

What Do Community Science Workshops Do For Kids?

The Benefits to Urban Youth

Introduction

In this module we present what we have found to be the key benefits to youth participating in the CSWs, and how these benefits reveal the [core values of the CSWs](#) in action. At the outset we note that, particularly at CSWs that offer drop-in programs, many participants return to the workshops over and over, on their own free will. We think this is an important sign of CSW's success. This ongoing voluntary participation suggests that CSWs are providing an environment and activities that are intrinsically satisfying to youth who could choose other, less constructive ways to spend their free time. A site director describes this well:

I think the most significant measure of the success in this program is that although we allow students to drop-in whenever they want, a core group comes every single day. They are clearly having some of their needs met or they would not return. When I have to kick someone out for a day for disciplinary reasons, they always return as soon as they are allowed back. The kids began to buy into the "free choice" model gradually and then embraced it wholeheartedly.¹

Our multi-year evaluation² of the CSW program included site visits to multiple Community Science Workshop sites around the country; interviews with participants, site directors, and other stakeholders; and observation of and participation in CSW programming and special events. This report summarizes our overall findings and offers links to profiles of individual participants. What we learned from our research helps to illuminate the reasons why youth continue to seek out CSWs on their own.

¹ The quotes in this module have been lightly edited for clarity and readability. We have made every effort to maintain the intended meaning of the speaker.

² Inverness Research Associates. *The Community Science Workshops: A Report on Their Progress*. January 2000. Electronic version available at: http://www.inverness-research.org/reports/ab2001-01_Rpt_CSW_ProgressRpt.htm.

Snapshot of a Community Science Workshop

Located in an urban middle school, this workshop's space is painted in the partnering museum's signature colors — bright green, yellow and purple. The space is quite large — almost 2,500 square feet. There are two storage areas, a range of hand tools (hammers, saws, drills, screwdrivers) along the back wall, work tables and stools in the center of the room, and "centers" (such as nature, painting, etc.) artfully separated from the main space by bookshelves and placards which the children painted. The children also painted some of the tables and stools. Around the perimeter of the workshop are several exhibits from the partner museum: a top table, giant gears, and a K'NEX bridge-building activity. Large tools like drill presses and band saws, and a kiln are set off from the main space by old backdrops from the Magic School Bus Inside the Earth exhibition. The space is bright, large, tidy, well-organized, and very welcoming, and its availability was one of the main reasons the workshop came to be housed at this school.

The youth here expressed and exhibited unique and individual views about the workshop experience. It seems to serve a variety of needs in interesting and varied ways. For some, it is a rare opportunity for these participants to work with tools. Girls, especially, seemed intensely interested in working with their hands. The process of building things is as absorbing as the product. Two sixth-grade girls we interviewed said: "We like coming to the workshop because we learn how to use tools and get to keep what we make." One of these girls was constructing and painting a jewelry box for Mother's Day. For other students, the science workshop is a place to envision and give form to their own ideas. One youth has become so proficient at building that he simply looks through books and finds projects that interest him and then he designs and produces objects to his own specifications.



