



Supporting Social and Emotional Development Through Quality Afterschool Programs

Research to Practice in the Afterschool and Expanded Learning Field

This first brief in our series focuses on how afterschool programs contribute to the development of social and emotional competencies in young people. In practice, we see how high-quality programs can help participants learn, grow, and develop. But what does the research say? How can we prove it? We chose to focus our first brief on this important topic because there has been a growing recognition that afterschool programs can and do facilitate the social and emotional development of young people. Despite the recent attention this topic has received, efforts to define and measure social and emotional competencies in afterschool settings are still emerging. This brief provides an overview of work done to date both in afterschool and school-based settings to define social and emotional learning, shares recent research on how afterschool programs contribute to the development of these competencies, and, finally, offers some next step recommendations to both practitioners and researchers.

American Institutes for Research (AIR)

is pleased to release this first brief in our series *Beyond the Bell: Research to Practice in the Afterschool and Expanded Learning Field*.

A core mission of the Afterschool and Expanded Learning team at AIR is to be both consumers and producers of rigorous research and to share with the field what we learn. It is essential that research findings reach the practitioners who can make use of them to inform their program improvement efforts. In that spirit, we are releasing a series of research to practice briefs designed to make research on the afterschool and expanded learning field accessible and easy to understand. Practitioners help young people grow and learn every day. Researchers study this work to understand how it helps youth, families, and communities. These briefs are designed to connect the dots so that we can learn from one another.

Measuring and Defining Social and Emotional Skills

During the past 20 years, the afterschool field has been held accountable in varying ways—first, on our ability to provide safe places for young people to spend time while their parents work; then, on our success in helping to improve participants' academic achievement as a supplement to the school day.¹ Today, measuring success in afterschool programs is more nuanced and has been influenced by an increased recognition that the social and emotional competencies youth develop while in afterschool programs are also critical to their success in school and life.² The heightened focus on social and emotional skills is also growing in formal education settings, and, as a result, researchers across the country and around the globe are grappling with how to measure social and emotional competencies in a world that prizes easily quantifiable indicators.³ The challenge for the afterschool field is that social and emotional competencies are not universally agreed upon, and their measurement is both complicated and controversial. In many ways, practitioners trying to identify how their program improves young people's

HOW are afterschool programs applying the CASEL framework?

One organization putting social and emotional learning into practice in afterschool settings is [Wings for Kids](#). This afterschool program has an intentional program model that incorporates the five core competency clusters through a comprehensive five-day-a-week program. Learn more about their program model at http://www.wingsforkids.org/program_model.

social and emotional competence suffer from an embarrassment of riches. That is, there are myriad definitions for social and emotional competencies as well as a growing number of researchers developing tools to measure them. In some cases, the varying frameworks present the same social and emotional competencies in different ways, and, in other cases, they are overlapping or not at all the same. In the end, practitioners are left to determine which framework best matches their interventions and programs. In an effort to help clarify the language confusion, we have highlighted some of the most prevalent frameworks here. In the callout boxes, we present practical examples of how afterschool programs are using the specified framework and resources to learn more.

Social and Emotional Learning Competencies

Social and emotional learning competencies are defined as the cognitive, affective, and behavioral competencies necessary for a young person to be successful in school, work, and life. The [Collaborative for Academic, Social, and Emotional Learning \(CASEL\)](#),⁴ an organization focusing on the implementation of strategies to improve social and emotional competencies, has developed a framework that identifies five competency clusters as critical for young people's success. These competency clusters are:

- **Self-awareness**—the ability to understand one's emotions and how they influence behavior
- **Self-management**—the ability to calm one's self down when upset, to set goals and work toward them, and to manage and control emotions
- **Social awareness**—the ability to recognize what is appropriate in certain settings and empathize with others
- **Responsible decision making**—the ability to make decisions that take into account social standards, consequences, and context
- **Relationship skills**—the ability to communicate well, to listen and respond appropriately, and to negotiate conflict

CASEL and other advocates for social and emotional learning contend that these competencies can be taught either through explicit stand-alone curricula (e.g., Second Step, PATHS) or through school- and classroomwide interventions that integrate social and emotional learning strategies into every aspect of the school day (e.g., Responsive Classroom, Caring School Community).⁵ Afterschool settings can incorporate social and emotional learning into programs in much the same way—either through explicit curricula or in the ways we organized and set norms for our groups.

Noncognitive Skills/Factors

Another umbrella term that is used to describe a wide variety of skills is *noncognitive factors*. Originally coined by economist James Heckman,⁶ researchers at The University of Chicago Consortium on Chicago School Research (CCSR) brought this thinking to educational contexts when they released a [literature review](#)⁷ focused on how noncognitive factors contribute to academic success.⁸ They deliberately chose the word *factors* to make the distinction that it is not only skills but also attitudes, behaviors, and strategies that young people need to improve their academic success. CCSR's report breaks noncognitive factors into five key areas, many of which are included in one or more of the other frameworks listed here: (1) academic behaviors, (2) academic perseverance, (3) academic mind-sets, (4) learning strategies, and (5) social skills. Since releasing the literature review, CCSR has developed a survey for schools that measures the noncognitive factors described in their report. Afterschool programs often support noncognitive factors through programming that is explicitly aligned with school-day learning and targets the improvement of competencies that influence school-related behaviors.

21st Century Skills

Another term often used in the afterschool field is *21st century skills*. These skills are defined by the [National Research Council](#)⁹ and the [Partnership for 21st Century Learning \(P21\)](#)¹⁰ as those needed for young people to be successful in work, life, and citizenship. P21 has developed a [framework](#) for 21st century skills that breaks them into four overarching categories:

- **Content knowledge and 21st century themes**—knowledge of specific academic content areas as well as knowledge of interdisciplinary issues such as global and environmental awareness, ethics, and civic literacy. This set of skills, along with the information, media, and technology skills, sets this framework apart from the others.
- **Life and career skills**—the ability to be adaptable, take on leadership roles, show initiative, develop social skills, and be productive.
- **Learning and innovation skills**—communication, critical thinking, creativity, and collaboration.
- **Information, media, and technology skills**—again, these skills set this framework apart from the others by emphasizing computer and media literacy.

HOW can afterschool programs address noncognitive factors?

In a recent [guide](#), Public Profit offers 16 strategies to promote noncognitive skills in youth development programs.

HOW do afterschool programs work to improve 21st century skills?

Boston After School and Beyond has developed its own version of the 21st century skills framework. Called the ACT (for Achieve, Connect, Thrive) Skills Framework, it highlights the skills young people need to be successful across every aspect of their lives. See the framework at http://bostonbeyond.org/initiatives/act_framework/.

HOW are afterschool programs supporting grit, self-control, and a growth mind-set?

The Afterschool Corporation's [ExpandED](#) program is a full-day model that partners a school and a community provider to create a comprehensive set of academic and enrichment experiences for youth. The program targets improved growth mind-set as one of its key outcomes.

Afterschool programs that focus on the development of these skills are often some of the more comprehensive and holistic programs that focus on arts, sports, academics, life skills, and career development.

Mind-Sets

During the past two to three years, there has been an increasing focus on a subset of social and emotional competencies that are related to academic achievement. These competencies, supported by the research of Carol Dweck¹¹ and Angela Duckworth,¹² focus on the *mind-sets* of youth and how changes in mind-sets can influence improvement in academic achievement. In particular, these competencies include:

- **Grit**—the ability to sustain interest in and persist toward long-term goals
- **Self-control**—the ability to regulate behaviors and emotions
- **Growth mind-set**—the belief that ability can change and comes from hard work and persistence

Similar to noncognitive skills, afterschool programs focused more explicitly on alignment with the school day and academic support are often the most likely to target the development of grit, self-control, and mind-set.

This list is not exhaustive. In fact, many other terms are used, including *character*, *soft skills*, and *life skills*. Other institutions, from [National Public Radio](#)¹³ to [Every Hour Counts](#)¹⁴ to the [Asia Society](#),¹⁵ have also presented ways to sort through this complex lexicon and find ways to define and categorize the various competencies that are increasingly being recognized as critical for youth success in school and life. Our goal here was to define some of the most commonly used terms in the afterschool field and highlight the need to break down the language barrier that is limiting the field's ability to describe the skills, attitudes, and behaviors being addressed in afterschool and expanded learning programs.

Do Afterschool Programs Contribute to Social and Emotional Development?

The short answer is yes, they do, for youth who participate regularly in high-quality programs.¹⁶ The caveat is that evidence is somewhat limited. Relatively few studies have rigorously examined the impact of afterschool programs on the social and emotional competencies outlined in the frameworks presented earlier. In the early 2000s, a handful of studies explored the connection between participation in out-of-school-time activities and improved social competencies. These studies found that

consistent participation led to improvements in peer relationships, sense of self-worth, altruism, and prosocial behavior and decreased problem behavior. These studies looked at traditional school-based afterschool extracurricular activities such as clubs, sports, tutoring, and honor society.¹⁷ Although promising, these studies were limited in their scope and the types of programs they studied. Then in 2007, Durlak and Weissberg released their seminal meta-analysis that examined the connection between developing personal and social skills in afterschool settings and a range of outcomes, including academic achievement. They found that afterschool programs employing what they dubbed the S.A.F.E. features (for sequenced, active, focused, and explicit) had significant benefits for youth on a wide range of outcomes, including:

- Feelings of self-confidence and self-esteem
- School bonding (positive feelings and attitudes toward school)
- Positive social behaviors

Since that report, only a handful of researchers have explored the connection between participation in high-quality afterschool programs and social and emotional outcomes. In particular, researchers at the School of Education at the University of California at Irvine have conducted several studies showing that **high levels of participation in programs are associated with improved social and behavioral outcomes, including gains in peer-to-peer social skills, prosocial behavior, engagement, intrinsic motivation, concentrated effort, and positive states of mind.**¹⁸ Similarly, researchers from the Youth Development Research Project at the University of Illinois have done extensive work to examine the process of how youth develop social and emotional skills in youth programs. Through this work, they have found that **youth report building skills in motivation and effort from participating in youth programs**—in particular, youth voluntarily engage in challenging work in youth programs, are committed to completing the work, and therefore put in the effort and make the connection between hard work and results. Youth then learn these behaviors and can engage in strategic thinking and persistent behavior outside the youth program.¹⁹

However, all of the aforementioned studies have shown that changes in social and emotional skills and competencies do not happen with just any program or at any level of participation. Rather, **quality of programming** and **level of participation** are two key factors that matter for producing outcomes for youth. In programs that were high quality, young people were more likely to see positive outcomes.²⁰ Likewise, youth who participated at high levels were more likely to experience changes than those who participated at low levels.²¹

WHAT do S.A.F.E. programs look like?

- **Sequenced**—program employs a sequenced set of activities to achieve skill objectives.
- **Active**—program uses active forms of learning.
- **Focused**—program has at least one component focused on developing personal or social skills.
- **Explicit**—program targets specific personal or social skills.

ADDITIONAL Resources

This topic, social and emotional development and how to measure it, is being discussed and addressed by dozens of organizations in the formal education and afterschool and expanded learning fields. The following are a few additional resources that may be helpful in sorting through this complicated topic:

- The Afterschool Corporation recently published [Social and Emotional Learning: A Resource Guide and New Approach to Measurement in Expanded Schools](#),²⁷ which contain links to a wide range of resources on defining and measuring these types of skills.
- The Asia Society and Professional Examination Services created [A Rosetta Stone for Noncognitive Skills: Understanding, Assessing, and Enhancing Noncognitive Skills in Primary and Secondary Education](#),²⁸ which provides a framework for understanding noncognitive skills as well as information on how to assess them.

