, including skill-building, encouragement, and reframing conflict, among others. *Interaction* reflects what adults do to influence the peer culture, such as structuring small groups and opportunities for youth leadership. The top level, *engagement*, reflects opportunities for youth to plan, make choices, and learn from their experiences (Smith et al., 2012).

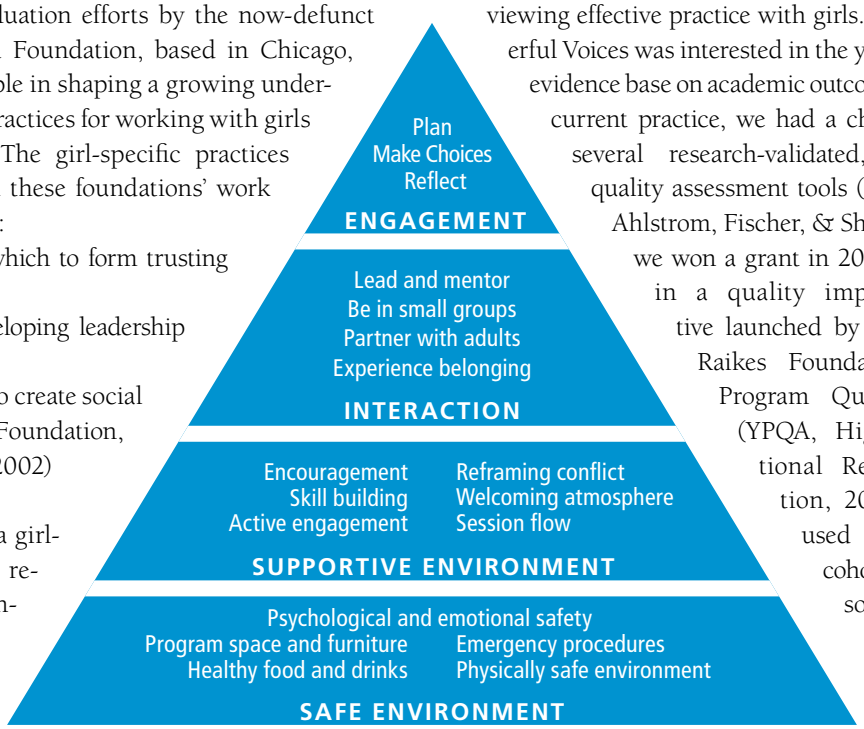

Figure 1. YPQA's Hierarchy of Program Characteristics
(Smith et al., 2012, p. 5)

Blending Girl-Specific and Youth Development Practices

Powerful Voices' involvement in the quality improvement initiative was transformative. We soon found ourselves aligning our girl-specific programming with practices known to work best in the broader youth development field. During the year-long initiative, we saw not only where our girl-specific model was congruent with YPQA's quality improvement framework, but also where the girl-specific practices added value.

Common Features

A close look at the two models reveals that both rely on these practice areas:

- **Ensuring safety.** Adult facilitators attend to the physical and emotional well-being of all participants.
- **Attending to peer culture.** Adults actively teach skills, manage conflict, and generally work to develop healthy relationships with and among participants.
- **Developing socio-emotional skills.** Program activities develop skills in communication, collaboration, critical thinking, decision making, and self-direction.
- **Promoting a sense of belonging, higher expectations, and feelings of self-efficacy.** As a group, participants feel that they matter to one another. As individuals, they believe that they have the ability to aim high and accomplish the goals they set for themselves.

"The [YPQA] model tied really well with what we were already doing," said one Powerful Voices instructor, "while giving us a youth development language that was widely spoken."

Gaps Filled by Girl-Specific Practices

Despite these common features, we discovered a few gaps when integrating girl-specific practices into the YPQA model. For example, the girl-specific framework shaped by the Ms. Foundation study and Powerful Voices' fieldwork views *safety* specifically in terms of developing healthy girl-to-girl and mother-daughter relationships. The *leadership* skills developed in the girl-specific framework help girls shape empowered identities as females of color. They become leaders who challenge society's oppression of people based on gender and race as well as other societal disadvantages such as class, sexual orientation, and ability. Similarly, the girl-specific model promotes *social change and activism* opportunities as critical to girls' struggle for identity and their ability to respond to injustice.

We also observed multi-directional movement along the YPQA's pyramid from *safety* to *engagement*. Progress was not linear but dynamic; often one step forward was followed by two steps back. For example, as girls developed trust with instructors and as instructors held higher expectations, some girls disclosed issues of abuse or family chaos that prevented them from working effectively in small groups, a facet of *interaction* in the YPQA pyramid. They might also have trouble planning projects, which falls into the top level of the pyramid, *engagement*. For these girls, the safer they felt with instructors, the more they needed outside support before they could engage with the group as a whole, undertake higher-level projects, and meet higher expectations.

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Blending girl-specific and youth development practices was hugely successful in taking Powerful Voices to the next level. Though the two bodies of practice have many features in common, our girl-specific and racial equity practices added value by attending to the cultural context in which these girls lived their lives.

How Girl-Specific Practices Influenced Academic Achievement

To make the case that our blend of youth development and girl-specific practices helped girls achieve academic success, Powerful Voices collected qualitative program evaluation data from the girls served by our group and one-to-one programs. The programs, offered in public middle and high schools and at community-based sites, serve 100 girls annually, at least 90 percent of whom are low-income girls of color. These girls are generally not making the educational gains hoped for by the girl justice movement.

The research questions for Powerful Voices' evaluation were:

- What are we doing for girls now that will help them academically in the future?
- What role do program instructors play in helping girls gain useful skills?
- Why does girl justice work matter to girls themselves?

With assistance from the University of Washington's School of Social Work, Powerful Voices staff collected and analyzed focus group responses, case histories, and alumnae

survey data. Ten focus groups were conducted with more than 100 girls over the course of three years. Facilitators led discussions guided by specific questions designed to capture how core program practices—ensuring safety, developing leadership skills, and promoting social change opportunities—translated into program impact. Audio recordings of the discussions were then analyzed for cross-cutting themes.

Powerful Voices instructors documented case histories of three girls who they felt had particularly benefited from program involvement. The instructors documented each girl's demographic information, cultural background, health, personality traits, and length and type of program involvement. They analyzed field notes for significant turning points in a girl's identity or shifts in relationships with group members, adult instructors, family members, peers or staff at school, and other community members. Powerful Voices goals—safety, leadership, and activism—were used as a lens to reflect on each girl's growth.

The alumnae survey reached a non-random sample of 29 young women whom agency staff were able to contact using Facebook, MySpace, e-mail, and phone calls. The alumnae used Survey Monkey to respond to multiple-choice and open-ended questions. In addition to factual questions about the number of years since program involvement and the number of participants with whom respondents were still in touch, open-ended questions asked about how the program affected their lives, relationships, and education and career choices. The survey data were analyzed for themes related to these questions.

Taken together, these data gave us a sense of how program practices benefited girls academically. Our findings included these observations:

- Experiencing a **positive girl culture** helped girls experience worthiness and belonging, which in turn could empower them at school.
- Girls developed **higher expectations** for themselves—including their academic futures—as well as for others.
- Developing **attitudes and skills** that specifically addressed the root reasons that these girls struggled academically was an important strategy for promoting school success.

