

COMMUNITY SCIENCE WORKSHOPS

A Powerful and Feasible Model For Serving Underserved Youth

An Evaluation Brief

Inverness Research Associates

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I. INTRODUCTION

Opportunities for urban youth to learn science

For more than a decade there has been a steady drumbeat of concern about science and math education opportunities for urban youth. In 1995, the Urban Institute published a comprehensive report on conditions for science reform in urban schools, identifying factors that support and impede teaching and learning (Clewell, et al., 1995). Dozens more studies have come on the heels of science reform efforts and, with few exceptions, the findings about school-based science are bleak, especially for urban youth in poverty. In March 2007, *Science* published a NIH study finding that elementary grade students are over-exposed to basic skills and have far too few opportunities for rich, student-centered learning in science (Pianta, et al., 2007). Other studies, in contrast, point to the benefits of informal science as a promising avenue into science for urban youth—particularly when science-rich experiences are embedded in local urban contexts (for example, Barnett, et al., 2004; Barnett et al., under review; Jones, 1997).

A study of the Community Science Workshops

In this brief, we report on the Community Science Workshops (CSW), a project that has grown from a single science teacher's garage in 1991 to a national network of 30 sites in 2006. Community Science Workshops are what the name implies: They are *workshops* full of equipment and tools, located in urban *community* spaces, where local youth can explore, investigate, and build—all with the support of caring, knowledgeable adults and in a culture of *scientific inquiry* and constructive social interaction.

We of Inverness Research Associates spent 12 years studying Community Science Workshops (CSW) in California and in six other states. We gathered statistics on the scale, scope, and cost-efficiency of CSW services to youth. We observed youth at work in the shops—taking apart computers, repairing bikes, growing plants, and so on—and interviewed youth and CSW directors. We also attended meetings of CSW directors and interviewed the national coordinators and principal investigators. In this brief, we distill the major findings from our research, and we provide our independent perspective on the CSW.

In our research on dozens of science education initiatives, we rarely encounter projects that have the combination of positive characteristics that the CSWs possess. Our purpose in preparing this evaluation brief is to inform funders and policy-makers about the value of the CSW model as an educational resource for underserved youth and communities.

This brief is one of four evaluation reports generated from our research which comprise The “[Community Science Workshop Evaluation Portfolio](#)”. The other three provide more detailed perspectives on the CSW:

Community Science Workshops: Building a Bridge to Science for Urban Youth tells the story of the CSW program, i.e., how CSW arose and spread, how local CSWs are structured and led, and what programs and experiences they offer to youth.

CSWs by the Numbers: A Statistical Portrait of Community Science Workshops paints a statistical portrait of the CSWs – where they are located, how many programs they offer, how many youth they serve, how many hours they operate, and how much the workshops cost.

What Do Community Science Workshops Do For Kids? The Benefits to Urban Youth
This report analyzes the range of benefits that youth receive from their participation in a CSW – from personal, to social, to academic.

II. SUMMARY FINDINGS

Our research on the Community Science Workshops yields a set of findings suggesting that the CSW is a model for serving underserved youth that is both powerful and feasible:

- **CSWs serve an important population in an important content area:** CSWs reach youth who have plenty of curiosity but little or no access to rich and constructive hands-on learning experiences in science.
- **CSWs produce important benefits to youth:** CSWs experiences provide youth with knowledge and skills that are important – and sometimes life-changing – to their personal, social and academic growth.
- **The CSW model is replicable:** As of 2006, there are multiple CSWs in 12 cities in seven states. In the national CSW community, there is both the desire and an established process for starting up new sites.
- **The CSW model is cost-efficient:** The cost per youth participant per year is \$114. Nearly half of the roughly 17,000 youth served annually, who attend on a voluntary basis, are in the workshops for 50 hours a year, and a third are there for more than 100 hours.

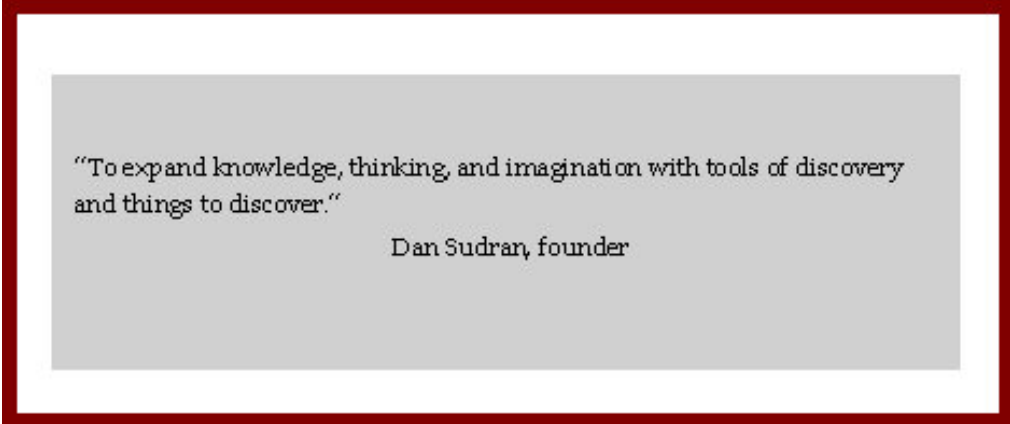
- **The CSW model is sustainable:** CSWs transition to non-NSF, community-based funding after three years.