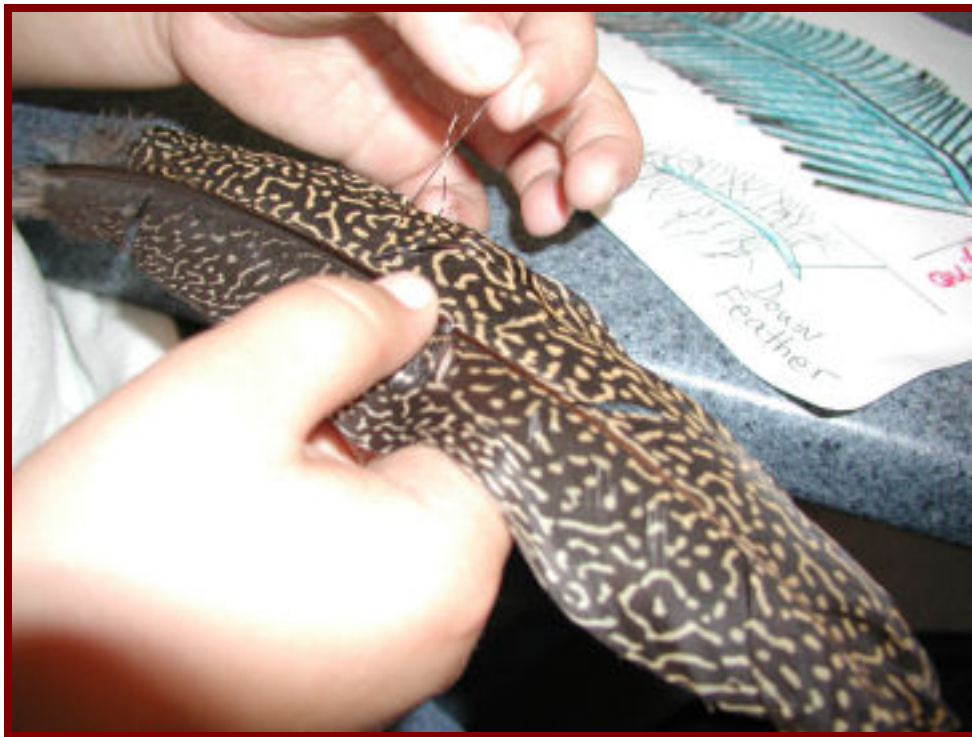
Participants working with plants

Benefits to Youth

CSWs help children develop knowledge and skills for school and life

We planted the garden in front of the CSW sign. We test ph hardness with [staff]. We check to see if it's basic or acid. If it's hard it has chemicals which is kind of good because it can kill bacteria. If it's soft it has no chemicals and is kind of bad. Sometimes we make experiments, make paperclips float on water. Water Olympics was really fun. We filled a cup almost up and used an eyedropper to see how many drops it took to fill it.
-CSW participant

CSWs are outside, yet supportive of, school educational efforts. They provide a context for children to get help with and develop special projects for school (such as Science Fair projects), and to learn more content about those projects in a hands-on format. In some cases children can also get help with their day-to-day homework assignments. The CSWs also provide youth with the chance to engage in a wide range of projects that cross multiple subjects areas and content foci, which can inspire children to pursue an area of interest to them. See section "[Profile: Malcolm – The CSW is a place to explore inherent interests](#)" later in this module³.



Participant examining and drawing a feather

³ In this module we did not use participants' real names, nor the workshop they attend, in order to protect their privacy.

At the CSWs, **children have access to – and learn how to use – many common and useful tools**, ones which traditionally are only available to adults. The workshops also provide exposure to phenomena, natural objects, systems, and materials to which urban youth may not be exposed in other contexts. For example, a CSW director explained how his participants have been involved in local creek cleanups, and that they spend time year-round in the garden at the CSW – which is located in a densely populated urban setting. A participant told us, “We dissected owl pellets and checked out the fur. Every time you do an experiment the CSW staff tell you something – like ‘An apple fell on a man’s head and he said, What was that? and he discovered gravity.’”



CSW participant explaining how to use a scroll saw

CSWs provide a place for children to solve practical problems, like fixing their bikes or making Christmas presents. Children sometimes take these skills home; for example, we interviewed a participant who applies what he has learned about computers at the CSW to help friends and family with theirs. One CSW director reported that participants learn how to use sewing machines at his workshop; this activity has also served as a way to attract more girls to the workshop. A participant told us about the variety of skills they learn and the tools they get access to: “We like coming to the workshop because we learn how to use tools and we get to keep what we make. We learn how to use a hot glue gun, and how to make a hole in wood. We learn about saws and drill presses.”



Participant working on an illustration

CSWs provide support for children's individual development

You can make different stuff out of your science experiments. You can bring imagination into your science experiment... and then it will be perfect.

