



Expanding **minds** and Opportunities

Leveraging

the Power of Afterschool and Summer Learning for Student Success

This article is an excerpt from the groundbreaking book, ***Expanding Minds and Opportunities: Leveraging the Power of Afterschool and Summer Learning for Student Success***. This landmark compendium, edited by Terry K. Peterson, PhD, is composed of nearly 70 research studies, reports, essays, and commentaries by more than 100 researchers, educators, community leaders, policy makers, and practitioners.

Collectively, these writings boldly state that there is now a solid base of research and best practices clearly showing that quality afterschool and summer learning programs—including 21st Century Community Learning Centers—make a positive difference for students, families, schools, and communities.

Together, the collection of articles demonstrates the power of quality expanded learning opportunities to:

- **promote student success and college and career readiness;**
- **build youth assets such as character, resilience, and wellness;**
- **foster partnerships that maximize resources and build community ties; and**
- **engage families in their children's learning in meaningful ways.**

For information on how to order the full book, download sections and individual articles, or explore the topic areas, visit **www.expandinglearning.org/expandingminds**.

About the Expanded Learning and Afterschool Project

The Expanded Learning and Afterschool Project is a 50-state initiative harnessing the power of networks and leaders to help schools and communities leverage the time beyond school to accelerate student achievement. A partnership of funders led by the C.S. Mott Foundation support the Expanded Learning and Afterschool Project. More information about the book and the project, as well as additional resources, can be found at www.expandinglearning.org.

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STEM Learning in Afterschool and Summer Programming: An Essential Strategy for STEM Education Reform

Science, technology, engineering, and math (STEM) skills are increasingly necessary to navigate an ever-more complex world and a globalized economy. There is tremendous energy and momentum to improve these skills among our citizens and students so they can participate fully in contemporary society and the modern economy.

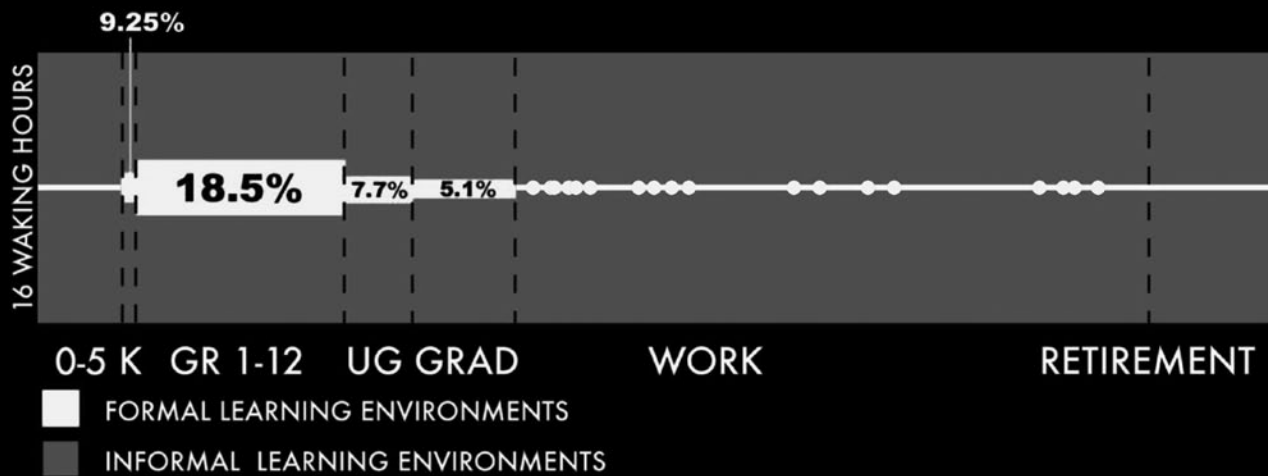
Afterschool and summer programs all over the United States are offering engaging, hands-on STEM learning programs that are not only getting children excited about these topics, but also are helping them build some real-life skills and proficiencies.

Yet most strategies and policies for reforming STEM education focus on what happens during the school day. While schools are absolutely essential for learning, we must acknowledge that children spend less than 20% of their waking hours in schools each year, and some persuasively argue that school is not where most Americans learn most of their science anyway (Falk & Dierkling, 2010).

Hence, efforts to improve and increase STEM education opportunities must include programs that take place during the afterschool hours and the summer. Despite the need for many more quality afterschool and summer programs, more than 8 million young people already attend afterschool programs (Afterschool Alliance, 2009).

In addition, there is a sizeable infrastructure of programming and support (for example, the 21st Century Community Learning Centers initiative and the California Afterschool and Safety Program) focused especially on serving young people from groups that are typically

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under-represented in the STEM fields. This is a large and growing field that local, state, and national education and business leaders and policy makers interested in STEM and K–12 education reform should pay attention to.