Evaluations of individual programs or program models have also found connections between participation and development of social and emotional competencies. For example, the longitudinal 4-H Study of Positive Youth Development found that young people who participated in 4-H over time were two times more likely to be civically engaged and four times more likely to be active in their communities than those who did not participate.²² Likewise, a study of the AfterZone system in Providence, Rhode Island, found that youth who participated in the program demonstrated a better ability to interact with their peers than nonparticipants.²³ The study also found that youth who were highly engaged in programming had greater social and emotional benefits than those who did not feel engaged. Specifically, participants who felt a stronger sense of belonging in the program, felt more connected to the adults in the program, and found the program fun thought more about their future, had better social skills, and demonstrated more positive behavior than their less engaged peers.

Where Does the Practice Community Go From Here?

There is indeed evidence that afterschool programs have had an impact on developing participants' social and emotional competencies. However, in this brief we outline research that has an important commonality; **high-quality programs** and **regular and high youth participation** are critical conditions for skill building. The research clearly points to several key features of afterschool programs that contribute to improved social and emotional outcomes. Given these key features, afterschool programs may want to engage in some or all of the following:

- Provide professional development for staff on how to make program activities S.A.F.E. (i.e., sequenced, active, focused, and explicit).
- Participate in existing quality improvement activities, or advocate for additional funding related to quality improvement—and then use that funding to create strong quality assessment and improvement practices.
- Conduct regular youth satisfaction surveys to gauge how engaged youth feel in the program. If engagement is low, implement strategies to foster a sense of belonging and fun in the program.
- Bolster youth participation (research has shown that duration, particularly for elementary age youth, needs to be between 30–40 days per year²⁴) by identifying what youth like and do not like about the program and making changes to match their needs and interests.

- Identify which skills, of the many listed in the frameworks earlier, the program targets. Make choices. Think about program activities. Decide on what few key social and emotional competencies the program truly targets and measure those—not the universe of social and emotional skills that exist. This is not an easy step, but it will hopefully get easier as more researchers develop and disseminate tools to measure social and emotional competencies.

Where Does the Research Community Go From Here?

Everyone is talking about social and emotional competencies, but not enough people are studying their development in afterschool programs in a rigorous way so that we can know which kinds of programs and practices are most effective. Given that, we see three key next steps for the research community to move the field forward:

1. **Collect new, current evidence.** The limited number of recent studies focused explicitly on how afterschool programs improve social and emotional skills suggest a need for a follow-up to the Durlak and Weissberg study that measures impact over the past decade. Although Vandell and others have begun this next generation of research, not enough has been done to examine the impact the wide variety of innovative programs are having on social and emotional skills over the decade since that meta-analysis was first released. In those intervening years, afterschool funders and individual programs have invested huge amounts of funding and time into quality improvement activities.²⁵ Given evidence linking quality to outcomes, the time has come to conduct a new generation of research that examines how potentially higher quality programs are contributing to social and emotional competencies.
2. **Improve the tools for measuring competencies.** There is also a need for stronger validated measures of social and emotional skills and clear guidance on how to use them. Surveys used in formal education settings to measure social and emotional outcomes are not necessarily suitable to afterschool settings. Formal and informal educators and facilitators differ in their methods of instruction and implementation, intended outcomes, and definition of social and emotional development. So, although several tools are available for use in school-based settings, very few exist that are explicitly designed and are appropriate for use in afterschool settings. A recent compendium, *From Soft Skills to Hard Data*, canvassed the field and identified 10 rigorously validated tools

ADDITIONAL Resources

- The University of Minnesota Extension Center for Youth Development hosts a [social and emotional learning series](#)²⁹ with links to articles, blogs, and resources on the topic.
- The Susan Crown Exchange has launched their [Social and Emotional Learning Challenge](#),³⁰ which brings together high-quality youth programs that target social and emotional learning in teens with researchers to identify what program practices support the development of social and emotional development. The result will be a social and emotional learning field guide due out at the end of 2015.
- Child Trends released [Workforce Connections: Key “Soft Skills” That Foster Youth Workforce Success: Toward A Consensus Across Fields](#), a report that identifies the research-based skills that young people need to be successful in the workplace.

that measure social and emotional outcomes.²⁶ Of those 10, only four are free and available for programs to use. All have limited to moderate evidence of validity and mixed evidence of reliability, and only a handful have been tested in afterschool settings.

3. Help afterschool programs better use the data they collect.

Afterschool programs use the handful of existing surveys to collect information about their participants, often not knowing exactly how to implement them or what to do with the data once they collect them. The field would benefit from a follow-up guide to *From Soft Skills to Hard Data* that outlines what programs should do once they have selected a measure—how to identify the skills the program actually targets and select an appropriate measure, accurately collect data on those skills, and report out on the data in a clear and responsible way.

If researchers can take these three steps as practitioners are simultaneously engaging in professional development, better identifying their targeted competencies, and growing quality improvement practices, the field will emerge in a stronger place in another decade to report on progress in supporting the development of social and emotional competencies in afterschool programs.

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About Beyond the Bell

Today's afterschool and expanded learning programs provide enriching activities that support academic, social, emotional, artistic, and physical growth. Research shows that these programs work best when they are high quality and evidence based. *Beyond the Bell: A Toolkit for Creating Effective Afterschool and Expanded Learning Programs* (4th Edition) takes the guesswork out of designing, implementing, and evaluating your program by translating the latest research into accessible information and tools. Whether you are a program leader or staff member, whether you are new to the field of afterschool and expanded learning or a seasoned veteran, whether you want to fine-tune a successful program or design a new one from the ground up—*Beyond the Bell* can help you provide enriching programming that supports youth development.

SEL-Focused After-School Programs

Noelle Hurd and Nancy Deutsch

Summary

After-school programs offer young people opportunities for self-expression, exploring their talents, and forming relationships with supportive adults. That is, after-school programs promote young people’s social and emotional learning (SEL) skills—whether the programs use that term or not.

Despite these programs’ potential, Noelle Hurd and Nancy Deutsch write, they have yet to make a big impact on the field of SEL. One reason is that studying them poses many problems for researchers—for example, attendance isn’t mandatory, meaning that it can be hard to separate a program’s effects from young people’s personal characteristics that led them to choose the program in the first place. Still, research shows that after-school programs can promote many desirable SEL outcomes, and Hurd and Deutsch outline the factors that make high-quality programs stand out.

How could policy help after-school programs promote SEL more effectively? First, positive youth-staff relationships are crucial to effective programs, and competent adult staff are the linchpin of effective after-school programs targeting SEL outcomes. Yet the after-school work force is poorly paid, and turnover is high. Hurd and Deutsch suggest several ways to professionalize after-school work—for example, by boosting professional development and creating more opportunities for career advancement.

Second, as schools have become more focused on standardized test scores, funders and policymakers have pushed after-school programs, too, to demonstrate their academic impact. Hurd and Deutsch write that this approach is misguided: overemphasizing academic outcomes leads to neglect of SEL outcomes that can help young people become productive and engaged citizens. They argue for expanding the criteria used to determine whether after-school programs are effective to include SEL. More broadly, they write, high-stakes evaluations create a disincentive for programs to undertake the difficult work of assessing and improving their own practices. A better approach to evaluation would focus less on whether programs “work” and instead seek ways to make them work better.

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Out-of-school settings, such as after-school programs and community organizations, are natural sites for social and emotional learning (SEL) interventions. Because these programs and organizations don't have schools' curricular demands and often have broader developmental goals and missions, they can focus on SEL skills and outcomes to a greater extent than schools can. Many of the types of skills that SEL interventions target are also implicit or explicit in the missions and objectives of out-of-school programs. Yet despite their potential to strongly influence SEL, out-of-school programs generally have had limited impact on the field of SEL, possibly because of their diversity—they range from after-school and summer programs to family- and community-level interventions—or the challenges of evaluating interventions in such settings. In this article, we examine research specific to SEL interventions that occur outside of school hours. But rather than consider all out-of-school contexts, we limit our scope to after-school programs, defined as adult-structured programs for students that are offered during the school year between the hours of 3:00 and 6:00 p.m.¹ Moreover, we review only programs that explicitly target what we define as SEL skills, whether the program uses the term SEL or not. This narrowed focus lets us be more thorough. In any case, most of the research on SEL interventions in out-of-school contexts has taken place in after-school programs rather than other settings. Thus research on after-school programs also offers the best opportunity to learn what works.

Even though SEL goals are common in programs that operate outside of school

time (a history we review below), only one extensive review has examined whether after-school programs that focus on social and personal development hold promise for boosting students' SEL development. In this article, we go over the findings from that analysis, paying particular attention to the features of effective programs. We also briefly review a broader set of studies that investigate the impacts of participating in SEL-focused after-school programs. To structure the article, we ask five questions specific to SEL and after-school programs:

1. Are after-school programs well suited for promoting SEL?
2. Is it realistic to expect after-school programs to affect SEL?
3. Do after-school programs affect SEL?
4. Why have findings thus far been so disappointing?
5. Where should researchers and practitioners focus in the future?

We conclude with policy implications for promoting SEL via after-school programs.

Are After-School Programs Well Suited for Promoting SEL?

The history of formal after-school programs suggests that they've always focused on SEL. Such programs arose in response to changing social conditions and the constraints of school, and their goals are often aligned with those of SEL. Thus, research on after-school programs often asks whether and how they foster SEL-related competencies. After-school programs are also rich in relationships. They offer good opportunities for young people to form the

kinds of relationships with adults that we believe enhance SEL.

The history of formal after-school programs suggests that they've always focused on SEL.

Historical Perspective

After-school programs have been around for more than a century, and they've always aimed to foster positive youth development broadly, including what we now call SEL. After-school programs were developed in the late 19th century as a practitioner-based movement, long before they became a field of study. Early programs sprang from reformers' concerns about children's safety and socialization. Child labor and compulsory education laws combined to leave children free during the after-school hours. In large cities with growing immigrant populations and crowded housing, many working-class and low-income children spent their out-of-school time on the streets. Child advocates worried about these trends. They saw a need for safe spaces where children could play after school. They also saw a need for adults to structure and supervise such play to socialize children in middle-class American values. The programs they built varied greatly and local actors developed their own aims and policies within them, yet they shared common goals. In his history of after-school programming, Robert Halpern identified the early goals of the field as protecting and caring for children; giving children opportunities to play, frequently as a means to promote SEL-related skills;

preventing delinquency among boys and reducing sexual risk among girls; teaching vocational and domestic skills (for boys and girls, respectively); and Americanization of immigrant youth, who made up a large proportion of the children served by early programs.² The adult staff members in these programs were to provide consistent oversight, guidance, role modeling, and support. From the beginning, programs differentiated themselves from schools in both their aims and activities.

These broad trends continued through the mid-20th century. Although these programs' aims were shaped by changing demographics and by societal developments such as mass media, the economy, and families' work circumstances, the focus on play, children's developmental needs, and after-school programs as unique out-of-school settings continued. During the second half of the 20th century, programs again responded to social concerns about low-income children.³ Reformers feared that these children were feeling alienated from broader American society. As a result, after-school programs became a space where poor children could "feel valued and recognized."⁴ At the same time, after-school programs continued to identify themselves as places where children who felt alienated by schools could express themselves and experience a sense of belonging. In the 1960s, in response to increasing worries about urban poverty, programs began to focus more on academic activities, which gave them access to government funding earmarked for improving education in high-poverty neighborhoods. And as more and more mothers entered the work force in the late 20th century, public attention again turned to after-school programs as safe, supervised spaces for children.