–CSW participant

Youth benefit from participating at the CSWs because – rather than being passive or directed – **youth can be active, self-directed learners**, challenged in a constructive way to think for themselves. They have the chance to be creative; to investigate a particular interest, project, or phenomenon; and to express themselves through that creativity and those investigations. CSW staff recognize that making mistakes is a key part of the learning process, and allow children to explore without exerting expectations of perfectionism or meeting some externally-imposed standard. A workshop participant explained how the workshop provides opportunities for self-directed learning: “I have been coming here for about six months, and I am really interested in the woodshop. I love to be creative with wood. It does feel good being creative, because you get to experience everything yourself.”



Participants using materials and tools

The importance of learning from mistakes

A 13 year-old girl who was fairly new to the workshop was working on one of the introductory projects – cutting the letters of her name out of wood blocks with a coping saw. She had placed one block in a vise and was sawing away on it when a staff person walked by. It was clear to the adult that the block was not properly placed in the vise; at some point in the sawing, everything was going to clatter to the floor. The adult asked the girl, “Who showed you how to set that up like that?” The girl shrugged. The staff member asked, “What do you think will happen when you get down to this point with your saw?” Again, the girl shrugged. Rather than correct her, the staff person then said, “Well, keep sawing and let’s see what happens.” She told us, “Unless, it is really expensive or dangerous, we let them make the mistakes and learn from them.”

CSWs nurture self-esteem in their participants. The core staff of the CSWs are caring, committed adults who provide support to children who often do not have a support system at home or at school. This helps children to become more confident in themselves personally as well as in their skills and abilities. As one child explained, “It’s useful knowing how to make things out of wood and how to compost. And if you have trouble, you can help yourself.”



CSW participants working on a bike

CSWs pay explicit attention to setting appropriate boundaries for children, which creates a respectful and safe space at the workshops. Individual children are in a social environment where they are learning to respect themselves and others, and where they are learning self-governance. As one director noted:

When I began as director, the kids were very rude to staff and to each other. They were used to doing whatever they wanted - going to the bathroom and not returning, using foul language, being very loud and disruptive, or sitting around socializing. I began to create a safe space and I got control very quickly. Students have to be working on something in order to stay, but we do not harass: we encourage. The rules are strictly enforced, uniformly, and as a result the students know where the line is and they have stopped pushing. They want to be there, and often a participant will let a new kid know when he or she is too close to [breaking the rules].

This director’s approach is consistent with that of many other directors we have observed. Rather than applying harsh or intimidating disciplinary measures, directors

apply the core values of respect and safety to create an environment where individuals want to be a part of the constructive social context.



CSW Director working with participant to repair computer

At the CSWs, **youth gain opportunities to develop personal leadership skills.** Through the context of the CSWs, participants can contribute back to the workshop and also to their communities. See section “[Profile: Alfonso – From young participant to staff member, the CSW changed his life](#)” later in this module.

A site director, in her weekly report, wrote the following story about the positive personal changes the workshop has instilled in one of her participants:

We had a victory today! Erika came in last year; she is a painfully shy child who does not take initiative. You can hardly get a word out of her. Most of the time she is hanging back while other kids do projects. We have been working on her almost six months, and finally today she came right out and spoke up without being prompted, just like she had always been doing it. I almost fell out of my chair! Later that afternoon, as I was telling someone else about a project, I turned to her and said, “You might be interested in this, Erika.” (For several days I have been trying to interest her in a project, any project). She then turned to me and spoke very firmly and said “You already have me working on two projects.” I almost did a cartwheel! But instead I calmly turned to her and told her she should pick the one that interests her, and she did!

CSWs provide a constructive social context

The CSWs provide a safe place for children to be off the streets, in a nurturing environment, and with constructive things to do. This kind of environment can be unusual in the lives of these children, who often face troubled family and school lives and have few similar opportunities. The workshops provide a consistent and stable environment. Children know that—as long as they follow the rules—they are welcome.