These findings suggest that the three girl-specific practices—ensuring safety, developing leadership skills, and providing opportunities for activism—are valuable because they attend to the cultural context in which these girls, with their lack of income and racial advantages, live their lives and struggle to achieve academically.

Experiencing a Positive Girl Culture

Our findings show that girls experienced belonging in the program's positive girl culture. As a result, they felt a sense of self-worth that empowered them at school and elsewhere.

The case of Lara, who opened this article with a photo from college, is illustrative. Lara came to Powerful Voices by accident—she thought the program focused on singing. As the curriculum moved into examining body image and the media, Lara anchored her choices in her growing understanding of society's pressures on young women. She became more articulate in group discussions. Her attitude shifted from saying, "I'm ignoring you because you're mean" to "I'm making the choice to ignore you because I love myself, and I'm not going to sink to your level." Herself struggling to accept her weight, Lara adopted the critique of "skinny culture" she learned from the comedian Mo'Nique. Lara learned not only to accept her body but also take care of it with diet and exercise, joining a volleyball team later that year. Lara became a staunch advocate for a positive girl culture in the school community. She rallied her Powerful Voices group with this wisdom, inspiring other girls to stay away from "girl drama" and to see Lara as a role model. Her developmental trajectory took a new direction.

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For many girls, participation in Powerful Voices exposed them for the first time to forms of self-expression that emphasized values and a positive view of their gender. A focus group participant described it this way: "We can be who we are without any shame with it. We can stand up; we can speak out." As girls developed a sense of belonging, we heard this kind of language: "I have learned that Powerful Voices is our girl culture and is a better way to express ourselves." The girls took this newfound power into other areas of their lives. One girl explained, "If I can open up inside the group, I can open

up outside the group." Participants reported that they started speaking up in class, joining enrichment activities, and expanding their peer groups. They felt that what they contributed at school mattered. One girl, for example, successfully challenged her teacher to celebrate Black History month. Another took over a display case in the school hallway, where she showcased a mannequin covered with positive statements about girls' bodies, in contrast to the messages in mainstream media. By forging a healthy gender and cultural identity in a safe environment and by learning to deconstruct and challenge media, girls developed the ability to negotiate power, at school and elsewhere, from a position of self-worth.

In Powerful Voices, our girl-specific practices of fostering safety, developing leadership, and providing social change opportunities led to improved academic behaviors, social skills, and interpersonal behavior.

Developing Higher Expectations

Girls' expectations for themselves shifted. They also developed higher expectations of others. When they become aware of greater possibilities for their academic future, they wanted more for themselves without feeling they were betraying where they came from. For example, Lara disclosed a great deal during one-on-one mentoring time about her circumstances: domestic violence, an alcoholic parent, periodic homelessness, her grandmother's death, the hardships that go with poverty. Lara felt she was the only mature member of her family, often carrying the burdens of others. Still, she somehow maintained excellent performance in school. Lara developed higher expectations when she confronted the anger and shame associated with negative gender identity and her socioeconomic circumstances. She discovered that she had the power to access new opportunities. Supportive female mentors were instrumental in helping girls reframe their expectations. One girl noted, "I'm always going to have goals for myself, but sometimes it helps when I tell other people so I can achieve them."

Equally important was when girls expressed hard emotions—particularly betrayal and anger—toward mothers or mother figures. Then they could shift from anger and shame to pride and compassion. One girl reported: "I started asking my mom more questions about herself, even though I didn't want to be like her. We began to fight less and listen more." Another girl put it this way: "Here I built self-confidence and understood my mom instead of just getting mad at her point of view at the situation." This shift often came when girls began to develop a social critique of how women and people of color are devalued in mainstream culture. The girls developed more compassion for their mothers when they could see that the older women had experienced many of the same forces—poverty, low expectations, lack of access to opportunity—that they themselves were struggling to overcome.

Developing Attitudes and Skills That Promote School Success

By developing attitudes and skills that girls need to succeed—communication skills, for example, and pride in racial and gender identity—we influenced girls' motivation to do well and stay in school. Lara's case concluded with a happy ending: she won a full scholarship to the historically Black college she chose to attend. Pride in her racial identity was a factor in her choice. She had experienced strategies Powerful Voices uses to promote healthy racial identity, such as in-depth workshops on structural racism and ongoing opportunities to examine how internalized racism lowers educational expectations and motivation. Lara explained the value she now places on high educational expectations: "Here, they take education very seriously! If you obtain a C– in a class, you automatically failed that course. Saying that, I feel like I have made a good choice coming here because I too take education seriously" (personal correspondence, September 2011).

In addition, Lara's success was a result of having learned skills to help her function in school. Another program participant said:

> I learned how to handle things different, not to yell at my teacher over little things and that there are other ways you can handle problems. I learned to not listen to gossip and to not let people's words get the best of you.

Powerful Voices instructors teach girls to take schoolwork seriously, actively participate in class, and communicate in ways that keep them from getting into trouble. Furthermore, the process of building pride in gender identity influenced colleges and majors girls selected. An alumna reflected, "I realized part of the reason I am interested in Women and Gender Studies as a major is because of Girls' RAP [a Powerful Voices middle school program]."

Implications and Recommendations

In Powerful Voices, our girl-specific practices of fostering safety, developing leadership, and providing social change opportunities led to improved academic behaviors, social skills, and interpersonal behavior. In practice, it is not a big stretch to square girl-specific and evidence-based practices aimed at improving the quality of youth development programming generally.

Youth development professionals can actively work to integrate practices and teach skills that shape a positive girl culture and healthy female relationships. Girl-specific practices address the relational and cultural context *among females* and empower girls to confront harmful societal expectations within girl culture itself as well as those that circumvent individual academic gains and prevent social change. Experts suggest that healthy female relationships contribute to the well-being of girls; girls make important decisions in the context of female relationships (Brown, Duff, & Way, 1999; Brown & Gilligan, 1992). Healthy female relationships, built on effective communication skills, can interrupt a variety of detrimental issues that cascade over time. For example, one in four adolescent girls have been involved in a serious fight (Substance Abuse and Mental Health Services Administration, 2009), and girls who have been expelled from school are twice as likely as those who have not to become depressed in later life (McCarty et al., 2008). Meanwhile, effective mother-daughter communication has potential to stem the rise in girls' involvement in the juvenile justice system; arrests due to fights with mothers is a significant factor in this growth (Hawkins, Graham, Williams, & Zahn, 2009).

Youth development programs—girl-specific or not—can promote the well-being and educational achievement of *all* youth by incorporating exploration of the impact of media as well as the historical effects of structural racism. Programs can partner with a media watchdog organization such as Miss Representation or a girl-specific community-based organization to build a media literacy curriculum. They might also consult with organizations doing racial equity work, for example, the Aspen Institute Roundtable on Community Change or the Southern Poverty Law Center, to develop staff training and youth programming.

Framing skill development in terms of what Delpit (1988) calls "the codes of power" is another powerful approach. Delpit explains that young people of color need an explicit understanding of classroom rules that are often implicit and unstated. Further, she suggests, these expectations and the language we use to communicate them are the "codes of power" that young people need to learn how to use. Teaching youth about the arbitrariness of those codes and the power relationships they represent is also an essential strategy (Delpit, 1988).