Afterschool and summer programs all over the United States are offering engaging, hands-on STEM learning programs that are not only getting children excited about these topics, but are also helping them build some real-life skills and proficiencies. There is mounting evidence that demonstrates the impact of these settings. A recent analysis of evaluation studies of several afterschool STEM programs showed that high quality programs can lead to increased interest and improved attitudes toward STEM fields and careers, increased STEM knowledge and skills, and increased likelihood of pursuing STEM majors and careers (Afterschool Alliance, 2011b).

Evidence of STEM Benefits from Afterschool

- **4-H** (nationwide) – 71% of 4-H science participants say science is now one of their favorite subjects, and 59% say they would like to have a job in a science field.
- **ACE Mentor Program** (nationwide) – 66% of program alumni (mostly from minority communities) are studying Architecture, Construction, or Engineering or working in one of these fields.
- **FIRST** (nationwide) – Participants learn a wide variety of skills, ranging from technical to teamwork and presentation skills, in this program focused on robotics. 89% of alumni go on to college.
- **TechBridge** (Oakland, CA) – This girls-only program enjoys great success, with more than 80% of participants reporting improved problem-solving, computer, and technical skills.

The impact of these types of expanded learning programs and extracurricular activities is also reflected in improvements in academic performance, as noted in the research cited by many other authors in this compendium. Other recent research also reveals the importance of out-of-school-time settings for STEM education. Tai, Liu, Maltese, and Fan (2006) found, for example, that early engagement with STEM fields was crucial and that a professed interest in STEM careers by eighth grade was a more accurate predictor of getting a science-related college degree than were the math or science test scores for average students. Thus, early encouragement of elementary and middle school students in STEM fields can be very effective in influencing their choice of college majors. Additionally, Wai, Lubinski, Benbow, and Steiger (2010) found that students who had more opportunities to participate in STEM learning (including beyond the classroom) were more likely to follow STEM career pathways and excel in them.

Afterschool programs are well placed to deliver on these needs by not only providing additional time to engage in STEM topics but also by doing so in a manner that is different from school and that engages different types of learners. These programs can also be very effective in improving access to STEM fields and careers among populations that are currently greatly underrepresented – women, African Americans, and Hispanics (Beede et al., 2011a; Beede et al., 2011b)—helped in part by the fact that African American and Hispanic children participate in afterschool programs in greater numbers (Afterschool Alliance, 2009).

Promising Trends in Afterschool STEM Learning

Afterschool programs are no strangers to STEM programming. STEM-rich institutions, such as museums and universities, as well as youth groups such as 4-H, Girls Inc., Girl Scouts, etc., that have deep roots in their communities, have been offering afterschool STEM programs for many decades. What has changed in the past decade is that they have renewed and deepened their commitment and that the average afterschool provider has also become interested in offering such opportunities to the children they serve. The only federal funding source exclusively dedicated to afterschool and summer learning programming, the 21st Century Community Learning Centers initiative, is now emphasizing STEM as a priority area for its grantees. Indeed, the importance of this key funding source cannot be overstated, as it is essential for providing the basic programs and infrastructure that many other STEM-focused partners can tap into to expand learning opportunities for students.

Funding from this federal initiative has significantly leveraged additional resources for STEM programming. For example, the Noyce Foundation is a private philanthropic foundation that invests heavily in afterschool STEM learning through innovative partnerships. A C. S. Mott Foundation-Noyce Foundation collaboration currently is active in 16 states and will continue to expand among the nation's growing number of state afterschool networks, which are supported by the Mott Foundation. Also Noyce is investing in "Project LIFTOFF," an initiative to develop and nurture afterschool STEM systems in 10 Midwestern states. This initiative has led many school districts to combine their foundation funding with their 21st Century Community Learning Centers funding to offer exceptionally high quality afterschool STEM opportunities.

In 2011, the Nebraska 21st Century Community Learning Centers program received a NASA Summer of Innovation grant to launch Nebraska BLAST! This is a 4-year collaborative initiative that brings together STEM content specialists with teachers and

afterschool staff from schools that receive funding through the 21st Century Community Learning Centers initiative. This effort will provide high quality STEM training to staff of all of Nebraska's 21st Century Community Learning Centers programs and will give thousands of Nebraska youth the opportunity to engage in exciting, hands-on STEM experiences through their local program.

As schools, communities, and parents negotiate how to provide additional learning opportunities for their children and youth, afterschool and summer programs that work closely with schools provide a model to meet this need. Research shows that afterschool programs that are well aligned with the school day and have strong community ties have optimal benefits for kids (Afterschool Alliance, 2011a).

The corporate sector is also getting deeply involved in afterschool STEM education. Change the Equation is a nonprofit organization that was formed to help companies with their STEM education-related philanthropy. Most of the philanthropic investments of these companies focus on the "informal education" arena, which includes afterschool.

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For example, in 2009, Time Warner Cable (TWC) decided to focus the majority of its philanthropic resources on a single cause. The result was Connect a Million Minds (CMM)—a 5-year, \$100 million cash and in-kind commitment to inspire students to engage in math and science learning. To bring this commitment to life, TWC supports *FIRST* (For Inspiration and Recognition of Science and Technology), a robotics organization with a model proven to engage young people in STEM learning also funded by 21st Century Community Learning Centers programs in areas across the country. On a national level, TWC also partners with the Coalition for Science After School to provide the "Connectory," a free, online resource that makes it easy for parents and teachers to find informal STEM learning opportunities. In addition, TWC brings the impact of CMM to its local markets by supporting *FIRST* teams and competitions, science museums, and other nonprofit organizations that are engaging kids in STEM.