The CSW is a place to feel connected

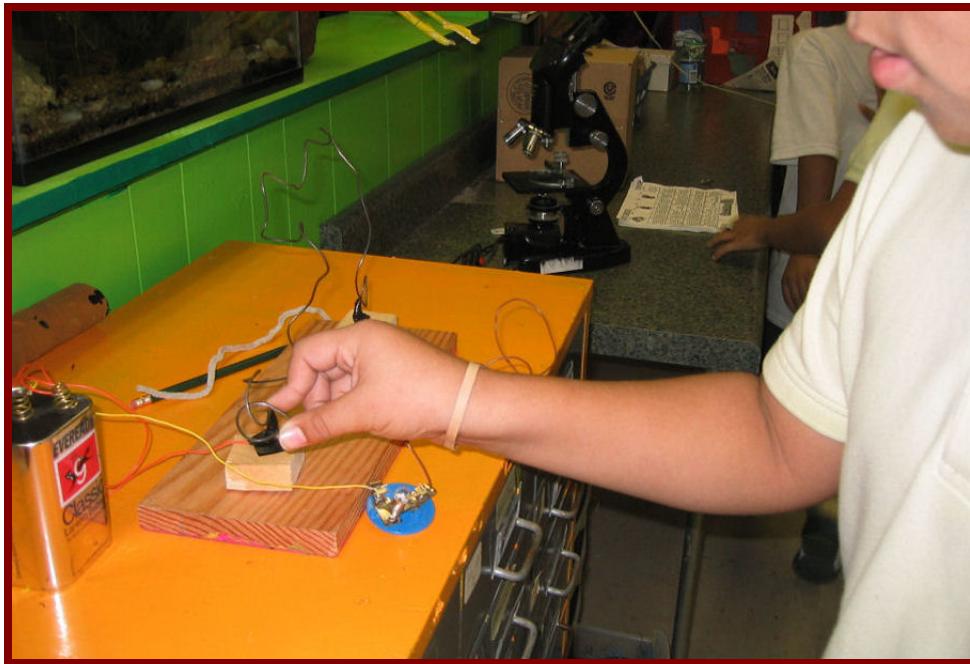
April, a 10 year-old girl who comes regularly to the one of the CSWs, experiences a strong sense of family and support at the workshop, both because she comes there with her sisters, and sometimes nieces and nephews, and also because she feels that the workshop is a safe place in a dangerous neighborhood: “[The CSW staff] really help you... [There are] bad things going around the neighborhood, but this is the right place to come.” April expressed several times how helpful and supportive the workshop staff has been for her: “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.”

April and her sisters come from a family with many challenges including poverty and an absent father. The director at this site, in reflecting on April's family life and her time at the CSW, noted, “For her, the Workshop is like a home away from home.” April's 8 year-old sister added another example of how the CSW staff care for the participants: “And then after we cleaned the creek, [the director] has these little bars that you can eat, and we had pizza too—it was so good!”

The CSWs also **create a context where everyone and every thing matters**. Adults at the CSWs respect children. These adults value children's insights, abilities and strengths, trust the children to know what they want, and allow them to pursue their own interests. It is expected that children will treat other participants, the adults, the materials and the environment with respect. A participant explained, “I have a lot of fun being here—sometimes we make stuff in the woodshop or we go around helping keep this community clean.”

The CSWs also **provide a positive peer culture**, where younger children can work with and see positive influences from older children (teenaged youth) and young adults. These relationships are important in that youth can “see themselves” in the young leaders, and can view—within their own social and cultural context—alternative and more positive ways of being than the often-chosen path of gangs, drug abuse, and other reflections of lack of opportunity. Because of these positive conditions, the CSWs

benefit youth by providing them with a constructive social context in which to spend time.



Participant building a battery experiment

CSWs can lead participants to rethink their sense of self and their possibilities for the future

In some cases, through the CSWs, **participants begin to think differently and more openly about possibilities for their future.** They begin to see that they have options for pursuing science, math, and/or other skill-based options for their lives, either building on school-based learning, or developing specific skills and interests that emerge at the workshop. A staff member told us about how a girl who came often to his workshop matured in several dimensions:

A girl from the projects came for many months to participate at the workshop... During our meetings with kids she was heard by others, and spoke to the group and was an exceptional leader amongst them. When a vacancy was open she applied and was hired... [S]he became confident at leading activities, knowledgeable about bikes and operating power tools. On many occasions she created innovative toys that the children enjoyed making with her... Some four to five years since her first visit she matured in several ways—socially and intellectually—and has joined another [youth leadership] program. This person developed a potential [at the CSW] to not only earn a living in a single-parent family, but others learned from her at the same time.