At the same time, cultural competency requires practitioners to be skilled at understanding how power and powerlessness function in girls' lives. Programs should work to develop staff members' understanding of how privilege and oppression affect their interactions with girls. All staff must learn to view the program's culture and policies through an equity lens. Striving to ensure that the field represents those we serve is also essential to cultural responsiveness.

The effects of Powerful Voices' three core gender-specific practices—safety, leadership, and activism—on the social and academic lives of our participants suggests that these practices, as defined specifically for girls of color, deserve to be added to the list of features of positive youth development. The areas of gender and racial equity deserve more research, as practitioners seek to apply different methods for different populations in different settings rather than using a one-size-fits-all model.

Although girls have made extraordinary gains in educational and economic access in the past several decades, these gains have not been shared equitably by women and girls of color from high-poverty backgrounds (U.S. Department of Commerce & Executive Office of the President, 2011). Youth development and girl-specific programs have done a great deal—and have a great deal more to do—to equip girls like Lara to meet the opportunities and challenges of the 21st century world while also challenging its injustices.

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Combat Sports Bloggers, Mad Scientist Poets, and Comic Scriptwriters

Engaging Boys in Writing on Their Own Terms

by Rachel Loeper

As the program director of a community writing center that serves children and youth ages 5–18, I see it all, from 15-year-old spoken word poets to six-year-olds whose first "books" are strung together with yarn. In all of my roles—administrator, teacher, volunteer trainer—I value engaging the most reluctant of young writers. I therefore began to focus on a few middle school boys who frequented the center, Mighty Writers in South Philadelphia. All were students of color; eight of the 10 were considered to be "at risk" in school because they received free or reduced-priced lunch. They were noisy, rambunctious, and disruptive to other writers. They tended to rush through their prewriting and were careless in their drafting. Revision was a struggle and proofreading barely a thought. They were most engaged when wrestling on the sidewalk or cheering one another on to the next level of a computer game. Although they were certainly writing, I didn't see the same enthusiasm, focused attention, or motivation I saw in other Mighty Writers.

I wanted to discover strategies to better engage these boys and others like them in writing in out-of-school time (OST) programs. When I participated in the Afterschool Matters Practitioner Research Fellowship during the 2010–2011 school year, Mighty Writers' second year of operation, I had the opportunity to conduct research in my program to try to find such strategies.

I wanted these boys to experience, as I had as a child, what Csikszentmihalyi (1975) calls *flow:* the feeling of being fully absorbed in a challenging but enjoyable task. No professional basketball player achieves the flow experience without taking thousands of shots from the foul line. However, those thousands of shots need not be tedious. In fact, they're often communal and fun. In my research, I

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found that, before flow can occur, students must be given the opportunity to take small, incremental steps toward engaging in the writing process with the support of adults and peers. They must go through the writing process in safety, with encouragement and real critical feedback from people they know. The onus then is on educators, mentors, parents, and other adults to create engaging and collaborative opportunities through which boys can experience the writing process. My inquiry into the experience of 10 boys in Mighty Writers workshops helped me identify some key indicators of engagement that can move boys toward the flow experience.

Means to an End: Engagement Leads to Flow

Csikszentmihalyi (1975) defines *flow* as an experience of participating in an activity—sports, crafts, academics, or nearly any other pursuit—in which the participant is highly engaged and enjoys the activity. Also key to the flow experience is challenge: The activity should be just beyond—but not far beyond—the participant's skill set and knowledge. The identifiers of flow are involvement of both body and mind, deep concentration, clear intentions, and awareness of the quality of the performance. A person who is in a flow state has no fear of failure, no self-consciousness, and no awareness of the passage of time (Csikszentmihalyi, 1975).

In a study of engagement and flow in OST settings, Shernoff and Vandell (2008) found that urban boys reported peak experiences of flow during arts and sports activities. They experienced the lowest level of flow during homework help and test prep times (Shernoff & Vandell, 2008). I wanted to explore how to make the writing process feel more like a sport or a game to my group of reluctant male writers. Though the end goal is flow, ongoing engagement in the writing process may be the key to getting there. For example, Judy Abbott (2000) found that developing tools and strategies for writing engagement led to the flow experience for two fifth-grade boys. The engagement strategies included a great deal of praise, conversations about hot topics and current events, students' ownership of their writing, and an environment that supported all student writing endeavors (Abbott, 2000).

Bartko (2005) identified seven elements of engagement in OST programs:

1. Reactions to teachers, classmates, curriculum, and school
2. Sense of belonging
3. Value placed on learning
4. Participation in academic and social activities
5. Conduct
6. Attention
7. Willingness to exert the effort required to comprehend complex ideas and master difficult skills

In addition to these psychological and behavioral elements, engagement also requires the support of caring adults (Woolley & Bowen, 2007).

How ongoing engagement might connect to the flow experience is illustrated in Lipstein and Renninger's (2007) study of stages of writing interest in adolescents. Young people at the initial stages of writing interest require specific praise and manageable feedback to remain engaged. At later stages, young writers need their teachers and readers to show an understanding of their intentions as writers and to provide them with leveled challenges. Challenges that are just at the border of writers' current abilities are characteristic of the flow experience.

Program Context: Mighty Writers

The population at Mighty Writers is socioeconomically, racially, and ethnically diverse. Some students find us because they are already avid writers; others are pushed in our direction by parents or teachers. We offer programs focused on encouraging clear, concise, and creative writing for students at all levels. During the 2010–2011 school year, when I conducted my inquiry, our afterschool program offered homework completion time, a snack, free-choice time, and opportunities to learn the writing process. The classic writing process approach to creative and informative writing taught at Mighty Writers involves five steps: prewriting, drafting, revising, proofreading, and publishing.

We tried to create an environment where students could safely receive critical feedback and embrace revision. After homework and formal writing time, students congregated in small groups, playing computer games or taking a hula hoop break on the front sidewalk. Although our programming space is only 1,700 square feet, we have six rooms designed with children in mind, featuring comic book heroes on the walls and lots of ways for children to engage in brief physical activity.

In addition to our afterschool program, the Mighty Writers staff works with volunteers to develop and implement long- and short-term writing workshops during evenings and weekends. Eight of the 10 boys in my focus group participated in the afterschool program, and all of them participated in at least one of four writing workshops I observed as part of my inquiry.

Exploring Boys' Engagement

I identified the 10 boys in my study group because writing appeared to be a struggle for them at every stage of the process. The program's flow from homework to writing to play became an incentive system that perpetuated their negative attitude toward writing. Instead of seeing writing as play, which was my goal, they asked, "If I finish my writing, can I play?" Both engagement in and ownership of the process of writing seemed to be lacking.

Still, these boys would frequently stay late to participate in the writing workshops. I speculated that something was happening in the workshops that wasn't happening in the afterschool program. I began my inquiry by observing four workshops: Writing My Neighborhood, Act Out Loud, Comic Book Club, and Sports Blogging. In these initial observations, I was looking for themes, structures, activities, and relationships that contributed to engagement of the boys in my study group. I observed several meetings of each workshop, taking notes on the conversations, body language, and group dynamics I saw.