Several *FIRST* teams have also utilized 21st Century Community Learning Centers funding with great success. The Camdenton R-III Afterschool Science, Engineering and Robotics program in rural Missouri receives funding from the 21st Century Community Learning Centers initiative and has leveraged that to great effect. Their team has won several awards, including the regional competition that has

allowed them to go to the finals for 2 years in a row. The Safe Harbor Before and After School Program in Michigan City, Indiana, which has received 21st Century Community Learning Centers funds for many years, worked with the Indiana Afterschool Network and the Indiana Department of Education to develop a *FIRST* Robotics team in 2012. The team won the All Star Rookie award in the Midwest and went to the national championship.

Recommendations

It is becoming clear that there is a great need—and a prime opportunity—to tap the potential of afterschool and summer learning programs to serve an urgent national priority to enhance STEM education. Deliberate action by all key stakeholders is required, however, to help afterschool and summer programs fully realize this potential and become strategic—and integral—partners in STEM education.

Federal and state education policies must ensure, in particular, that afterschool and summer programs are included in STEM education policy initiatives if this to become a sustainable, long-term practice (Krishnamurthi, 2012; Afterschool Alliance, 2012).

In addition, the afterschool field must also adopt several strategies to become effective partners in STEM education:

- *Afterschool programs must deliberately commit to offering STEM learning opportunities and then prioritize and allocate resources to provide professional development in STEM programming areas to staff.*
- *Afterschool intermediary organizations and large networks must widely promote existing high quality curricula to avoid wasting scarce resources on developing new programs and curricula.*
- *The field must reach consensus around youth outcome indicators and adopt them widely so that programs have a clear vision of their goals and role within the STEM education ecosystem. A local- or state-level hub is often a necessity for disseminating information and coordinating professional development efforts and other STEM programming needs for afterschool. This may include seeking partnerships with STEM-rich institutions, such as science museums and universities, as well as other science and math hubs in many states.*
- *Meaningful STEM learning that extends beyond one-shot experiences are necessary. Afterschool and summer programs must pay close attention to offering regular, consistent programming in STEM topics. Furthermore, wherever possible, programs must offer a continuum of STEM learning experiences that extend into middle and high school in order to derive maximum impact from their STEM programming.*

Employers and professionals in STEM fields who would like to engage in afterschool programs might find it helpful to familiarize themselves with the landscape of afterschool STEM in their region before getting started. As with any new community, the afterschool field has its own culture and philosophy, and it is important to be aware of the issues before delving into it.

- *A good place to start is to seek out the Mott-funded statewide afterschool network in the state, the national Afterschool Alliance, the local afterschool consortium, or the National Girls Collaborative Project and other similar networks to find out about existing efforts and partnership needs.*

- *Large afterschool providers, such as local and state 21st Century Learning Centers programs, 4-H, Boys and Girls Clubs, Girls Inc., the YMCA, as well as afterschool coordinators within school districts, are all good places to get started at a local level.*
- *Additionally, businesses wishing to get involved in supporting afterschool and summer STEM programming might find the guidelines suggested by Change the Equation in their “Design Principles for Effective Philanthropy” (n.d.) useful. Public-private partnerships could also greatly advance the systems-building effort required to support STEM learning in afterschool by focusing on content-related professional development, evaluation studies, and other technical assistance. An example of such a public-private partnership is that between the Mott Foundation and the Department of Education around the 21st Century Community Learning Centers. Recently, the Noyce Foundation has partnered with the Mott Foundation to support some of the Statewide Afterschool Networks in their STEM efforts, further leveraging the investments. Many other partnership opportunities are available with the state afterschool networks and local and state 21st Century Community Learning Centers programs.*

Afterschool and summers programs have emerged as essential partners in improving and increasing STEM education opportunities for our children and youth. They are often overlooked but have a big and growing infrastructure and interest in STEM. Your involvement and leadership is needed to capitalize on it.

For More Information

- **Afterschool Alliance** – <http://www.afterschoolalliance.org/STEM> - This website provides information on resources for programs as well as ways for STEM professionals to get involved in afterschool.
- **Coalition for Science After School** – <http://afterschoolscience.org/> - This organization has several resources, including a guide to science activities and curricula (look under the Program Resources tab).
- **Connect a Million Minds Connectory** – <http://connectamillionminds.com/connectory.php> - This resource allows you to search by zip code for activities and resources for afterschool programs.
- **Statewide Afterschool Networks** – <http://www.statewideafterschoolnetworks.net/> - The Statewide Afterschool Networks work with a broad range of partners to foster partnerships and policies to develop, support and sustain high quality afterschool and expanded learning opportunities for children and youth.

ABOUT THE AUTHORS

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