Although most programs retained their core recreational activities and continued to offer young people opportunities for self-expression, exploring their talents, and forming relationships with supportive adults, it also became increasingly common to set aside time for children to get help with their homework. More recently, after-school programs have been under pressure to demonstrate academic impacts, but this push has been driven by funders and policy makers rather than the programs themselves. As schools have become more focused on standardized test scores, after-school programs, too, have been pushed to demonstrate their academic impact. This trend threatens after-school programs' traditional focus on self-expression, exploration, and development.

Despite the increased pressure to boost test scores, numerous after-school programs explicitly aim to enhance young people's social and emotional competencies. For example, Boys & Girls Clubs of America, one of the nation's largest networks of out-of-school centers (serving nearly four million children at four thousand clubs), seeks to "promote and enhance the development of boys and girls by instilling a sense of competence, usefulness, belonging and influence." Its mission is "to enable all young people, especially those who need us most, to reach their full potential as productive, caring, responsible citizens."⁵ Similarly, 4-H, which reaches six million young people, aims to "[empower] young people to be true leaders," described as "young people who have confidence; know how to work well with others; can endure through challenges; and will stick with a job until it gets done."⁶ 4-H'ers work on four values (the four H's of the organization's name): head (managing, thinking), heart

(relating, caring), hands (giving, working), and health (being, living). Although Boys & Girls Clubs and 4-H both include some academic programming, their goals are much broader than academics alone, encompassing the types of personal and social competence that make up SEL.

The Role of Adult Staff

Competent adult staff are the linchpin of effective after-school programs targeting SEL outcomes.⁷ Interactions with staff shape young people's experiences, and those interactions are the pathways through which after-school programs affect SEL.⁸ Adult staff influence young people's outcomes in many ways. They determine whether the program's space will be conducive to SEL development, they implement the curriculum and transmit the program's values, and they cultivate meaningful relationships.

Effective Staff Practices for Promoting SEL

Adult staff foster SEL development by giving young people autonomy, choice, and appropriate levels of structure and supervision.⁹ Basing its recommendations on the best developmental science research, the National Research Council and Institute of Medicine suggests that adults can foster positive developmental settings by providing eight components:¹⁰

- physical and psychological safety;
- appropriate structure;
- opportunities to belong;
- positive social norms;
- support for efficacy and mattering;

- opportunities for skill building;
- integration of family, school, and community efforts, and
- nurturance and support.

Below, we apply each of these recommendations to promoting SEL in after-school programs.

Safety. Unquestionably, adult staff members' ability to ensure participants' physical and emotional safety is vital—not just during the program itself, but on the way to and from it as well. Safety is a basic human need that must be satisfied for young people to have the mental resources they need to improve their social and emotional competencies. Staff can ensure safety by selecting safe locations, by establishing transportation plans that consider safety hazards, and by including activities that foster healthy and positive peer group interactions. Ensuring safety also means understanding implicit and explicit biases on the part of both staff and young people, and collectively working to confront these biases by modeling fair treatment of young participants.

Structure. After-school programs should be structured to ensure that they give young people the stability to grow and develop. Specifically, daily activities should give young people space to process their emotions, share their experiences, listen to the experiences of others, work together in teams, solve problems, and reflect on the outcomes of their decisions.¹¹ Staff must find the right balance between giving participants autonomy and, through clear and consistent rules and expectations, setting limits on their behavior. Depending on their age and how long they participate in the program, young people may also benefit

from increasing opportunities to help set rules and expectations themselves. Thus, staff can set and monitor clear boundaries but also let young people make important program decisions. University of Illinois researchers Reed Larson and Rachel Angus have called this approach “leading from behind”; they found that young people benefit most when adult staff support participants' leadership and offer “light touch guidance and assistance as needed.”¹²

Belonging. By highlighting their strengths, emphasizing healthy identity development, and encouraging positive bonding, staff can enhance young people's sense of belonging, which in turn will help recruit and retain a diverse set of participants.¹³ Program staff must also deal effectively with the participants' social identities and cultural backgrounds. Belonging is likely to be more important to young people from marginalized social groups, for whom key developmental tasks include being able to feel good about their group membership and connection to similar others. Participants should be able to feel good about their own social identities (for example, race, ethnicity, gender, sexual orientation, ability status) and to interact positively with members of different groups. Thus, staff should ensure that interactions occur on a level of equal status, explicitly talk about difference in relation to privilege and oppression, and ask young people from different groups to work collaboratively to achieve shared goals.¹⁴ Because no population of young people is homogeneous, staff should also pay attention to differences within racial, ethnic, cultural, gender, ability, and sexual orientation groups, as well as between such groups.¹⁵

Positive social norms. Program staff can foster SEL competencies by supporting a group culture that is conducive to prosocial values and behavior. For example, staff can set expectations regarding the use of inclusive language; group check-ins (in which participants report on their weekly highs and lows) can be an opportunity for staff to model caring responses to the good and bad things happening in young people's lives. Although a program's cultural norms should vary to accommodate the participants' backgrounds and needs, prosocial norms are fundamental to constructive behavior. Programs can establish patterns of behavior that lead participants to internalize certain values and morals.¹⁶ In this way, behavioral patterns can be self-reinforcing and solidified as good habits. But if staff and participants don't intentionally establish positive social norms, less favorable norms may emerge and become difficult to alter. Therefore, staff need to develop practices that foster good behavior, mutual respect, and inclusivity from the very beginning and maintain them throughout the program.

Efficacy and mattering. Feeling effective at appropriately challenging tasks and making a difference in one's social world are central to growth in SEL competencies. Adult program staff can foster efficacy and mattering through engaging and personally meaningful activities. As they progress from childhood to adolescence, young people are increasingly likely to benefit from empowering, youth-centered programs. They can learn to develop their own voice and leadership potential when they have a say in how programs are run or what types of activities are made available.¹⁷ They can also help identify community service projects or injustices that they

would like to take on. When activities have consequences for real-world problems facing them and their communities, young people can gain a sense of mattering and making a difference. Adult staff can help them gain agency by actively seeking their input and creating leadership positions for them to fill. Adults also can give young people greater responsibility based on their age and experience in the program. For example, *youth-adult partnerships*—in which youth and adults work collaboratively to address important social issues—seek an equal distribution of power between adult staff and participants.

Skill building. Staff can promote SEL by letting participants plan, practice, and perform targeted skills and apply those skills to the real world; by giving frequent feedback; by making sure that young people take an active role in their own learning; and by helping young people focus on personal improvement instead of comparing themselves to others.¹⁸ Staff also can model SEL skills themselves. Other ways to build skills include coaching youth on successful interactions with peers or adults, setting high expectations for participants, encouraging them to persevere when things get tough, celebrating their effort, and scaffolding (that is, providing more support initially and gradually withdrawing it as they become able to complete a task independently).¹⁹ As in other areas, young people's cultures, backgrounds, ages, and experiences should guide which skills the program targets. For example, an important SEL skill for young people of color is *bicultural competence*, or the ability to successfully navigate two cultures. Thus, programs that serve racial and ethnic minorities may help participants

get better at *code switching*—moving from one cultural style of interacting to another.

After-school staff may have more opportunities for informal conversations and shared activities than the young people's own parents.

Integration of family, school, and community. When adult expectations and values are consistent across family, school, and community, it's easier for young people to establish positive attitudes and patterns of behavior. Moreover, adults can use their connections with other adults to help give young people new opportunities and connections of their own. Adult program staff are uniquely positioned to bridge youths' social contexts such as family, school, community, and workplace. They can expose families, schools, and the broader community to the SEL content that program participants are learning. If they do so, adults in other settings can reinforce the after-school learning and apply it more broadly.

Nurturance and support. Caring and responsive staff members have the best chance to enhance young people's SEL outcomes.²⁰ Adults who have the capacity to understand and appropriately respond to young people's cultural backgrounds and needs are best positioned to build strong, positive relationships. Thus, after-school programs seeking to boost students' SEL outcomes should screen adults for key qualities such as attunement (that is, the ability to read and flexibly respond to

young people's needs and desires), effective communication, and empathy. Adults who understand the roles of power and privilege in maintaining societal inequities can effectively bridge differences and have the best chance to nurture and support all young participants.

Youth-Staff Relationships

Unlike teachers, after-school program staff don't face heavy instructional requirements and evaluation responsibilities. That means they have more flexibility in working with young people.²¹ In fact, after-school staff may have more opportunities for informal conversations and shared activities than the young people's own parents, who may be contending with work and other competing responsibilities. Unlike parents and teachers, after-school staff not only have time to share with young people during the after-school hours, but can also often do so around activities that align with their interests. These less structured and perhaps more enjoyable interactions may be ideal for transferring adult values, advice, and perspectives.²² After-school program staff also tend to be closer in age to young participants and are often from the same communities. Both factors may encourage closer relationships and lead young people to see program staff as more credible sources of information than teachers or parents. These two factors may also help after-school staff serve as role models, especially if they've overcome challenges similar to those that the program's participants face.²³

In-depth observations of after-school programs and interviews with staff members and participants have identified features of youth-staff relationships that appear to be

related to young people's SEL development. These include such things as the nature of staff-youth communication (for example, the peerlike nature of interactions or culturally relevant ways of communicating), the way staff handle young people's dilemmas that crop up during the program, how they express respect for participants, and how staff and participants communicate with each other about the young people's strengths and struggles.²⁴ Using data from its National Outcomes Survey, the Boys & Girls Clubs of America examined associations between youth-staff relationships and how young people described their experiences at the clubs. It found that young people tended to have more positive experiences when staff knew all the participants' names, had relationships with their parents, worked well together, and had received training in program planning.²⁵ Although such research can't prove that links between youth-staff relationships and outcomes are causal, it nonetheless suggests that programs can foster SEL when staff cultivate meaningful relationships with young participants.

Supporting Adult Staff

If staff practices play a central role in young people's SEL development, then support for the staff is crucial to after-school programs' success. Recently, the SEL Challenge—a collaboration among practitioners, researchers, and a prominent national foundation that analyzed eight highly effective after-school programs across the country—sought to identify key practices that foster growth in six SEL outcomes: emotion management, empathy, teamwork, initiative, responsibility, and problem solving.²⁶ Among its recommendations, the project suggested five strategies for supporting program staff:

- First, programs should recruit young people who are more likely to benefit from participation (for example, because their interests are a good match with the program's activities). Seeing youth succeed in the program is a powerful incentive for staff because it reinforces the challenging work that they do.
- Second, programs should ensure that multiple staff members have appropriate training in practices to promote SEL. Staff members should receive equivalent training so that they can best support each other and all youth in attendance. Having many trained people on hand also means that one staff member can work on an individual participant's needs while another leads the larger group.
- Third, staff members need collaborative planning time before program sessions and interactive debriefing afterward to ensure that they can communicate with one another, prepare adequately for program sessions, and work together to respond to problems that arise. Staff members may also need time to process their own reactions to program sessions and to support one another when they encounter difficulty. A supportive and collegial environment can motivate staff members to put forth their best effort and may reduce staff turnover.
- Fourth, staff need organizational supports such as extended vacation after intensive periods of work, mental health services or referrals,

resources for continued learning, and check-ins with supervisors to ensure the staff's general wellbeing. Staff who have the supports they need to bolster their own mental health and wellbeing are better positioned to serve program participants effectively.