From these initial observations, I settled on a number of points of interest, which I used to guide interviews with students, parents, and instructors. Student interviews focused on the workshops themselves, the boys' identities as writers, their role models, and their writing portfolios. In parent interviews or surveys, I asked about social, emotional, and academic changes in their children, as well as the boys' attitudes toward writing. In the instructor interviews, the volunteers spoke about the challenges and opportunities of the workshop setting.

Finally, I closely studied the students' writing samples. For each of the boys, we had an average of seven writing samples or literacy artifacts spanning a period of six months to two years. In paging through the writing they produced, I first wanted to identify themes that had emerged in interviews: role models, autonomy, experimentation, relationships, and identity formation. I also looked for evidence of revision, working on the assumption that multiple revisions of a work connote a high level of student investment.

What Engagement Looks Like

I chose to study these 10 boys because I thought they weren't experiencing flow, and this observation led me to believe that they weren't engaged in the writing process. Once I began to speak with the boys, their parents, and the instructors, however, I learned that I was confusing *flow* with *engagement*. Entering into *flow* requires a certain level of expertise. *Engagement*, by contrast, can happen at all skill levels and is a necessary prequel to flow.

My observations, surveys, and interviews pointed to four features of the boys' engagement with the writing process:

- Banter and physicality
- Frequent breaks to talk about form or content with peers and adults
- Sharing work with the writing community throughout the writing process
- Sharing work beyond the writing community

The program's flow from homework to writing to play became an incentive system that perpetuated their negative attitude toward writing. Instead of seeing writing as play, which was my goal, they asked, "If I finish my writing, can I play?"

When all four of these identifying features were present, the boys showed what Bartko (2005) calls "willingness to exert the effort required to comprehend complex ideas and master difficult skills" (p. 112).

Of course, many of these identifiers will be present when girls are engaged as well, while some instances of boys' engagement will be missing some or all of them. I offer these observations and strategies not to contribute to a gender binary, but rather with the understanding that each child has a unique identity and experience, which makes each child receptive to a unique set of learning inputs.

Banter and Physicality

For many preadolescent boys, physical exploration is their primary way of understanding the world, although such exploration is generally discouraged in school settings. My observations and interviews showed that banter and physical activity affirmed boys' experience. These activities created a safe zone where boys felt safe because their way of being in the world was affirmed. Here my observations disagree with Bartko's list of elements of engagement, which includes "conduct." Though activities like wrestling, speaking with raised voices, or bantering in front of a computer screen are often viewed as poor conduct in a classroom, they may be acceptable in OST settings. In fact, we can harness this energy and redirect it toward positive writing experiences.

Banter and physicality can foster a sense of belonging among middle school boys and allow them a way into the workshop space on their own terms. Nearly all of the boys

talked in their interviews about a favorite workshop activity, such as gardening, acting, or painting, that incorporated movement. A fifth grader fondly remembered a game of charades he played during the Act Out Loud workshop: "The best thing about Mighty Writers for me was when I had to act like Steve Urkel in charades. Everyone was laughing as I was done and that made me feel excited." This young actor generally struggled in social settings because of behavioral problems, but the game of charades gave him an opportunity to make everyone laugh and so to feel accepted.

A seventh-grade student critiqued the workshop Writing My Neighborhood by comparing it to Act Out Loud:

> All you're really describing is what your neighborhood is like….You'd describe something, the people, it wasn't as fun…For me, it might be better to act out your neighborhood, what you would change.

This student's critique went on at some length. He made it clear that the topic of Writing My Neighborhood wasn't what left him disengaged; it was the delivery. Even a workshop about neighborhoods can incorporate banter, physicality, and maybe a game of charades.

A good example of banter turned up in my observation of the Sports Blogging workshop. The instructor opened by talking with the group—three boys and three adults including himself—about what had happened in sports that week. As the conversation moved to the Mets and Yankees, the students—who were all Phillies fans—were making fun of one of the volunteer teaching assistants for favoring the Mets. Then this exchange ensued between the instructor and Daniel,[1] an eighth grader of mixed ethnic heritage.

> *Daniel*: There's this kid in school who always wears a Yankees cap, and everyone makes fun of him.
> *Instructor*: Do you make fun of him, Daniel?
> *Daniel*: Yeah! I don't know why he wears the hat.
> *Instructor*: That's not cool! The poor dude already is a Yankees fan. He's got enough problems.

This light, friendly opening engaged students and volunteers alike. The banter created a way into the safe space of the workshop. Educators and youth workers may resist informal dialogue or make the mistake of thinking that conversations like this one are superfluous to the activities at hand. In fact, this kind of dialogue is essential to the writing that follows.

[1] All names in this article are pseudonyms.

Frequent Breaks to Talk About Form or Content

The boys I observed were often most successful at writing when they drafted a piece with an adult at their elbow, often stopping to engage in conversation about form or content. Having an expert adult nearby during the drafting phase does wonders to increase boys' attention and cultivate their perception of the value of the writing process. Targeted questions from adults during drafting makes the effort required to write well less intimidating, since support is nearby. One parent said on the parent survey that the Sports Blogging workshop "made [my son] think about what he wanted to say, how to say it, and how to present it." Another parent of two boys said in an interview:

> My boys have a lot of respect for what the tutors say. I think they're looking for role models who have a strong self-identity and understanding of their own abilities, and I see them benefiting from both male and female role models at Mighty Writers, and even older students.

Having an expert adult nearby during the drafting phase does wonders to increase boys' attention and cultivate their perception of the value of the writing process.

These role models help to engage boys in writing by offering support while communicating respect for the boys' ideas.

Volunteers who sit next to the boys as they write offer a hybrid of critique, critical thinking, encouragement, and positive feedback. During one observation of the Sports Blogging workshop, I saw three boys writing for nearly an hour, each with an adult at his elbow. During that time, the boys and their mentors engaged in conversations about how to write transitions and, because the room contained a Ping-Pong table, banter about past Ping-Pong games. Most amazingly, they also had really great discussions about the form and content of the boys' writing, all of it couched in encouragement and a spirit of collaboration.

> *Volunteer*: So you know that every writer has to rewrite things several times. Let's try reorganizing this a little bit. We want a hook here, something to catch your reader. Of all of your sentences, which one do you think would be best to start with?
> *Muhammad*: [Whispers to volunteer.]
> *Volunteer*: That's good. Go with that.
> *Muhammad*: All right, now I got it.
> *Volunteer*: So what's going to come after this? You just told me you have something to say. What do you have to say?
> *Muhammad*: Maybe this? [Points to the page.]
> *Volunteer*: What's the basic thing that you're trying

to get across? What's the one sentence that this just doesn't make sense without?

Muhammad: [Reads one of his sentences.]

Volunteer: Right. So before you tell them that they have to agree with you, tell them what they have to agree with. Keep going. [Plays with his phone.] Keep going. You've got the idea now.

Muhammad: So then I might say this. [Points to his notebook.]

Volunteer: It's up to you, your choice. You are always right.

In this observation, we see the volunteer using a lot of joining language: "we" instead of "you." Also, rather than telling Muhammad that his first suggestion for the main idea doesn't work, the volunteer asks more questions to try to get Muhammad to come to the main idea on his own. Finally, the volunteer offers encouragement in almost every line. Conversations like these keep writers' attention sharp, communicate respect for the written word, and ease the effort of the task at hand.