II. THE COMMUNITY SCIENCE WORKSHOP MODEL

Dan Sudran, a San Francisco science teacher and community activist/organizer, opened up his garage full of tools to neighborhood youth in the Mission district in 1991. He involved youth in projects and investigations when they dropped by, drawing from his knowledge of science, love of tinkering, and commitment to education in underserved communities. When he secured space to create a workshop on a university campus in 1992, he called it the Mission Science Workshop. In Sudran's words, the mission of the CSW is "to expand knowledge, thinking, and imagination, with tools of discovery and things to discover."

Community Science Workshops are neither science museum nor school, neither youth club nor YMCA. Though each has its own flavor, they are typically part science center, part wood shop, part art studio, part nature center. Most importantly, they are workshops in the traditional sense of the word, packed with tools and materials to tinker with, and things to observe, take apart, build, test, and fix.

CSWs vary in size, but they typically serve 550-1,200 youth annually through 800-1,000 hours of programming, and they reach another 400 youth and other community members at outreach programs. Most participants are 8-12-year-olds of ethnic minority backgrounds, with roughly equal numbers of girls and boys. Site directors report that many youth not only participate in workshops for 50 hours or more per year, but do so for several years. The average CSW operates on a budget of roughly \$100,000 a year, making the average cost per participant roughly \$114 per year.



"To expand knowledge, thinking, and imagination with tools of discovery and things to discover."

Dan Sudran, founder

A mission-driven model for educating youth

With grants from the National Science Foundation, what Sudran founded has grown to six CSWs in California (three with multiple sites) and multiple CSWs in cities in six other states. While the CSWs do not take a franchise approach or even espouse a single model, our study of CSWs' work over time and in various settings suggests that, in fact, a definable and replicable model has evolved. These are the model's key dimensions:

Strong sense of mission. From our earliest observations, we have seen CSW directors, PIs, and staff as primarily mission-driven people. They respect the youth in their poorest communities and recognize that not all of their educational needs are being met, or can be met, in schools. For example, CSW staff observe that it is rare for children to have an opportunity to use their own hands and a screw driver or tape measure to work with a piece of wood, metal, clay or a recycled object to create something or to figure out how something works. Simply tinkering or what scientists call "mucking about" – following one's own curiosity, with access to tools and resources for investigation – is not typically valued in formal schooling nor is it often supported in high poverty homes. In our research, we came to refer to this absence in many children's lives as "endangered experiences." More typically, urban students become disenchanted with learning, especially in science and math.

The CSWs evolved because the founders – and subsequent directors, PIs, and partners – believe in the inherent value of providing youth who are underserved by our society with access to a safe, supportive atmosphere in which to spend productive time with a caring, knowledgeable adult. Science, with an emphasis on youth-directed inquiry, provides the context within which CSWs work with youth and provide these kinds of endangered experiences. (For detailed findings on benefits to youth, see ["What Do Community Science Workshops Do For Kids? The Benefits to Urban Youth"](#).)

"They [CSW staff] really help you . . . [there are] bad things going around the neighborhood, but this is the right place to come. What I like most about coming here is that they help you when you need help, they are here when you need them, they are by your side."

10-year-old African American girl and CSW "regular"

Core values underlie varied programs. CSWs are not a cookie-cutter franchise. Some are open after school on a drop-in basis, some offer more structured programs during school hours, and a few provide programs during weekends and holidays. CSWs are typically cross-disciplinary; they can be about materials science, engineering, technology, physics, environmental science, natural history, and/or art. What the CSW leaders refer to as “core values” is what binds them together in a common approach to working with youth. Eighteen core values are listed on the CSW web site, along with eight statements saying “what a CSW is NOT.” The core values emphasize a particular learning environment, e.g., accessibility to tools for discovery, personal investigation and inquiry, and purposeful problem-solving (“not chaos”); as well as ways to serve the intended clientele, e.g., free of cost, located in an underserved neighborhood, respectful, and with relationships to schools if possible. The eight statements about what CSWs are not about include computer games, cookbook science, baby-sitting or hanging out.