- Fifth, programs should support continuous improvement. Staff need opportunities to reflect on and refine program practices. The inclusion of evaluation components to assess their practices will make staff members more aware of strengths and areas that need improvement. Such evaluations could collect data from young people, staff, and staff supervisors; if these evaluations include self-assessment, however, that should not be the only component.

Is It Realistic to Expect After-School Programs to Affect SEL?

After-school programs are natural settings for promoting young people's SEL skills. Because the programs don't face schools' curricular demands, they can focus on nonacademic skills. Well-run after-school programs let young people participate in activities that are meaningful to them and that form rewarding relationships. But despite these strengths, after-school programs face a number of barriers in promoting SEL. First, participation in after-school programs isn't mandatory. As a result, SEL interventions in after-school programs will never reach all young people, and sporadic attendance may dampen a program's effects. Further, staff turnover in after-school programs tends

to be high. Therefore, even though youth-adult relationships can be a significant strength of such programs, they can also be less stable than in schools. Funders' increasing focus on academic outcomes may also lead programs to offer fewer types of activities that are most likely to enhance SEL. Some of these issues, such as sporadic attendance, affect researchers' ability to confidently measure program effects. They may also affect the quality of the programs themselves, and as we discuss below, quality has an impact on program effects.

Despite their strengths, after-school programs face a number of barriers in promoting SEL, such as sporadic attendance and high staff turnover.

Do After-School Programs Affect SEL?

Many comprehensive after-school programs focus on personal and social skills broadly, even if they don't use the term SEL. Reviews of how after-school programming affects academic outcomes have yielded mixed findings.²⁷ Here we review the research exploring SEL-related outcomes from after-school programs that aim to improve young people's personal and social development. These types of after-school programs have been associated with improvement in such SEL outcomes as self-confidence, self-regulation, and social competence, as well as with decreases in adjustment problems such as delinquency, depression, and anxiety.²⁸ Evaluations of

after-school programs that target SEL skills, however, vary widely with respect to the methods they use and the effects they report.

In 2010, psychologists Joseph Durlak, Roger Weissberg, and Molly Pachan published a meta-analysis of after-school programs with an explicit SEL component (a meta-analysis is a statistical technique that combines the results from many studies to test for overall effects).²⁹ They included 68 studies of SEL-focused after-school programs. About half the programs targeted elementary school-aged students, about one-third targeted middle school-aged students, and about 10 percent were geared toward high school students (several evaluations didn't report participants' ages). About one-third of the studies used a *randomized* design, meaning that young people were randomly assigned either to a program or to an alternative such as a waiting list. Because a randomized design removes bias introduced by self-selection into a program (that is, young people who sign up for and attend after-school programs may differ in important ways from those who don't), it's considered the best way to test whether an intervention works. The rest of the studies included in the meta-analysis used what researchers call *quasi-experimental* designs, which use different approaches to cope with bias and isolate program effects. Although more than one-third of the studies did not give much information about the demographics of study participants, those that did represented groups of young people who were diverse with regard to race/ethnicity and socioeconomic status.

The meta-analysis found that after-school programs targeting SEL outcomes appear to improve young people's self-confidence,

positive attitudes toward school, positive social behavior (for example, cooperation and leadership), grades, and standardized test scores. At the same time, they reduced problematic behaviors such as aggression and drug use. Overall, the size of these effects was in the small-to-medium range; in statistical terms, average program effect sizes—a number that assesses how large the difference is between two groups on an outcome of interest—ranged from .12 for academic grades to .34 for increased self-esteem.

Not all after-school programs targeting SEL outcomes produced the desired improvements in students' skills and behaviors. Only programs that used evidence-based skills-training approaches were effective in boosting students' SEL outcomes. Evidence-based skills-training approaches met four requirements, identified by the acronym SAFE: they included a sequenced (S) set of activities, emphasized active (A) forms of learning, included a focused (F) component aimed directly at improving students' social and emotional skills, and contained explicit (E) learning objectives (that is, program staff communicate to young people what they're expected to learn through the program). Programs that didn't follow the SAFE guidelines showed no effects on the studied SEL outcomes. The SAFE programs yielded average effect sizes in the small-to-medium range—from .14 for school attendance to .37 for increased self-esteem.

The fact that SEL-focused after-school programs can affect such a variety of outcomes underscores their potential value. Moreover, even if the size of the programs' effects fell in the small-to-medium range, those effects were larger than those found

Table 1. SEL-Related Outcomes of After-School Programs

| Program | Population | SEL Skills Assessed | Findings |
|--|--|--|--|
| Boys & Girls Clubs of America (four clubs in one city) | Club members ages 10–18 | Psychosocial functioning | Positive experience at clubs, but not attendance alone, was associated with positive outcomes |
| Boys & Girls Clubs of America (10 urban clubs) | Club members in seventh and eighth grade | Character development | Greater attendance was associated with improvement in about half the outcomes assessed |
| Boys & Girls Clubs of America (one urban club) | Club members and comparison group from same community; mean age 11 | Self-concept, social skills, attachment to family, risky behaviors | Greater attendance at clubs, but not participation alone, was associated with positive outcomes |
| Boys & Girls Clubs of America (2,400 clubs nationally) | Club members nationally; compared to data on peers from other national studies | Community service, social skills, risky behaviors | Middle and high school club members volunteered more and reported lower levels of substance use; higher quality and level of participation associated with some outcomes |
| 4-H (in 42 states) | 7,000 youth in grades 5–12 (~2,520 of those were 4-H participants) | 5 C's—Confidence, Competence, Character, Caring, and Connection—as well as contribution to community | In some grades 4-H members demonstrated more positive outcomes in the 5 C's and were more likely to contribute to their communities |
| After School Matters (apprenticeship program in Chicago)* | High school students | 21st Century Skills linked to SEL | Positive effect on some outcomes; no effect on majority of outcomes |
| Systematic review of programs with recreational or youth development focus combined with academic supports * | Primarily low-income racial/ethnic minority students in urban areas | College aspirations, believing the best about people, bonding, feeling bad for others, feeling left out, sticking to beliefs | No effects |
| Maryland's After School Community Grant Program (14 sites)** | Elementary and middle school students | Social skills, social bonding, delinquency, substance use | Participation was linked to small decreases in delinquency for middle school students |
| 35 high-quality after-school programs from ethnically diverse, high poverty communities | 3,000 elementary and middle school students | Work habits, task persistence, social skills, prosocial behaviors, problem behaviors, misconduct | Program participants improved in many of the tested skills |

Sources: See endnote 30.

Note: * = experimental design; ** = three of 14 sites used experimental design.

for other types of youth programs, such as school-based drug prevention or mentoring programs. In fact, the average effect of SAFE after-school programs on students' standardized test scores was larger than the average effects found in meta-analyses for after-school and summer school programs that focus heavily on academics. The effects of SAFE programs may also have been underestimated. A high proportion of the comparison group students (that is, those who did not participate in a particular SEL after-school program) were participating in other types of after-school activities, rather than attending no program at all. Further, at least some of the SEL after-school programs recorded fairly inconsistent attendance by participants. Both of these factors make it harder for researchers to isolate a program's effects. The fact that we see rather strong findings despite the presence of factors that could undermine their effects suggests that SAFE after-school programs can indeed foster SEL development along with a host of other positive youth outcomes.

What Does the Rest of the Research Say?

Beyond the meta-analysis by Durlak, Weissberg, and Pachan, other evaluations of after-school programs' effects on SEL outcomes have yielded inconsistent results. Table 1 summarizes findings from studies of after-school programs that have examined SEL-related outcomes, ranging from studies of single after-school centers to combined studies of multiple programs. Although there is a rich tradition of qualitatively analyzing SEL development in after-school programs using a descriptive approach, we only included quantitative (that is, numeric) findings in our summary so that we can compare the sizes of program effects.

Participating in SEL-focused after-school programs has been associated with outcomes that include improvements in social skills, prosocial behavior, community service, civic activity, academic and school-related outcomes, and reductions in delinquency and other problem behaviors. But even when studies have documented positive effects on some outcomes, they tend to find no effects on others. And the effects they do find are often limited to certain age groups or genders. Overall, findings from correlational studies (that is, studies that look at associations between programs and outcomes without fully controlling for sources of bias) tend to find some positive outcomes, but experimental studies (that is, studies that more completely account for bias) find fewer or none. One limitation of correlational studies is that they don't let us determine whether participation in the program actually *caused* the differences we see in youth outcomes, as opposed to the possibility that the program attracted young people who were already doing better than their peers.

One trend that we see across many of the studies is that program quality matters. Attendance alone doesn't appear to be enough to promote SEL outcomes. Rather, multiple studies have found that positive outcomes are related to how much young people participate in the program and the quality of the experience they have there. Although program quality is often measured by outside observers, young people's own perceptions of program quality may also be an important predictor of outcomes.³¹

Differences among Young People

Young people's experiences in after-school programs and the extent to which they

benefit from participation aren't a function of the program alone—they're determined by the fit between the program and the young people's characteristics.³² Not only may outcomes differ across different groups, but different program features may be important to different young people.³³ Despite the role that race, ethnicity, culture, and other characteristics play in shaping young people's experiences in SEL-focused after-school programs, however, few studies have considered differences in experiences and outcomes as a function of participants' characteristics. Among the few studies that have done so, age and gender have been associated with differences in a program's effects.³⁴ But these differences haven't shown a consistent pattern.

The very nature of after-school programs poses problems for researchers. After-school programs are both voluntary and, for many families, necessary.

Why Have Findings Been Disappointing?

Significant limitations make it hard to draw definite conclusions from studies of SEL-focused after-school programs. First, many studies of after-school programs don't evaluate program curricula or specific program activities, so it isn't clear what precisely is being evaluated. Second, few studies of after-school programs use research designs that prove a causal link between participation and SEL-related outcomes. Even studies that have

used rigorous randomized designs have been criticized for other methodological flaws, such as ignoring differences in implementation across sites. Third, evaluation studies often look only at participation versus nonparticipation in a given program. But participation comprises many things, including frequency of attendance, years of participation, breadth of the activities in which one participates, and quality of engagement.³⁵ Therefore, participation defined simply in terms of attendance may not be related to effects. Fourth, young people who don't participate in a given program are frequently participating in another program, rather than no program at all. Working parents need childcare after school, and they're likely to find an alternative program if their child isn't assigned to the after-school program being studied. For example, in the experimental study of After School Matters, 91 percent of the comparison group participated in other after-school programs.³⁶ Thus, after-school research is often comparing the program being studied to another program or activity. And as the Study of Promising After-School Programs shows, many young people participate in several programs, which makes distinguishing the effects of any given program even harder.³⁷

Indeed, the very nature of after-school programs poses problems for researchers. After-school programs are both voluntary and, for many families, necessary. Moreover, many of the outcomes that researchers are interested in are related to the very youth and family characteristics that may also affect young people's participation in after-school programs. Although it's hard for researchers to isolate program effects, we recognize that after-school programs

are an important part of the landscape for young people, especially those who live in marginalized communities and attend under-resourced schools. Being unsupervised in the after-school hours is associated with substantial risk for young people, suggesting that involvement in any supervised after-school programs is preferable to being left unsupervised.³⁸ Consequently, it may be better if researchers and practitioners focus on improving the quality of programs rather than on simply attempting to prove whether particular programs work.

