

Let's Partner More to Offer High-Quality STEM Education in Afterschool Programs

By Anita Krishnamurthi

Science centers and museums are a major player in improving the quality of and access to science, technology, engineering, and math (STEM) education in the United States and across the globe. As science centers are challenged to reach new audiences and engage their communities more deeply, one area into which they could expand and play a greater role is afterschool programming.

Afterschool programs allow for youth-driven exploration that complements school day teaching and learning and provides students with opportunities to immerse themselves in STEM learning. They also offer room for experimentation and failure and time for children to develop strong relationships with mentors and peers, all while gaining knowledge and skills. These experiences are vital for future access to, and participation in, STEM fields and careers.

Research shows that what happens outside of school can be equally as important as what happens in school to set children's direction and activate their interest in STEM (Bevan & Michalchik, 2013). Thus science education improvement leaders, including at the U.S. Department of Education, have come to recognize that afterschool programs can play an important role in STEM learning, especially when it involves real science and engineering practices such as running science experiments, analyzing

data, developing explanations, or designing engineering solutions. Afterschool programs allow students to be immersed in STEM and build fluency in these subjects, while also learning valuable skills such as teamwork, collaboration, and communication, which are necessary for thriving in any workplace.

The Afterschool Alliance, a nonprofit public awareness and advocacy organization in Washington, D.C. (afterschoolalliance.org), conducts the United States' most comprehensive survey of how children spend the hours after school, from 3:00 to 6:00 p.m. The *America After 3PM* survey has been conducted three times (2004, 2009, and 2014) and asks parents and guardians of school-age children about availability and access to afterschool programs. The 2014 survey was the first to ask about children's participation in programs offering STEM learning opportunities. It includes responses from 30,720 households. Parents in 13,709 households completed in-depth



interviews through an online survey using a blend of national consumer panels. The responses allow us to report and analyze differences in the demand for, access to, and satisfaction with afterschool programs by income, gender, geographic location, race, and ethnicity.

AFTERSCHOOL PROGRAMS BY THE NUMBERS

The *America After 3PM* survey has revealed changes over a decade in availability and access to afterschool programs. The number of children in afterschool programs has grown from 6.5 million to more than 10 million. Parents of an additional 19.4 million children would enroll their children in a program



if one were available to them.

STEM has become widespread in afterschool programming. Sixty-nine percent of parents of afterschool participants report that their children have STEM learning opportunities in their program, with math being offered at the highest rates, and technology and engineering at the lowest rates. While parents report that many factors were important to them in selecting their child's afterschool program, 53% said that STEM learning opportunities were very important in their decision. Of these parents, 85% are satisfied with their afterschool program's STEM learning opportunities.

PARTICIPATION AND ACCESS

Afterschool programs present an opportunity to engage young people from the very populations that are traditionally underrepresented in STEM. Women, African Americans, and Hispanics/Latinos are currently underrepresented in STEM in the United States, as the percentage of members of these groups who earn postsecondary STEM degrees and are employed in STEM fields is disproportionately less than their percentage of the U.S. population (National Science Foundation and National Center for Science and Engineering Statistics, 2013). But our survey indicated that girls attend afterschool programs at similar rates to boys, and children from

African-American and Hispanic/Latino backgrounds are at least twice as likely to participate in an afterschool program as non-Hispanic White children. We also found that parents from African-American, Hispanic/Latino, and low-income backgrounds agree strongly that afterschool programs should be offering STEM learning opportunities and tend to consider STEM as a particularly important factor when enrolling their children in an afterschool program. STEM programs thus present a great opportunity to reach a wide range of children who might not otherwise have access to STEM learning opportunities.

There is a marked scarcity of high-quality STEM programs for students in

rural areas compared with urban and suburban areas. Rural students are generally less likely to have access to high-quality STEM learning opportunities either in or out of school. There are fewer qualified teachers in math and science, STEM role models, resources, or community partners such as STEM corporations or science museums in rural communities (Change the Equation, 2013). Lower availability of afterschool STEM programs only adds to the disparities faced by rural students. Hence, content-specific topics like STEM must be a part of any policy or funding initiative to expand afterschool initiatives into rural areas.

PROGRAM PROVIDERS

Parents responding to the *America After 3PM* survey identify the most frequent providers of afterschool programs as schools (both public and private); national organizations (e.g., Boys and Girls Clubs of America, YMCAs); and religious organizations. Only 3.3% of students overall attend afterschool programs run by science centers and museums, which are likely to be STEM-specific programs. (This number may not reflect partnerships between science centers and afterschool sites.) Many factors are likely to influence this choice, such as convenience, transportation, proximity, availability, and affordability. However, these data highlight the need for STEM-rich venues such as science centers to partner more with afterschool program providers in their communities to reach children where they are after school ends. Such partnerships will reach more children than bringing them to a science center, which only a small fraction might be able to access and attend.