The instructors are not gatekeepers of good writing, letting students in or keeping them out. Rather, they are writers working alongside students, discussing struggles and successes as they arise.

Sharing with the Writing Community

In Mighty Writers workshops, all members of the boys' writing communities shared their work in formal and informal ways throughout the writing process. At every stage, they received praise and encouragement.

The best writing teachers are writers themselves who are unafraid to share their own work with students. They offer students models of good writing while creating a community in which writers can safely receive critiques and engage in revision. The instructors are not gatekeepers of good writing, letting students in or keeping them out. Rather, they are writers working alongside students, discussing struggles and successes as they arise. When all members of the writing community share their work, students are more willing to exert the effort to comprehend complex ideas and master difficult skills—a key element of engagement, according to Bartko (2005). Conversations with instructors and peers help to scaffold skill development, and then the effort is rewarded when writers share their work and receive positive feedback.

For example, during one session of Sports Blogging, it was Andy's turn to share his first draft of an introductory blog post, a descriptive list of his top five favorite combat-based video games. As he read, Andy, an eighth grader, showed a fair amount of reticence, speaking softly and holding his binder to cover his face. When he finished, everyone applauded. Muhammad, a fifth grader, gave this feedback: "[Andy] used a metaphor in that sentence, and he was very specific about what was going on, about dead scum being on the ground in the jungle. It made me see the game that he plays." As Andy listened to Muhammad's comments, he put his binder down and nodded slightly. He was back in the fold, feeling a little more confident.

In all Mighty Writers workshops, students produce a final written product. Many workshops end with a performance as well. At the conclusion of Act Out Loud, students performed their final monologues at a local college theater. One parent spoke about how proud she was of her son. A fifth grader a full head shorter than the other students in the workshop, this boy took a lead role in the production. His mother said, "I couldn't believe it when I saw him on presentation night, this little guy among all these older kids. They really gave him a level playing field." Observing how the boys shared writing was an eye-opening experience for her. She said, "I wanted [my son] to think of himself as a writer, but I didn't really see how he was doing that until the final performance for Act Out Loud. There, he was loving it."

In my research, the act of sharing student work throughout the writing process stood out as both an indicator of and a motivator for engagement. Sharing gave the boys multiple opportunities for praise and critique at every stage of the writing process. The students seemed to understand that they were working side by side with adult writers who faced the same struggles they did. The support of those adults empowered the boys to approach the difficult business of drafting and revising.

Sharing Outside the Writing Community

In Mighty Writers, as in many other programs, students share their work with others outside of the immediate writing community. When boys bring their writing back into their lives, sharing with teachers, friends, parents, and other relatives, they reveal their pride and investment in the good work they've done, creating a snowball effect of effort and reward.

Daniel's mother said on her survey that Daniel "talked about Sports Blogging a lot afterward, including what they

did and progress on his blog." Another student's guardian noted that the boy would spend hours working on his Act Out Loud monologue at home. "As far as I can tell, the workshops really made him think. [He] would work hard on the Mighty Writers assignments and spent countless hours at my house working on his pieces."

In the most telling account, Muhammad's mother talked about the way his sports blog became a conversation point at gatherings of both immediate and extended family:

> [Muhammad's tutor] gave him an idea of what a blog was. They considered it like an online journal where he could write about things that mattered to him, and other kids would respond. I signed on to review it and comment, and we'll often pull it up when the family is together to show off his work.

When boys take the work they produce beyond the writing community, asking friends and family to affirm this new skill, they reveal their engagement in the writing process. As their skills and engagement increase, they take ownership of their writing and embrace their identities as writers. I've found that this internalization of a writerly identity is the last step in moving from leveled engagement to flow.

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Ways to Foster Engagement

In the process of discovering these four key indicators of boys' engagement in the writing process, I also identified several strategies that promoted our boys' success. With thoughtful planning, these strategies can be easily implemented in other OST programs, in clubs within OST programs, or in other educational settings.

Training and Professional Development

Professional development is crucial to the success of any OST writing program. Programs that seek to engage boys in writing can train their staff and volunteers to create an environment in which the four indicators of engagement can flourish. Programs should to train adults to:

- **Create opportunities for conversation and banter to emerge naturally.** OST instruction periods need not begin with a formal check-in. When boys and adults practice the art of conversation on their own terms, everyone can feel at ease.
- **Use mentor texts to encourage critical thinking about writing.** Volunteers and staff can use discussions of newspaper articles, literature, web content, or their own writing to help boys discover what makes a written piece work.
- **Collaborate with students throughout the writing process.** Programs should train staff and volunteers to listen well, use critical questions to guide revision, and treat writing as a shared endeavor.
- **Communicate high expectations and specific praise.** Both expectations and praise should be conveyed in a clear and concise manner.

During an observation of the Comic Book Club, I saw a volunteer exemplifying the kind of communication we hope to achieve at Mighty Writers:

> Joshua is doing something I forgot to mention. He must have taken comic book classes before. (Have you?) He drew a blue feather on his hero's chest in every panel, so there's no question about who that figure is.

In this example, the praise for Joshua is also a teaching moment for other students.

Program Design

The shape of the program also helps to create an environment in which boys can get engaged with writing. One important component is opportunities for boys to work one on one with adults. Staff or volunteers who get to know each student's writing intimately can offer the greatest amount of support. The effectiveness of the relationship depends on the adults' skills, patience, and ability to praise.

Programs can also create workshops that are explicitly boy-centered, along with girl-centered and gender-neutral workshops. At Mighty Writers, workshops that have attracted upper elementary and middle school boys include Sports Blogging, Comic Book Club, and a playwriting workshop called For Boys Only. The key to success is the degree to which boys can identify with the theme of the workshop. Gender-targeted workshops are usually not exclusive. When a boy wanted to join Hair Stories to write about his dreadlocks, we let him. Workshops

that appeal more to boys and more to girls should exist alongside gender-neutral options.

Safe Spaces

Every writer needs a safe space in which to write drafts, get feedback, and revise. One aspect of safety that may be more important for boys than for most girls is that the program space allows for movement and physical activity. Even when program goals are academic or creative, as in the case of Mighty Writers, a Ping-Pong table in the writing space gives boys an outlet. Staff and volunteers can find energetic but focused games that give students a chance to expend their energy in positive ways while building community. After "blowing off some steam" together, boys will be better able to function as a community of writers who compassionately and thoughtfully critique one another's work.

Every writer needs a safe space in which to write drafts, get feedback, and revise. One aspect of safety that may be more important for boys than for most girls is that the program space allows for movement and physical activity.

Another aspect of safety is multiple opportunities for positive feedback at every stage of the writing process. Encouragement breeds motivation. Anyone who puts pen to paper or sits down at a keyboard is taking a risk. In order to uplift boy writers, the adults who work with them must find the good in everything they write, point it out in specific terms, and encourage them to try it again and again.

Finally, adults should encourage autonomy and responsibility. In my interviews with boys, I asked, "Are you any kind of writer?" Every boy had an answer. Volunteers and staff at Mighty Writers encourage autonomy and responsibility by having clear, specific expectations for student writing while also giving students the freedom to choose genres, make process decisions, and decide when to share their work.

"Are You Any Kind of Writer?"