Where Should Researchers and Practitioners Focus in the Future?

As we've noted, evaluations of after-school programs—and the conclusions we can draw from them—have been limited in various ways. Self-selection into programs restricts our ability to ascertain their effects and determine whether any given findings generalize to groups of young people who differ in substantial ways from those studied. Other complicating factors include the tremendous variety in purpose, activities, and dosage (that is, frequency and length) across SEL-focused after-school programs. All these factors likely play a role in determining the extent to which young people benefit. And as we've mentioned, young people's own attributes also likely influence their experiences in programs, meaning that some of them benefit more than others.

It's important to highlight all the challenges facing evaluations of SEL-focused after-school programs, because these challenges can contribute to inconsistent findings across evaluation studies. They can lead us to find effects that don't exist and to miss

effects that do. Currently, many researchers argue that better integration of multiple approaches to evaluation could better account for the complexities inherent in evaluating SEL-focused after-school programming.³⁹ Although randomized design has been upheld as the gold standard for evaluating program effects, this approach does little to help us identify how and why programs benefit (or fail to benefit) young people. When assessments are limited to closed-ended measures, and only include measures of attitudes and behaviors before and after a program, evaluators miss the opportunity to collect more detailed information about how individuals experienced the program and what they found to be most or least beneficial. As a result, evaluators may not be able to explain what about the program made a difference (or why it didn't)—and that's the kind of information that can help programs improve. Integrating various approaches to evaluating programs—for example, by including open-ended interviews with program staff and participants—could help researchers determine not just whether a program benefited its participants, but also understand why it did or did not confer benefits and in what other contexts we may or may not expect to see effects.⁴⁰ Extensive observations of highly effective SEL-focused after-school programs have identified universal processes that effectively build SEL across different programs, and they've pointed to program practices that best promote these processes.⁴¹ And new measures (for example, the Youth Program Quality Assessment) have been developed to assess two critical ingredients of SEL-focused after-school programs: the quality of the setting as a whole, and the experiences and interactions of the young people and adults in that setting.⁴²

Measuring these dimensions also can help to capture universal processes that drive program effects, and programs can use such assessments to drive improvements in their practices. The notion that only researchers should conduct evaluations is antiquated. Scholars increasingly advocate for greater bidirectional influence between research and practice and for shifting the broader agenda of evaluation research away from proving what works to identifying opportunities to improve programs.⁴³ This approach to evaluation could greatly enhance the experiences and outcomes of young people who attend SEL-focused after-school programs.

We also advocate for considering social justice in the practice and study of SEL-focused after-school programming. For example, we should ask what program factors can promote the greatest improvements among the most marginalized and underserved youth.⁴⁴ Moreover, underserved youth may find it harder to get to after-school programs because of factors such as cost and transportation. If they can't get to after-school programs, they're likely to spend more time in unsupervised and unstructured activities, placing them further at risk for poor outcomes. Staff turnover and limited program offerings also tend to be more common in programs that serve marginalized youth. In this way, after-school programs may replicate and extend societal inequality. If young people's experiences in after-school programs vary in accordance with their access to resources more generally, such programs will exacerbate disparities rather than remedy them.

Implications for Policy

To bolster the potential of after-school

programs to promote improvements in SEL, we must look beyond research and practice to consider the pivotal role of policy. To start, we make several recommendations for policy changes at various levels that could make adult staff more effective. Positive youth-staff relationships likely are the driving force of effective after-school programs targeting SEL outcomes, and a number of structural program elements may determine whether these relationships confer benefits to participating youth. For example, a high youth-staff ratio and high staff turnover can undermine the formation of strong ties between young people and adults. High-quality programs have been found to have low staff turnover rates and to hire staff with more experience and higher levels of education.⁴⁵ Yet the after-school workforce as a whole tends to have high turnover rates, and workers enter the field with mixed levels of relevant prior experience—and, as with other childcare jobs, the pay is low.⁴⁶ Thus, programs may have a hard time hiring and retaining the most qualified people.

One way to boost staff quality is to professionalize after-school staff positions.⁴⁷ These positions often feature low status and low pay, and they seldom provide opportunities for hierarchical advancement within a youth-serving organization. A greater emphasis on professional development, growth, and career advancement is key to improving staff quality and retention. Furthermore, staff evaluations should focus explicitly on the quality of interactions with young people, and incentives should be provided for staff members who consistently perform well or demonstrate improvements. We can also help create professional networks of

youth workers—similar to teacher learning communities—so that they can learn from one another and access in-person and online opportunities for networking, training, and support.⁴⁸

Another challenge is that staff positions in after-school programs are, by their very nature, part-time. Hence they may be better suited to young adults who are completing their education, or to retirees. One way to encourage young adults to take these positions would be to forgive student loans in exchange for a set time commitment to after-school programs in underserved communities. Such an approach could make these positions more desirable for young adults and diminish staff turnover in under-resourced programs. Giving young adults opportunities to advance into full-time positions in an organization could also help to attract qualified staff and would increase opportunities for junior leadership. And some organizations, such as Boys and Girls Clubs of America, have junior staff programs in which teenage participants undertake an apprenticeship program aimed at developing their skills and interests in human services work. In any program, as staff members move through the ranks, they could mentor less experienced hires.

Another option for overcoming the problems associated with part-time work would be to hire staff who can combine school and after-school work hours. This could mean hiring teachers and teacher's aides as after-school program staff or finding opportunities for after-school staff to extend their hours by working in schools during the day.⁴⁹ Such an approach might not only enhance the quality of

after-school program staff, it could also bridge young people's school and after-school experiences. Consistency of adults across different contexts can further support SEL development.

Policy could also alter the approach to evaluating after-school programs by broadening the criteria used to determine whether programs are effective and, consequently, worth funding. The current overemphasis on academic and economic outcomes leads to neglect of SEL outcomes that are valuable in their own right and also have great potential to foster more successful life outcomes over time. Focusing exclusively on academic improvement or reductions in problem behavior as the key determinants of effective after-school programming can mean taking resources away from programs that effectively foster growth in SEL competencies. And because SEL competencies can take time to translate into improvements in academic performance and classroom behavior, programs shouldn't lose funding if little or no immediate change can be seen in those outcomes. Expanding the criteria used to evaluate programs to include key SEL outcomes could also help to produce productive and engaged citizens, rather than just high-achieving students.⁵⁰ Collectively, we should invest in supporting the next generation's ability to make positive contributions to society in many areas. Undoubtedly, feeling self-confident and being able to effectively manage relationships with others are central to engaged citizenship, and the personal and social skills that constitute SEL are at the core of civil society.

We've discussed the need for evaluations of after-school programs to shift from focusing

solely on whether programs are effective to focusing on how to make them work better. The current policy environment isn't structured to support such a shift. Notions of accountability reinforce the removal of human and financial support from programs when evaluations don't show effects. This policy climate may, in fact, discourage programs from seeking evaluation and may undermine opportunities to learn about nuanced aspects of programs that could be modified to yield program benefits. An alternative approach to evaluation would prioritize finding the key elements of features or practices that have been linked to improvements in after-school participants' outcomes. Evaluation data could then drive program improvements and subsequent

re-evaluation. High-stakes evaluations create a disincentive for programs to undertake the difficult work of assessing their practices and outcomes. But creating incentives for evaluation would better support after-school programs' efforts to further develop and refine their approaches to fostering young people's SEL development. After-school programs are uniquely positioned to further the goals of the SEL movement. Not only are their objectives aligned with those of targeted SEL interventions, they also can help level the playing field for young people with the fewest resources. Thus, allocating more attention and resources to determining how we can best promote SEL after school holds promise for broadening the SEL movement's impact on all young people.

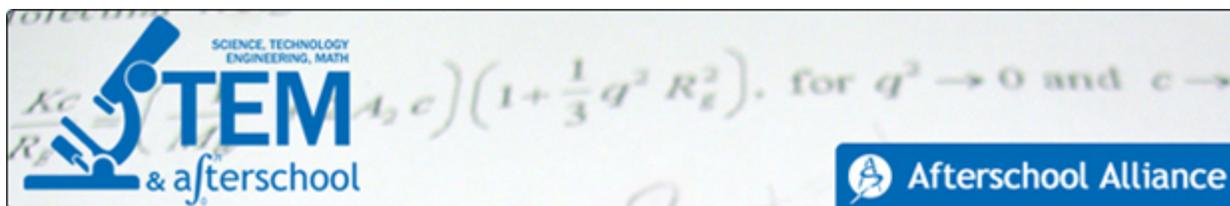
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STEM Learning in Afterschool: An Analysis of Impact and Outcomes

There is a widely acknowledged, urgent need for improving and increasing science, technology, engineering and math (STEM) skills among our citizenry and students to navigate the modern world and access the opportunities it affords. The need for a more STEM literate workforce has been discussed in respected reports such as “Rising Above the Gathering Storm” from the National Academies, and data on the workforce show clear benefits of a STEM-related post secondary education in the current job market.^{1,2}

A critical factor in this issue is the need to improve access to STEM fields and careers among populations that are currently underrepresented. According to the U.S. Department of Commerce Report *Education Supports Racial and Ethnic Equality in STEM*, “Non-Hispanic Blacks and Hispanics each account for six percent of all STEM workers, but 11 percent and 14 percent, respectively, of overall employment.”³ In another report by the Department of Commerce, focused on the gender gap, it is noted that women make up 48 percent of the workforce but only 24 percent of STEM jobs.⁴ These data make it very clear that women and minorities are greatly underrepresented in the STEM fields. Increasing access to and representation of these populations in STEM fields is necessary to increase their opportunities to participate in the modern economy; the nation would also benefit greatly if a larger and more diverse talent pool was to participate in the STEM workforce.

Given a need to improve STEM education in America and increase access to STEM learning opportunities, what steps can be taken to get there? While improvements in formal K-12 education are necessary, children spend less than 20 percent of their waking hours in school. Opportunities lie in all aspects of their education, including enrichment programs that take place during the afterschool hours and the summer.⁵

Afterschool programs* are especially well-placed to help close the opportunity gap that many children and youth from underserved and underrepresented communities face. Of the 8.4 million children in afterschool programs, ethnic minority children are more likely than others to participate.⁶ 25 percent of Asian, 24 percent of African-American, 21 percent of Hispanic and 16 percent of Native American children attend afterschool programs, compared to the national average of 15 percent. Furthermore, girls attend afterschool programs in equal numbers to boys. These participation data provide evidence that the afterschool setting reaches students from populations that are underrepresented in STEM fields and provides enrichment opportunities that can bring STEM alive for them.

* The term “afterschool” is used in this paper to refer broadly to before school, afterschool and summer learning opportunities.

Among students who are fortunate enough to have access to afterschool enrichment opportunities, the benefits of afterschool programs in general are well documented, showing positive impacts on both academic and behavioral development.⁷ In addition, outcome and impact data are now emerging from studies of afterschool programs that offer STEM learning and this recent research highlights the unique benefits for youth participating in these afterschool and summer programs.

This document summarizes evaluation reports from afterschool STEM programs across the United States and identifies common trends and strengths that afterschool learning brings to STEM education. Like many programs nationwide, several of the programs highlighted in this paper were designed specifically to provide services to underrepresented populations in STEM fields, and many also focus on providing girls with exposure to science and female role models. Thus they are reaching some of the very children and youth we need to better engage in STEM fields and careers.