Embedded in communities. CSWs are housed in community centers, parks and recreation district buildings, or schools. They are jointly funded by the National Science Foundation (NSF) start-up grants and local community organizations. Finding community partners who share the mission and can offer financial or other support is a vital and challenging aspect of starting up and sustaining a CSW.

A well-equipped workshop that supports meaningful projects. While CSWs have their own local flavor and offer a range of programs to best serve the youth in their neighborhoods, they have in common that they are well-equipped with tools and equipment that youth can work with using their hands. Part of starting a CSW is to equip the physical space, using a recommended tools list.

Led by mission-driven people with “hybrid expertise.” CSW directors are men and women who have a personal commitment to the CSW mission and who have what we have come to call a “hybrid” expertise. They are caring adults who are able to create a safe space to nourish children’s individual and social growth; they have a passion for and knowledge about science and first-hand learning; and they have the skills and connections for fundraising and community relations. They come from a wide range of backgrounds, including school teaching, museum education, environmental education, and the trades (e.g., one is a former electrician). In a few CSWs that have been in existence for many years, CSWs are beginning to “grow their own” leaders, as former participants grow into the caring, knowledgeable adults. A vital element of the start-up process of a CSW is to identify people with these qualities who have potential to become directors. Those who become new directors then receive careful mentoring and support by others in the CSW network.

Alfonso Curnplido started going to the CSW in Watsonville, California when he was 11 years old. Growing up in a first-generation immigrant family of farm-workers from Mexico, Alfonso told us, **“When the science works hop came, it was something new and exciting, because of all the projects and activities that they do, I thought it was really cool.”** He added, **“If you learn how to learn, it is harder to forget things. [They showed me] how to use a hand saw, hammers, how to weld, how to use a scroll saw, miter saws, drill presses, everything. Just being around people that believe in you is really great. It just lifts you up and gives you a thought that you can make it.”** Now in his early 20s, Alfonso lives in Fresno, California, where he is a paid staff member for the CSW and is in college. He told us, **“Wow, this is a really good way to help people. I want other kids to believe in themselves; I guess that is why I am committed to helping. Just like people at the CSW believed in me, I want to believe in everybody else.”**

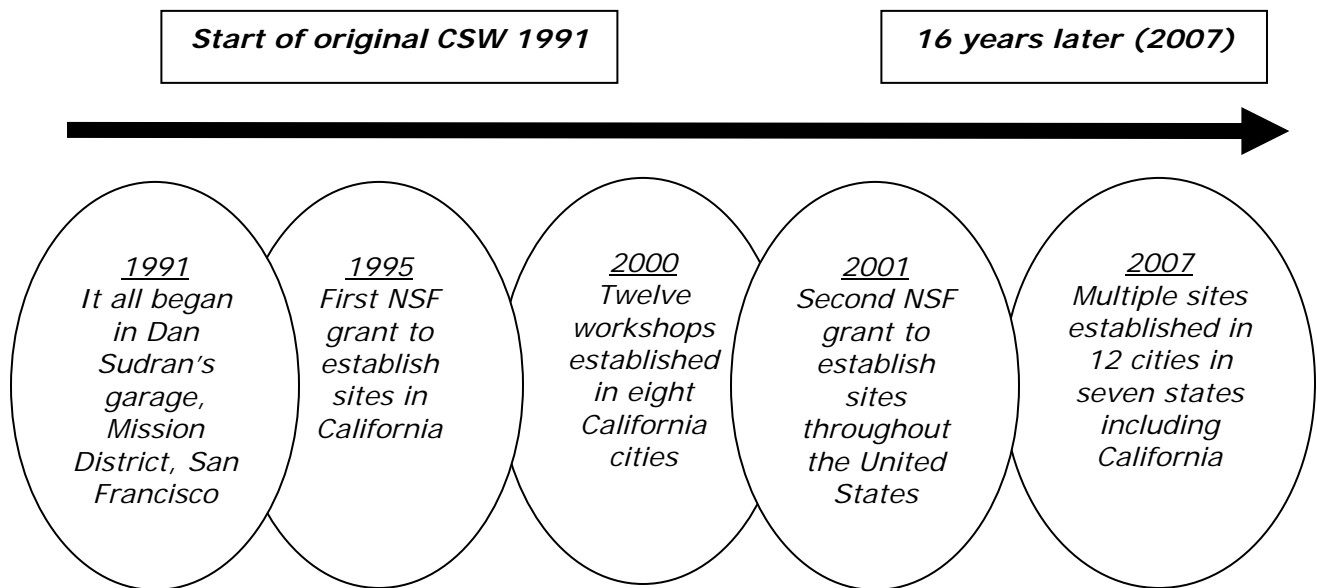
An evolving CSW network

A national network of CSW sites is evolving and developing. To date, the national coordinator’s office has served the following main functions:

- administers grants and starts up new CSW sites,
- sponsors an annual conference where all CSW staff members share ideas,
- maintains the CSW website, which enhances the visibility of the CSWs as a program and provides resources to members,
- offers travel grants so that directors may visit other sites.