Over the past decade, a robust infrastructure has developed in the United



States to support afterschool program providers. In addition to national associations and networks, there are statewide afterschool networks (SANs) and partnerships operating in all 50 states. Approximately half the SANs are deeply involved in building systems to support afterschool STEM programming, including developing partnerships with business and industry, higher education, science centers, and other STEM-rich institutions (www.statewideafterschool-networks.net). At the city level, Every Hour Counts is a coalition of citywide organizations currently operating in

nine U.S. cities to coordinate the work of service providers, public agencies, funders, and schools (www.afterschoolsystems.org). These networks are good points of contact for science centers and museums interested in partnering with afterschool programs.

KEY RECOMMENDATIONS

It is important to consider the implications of our survey's findings within the broader context of STEM education in the United States today. A remarkably rapid shift is taking place from a focus on science and mathematics to inclusion of



A participant in a Thinkery EdExchange workshop in Austin, Texas, prepares to code Ozobots (tiny smart robots) to recreate stories by children's book author Mo Willems. Photo courtesy Riley Calderon and Holly Lauber/Zavala Elementary School

engineering and technology in the curriculum. The new Next Generation Science Standards (www.nextgenscience.org) that are now taking root allow equal roles for scientific inquiry and engineering design. Support for the new standards has been strengthened by reports that STEM jobs are growing three times faster than non-STEM jobs (Langdon, McKittrick, Beede, Khan, & Doms, 2011). Private foundations and education stakeholders are also paying increasing attention to creating ecosystems for STEM learning that knit schools and communities together more intentionally.

Afterschool programs around the United States have stepped up to offer innovative programming that engages young people in a diverse array of STEM topics, and these programs are increasingly recognized as integral members of the STEM education ecosystem. Nonetheless, as *America After 3PM* reveals, needs are still unmet, and opportunities are being missed.

The Afterschool Alliance has six key recommendations for afterschool stakeholders, including program providers, researchers, and funders:

1. **Engage and educate parents** about the important role that high-quality afterschool programs can play in supporting STEM learning.
2. **Further explore parent perceptions** of STEM learning in afterschool to get a better picture of the nature of STEM offerings, any gaps in STEM programming, and whether programs need to communicate more with parents to describe their STEM offerings.
3. **Increase the technology and engineering programming** available afterschool.
4. **Strengthen partnerships** between the larger STEM education community (including science centers and museums) and afterschool programs to advance practice and policy. (This recommendation is discussed in more detail below.)
5. **Improve assessment measures** to determine the impacts of afterschool STEM programs on a broad set of skills, rather than focusing narrowly on school achievement data.
6. **Increase investment** in afterschool programs to improve access to, and participation in, STEM learning opportunities.

STRENGTHENING PARTNERSHIPS

Stronger partnerships between the afterschool field and STEM-rich institutions, STEM-based corporations, and the larger STEM education community are crucial

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not only to advance afterschool STEM practice and implementation but also to affect policy initiatives. Partnerships are a cornerstone of afterschool programs, and providers are always looking to access community resources. Many afterschool providers have strong partnerships with universities, science centers, and corporations in their communities. But to increase and improve the quality of afterschool STEM programming, it is vital that STEM-rich institutions like science centers and museums are more open to partnering with community-based afterschool providers rather than creating and providing their own programming.

As our survey showed, the majority of children attend afterschool programs run by schools and youth-serving organizations. Partnerships can therefore extend the reach and impact of the STEM-rich institutions, while strengthening the programming offered by the youth-serving organizations. The resources and STEM expertise available in STEM-rich institutions, combined with the youth development expertise of afterschool providers, will help to make afterschool STEM programming more robust and extensive.

At the next level, such partnerships also hold the key to the challenge of professional development and technical assistance for afterschool educators. STEM-rich institutions can serve as local or regional professional development

providers and offer technical assistance to program providers in their communities working in concert with the statewide afterschool network that often coordinates such resources. These partnerships will also help create a stronger, more cohesive afterschool science education community in cities and states that can make a compelling case for the value of such programs. Together they can bring the conversation about outcomes and impacts beyond just school-based measures and highlight the unique and necessary role of afterschool programs in fostering STEM-relevant life and career skills.

Finally, it is vital that STEM education advocates understand the importance of afterschool programs in improving STEM education for all students. Stronger partnerships between afterschool advocates and STEM education advocates would be extremely beneficial not only to afterschool providers but also to advance the larger goal of truly bringing all hands on deck to improve access to innovative STEM education opportunities and careers. Well-researched, high-quality communications and advocacy materials are available at the Afterschool STEM Hub website (afterschoolstemhub.org). This project is a collaboration among afterschool leaders and stakeholders (including ASTC) and aims to provide coordinated messaging and

communications that can help to make the case for expanding and supporting innovative and engaging informal STEM learning.

If the broader STEM education community were to partner with the afterschool community to advocate for inclusion of afterschool programs in policy and funding initiatives, it would send a very powerful signal to policy makers and funders. The Afterschool Alliance is currently engaged in some efforts to forge relationships between science centers and afterschool providers, including through a memorandum of understanding with ASTC. We look forward to increasing and deepening these partnerships and invite you to join us. ■

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