Evaluations presented here were collected by casting a wide net to solicit reports from afterschool programs across the country through various communication channels as well as searching through evaluation databases. Several of the programs used pre- and post-program surveys and focus groups to measure change in students while a few continued to track their students after they left the programs. There were also some that measured academic achievement through administering pre- and post-program tests as well as recording grades and standardized test scores. Some evaluation studies also surveyed parents and program staff.

Our review of evaluations found that attending high-quality STEM afterschool programs yields STEM-specific benefits that can be organized under three broad categories: improved attitudes toward STEM fields and careers; increased STEM knowledge and skills; and higher likelihood of graduation and pursuing a STEM career. Below is a brief overview of these three types of outcomes, followed by specific findings that were common across a number of the evaluations.

1. Improved attitudes toward STEM fields and careers
 - a) Increased enrollment and interest in STEM-related courses in school ^{11,16,21}
 - b) Continued participation in STEM programs ^{9,11,13,15}
 - c) Increased self-confidence in tackling science classes and projects ^{10,15,22}
 - d) Shift in attitude about careers in STEM ¹²

2. Increased STEM knowledge and skills
 - a) Increased test scores as compared to non-participants ^{19,23}
 - b) Gains in knowledge about STEM careers ^{22,18,23}
 - c) Gains in computer and technology skills ^{20,22}
 - d) Increased general knowledge of science ^{17,24}
 - e) Gains in 21st century skills, including communication, teamwork and analytical thinking ^{17, 18, 19, 20, 22}

3. Higher likelihood of graduation and pursuing a STEM career
 - a) High rate of high school graduation among participants ^{18,28,27,29}
 - b) Pursuit of college and intention of majoring in STEM fields ^{22,28,27}

Improved Attitudes Towards STEM Fields and Careers

Researchers have shown that an early interest in pursuing science and engineering is a better indicator of whether a student will pursue a career in these fields than a student's grades in school.⁸ Increasing interest early on is critical so that students are motivated to develop the knowledge and skills required to pursue more rigorous math and science courses in high school. The following programs have documented increased interest, self-confidence or positive attitudes towards STEM fields among their participants as seen from pre- and post-program surveys. Increased interest in STEM is also evidenced by increased enrollment in advanced math and science classes as well as continued participation in STEM programs and clubs outside of the school day.

- *Communication, Science, Technology, Engineering and Math (CSTEM)* started in Houston, TX, operates both in the formal classroom and out-of-school-time setting and spans K-12. CSTEM seeks to eliminate barriers to the STEM disciplines as well as communication for under-represented populations and currently operates in six states (Louisiana, Michigan, Maryland, Mississippi, Tennessee and Texas) and the Dominican Republic. The school year culminates with a CSTEM challenge that includes a robotics competition and presentation of work done throughout the year. CSTEM focuses on professional development for teachers who are leading the robotics teams, most often in the afterschool time. Each team consists of participants from one high school, middle school and elementary school. Each school team completes a section of a larger end product. The different components of the competition include robotics, creative writing, a "green" challenge, sculpture and Geographical Information System (GIS) mapping.

Highlights from its 2010-2011 community impact reports show that many students participating in CSTEM had not previously been exposed to similar topics and that there was a high interest among students:

- 94 percent of students reported that they want to continue in the CSTEM program.
 - 100 percent indicated that CSTEM provided their first STEM enrichment experience. 75 percent spent three hours per week or more on their CSTEM project, and 20 percent spent 10 or more hours per week.⁹
- *For Inspiration and Recognition of Science and Technology (FIRST)* provides several leagues in which student teams compete in robotics competitions. The program is open to all K-12 youth. Within the teams, students spend six weeks planning and designing a robot to compete in local, regional and national competitions. *FIRST* Robotics Competition and *FIRST* Tech Challenge are designed for high school students while *FIRST* LEGO League is for 9-14-year-olds and Junior *FIRST* LEGO League is for youth aged 6-9.

A retrospective study of *FIRST* alumni was conducted by researchers at Brandeis University who surveyed participants who graduated from the program between 1999-2003 in New York City and Detroit. The study found that:

- 80 percent of respondents reported an increased understanding of the role of science and technology in everyday life.
- 86 percent reported an increased interest in science and technology generally and 69 percent had an increased interest in STEM careers.
- 89 percent reported increased self-confidence and 70 percent had an increased motivation to do well in school.¹⁰

Several national organizations host *FIRST* teams, including the Girl Scouts. A survey of Girl Scouts *FIRST* Lego League (FLL) and *FIRST* Tech Challenge (FTC) teams at the world championship in 2010 highlighted the following findings:

- 66 percent stated that they enjoy math and science projects in school more than before their participation in FLL.
- 56 percent stated they were more interested in their science classes than before participating in FLL.
- 92 percent of respondents stated that they “want to learn more about science and technology” as a result of their participation in FLL.¹¹

- Operation SMART[®] is a national program offered by Girls Inc. and provides K-12 participants an opportunity to explore STEM careers through afterschool and summer programs. Students spend time working on science experiments, designing projects and having discussions about careers in STEM with professional mentors.

Participants from a Girls Inc. site in Harrisburg, PA, were asked particular questions about their attitudes towards math, science and learning before and after their experiences in the program. They responded as below:¹²

| Survey item | Percent who answered YES | |
|--|--------------------------|-------|
| | Before | After |
| I know what a scientist does | 45% | 99% |
| I am good in math | 90% | 100% |
| I am smart (intelligent) | 91% | 100% |
| I like to discover things (or invent things) | 54% | 97% |
| Not having science would be okay with me | 40% | 3% |

- Science Club for Girls (SCFG) operates out of Cambridge, MA, at school sites throughout the state. Girls in 8th-12th grades build leadership skills by serving as mentors to younger girls (K-7). Students interact with STEM professionals, do science activities and take field trips to local museums.

A survey given to Cambridge Public School students who participated in SCFG for at least one year and girls who did not participate found:

- Those who participated in SCFG scored 4.9 points (out of 48 points) higher than those who did not on a survey that measured attitudes towards science.
- SCFG members had more confidence in themselves as science students than their non-participating counterparts.

- Student Science Enrichment Program (SSEP) was established by the Burroughs Wellcome Foundation in 1996 to fund innovative programs in the state of North Carolina that work during out-of-school-time (OST) on science enrichment. The monetary awards are granted to programs that provide hands-on science learning and inquiry-based exploration. The programs are also required to align with the school-day curriculum. Since its inception, SESP has worked with 69 programs across North Carolina.

Evaluation of the OST programs began with the inception of the award in 1996 using an external evaluator. The evaluation tools included student feedback surveys, project profiles, observations and annual reports by program directors. From the feedback survey conducted during 2008-09:

- 72 percent stated that they are more interested in learning science since being part of the program.
- 76 percent stated they are more excited about science because of the program.
- 81 percent stated they want to participate in a similar program.¹³

- *TechBridge* works exclusively with girls in grades 5-12 and operates as an afterschool program located on school campuses in Oakland, CA. The program provides participants with an opportunity to work on projects organized by discipline (computer science, chemistry, biology). Activities include learning about chemical properties by making bouncy balls or the principles of programming by creating Scratch[†] animations. Youth also have an opportunity to visit tech companies and participate in career exploration activities.

Evaluation data from its annual report in 2010 showed that there was increased interest in STEM among participating girls:

- 95 percent believed engineering is a good career for women.
- 85 percent were more interested in working in technology, science or engineering because of role models and field trips.
- 82 percent could see themselves working in technology, science or engineering.¹⁴

- *Tech Corps* programs include Student Tech Corps, Techie Club, Techie Club: Girl and Techie Camp, and can be found in Ohio and Texas. Techie Club is designed to expose elementary school youth to STEM. The curriculum includes computer programming with LEGO Mindstorm NXT[‡] and Scratch as well as work on digital media and Web tools.

An evaluation of 10 Techie Clubs in Ohio during the 2009-2010 school year included pre- and post-program attitude surveys from students, mid-year surveys from site coordinators, student impact surveys from homeroom teachers and program impact surveys from parents. Site coordinators as well as homeroom teachers observed a significant increase in confidence using technology among Techie Club participants:

- 67 percent of those surveyed stated that participating in Techie Clubs allowed them to be more confident about how a computer works.
- 17 percent said they were more excited to be an engineer at the end of the program.
- 89 percent of students said they would recommend Techie Club to their friends.
- 97 percent of students said they would want to participate in Techie Club next year.¹⁵

- *TechREACH*, based in Washington state, provides afterschool clubs for middle school students at several school sites. The curriculum includes 3D design, creating podcasts, learning and building small-scale wind turbines, and designing arcade games. Club mentors are brought in to talk about

[†] Scratch is a platform in which users can create programs by manipulating visual icons that represent program code. It was created as an educational tool by researchers at the Media Lab at MIT.

[‡] LEGO Mindstorm NXT is a kit of LEGO bricks with a central microcontroller with which participants can build and program a robot to move autonomously.

their careers in STEM fields. The program also has a teacher training component to equip teachers with the resources to implement curriculum. The clubs are separated between boys and girls.

Evaluations done by an external reviewer in 2008 through surveys, focus groups and interviews showed that participants had increased interest in science and math and increased confidence in their ability to pursue these subjects.¹⁶ Highlights from the report include:

- More than 73 percent agreed or strongly agreed that it made them want to take more technology classes in high school.
- 62 percent said it increased their interest in a career in technology.
- 49 percent said it increased their interest in a career as a computer scientist.
- 49 percent said it made them want to take more math classes in high school.

All of these programs have found ways to increase interest in STEM by providing youth with engaging curriculum that sparks their curiosity. All the programs promote teamwork and provide an element of problem solving that puts students in control of what they are learning. Many of the programs highlighted here have a strong mentorship component that exposes youth to various career opportunities through interaction with STEM professionals. In addition, several evaluations noted that the staff and parents of participants reported an increase in confidence among their youth. This increase in confidence, especially among young girls, is key to taking the next steps to pursue STEM education and careers.

Increased STEM Knowledge and Skills

While engagement and developing positive attitudes towards STEM fields is the first step, afterschool programs also provide an opportunity for participants to gain knowledge, further their interest in the topic and gain the skills necessary for STEM careers. Problem solving, critical thinking, communication and collaboration are all part of the skill set required for the knowledge-based jobs of the present and future. These skills are being cultivated in the afterschool space.

- 4-H Science Initiative is offered by 4-H clubs across the U.S. Program curriculum ranges from animal and plant biology to renewable energy. The educational materials are created by 4-H members and are reviewed and evaluated. 4-H afterschool and summer programs are run through land grant universities and colleges which have liaisons for the surrounding community.

Evaluation of the Science Initiative was done in 2010 through the 4-H Science Youth Engagement, Attitudes and Knowledge (YEAK) survey which measures interest in science as well as probable pursuit of a STEM career from participation in the Science Initiative. On the survey, students reported gains in the skills and knowledge they learned:

- Recording data accurately (76 percent of students).
- Using data to create graphs (75 percent of students).
- Using results of an investigation to answer questions (73 percent of students).¹⁷

Other highlights of the evaluation include 4-H participants' increased interest and participation in science activities outside of school as compared to the national sample. A high percentage of participants planned to go on to college and higher education in pursuit of STEM fields.

- ACE Mentor Program is a national program that partners high school youth with local mentors in the architectural, construction and engineering (ACE) industries to work on a real-life design problem. The students work as a team to develop a design proposal, learning to use drafting tools, budgeting and planning for material acquisition as they design the proposed infrastructure and present their plan at an end of the year showcase.