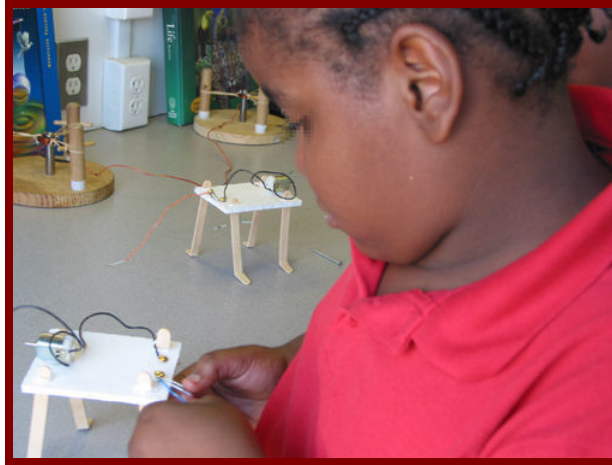
-CSW staff



Participant working with batteries and wires

A group of three older participants offered their own explanation of the workshop experience. Two of the boys were recent immigrants from Mexico and one of them came to this country two years ago unable to speak or read English. He is now the class president at his middle school and plans to be a civil engineer. When we asked him how his participation in the workshop fits with his future plans, he told us that it would “improve his education.” When asked to explain this, he said that there were many things at the workshop that he had never seen, nor would be able to work with, at home or at school. He cited books, tools and equipment. And then he said, “The people I meet at the workshop know things about work and school that I need to know.”

We see that the CSWs create an environment and a structure where youth can begin to alter their sense of self, and develop the wherewithal to have a different life than that predicted by their socio-economic status. At the CSWs, students can learn about respect, gain self-determination, and experience the value of industriousness, inquisitiveness and skillfulness in application of problem-solving abilities.



Participant working on robot



In summary, as long-time researchers of the CSW initiative, we have learned that the core values of this project seem to be the right ones to drive the design and implementation of its programs. These values are woven explicitly and implicitly throughout the ways that CSWs work with youth. As we have noted throughout this report, through these core values, youth learn a range of practical skills; implementation of these values also create a context where children can gain confidence and self-determination. We feel that these important benefits lead youth to be very likely to develop a sense of stewardship for their environment, and also to contribute positively to their communities.

Profile: Malcolm
The CSW is a place to explore inherent interests

Malcolm⁴ is a 12-year-old 6th grader who regularly spends time after school at one of the CSWs. Malcolm's inherent interests and abilities in science and engineering flourish in the environment provided by the CSW. In the woodshop room of the CSW, he explains with pride his model of a bridge and the school assignment that instigated his project. The idea started out as an "earthquake project." Students in his class were given a design challenge to create a bridge that could survive simulated earthquake tremors. Malcolm explained his success:

This smaller bridge was for an earthquake project. We had a table in a classroom and then we shook it; whoever's bridge was very damaged got points taken off. In my whole class, I got the most points. The people who had the most points in the project passed the idea to other 6th grade classes. So our project will be, like, an example of what other classes could do.



Malcolm explains his thinking about the Bridge project

⁴ Though this participant gave permission to display the pictures of him in this report, we do not use the participant's real name.

When asked about how he solved the problems he encountered while making his project, Malcolm explained in some detail several aspects of his decision-making in terms of design and choice of materials:

I thought I could get a lot of these cables and twist them together, but that wouldn't be safe. It just has little weak wires into it, but then the plastic is really strong. I didn't know how to do it, and so the workshop helped me with part of it, and told me what is inside the real thing.

Projects like the one Malcolm demonstrated and explained often stimulate creative thinking about other sorts of possibilities. Beaming with enthusiasm, Malcolm explained an “invention” he came up with and how the CSW supported him and helped him develop his idea:

I found a scooter with no back wheel; I passed it for a couple of weeks and then I finally brought it to the workshop. It didn't have no back wheel and then for awhile, I was thinking of "How I am going to make a back wheel for it?" I didn't have ideas and so my friend gave me an idea of knocking the back brakes off, because we didn't have custom wheels that would fit on the back wheel and so I knocked off the brakes. But then there was still a problem—the back thing was rubbing against the wheel and so I cut it off with this special saw. First I knocked off the brakes and then I cut the metal off. It solved my problem, it was good. The back wheel fit. I made up an invention!