The boys I interviewed had a lot to teach me. As I listened to their stories and those of their parents, I learned that they already were engaged in the writing process. When I looked for ways to keep them engaged, I came up with a framework and recommendations that will shape future writing programs at Mighty Writers. However, my greatest reward was being allowed to listen to the boys' stories and learn why and how they identified as writers.

The response of Andy, from the Sports Blogging workshop, was the most poignant. Andy was a quiet boy who grew a foot in the two years I knew him. He was often found hanging at the periphery of the room or activity. Two years into the program, when Andy was finishing eighth grade, I asked him, "Are you any kind of writer?"

Without answering, he jumped up, walked to the closet of my office (which also doubled as program space), and pulled down his June writing project, a poem in which he imagined himself a tree at the center of one of his favorite combat video games. It was June 1. Andy had already completed that month's assignment and stashed it in a place where only I might find it. I was reminded of similar moments I'd experienced during the year: I'd be cleaning out a cabinet or pulling a book down from a high shelf, and there I'd discover an Andy poem.

In the two-page poem, Andy takes on the persona of a tree in the middle of the battle zone, standing firm despite the war and chaos exploding around him. The poem concludes:

I survived because I am worthy
My roots are strong
as they stand before me
I was here first
and I will be here after
I guess I could stand through
any disaster.

"I'm a poetry writer. I listen to a lot of music, and I guess I'm good at rhyming now," he shrugged.

Andy is a poet. Maybe he was a poet before he came to Mighty Writers, but he may not have been aware of his gift or had the chance to develop it. A community writing center, or a writing community within a broader OST program, is a dynamic and interactive approach to OST education. If we can train volunteers adequately, design programs with boys in mind, and create safe and accountable spaces for boys, we've made a start. If nothing else, adult readers of children's work must learn to identify the writers' engagement with every piece they're willing to share, praise their successes, and cheer them on to try again and again.

Through practice and regular engagement, more of our boys will achieve the skill necessary to experience flow in writing. Whether they become teachers, engineers, or business managers, the joy of writing will inform their private and public lives as they grow into adulthood. Just as the high school basketball star returns to the court later in life when he needs to clear his mind, so will our young writers have the ability to return to the page to clear away the cobwebs, clarify their thoughts, and construct their future.

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Hmong High School Students in Afterschool

Effects on Achievement, Behavior, and Self-Esteem

by Kimberley A. M. Boyer and Susan M. Tracz

By 2040, Asian Americans are expected to account for 10 percent of the country's total population (Lee, 1999). However, few studies focus on afterschool interventions for Asian-American young people or examine how afterschool programming affects them. One reason may be the myth of the model minority, the stereotype that Asian-American students are all high-achieving conformists (Olsen, 1999; Walker-Moffat, 1995). However, Asian Americans are far from being a monolithic group. For one thing, their backgrounds are highly diverse.

The Asian population is made up of 31 different ethnic groups who speak close to 300 languages and dialects (Olsen, 1999). Among these groups, wide differences in experiences are common. Recent immigrants, particularly those from underprivileged areas where education levels are low, are less likely to have the resources to support their children's learning than are immigrants from more affluent regions. Experience of trauma before and during immigration likewise takes its toll. For example, the families of the Hmong students who are the focus of this study came to the U.S. as refugees, often after long and debilitating stays in refugee camps. The children of such immigrant families must cope not only with language and cultural differences but also with recent trauma and with all the challenges of living in poverty. Contrary to

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the "model minority" stereotype, these young people face at least as many barriers to educational and social success as do members of other minority groups in this country.

Afterschool programs can support Asian-American young people by providing academic support and culturally specific programming designed to help them bridge their native and adopted cultures. However, little is known about the effect of afterschool participation on academic and social outcomes for Asian-American students. This causal-comparative study helps to fill this gap by studying the differences in achievement, behavior, and self-esteem between Hmong students who did and did not participate in afterschool programs in two high schools in the Central Valley of California. The focus on a specific ethnic group is a reminder that Asian Americans are not a single entity but a diverse set of groups. Our study helps to fill another gap in the literature by focusing on the high school level, where the effects of afterschool programming are much less well documented than at the elementary and middle school levels.

The Experience of Hmong Students

Beginning in 1975, the Hmong from northern Laos began to immigrate to the United States (Bliatout, Downing, Lewis, & Yang, 1988). Recruited by the CIA during the Vietnam War, many Hmong later fled from Laos to Thailand, where large numbers lived in refugee camps for up to 20 years (Goodkind, 2006). Between 1975 and 1999, about 1.2 million Southeast Asian refugees resettled in the U.S. (U.S. Department of Health and Human Services, Office of Refugee Resettlement, 1999). Some of these families experienced catastrophic losses during the Vietnam War and in the refugee camps. These losses were further compounded by the losses involved in emigrating.

The total Hmong population in the U.S. is estimated at more than 235,000 people (California State University, Fresno, 2011). California's Hmong population is estimated to be nearly 85,000; in the Central Valley, the population is about 47,000. The adjustment issues these immigrants faced in the U.S. included poor health, post-traumatic stress disorder, poor English language skills, lack of formal education, conflicted intergenerational relations, unemployment, poverty, and identity confusion about family and other roles (Beiser, Turner, & Ganesan, 1989; Pernice & Brook, 1996).

According to Lee (2001), the proportion of Hmong who are 17 years or younger is 44.1 percent; the U.S. average is 24.3 percent. Initially, when Hmong students began to attend U.S. schools, their achievement rate was perceived to be low, and Hmong students had high dropout rates, in part because of the early marriages of girls. To compound the burden, newly educated English-speaking children often did not respect their elders as their culture expected, perceiving their parents and grandparents as clinging to traditional ways. Later this pattern was broken as two distinct types of Hmong students emerged. Some students were highly successful in school, reinforcing the stereotype of the model minority. Girls were higher achievers than boys. However, for other students, low achievement, early marriages and pregnancies, dropping out, and gang membership continued to be problems.

A Shortage of Research

The positive effects of afterschool programs generally are well documented. Teens in afterschool tend to have higher achievement, higher test scores in high school, better attendance, better study habits, and better psychosocial indicators (American Youth Policy Forum, 2006; Espino, Fabiano, & Pearson, 2004; Fabiano, Pearson, Reisner, & Williams, 2006; Goerge, Cusick, Wasserman, & Gladden, 2007; Vandell, Reisner, & Pierce, 2007; Welsh, Russell, Williams, Reisner, & White, 2002). These positive outcomes are especially important for young teens and high school students, who are increasingly likely to drop out of school or engage in risky behaviors as they grow older.

Most of the research on the effect of afterschool programs on high school students examines programs in middle school, where the foundation is laid for academic and social success in high school. For example, Vandell and colleagues (2007) found that middle school students in high-quality afterschool programs experienced significant gains in mathematics achievement. They also found a reduction in incidence of misconduct, with a corresponding increase in positive work habits. Similarly, researchers (Espino et al., 2004, Fabiano et al., 2006) examined the high school outcomes of eighth grade students who attended Citizen School afterschool programs in Boston. Fabiano and colleagues (2006) found that participating students had better school attendance, better English and math grades, and fewer school suspensions than did students who did not attend afterschool programs. In a study of LA's BEST programs for students in grades 6–9, Huang and colleagues (2005) followed four cohorts of students through grade 12. LA's BEST students were reported to have higher self-esteem and lower dropout rates than did matched nonparticipants (Huang, Kim, Marshall, & Pérez, 2005).