Evaluations of program alumni were conducted in 2010 in which 933 alumni completed a Web survey of their experiences in ACE Mentor Program and current status as it relates to ACE careers. Nearly half of the respondents completed the program in 2009.

- More than 90 percent of participants said that they gained valuable life/work skills by participating in the ACE Mentor Program.
- More than 95 percent of alumni said that they gained valuable knowledge about ACE careers and about how the industry works.¹⁸

- After-School MathPlus is implemented in afterschool programs nationally to highlight the importance of math skills for future career options. The curriculum is designed to help students identify and learn math in everyday experiences.

Evaluation data was collected from two sites where museums collaborated with local afterschool programs. The New York Hall of Science worked with the Chinese American Planning Council, and the St. Louis Science Museum worked with Adams Park Community Center and Adams Elementary to provide programming for third through eighth-grade students and their parents, including creating math exhibits that were showcased to a larger audience. Participants showed significant increases in math test scores as compared to students who did not participate in the program.¹⁹

- Build IT is administered through Girls Inc. of Alameda County, CA, and co-developed by SRI International. Designed for middle school-aged girls, the program provides participants with an opportunity to learn about careers in information technology (IT) and to work on design projects with mentors.

Evaluations conducted through self-assessments show that the girls gained technical skills and knowledge:

- 80 percent of participants stated they were able to tell someone how to use a computer program, explaining specific functions to accomplish a task.
- 77 percent stated they could troubleshoot a computer problem.
- 78 percent stated they could easily learn new computer programs and describe how information travels through the Internet.²⁰

- Design Team is run through the Kitty Anderson Youth Science Center at the Science Museum of Minnesota in Saint Paul, MN. Design Teams provide middle school participants the opportunity to work on design projects in groups.

Summative and formative evaluation methods included observations of the teams, documentation of work on an online group site, interviews and surveys. A 2009 report summarizing exit surveys of participants showed that a significant number of students became more comfortable in programming the tools used and gained significant communication and teamwork skills:

- 70 percent stated that they used what they learned in Design Team in school.
- 57 percent stated that participating in the program influenced them to take engineering courses in high school.²¹

➤ *Project IT Girl* is a three-year program offered by GirlStart in Austin, TX. Female high school students explored various aspects of information technology, including programming and design principles, culminating in an internship with a local tech company. A group-based, mentored design project required them to use problem solving skills, teamwork and presentation skills.

A review of the program after its third year (2008-2009) revealed positive impacts on participants' interest level, knowledge and skills, and desire to pursue STEM careers:

- 82 percent of participants stated that they were more confident in gaining high-tech skills.
- 79 percent stated they have a better understanding of technology-related careers.
- 71 percent of participants stated they can code HTML to create a website as compared to the 19 percent who came into the program with this skill.
- 85 percent stated they are more confident in their business communication skills.²²

The study also found that while the students participated in IT-related projects, their new skills in project management, design and communication—including business skills, teamwork and confidence working with IT professionals—could be applied to a wide range of career pursuits. One of the participants noted, “I learned about databases’ organization, but more than that, I gained valuable experience on how the workplace works and improved my teamwork skills.”

➤ *SHINE 21st Century After-School Program* operates in schools in Carbon and Schuylkill counties in Pennsylvania. Participants are referred to the program based on academic performance. SHINE began a pilot Career Camp in 2009 for fifth and sixth-grade students who had previously participated but were currently ineligible to return to the program. The Career Camp had a STEM focus that exposed students to health services, manufacturing and business. The students engaged in hands-on problems solving activities and visited local businesses and community colleges.

Data collected from report cards of program participants in the three school districts from the third marking period to the fourth marking period showed:

- Gains in overall academic performance as measured by school grades (67 percent)
- Improvements in their science grades (62 percent)
- Improvements in classroom conduct (54 percent)

Furthermore, students reported an increased knowledge of job possibilities, understanding of the importance of reading and mathematics for future careers, and gained insight into high priority fields such as health services, business and finance, logistics, and advanced manufacturing.²³

- *The After-School Corporation (TASC)*'s initiative to increase STEM learning in the afterschool space, *Frontiers in Urban Science Exploration 2.5*, was designed in 2007 to provide afterschool staff with professional development training to implement STEM curriculum in their programs. TASC evaluated 19 of these programs during the 2009-2010 school year to gauge the program's effectiveness. Programs were given materials and training on various curricula including After-School Science Plus, After-School Conservation Club, Afterschool Universe, 4-H Wonderwise, Mixing in Math, NASA: The Planetary Neighborhood and Tech After-School.

The evaluators surveyed both staff and students to better understand the impact of training on staff development as well as student learning.

- 72 percent of students reported that the program made science more fun for them.
- 76 percent of students reported that the program allowed them to learn things about science that they did not know before.²⁴

- *YMCA of Central Maryland* used the Let's Go STEM curriculum at six Y of Central Maryland sites during the fall of 2010 in which participants worked on LEGO Mindstorm NXT robotics kits over a 10-week period.

Evaluations were done through pre- and post-program surveys of participants, teachers and parents that included questions which measured student interest as well as how much the program changed their perception of science. The first section of the pre- and post surveys included expectations and motivations for joining the program and the second part measured their attitudes using the *Modified Attitudes towards Science Inventory (mATSI)* to create the tool. A section of the post-participation survey also measured what students learned from the program about specific content and robotics skills. The evaluation showed that there was increased perceived knowledge of robotics among the participants after completing the program.²⁵

These examples show how afterschool programs can help develop career-relevant knowledge and skills prior to graduation. The STEM skills and knowledge acquired through afterschool programs are essential to future success in the job market. In addition to providing content knowledge, afterschool programs teach and strengthen 21st century skills such as teamwork and communication, which are invaluable to the participants regardless of their post-graduation plans. Participants also explore careers and identify mentors and role models who can provide guidance on pursuing STEM careers if students choose to follow that path.

Graduation and Next Steps

Evaluations of afterschool programs have shown a link between afterschool participation and decreased high school dropout rates.²⁶ Evaluations of STEM programs offered in afterschool are also showing that participants are more likely to pursue higher education and study STEM fields. Although tracking students is a resource-intensive approach to evaluation that only a few programs can afford, some programs have been able to track their alumni, providing a rare glimpse into how many have pursued STEM careers.

- *ACE Mentor Program* partners high school youth with local mentors in the architectural, construction, and engineering (ACE) industries to work on a real-life design problem. The

students work as a team to develop a design proposal learning to use the tools of the trade along the way.

Results from a survey of program alumni showed that:

- ACE students who were seniors in high school in 2009 graduated at a rate of 97 percent compared to the 73 percent national graduation rate as reported by the National Center for Education Statistics.
- 66 percent of alumni from the ACE program are studying architecture, engineering, construction and the skilled trades, or are already working in one of these fields.¹⁸

- *For Inspiration and Recognition of Science and Technology (FIRST)* provides several leagues in which student teams compete in robotics competitions. The program is open to all K-12 aged youth. Within the teams, students spend six weeks planning and designing a robot to compete in local, regional and national competitions.

A retrospective study of *FIRST* alumni who graduated from the program between 1999-2003 in New York City and Detroit was conducted by researchers at Brandeis University. The study found that:

- 99 percent graduated from high school.
- 89 percent went on to college.
- Of those in college reporting a major, 41 percent reported that they had selected engineering.¹¹

- *Project Exploration*, based in Chicago, IL, started in 1999 and provides out-of-school-time programs for youth to explore science through a strong mentor component. Seventy-four percent of participants are girls and 85 percent come from low-income families (predominantly African-American and Latino). Scientist mentors work with youth in their respective fields to spark their curiosity in science. The Junior Paleontologist programs take participants out to dig sites where they work with professional paleontologists to learn about geology. Sisters4Science is an all-female afterschool program in which students go on field trips and work on science activities with female scientists. Project Exploration staff maintains a relationship with its participants even after they become alumni of the program, which gave them access to report on the impacts of their efforts over time.

A 10 year retrospective study that surveyed 30 percent of an estimated 259 alumni showed that:

- 95 percent have graduated or are on track to graduate from high school, nearly double the rate of other Chicago Public School students.
- 60 percent of those who are enrolled in a four year college are pursuing a degree in a STEM-related field.
- 60 percent of those who graduated from college did so with a degree in a STEM-related field.²⁷

As stated before, tracking students long term is a very resource-intensive process that few programs are able to afford. More commonly, evaluations have asked students about their intentions for the future, and many students reported that they planned to graduate from high school and pursue STEM fields in college.

- *Digital Wave* at the Miami Science Museum in Florida introduces students in 9th-12th grades to climate change, digital technologies and related careers. Participants learned 3-D design and animation to create educational simulations about climate change.

Evaluation of the second cohort in 2010 showed a strong number of participants graduating high school with plans to pursue STEM education:

- 96 percent of program alumni planned to attend college.
 - 77 percent planned to major in a science or technology field in college (an increase of 9 percent compared to the start of the program).
 - 96 percent of students who completed the Digital WAVE Design Studio program expressed plans to take Advanced Placement classes in STEM subjects in high school (an increase of 20 percent compared to the start of the program).²⁸
- *Science Club for Girls (SCFG)*, a program based in Cambridge, Massachusetts, provides girls with an opportunity to interact with STEM professionals, do science activities and take field trips to local museums. It also provides girls in 8th-12th grades an opportunity to serve as mentors to the younger girls and build leadership skills.

A survey given to Cambridge Public School students who participated in SCFG for at least one year and girls who did not participate found that:

- When asked about their future plans, 99 percent of participating students stated that they plan to attend college as compared to 91 percent of non-SCFG students.
- 46 percent of SCFG members stated they wanted a STEM-related career as compared to 35 percent of non-SCFG students.²⁹

Several other programs can also point to a high percentage of participants that graduate from high school and plan on pursuing careers in STEM fields:

- 87 percent of participants of Project IT Girl enrolled in a four-year university and 80 percent stated they will pursue a STEM major.
- 93 percent of Design Team participants plan on pursuing education after graduating from high school.
- 75 percent of CSTEM participants plan to attend college.
- 68 percent of Girl Scouts FLL participants surveyed stated they wanted to pursue careers in design.

The high percentage of high school graduates among afterschool STEM program participants clearly indicates that the benefits of STEM in afterschool extend beyond sparking interest and capturing students' imagination in the short term. Students are also more motivated to pursue higher education and careers in STEM fields; and select studies are beginning to show that they follow through on these intentions.

Conclusion

This report highlights just a handful of afterschool programs across the nation that provide engaging opportunities for STEM learning. While individual programs have collected data on their participants' outcomes to refine and support their local models, patterns in the findings across multiple studies begin to reveal the potential of STEM programming in afterschool as a means to engage students in STEM fields and careers and nurture that interest.

The evaluation results collected here offer a sample of the positive impacts of these programs on youth: Afterschool programs can not only inspire youth, but provide them with the confidence to pursue STEM fields both academically and professionally. Yet the skills and knowledge gained through these programs are not exclusive to STEM career aspirations, as outcomes such as increased communication skills and the ability to work in groups are essential skills in any career. More outcome studies and impact data from afterschool and summer programs that provide STEM enrichment will help to clarify the promising trends noted in this paper. However, data from these programs already show that afterschool is playing a key role in supporting STEM learning. To maximize potential impact, future STEM education policy should support afterschool and summer opportunities for STEM engagement.