Malcolm's story serves as a good example of how the CSWs can nurture and develop nascent interests and inclinations in science and engineering. The CSW provides an opportunity for children like Malcolm to open their minds and explore their interests, without the restrictions or constraints of a school setting, and with a supportive atmosphere where children's ideas are valued.

Profile: Alfonso
From young participant to staff member, the CSW changed his life



Alfonso Cumplido (left) working with youth in Houston with the Fresno Sciencemobile
October 2005

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.

Background: Alfonso Cumplido⁵ is a 22-year-old living in Fresno, California. He first encountered the CSW as an 11-year-old living in Watsonville, where his family lived next door to the Environmental Science Workshop.⁶ Alfonso grew up in a first-generation immigrant family from Mexico; in his younger years the family lived in Los Angeles and then in Watsonville. Alfonso's family are farm workers who, for some time, migrated within California to work the farms before settling in Watsonville between 1986 and 2004.

⁵ With his permission, we have included Alfonso's real name in this profile.

⁶ This is the official name of the CSW based in Watsonville; in this module we refer to this workshop as the Watsonville CSW.

Alfonso had been going to Marinovich Park where the Watsonville CSW is housed, even before there was a workshop. He went there to be with friends and play “because there was really nothing to do at home. My dad was off working and he wouldn’t have time to take us out or anything, and he was always working weekends. My mom was always busy with the house and she was working nights.”

When the Workshop opened in 1997,

I met Curt [the CSW director in Watsonville] and everybody else that was involved and I thought it was really cool. It was just something different. I had grown tired of just going out and playing with my friends. It was all the same thing. I was tired of that, so I would just stay home and watch TV, but then when the science workshop came, it was something new and exciting, because of all of the projects and all of the activities that they do - I thought it was really cool.

Alfonso went almost daily to the Watsonville CSW until the middle of his freshman year in high school. At that time, he became quite busy with schoolwork and his two jobs. When it came time for Alfonso to go to college at Fresno State University, Alfonso asked Curt whether there was work for him at the Fresno CSW. Alfonso had, over the years, established a very positive relationship with Curt, and decided he wanted to stay involved with the efforts of the CSWs. He had also met Manuel Hernandez, the Fresno site director, on joint Watsonville/Fresno CSW field trips.

After I moved out from home [to go to college], I just discovered I loved kids - a lot of them reminded me of myself when I was little. Since Manuel works with underprivileged kids, I thought, “Wow, this is a really good way to help people,” which is always something that I would like to do.

Curt helped Alfonso make contact with Manuel, who immediately provided a place for him. Alfonso has now been working with Manuel as a staff member for three years.

Benefits of the CSW for Alfonso Cumplido: This long-term participant feels very strongly about the benefits of the CSWs for his life. He benefited from his participation in multiple ways.

Learning about creativity, and how to think for himself: At the CSW, Alfonso was given, and took advantage of, multiple opportunities to be creative and to make many science-based projects—both those designed and instigated by the site director, and also projects of his own invention. By learning in a hands-on way from the director, Alfonso was able to “help Curt doing all of these crazy inventions and activities... [I]t was really cool that he gave us a chance to do that.” In this way, Curt served both as a teacher and as a role model for how to think for oneself and build on ones’ own interests. “You went there and you learned how to think for yourself, which is a great skill... [I]f you learn how to learn, it is harder to forget things, than if you just [memorize] them.”