Studies of afterschool programs in high schools are less numerous because fewer students attend high school programs. Indeed, as students drop out, fewer even attend high school. The studies on the effects of afterschool programs on high school youth that do exist generally show

positive results. For example, a study of the After School Matters program in Chicago (Goerge et al., 2007) found that participants had fewer absences, fewer course failures, better high school graduation rates, and lower dropout rates than nonparticipants. A report by Hipps and Diaz (2007) on the After School Safety and Enrichment for Teens (ASSETs) program—also the setting of our research—revealed that ASSETs had some significant effects on students and schools. Participants passed California's English language arts and mathematics exit exams at significantly higher rates than did similarly situated students not involved in afterschool programs. The program also increased students' awareness of options after high school and facilitated positive relationships with adults and peers.

Ethnicity is rarely mentioned in these studies of the effects of middle and high school afterschool programs. In those that do specify the ethnicities of the student samples, the percentages of Asian-American students are predictably low, from 3 percent (Vandell et al., 2007) to 9 percent (Welsh et al., 2002). In the LA's BEST study, Asian-American students were the third largest group after Hispanic and African-American students (Huang et al., 2005). Even in these studies, however, the effects of afterschool programs specifically on Asian-American students go essentially unexamined.

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We know of no research that examines afterschool programming for Hmong high school students. The only study we have found of afterschool programs serving low-income Hmong immigrant youth is that of Lee and Hawkins (2008), who conducted a qualitative study of community-based programs in Lakeside, Michigan, serving children ages 6–12. Through observations and interviews, Lee and Hawkins examined how these programs supported students' development of their cultural identity by drawing on Hmong culture, history, and family structure as well as mainstream American culture. Children were encouraged to learn English while continuing to speak the Hmong language. The director advised students to adopt aspects of the dominant American culture that were necessary for social mobility and success but not to give up their cultural identities. Lee and Hawkins concluded that participants felt safe and comfortable in trying out their new Hmong-American identities, so that they developed their self-esteem and could be successful in school. However, the study did not quantify academic and psychosocial outcomes among participating Hmong youth.

Methods

In order to begin to quantify the effect of afterschool programming on Hmong high school students, we conducted a causal-comparative study of the differences in academic outcomes, academic behavior, and self-esteem between such students who attended and did not attend afterschool programs.

Setting

The setting for our study was the After-School Safety and Enrichment for Teens (ASSETs) program in two high schools in the Central Valley of California. These two high schools average approximately 2,600 students apiece in grades 9–12; both have high Hmong enrollments. These schools were chosen for this study because they were early ASSETs program grantees, beginning the ASSETs program during the 2007–2008 academic year. Our research covered the 2008–2009 academic year.

ASSETs is a 21st Century Community Learning Centers program established by the California Legislature in 2002 as part of a statewide effort to address the underachievement of California youth (California Department of Education, 2008). Priority is given to projects that serve students in schools that, like the two schools in this study, ranked in the lowest three deciles of the Academic Performance Index (Hipps & Diaz, 2007).

The ASSETs programs we studied offered academic support activities every day. Academic programs included mentoring, tutoring, and workforce readiness training, as well as frequent and extensive training to prepare students for academic testing. Students could drop in and out depending on their schedules and participation in other ASSETs activities. Cultural enrichment and awareness activities like dance and cooking were offered in modules so students could pick and choose. These classes typically met three to five times a week. Program facilitators were school teachers or college students.

At each of the two schools, about 200 students attended the ASSETs program each day. Roughly 15 percent of the attendees were Hmong. In both schools, all students were invited to attend, but program facilitators and mentors purposefully recruited struggling students who were

referred by teachers and administrators to take advantage of the academic help the ASSETs programs offered.

Participants

We recruited from among all Hmong-American students in the two high schools chosen for this study. The final sample consists of 226 Hmong high school students. Approximately one-third (77) participated in the afterschool program, and two-thirds (149) did not.

Of the 176 students for whom gender information was available, 42 percent were male and 58 percent were female. Nearly equal numbers of students were in all four grades, 9–12. According to the student surveys, parental education levels were low, with 36 percent of students' parents having only an elementary school education or less and another 41 percent having some high school education. We did not have demographic data for all students because some students did not answer those questions on the survey.

Data Sources

To measure academic performance, we used student scores from the California High School Exit Exam for English language arts (ELA) and mathematics. Only 11th- and 12th-grade students take these tests, so scores were not available for students in grades 9 and 10. We assessed academic performance using cumulative grade point average (GPA) and academic behavior using individual attendance rates. The attendance rate was calculated as the number of days a student was present in school divided by the number of days that student was enrolled. All of these data came from school district records.

To measure the affective outcome of interest, we used the Rosenberg Self-Esteem Scale (Rosenberg, 1989), the most widely used self-esteem measure in social science research. The Rosenberg scale contains 10 items that are rated on a four-point Likert scale ranging from "strongly agree" to "strongly disagree." We administered this assessment to participating students along with a survey of pertinent demographic information.

Procedures

In order to examine differences between Hmong youth who did and did not participate in the ASSETs program, we took several steps. First, we secured approval from the institutional review board of California State University, Fresno. At one school the principal assisted with recruiting students from their homerooms. In the other school, students were recruited with announcements asking them to come to the library for further information. As an incentive, participating students were entered into a lottery for an iPod. Once students volunteered, we gave them informational packets that included an introductory letter; a consent form; and a DVD that educated the students and their parents about the purpose of the study, the surveys, and other relevant materials. After permission was secured, we brought students together to take our survey, which included self-esteem and demographic measures.

We then divided the 224 Hmong students whose parents gave consent and who responded to our survey into two groups: students who had participated in the ASSETs program for at least 30 days since August 2008 and students who had not. We identified members of these groups based on their answers to our survey questions and then checked the afterschool site attendance databases. We chose 30 days as the cutoff point based on research by Hipps and Diaz (2007) indicating that significant increases in student achievement took place at 30 days or more of participation in the ASSETs program. Furthermore, students who dropped out of ASSETs tended to leave within the first 30 days, so that those who persisted past 30 days tended to continue in the program.

Next, we collected archival 2008–2009 data for students in both groups, including exit exam scores in ELA and math, cumulative GPAs, and school attendance. Using student ID numbers as identifying information, we merged our survey data with the archival data for analysis. We ran a variety of statistical tests to determine significance. For example, we ran chi-square tests of independence to determine whether gender, grade, or parent education level affected whether or not students participated in the afterschool program. We calculated average results for each of the dependent variables—ELA scores, math scores, GPA, attendance rate, and self-esteem—by afterschool participation and by grade and then ran tests to determine whether these results were significant at the 0.05 level.

Effects of Afterschool Participation on Hmong High School Students

We found no significant differences in afterschool participation by gender or parent education level. Students whose parents had only an elementary school education, for example, were no more or less likely to attend the afterschool program than students whose parents had college degrees. However, we did find a significant chi-square value between grade and afterschool participation: a higher proportion of students in grade 12 than in other grades participated in ASSETs.