An effort is underway within the CSWs to design the network for sustainability and future growth.

From Idea to Reality - An Evolution of CSWs



For additional descriptive information about CSW, their history and distinguishing features, please see "[Community Science Workshops: Building a Bridge to Science for Urban Youth](#)".

III. ISSUES AND CHALLENGES

Like many worthy endeavors, CSW has not been without its challenges both at the individual site level and at the national network level.

Network development

Strong leadership at the national level, we believe, is imperative if CSW is to meet the developmental challenges of maintaining existing sites' vibrancy and cohesiveness, and of building new sites in more cities. Our documentation of the CSWs over time shows that the CSW national network has provided considerable support and inspiration to individual sites. However, developing a strong and unified network has been a significant challenge. There is not yet a shared vision of the design and function of the network as a whole. Leadership for this network-building endeavor is emerging from the pool of veteran directors, and they are making progress. However, there is little untapped capacity within the pool of CSW directors that can be brought to the considerable task of structuring and coordinating a strong national network entity. Our own observations of the CSW and other networks, as well as others' research (Lieberman & McLaughlin, 1992 and Lieberman & Grolnick, 1996) suggests that

network leadership requires skills, knowledge, and propensities that are congruent with but qualitatively different from those of site leadership.

The advantages of a CSW network are many, and some are already evident, such as sponsoring cross-site learning, identifying fertile ground for new sites and starting them, and sharing resources. As the CSW continues to scale up, the network function of maintaining cohesiveness and program standards around the core values will become even more critical. Given the considerable demands on directors and their modest funding, we believe the building of a successful and lasting CSW network will require an investment in resources targeted to that purpose.

Site development

Those who start up and direct sites face numerous challenges, including finding compatible partner organizations, securing sustained funding, and maintaining a site whose programs serve the local community while adhering to CSW values.

Community partners. Partnerships with community organizations can initially appear to be win-win, with both groups expecting to gain from and contribute to the relationship. We have observed, however, that once the work begins in earnest, conflicts can arise around values, organizational practices (CSWs tend to be incompatible with highly bureaucratic organizations), or follow-through on commitments of funds, space, support staff, equipment, or assistance with public relations. Negotiating with partner organizations is time- and energy-consuming for CSW staff at best, and can occasionally involve dissolving partnerships and starting over.

Sustainable funding. All CSW sites are expected to become sustainable within their communities. While many sites have been successful at establishing ongoing funding beyond their initial NSF grant and have become institutionalized in their communities, some sites have struggled. Competition can be fierce for a space within which to operate as well as for community funds, and not all CSW directors have sufficient fundraising and marketing skills to simultaneously run their workshop and secure its future.

Sustainable leadership. Another site-level challenge is to find, support and retain staff i.e., finding directors and support staff with the mission, knowledge, and skills to do this kind of work with youth in this way, *and also* have the politically savvy needed to work constructively in the community and with their partner institutions. In the lexicon of the CSW, directors need not only be tinkerers and science educators, but also “suits” who can “dress up and sell” the CSW concept to a business, a city council, or a foundation.

These challenges are not insurmountable, but when they are addressed only at the site level, they consume attention and resources that could be devoted to programming. In our view, these challenges speak further to the need for the CSW to build a strong national network, which could provide directors with professional growth opportunities and shared resources. To date, the CSWs have survived – and many have thrived – as local sites and as a network because the leaders hold their mission at the center of what they do.

IV. INVESTING IN THE CSW AS A POWERFUL MODEL FOR YOUTH

Creating opportunities for underserved urban youth to engage with science and with their own learning remains an important educational challenge. These youth have too few places near their homes where they can spend their out-of-school time in a safe, productive, science-rich environment where knowledgeable adults are focused on their personal, social, and intellectual development. We have studied dozens of science education projects – both formal and informal – and the CSWs stand out as being powerful in their short- and long-term benefits to youth, as being cost-efficient, and as being both scalable and sustainable. CSW's mission-driven and values-based approach, with the sciences at the heart of the work, has been vital to its success and will continue to be so. This rare combination of qualities, in our view, makes the CSW model worthy of ongoing investment as a valuable addition to the urban science education landscape.

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