The table below provides additional detail on the afterschool evaluations included in this analysis, including demographic information and specific outcomes organized into the three main trend categories from the various afterschool program evaluations described above.

| Program | Description | Demographics | Improved Attitudes Towards STEM Fields and Careers | Increased STEM Knowledge and Skills | Graduation and Next Steps |
|--|--|--|---|--|---|
| 4-H (Nationwide) | 4-H Science Initiative creates science curriculum for 4-H chapters to use in their afterschool and summer programs. The curriculum looks holistically at science topics ranging from biology to renewable energy. | | <p>59% would like to have a job related to science when they graduate from school.</p> <p>71% of 4-H Science Initiative participants said science is one of their favorite subjects.</p> <p>68% do science-related activities that are not for school work.</p> | | More than 80% of respondents intend to finish college or continue to pursue more education after college. |
| ACE Mentor Program (Nationwide) | ACE Mentor Program works with middle and high school students to partner them with members of the community in the <u>a</u> rchitecture, <u>c</u> onstruction, and <u>e</u> ngineering (ACE) fields. Mentors at partnering firms are paired with project teams at schools and work with them throughout the year on a design project that is presented at the end of the year. | 61% minorities in the program in 2008-09 | | <p>95% of ACE Mentor Program alumni agreed that they gained valuable knowledge about ACE careers and about how the industry works.</p> <p>90% of ACE Mentor Program alumni agreed that they gained valuable work/life skills to use in a career and gained an edge over their peers studying ACE in college as a result of the ACE Mentor Program.</p> | <p>90% of ACE Mentor Program participants enrolled in post-secondary institutions.</p> <p>66% of ACE Mentor Program alumni are studying architecture, engineering, construction and the skilled trades, or are already working in one of these fields.</p> <p>ACE Mentor Program attracts a high percentage of African-American and Hispanic college freshmen into engineering.</p> |

| Program | Description | Demographics | Improved Attitudes Towards STEM Fields and Careers | Increased STEM Knowledge and Skills | Graduation and Next Steps |
|---|---|---|---|--|---|
| After-School MathPlus (NY, MO) | This program is a collaboration with museums, including New York Hall of Science, to provide programming for youth and their parents. Participants worked on math exhibits that were showcased to a larger audience. | The NYC site served mostly Asian-American students while the St. Louis and Louisville sites served mostly African-Americans. | | Participants showed a significant increase in math test scores as compared to students who did not participate in the program. | |
| Build IT (Alameda County, CA) | Build IT is an out-of-school, project-based program administered through Girls Inc. in Alameda County to get middle school girls interested in information technology (IT) careers. | 100% girls | Girls expressed more interest in mathematics and computer science after participation. Many of the girls expressed interest in IT careers and can articulate the responsibilities of specific IT jobs. | 80% stated they can tell someone how to use a computer program, explaining specific functions to accomplish a task. 77% stated they can troubleshoot a computer problem. 78% stated they can easily learn new computer programs and describe how information travels through the Internet. | |
| CSTEM (LA, MD, MI, MS, TN, TX, Dominican Republic) | CSTEM operates both in the formal classroom and the out-of-school-time setting depending on implementation at each school and spans grades K-12. The year culminates with a CSTEM challenge, which includes a robotics competition and presentation of work done throughout the year. | 91% African-American and Hispanic students 45% girls Participating schools serve 80-100% economically disadvantaged students. | 94% of students reported that they want to continue in the CSTEM program. 75% spend three hrs/week or more on CSTEM projects (2% spending 10 or more hrs/week). | 100% of participants passed math and science state tests. 100% indicated that CSTEM provided their first STEM enrichment experience (i.e. robotics, GIS, digital fabrication, etc.). | 82% plan to attend a college or a four-year university. More than 53% of CSTEM participants that have graduated high school are in college or university pursuing a STEM-related degree. |

| Program | Description | Demographics | Improved Attitudes Towards STEM Fields and Careers | Increased STEM Knowledge and Skills | Graduation and Next Steps |
|---|---|--|--|--|---|
| Design Team (Science Museum of Minnesota) | Design Team participants are middle school-aged students who work on design projects. The program runs afterschool and weekends at the Science Museum of Minnesota. | | | 70% of participants said Design Team helped them in school. | 93% of participants plan on pursuing education after high school graduation. |
| Digital WAVE Summer Design Studio (Miami Science Museum) | Digital Wave is a yearlong program offered by the Miami Science Museum to high school students to learn more about climate science, digital technologies and related careers. | 100% enrolled in the free and reduced lunch program. Nearly 75% spoke languages other than English at home. | | Participants reported that they had learned 3-D modeling skills through the program. | 96% plan to attend college. 77% plan to major in a science or technology field in college. |
| FIRST (Nationwide) | <i>FIRST</i> is a robotics competition with various leagues for K-12 students. Participants work in teams to build robots for competition. | 55% non-white 41% girls 37% neither parent attended college. | Four times as likely to expect to pursue a career in engineering. Ten times as likely to have had an apprenticeship, internship, or co-op job in their first year of college. | 73% reported learning how to make a presentation in front of people they did not know and how to gather and analyze information. 68% reported learning how to use computers to retrieve and analyze data. | 99% reported graduating high school. 89% went on to college. |
| Girls Inc. Operation SMART (Nationwide) | Operation SMART provides K-12 participants an opportunity to explore STEM and related careers through afterschool and summer programs. | 100% girls | Participants demonstrated an increase in their confidence, competence and comfort in STEM. Participation lessened girls' stereotyped views of scientists and whether men or women should have certain jobs. | | |

| Program | Description | Demographics | Improved Attitudes Towards STEM Fields and Careers | Increased STEM Knowledge and Skills | Graduation and Next Steps |
|---|---|---|--|--|--|
| Project Exploration (PE) (Chicago, IL) | PE provides youth programming that focuses on different science disciplines and interaction with mentors in the field. Programs vary in length and operate both afterschool and during summer. PE works in the Chicago area with predominantly minority and female middle and high school students. | 85% from low-income families, primarily African-American and Latino 74% girls | 94% of those surveyed responded that PE increased their interest in science outside of school. 93% responded that PE sparked their sense of curiosity about science. 84% responded that PE motivated them to find other science-related opportunities. | 95% of those surveyed reported that they learned “science in ways that was different from school.” 90% responded they learned “how to ask scientific questions.” 86% responded they learned “how to use evidence when making an argument.” | 95% of those surveyed have graduated high school or are on track to graduate—nearly double the overall rate of Chicago Public Schools. 60% of those enrolled in a four year college are pursuing a degree in a STEM-related field. 60% of those who graduated from college did so with a degree in a STEM-related field. |
| Project IT Girl (Austin, TX) | Project IT Girl worked with girls in 10th through 12 th grade afterschool and during summers. The program curriculum focused on information technology (Web design and programming) as well as an internship component in which they worked on project teams with mentors. There was also a cohort of middle school girls. | 100% girls 93% Hispanic or African-American among the middle school cohort 42% spoke Spanish as their primary language at home. 91% qualified for free or reduced lunches. | | Participants increased knowledge in Web design and learned about business, communication and teamwork skills. | 87% of participants enrolled in a four year university. 80% plan to pursue a STEM major in college. |

| Program | Description | Demographics | Improved Attitudes Towards STEM Fields and Careers | Increased STEM Knowledge and Skills | Graduation and Next Steps |
|--|--|--|--|--|--|
| Science Club for Girls (SCFG) (Cambridge, MA) | SCFG operates as clubs on various school sites in Massachusetts in which girls are exposed to hands-on science activities. The club operates for one hour per week and is open to K-seventh-grade female students. Eighth through 12 th -grade students have the opportunity to serve as mentors for younger girls and also get to work with adult mentors. | 100% girls 32% African-American 24% Hispanic | SCFG members scored higher on science attitude surveys than their non-SCFG counterparts. | | 99% of SCFG members said they planned to attend college. 46% of SCFG members said they desired a STEM-related career. |
| SHINE 21st Century Afterschool Program (Carbon and Schuylkill County, PA) | SHINE offered a five-week career camp for fifth- and sixth-graders that exposed them to careers in health services, manufacturing and business. The students worked on hands-on problems solving activities and visited local businesses and community colleges. | 100% from rural counties 82% low income | | Students in three school districts showed gains in academic performance (67%), science grades (62%) and classroom conduct (54%) from the third to the fourth marking period on their report cards. | |
| Student Science Enrichment Program (SSEP) (North Carolina) | SSEP is a fund established by the Burroughs Wellcome foundation to support programs in North Carolina that promote hands-on science activities and inquiry-based learning outside of the regular school environment. | | 76% of the students surveyed said they are more interested in learning science because of the program. 81% stated that they wanted to participate in a similar program in the future. | 43% of students said they learned specific content or developed skills. 80% of students said they are better able to learn science. | |

| Program | Description | Demographics | Improved Attitudes Towards STEM Fields and Careers | Increased STEM Knowledge and Skills | Graduation and Next Steps |
|---------------------------------|---|---|--|--|--|
| TechBridge (Oakland, CA) | TechBridge works with girls in grades 5-12 and operates as an afterschool program located on school campuses. The program provides participants with an opportunity to work on projects, visit tech companies and explore career options. | 100% girls 37% Hispanic 25% Asian 14% African-American | Participants became more aware of STEM career opportunities. Participants gained technical skills and learned to think/act like a scientist. | 95% stated they know more about how things work (like circuits and simple machines). 82% stated they are better at using new computer programs. 91% stated they learned that teamwork is good for solving problems. 84% stated they are better at problem solving. 68% said they speak up more in classes at school than before. | 96% said they know more about different kinds of jobs. 95% stated they believe engineering is a good career for women. 85% stated they are more interested in working in STEM fields because of role models and field trips. |
| TechCorps (Nationwide) | TECHie Club is designed for elementary school students and has a curriculum that includes programming through LEGO Mindstorms NXT and Scratch as well as the use of digital media tools. | | Participating in TECHie Club increased the number of students who said that computer jobs are exciting. | Participants stated they were more confident in their knowledge of how computers work. | |
| TechREACH (Washington) | TechReach provides afterschool clubs for middle school students in which they participate in hands-on science and engineering curriculum. The program also has a teacher training component to equip teachers with the resources to implement curriculum. The clubs are separated between boys and girls. | | Science and math teachers reported that girls were more engaged in science and math classes after participating in TechREACH. 73% of participants reported increased interest in science or math. | 87% of survey respondents agreed that they learned about STEM careers. | |

| Program | Description | Demographics | Improved Attitudes Towards STEM Fields and Careers | Increased STEM Knowledge and Skills | Graduation and Next Steps |
|--|--|--|---|---|----------------------------------|
| The After-School Corporation (New York) | TASC provided professional development support in STEM to several afterschool programs as part of their initiative, Frontiers in Urban Science Exploration 2.5. They used available curriculum, including Afterschool Universe, 4-H Wonderwise and Mixing in Math. | 50% Hispanic 26% African-American | 72% of students reported that the program made science more fun for them. | 76% of students reported that the program allowed them to learn things about science that they did not know before. | |
| YMCA of Maryland (Maryland) | Let's Go STEM is a curriculum used by the YMCA of Maryland to introduce participants to STEM through robotics. | 43% African-American | There was an increase in STEM career aspiration after participating in the program. | There was a significant increase in self-reported knowledge gain of designing robots. | |

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