Tests comparing the effect of afterschool participation on academic outcomes showed some statistically significant differences. We found that the difference in GPA by ASSETs participation was in the negative direction: Students who participated had an average GPA of 2.05, lower than the average GPA of nonparticipants, 2.47. However, on the California High School Exit Exam, 11th- and 12th-graders who participated in the afterschool program had a higher average ELA score than did nonparticipants. The average ELA score was 371 for participants and 355 for nonparticipants, a statistically significant difference. (The passing score is 350.) Participants also had higher math scores than did nonparticipants, though the difference was not statistically significant.

In our measure of academic behavior, ASSETs participants had significantly better average attendance rates, at 99 percent, than did nonparticipants, at 95 percent.

The findings for self-esteem were mixed. Ninth-grade students who did not participate in ASSETs had higher scores for self-esteem than did participants. However, for all other grades, participants had higher self-esteem scores than did nonparticipants, with participating seniors having the highest self-esteem score of all.

Understanding the Results

In contrast to much of the published research on afterschool programming for middle and high school students (Fabiano et al., 2006; Goerge et al., 2007), which reports higher achievement rates for afterschool students than for non-participating peers, our findings were mixed. Though students in the ASSETs program achieved higher scores on the ELA exit exam than did non-participating students, participating students had lower GPAs. It must be noted that GPAs for both groups of Hmong students were relatively low: just 2.05 for participating students and 2.47 for non-participating students. In this respect, Hmong students in this study apparently experienced an achievement gap comparable to the often-cited gap experienced by Hispanic and African-American students. Clearly the Hmong students in our study did not fit the model minority stereotype of Asian Americans.

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The relatively low GPAs of all Hmong students may be at least partially explained by cultural and educational background. Formal schooling in all subjects relies on reading and writing. Hmong is an ancient culture, but, unlike many Asian cultures, its language has only recently acquired a system of writing (Bliatout et al., 1988). Meanwhile, about 40 percent of the parents of the students in our study had, at best, only a grade school education—a finding consistent with their backgrounds as refugees. Parents with little education themselves, and particularly those raising children in marginal settings such as refugee camps, are not likely to engage in the child-rearing practices that prepare children to excel in school, such as reading aloud. As a group, then, the Hmong students in our sample may have started with an educational deficit that helps to explain their relatively low grades.

The fact that afterschool participants had lower average GPAs than did nonparticipants may also be attributed to the students' starting point before the afterschool intervention. Students with low GPAs were targeted for recruitment into the ASSETs programs so that they could benefit from the specialized academic support the programs offered. Tutoring in core subject areas, credit recovery classes, and exit exam tutorials were designed to help ASSETs students get and stay on track to graduate. As a group, ASSETs students are likely to have started out with lower GPAs than their non-participating peers.

Two areas in which the ASSETs program does seem to have helped participating students are preparation for the high school exit exam and school attendance. Test preparation was offered to all students in the high schools in our study, but it was offered only sporadically, and students often did not take advantage of the opportunity or use it regularly. Meanwhile, ASSETs students received targeted tutoring to help them with the exam. Evidence of the effectiveness of this exit exam training is that participants had significantly higher mean scores on the ELA exam than did nonparticipants. ASSETs students also had better attendance rates than did non-participating students. These findings echo the research described above that found higher results on some measures of academic achievement and behaviors for afterschool participants.

The ASSETs program also seems to have had positive effects on self-esteem. In the ninth grade, students attending the afterschool program had lower average self-esteem scores than those who did not attend. Perhaps these students were experiencing more freedom

as they started high school, while the ASSETs students felt confined by their participation in a school-related activity after school. However, students in grades 10–12 who participated in ASSETs had higher self-esteem scores than did those who did not participate. The highest self-esteem rating was for seniors who were assisted academically by ASSETs as they neared the achievement of a high school diploma. Program participants may have benefitted from the positive adult relationships, academic support, and Hmong cultural enrichment provided by ASSETs, similar to the students in Lee and Hawkins's (2008) qualitative study.

School and afterschool educators who work with Hmong students should pay particular attention to the students' distinct cultural context. These professionals need to understand the ecological realities and ethno-cultural dynamics faced by Hmong students in order to help them more effectively.

Implications for Policy and Practice

The ASSETs afterschool program produced positive outcomes for the Hmong high school students in our sample. The implication is that other Hmong high school students could also benefit from afterschool programs. If they receive intensive test preparation, students are likely to improve their test scores. They may be more likely to attend during the regular school day if they are motivated to attend the afterschool program. Furthermore, exposure to experiences related to their home culture with the support of caring afterschool staff may improve their self-esteem.

Self-esteem is one possible indicator of mental health status. The process of acculturation—the cognitive and behavioral changes brought about by close contact with a different culture—can be stressful for acculturated individuals, often producing depression, anxiety, and low self-esteem (Rhee, Chang, & Rhee, 2003). As Rhee and colleagues (2003) found, professionals must recognize the importance of communication, within families and across cultural groups, in promoting self-esteem among adolescents. School and afterschool educators who work with Hmong students should pay particular attention to the students' distinct cultural context. These professionals need to understand the ecological realities and ethno-cultural dynamics faced by Hmong students in order to help them more effectively. Many afterschool programs like ASSETs strive to address these realities. Afterschool programs' ongoing efforts along these lines can produce positive social-emotional outcomes not only among Hmong students but also among students from any disadvantaged immigrant group.

As with all studies, this one leads to future research possibilities. Future studies that address academic differences among Asian subgroups, including the Hmong, may be useful in dispelling the myth of Asians as the model minority. Studies comparing the academic and social outcomes of Hmong students and of members of other non-Asian minorities may find more similarities than differences. Other research could compare outcomes among Hmong students whose families have lived in the U.S. for longer and shorter periods of time. This avenue of research could provide useful insights into Hmong students' educational and acculturation processes.

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Afterschool Matters

Call for Papers

Spring 2015 Issue

Afterschool Matters, a national, peer-reviewed journal dedicated to promoting professionalism, scholarship, and consciousness in the field of afterschool education, is seeking material for the Spring 2015 issue. Published by the National Institute on Out-of-School Time with support from the Robert Bowne Foundation, the journal serves those involved in developing and running programs for youth during the out-of-school time hours, in addition to those engaged in research and in shaping youth development policy.

Afterschool Matters seeks scholarly work, from a variety of disciplines, which can be applied to or is based on the afterschool arena. The journal also welcomes submissions that explore practical ideas for working with young people during the out-of-school hours. Articles should connect to current theory and practice in the field by relating to previously published research; a range of academic perspectives will be considered. Articles should be relevant and accessible to both practitioners and academic researchers. We also welcome personal or inspirational narratives and essays for our section "Voices from the Field."

Any topic related to the theory and practice of out-of-school time programming will be considered for the Spring 2015 issue. We are particularly interested in manuscripts that offer practice recommendations and implementation strategies related to the featured research. We invite you to discuss possible topics in advance with us. Suggested topics include:

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- Submissions should not exceed 5,000 words.
- Include a separate cover sheet with the manuscript title, authors' names, addresses, phone numbers, and e-mail addresses.
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- Follow the *Publication Manual of the American Psychological Association, 6th Edition* (July 2009), for reference style guidelines. Present important information in the text and do not use extensive footnotes.

Inquiries about possible articles or topics are welcome.
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