Learning how to use common and useful hand and power tools: Before coming to the workshop, Alfonso not only had not used tools, but he was afraid of them. He was very impressed when, upon expressing interest in the CSW, Curt said he would teach Alfonso how to use the tools that so often are only available to adults:

I was more scared that I would chop off my fingers. I guess I used hammers once in awhile to kind of "work" on my toys that were broken and I would probably break them even more. But, I didn't really use tools very much. But I remember, when Curt's shop opened, he was like, "Yeah, you can use any tool; I just got to show you how to use them." He showed me how to use a hand saw, hammers, everything. I remember when he came back and I was in high school I went to visit him and he showed us how to weld - that was pretty cool. I learned how to use a scroll saw, miter saws and drill presses.

Gaining guidance and a vision for his life: Although Alfonso felt he had emotional support and good intentions for his life from his family, he could see their limitations:

I have always had support from my parents, but they just didn't know how to give it to me, because they never got it and they both just went to 6th grade and then they stopped going to school because they had to work when they were little. They didn't really know how to give me the right support or how to guide me very well, even though they have always told me, "You should go to college."

The CSWs were able to provide an infrastructure of support, and the groundwork for Alfonso to see a better life for himself than that from which he came:

That was one of the great things about the CSW, because they showed me their support, and at an early age, I found out they were there to help me out and to guide me. So just being around people that believe in you and think there is something special, is really great, because you are a lot more; it just lifts you up and gives you a thought that you can make it, and you can do something other than just go out and work in the fields.

Related to this is the fact that many of Alfonso's peers, over time, ended up on more destructive, unhealthy life paths. Because of the social structures of the community, many of Alfonso's friends from middle and high school, who "were

all really good kids...in my eyes” lacked enough attention from caring adults, and for various reasons became involved with gangs:

[Going back to the community after time had passed,] I was like, “Wait, wow. That is weird.” I remember we were just in 6th grade and I thought there was no way my friends would be in a gang, but they were and now I go back to Watsonville, even though my parents don’t live there anymore, to visit some friends and family that I still have there, but I hear that a lot of my friends are in prison. They are so caught up in that game.

Alfonso’s perspectives about the CSWs and their contributions to youth: Alfonso feels that the CSWs have a very important role to play in under-served communities. He thinks that an important issue at this time is that there is not enough staff capacity at the sites to serve the local youth in the one-on-one, personal way that he experienced the Workshop:

There needs to be a lot more to it, because it is a small program—it is not as small as it used to be, but it needs to grow a lot more for it to be really effective and to reach a lot more kids. I saw it in my neighborhood—a couple kids did get involved, but only a few of them I see got the message and chose to go.

It needs to be a lot more personal, because a lot of the kids—like me—need the attention they don’t necessarily get at home. One of the main reasons I think, because their parents are working so hard trying to just make a living.

Alfonso feels that the communities and schools served by the CSWs need to make a greater commitment to support them and to recognize the CSWs’ importance:

I think the CSWs need to be spread all over. I think the schools need to embrace it a lot more, the community needs to embrace it a lot more. It just needs to expand a lot more for it to be effective to a lot of people.

Alfonso understands that, in order for him to be able to make a real contribution to the CSWs, perhaps in a greater leadership role, that he needs to complete his education. He experimented early in his college career with mechanical engineering but did not feel it was a social enough job for his interests and personal inclinations:

I realized I really wanted to be a part of the CSWs and to be a part of it, I need a good education and to learn how to write so I can do grants and work with people and get some background on teaching. And also, marketing: if I do open up my own shop or take one over or something like that, I can use my marketing background to gain support.



Because of the way that his relationship to the CSW evolved, and the kind of person that he is, Alfonso feels a strong sense of loyalty and commitment to the Community Science Workshops and the youth they serve. Because of this commitment, because Alfonso is bilingual in Spanish and English, and because he comes from a family background that is shared by many of the CSW participants, Alfonso is uniquely poised to make significant contributions to the CSW youth and to other members of the CSW network. Above all, Alfonso's deep appreciation for the potential in everyone, and the fact that it was brought out in him through the CSWs, makes this young person very likely to make great progress in his own life and the lives of others through the venue of the Community Science Workshops:

I talked to all of my friends, we are really smart and we had a lot of potential and I remember that a lot of people told me that I had a lot of potential and I was going to do something really great sometime. I believe that everybody has potential to do something great. I don't think I have gone as far as I have wanted, and there is still a lot that I want to do.