

Best Practices Models for Implementing, Sustaining, and Using Instructional School Gardens in California

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ABSTRACT

To ascertain best practices for schools implementing or sustaining instructional school gardens by interviewing key members in 10 schools with exemplary instructional school gardens programs in California. Practices of schools with exemplary instructional school gardens programs were analyzed by constant comparative analysis using qualitative data analysis software. Seven of the 10 schools had people from at least 3 of the following 4 groups: administrators, teachers, parent and community volunteers and garden coordinators. Nine of 10 schools had a part- or full-time garden coordinator. Results demonstrated that a committee committed to instructional school gardens is the most important step towards success.

Key Words: schools, gardens, best practices, school wellness, child nutrition (*J Nutr Educ Behav.* 2011;43:409-413.)

INTRODUCTION

The prevalence of obesity has increased in children of all ages during the past 30 years.¹ More than 30% of boys and girls aged 6 to 19 years are overweight (body mass index for age \geq 85th percentile) or obese (body mass index for age \geq 95th percentile), and the prevalence is higher for non-Hispanic black and Mexican American children.² Less than 10% of adolescents currently meet the *Healthy People 2010* recommended fruit and vegetable consumption.^{3,4} In addition, the economic burden of obesity has tripled from 1979 to 1999.⁵ The combination of the increasing prevalence of obesity and inadequate fruit and vegetable consumption may also be contributing to higher morbidity and mortality rates associated with chronic diseases.⁶

Increasing fruit and vegetable consumption by children has become a priority for state and federal agencies.^{4,7-9} Recently, the school environment has often been chosen as the location for programs aimed at

increasing fruit and vegetable consumption in children because children spend much of their time on school campus. Schools also offer existing infrastructure, easing the implementation of programs. The infrastructures of many schools include gardens.¹⁰

In 1995, under the direction of the then State Superintendent of Public Instruction Delaine Eastin, the California Department of Education (CDE) launched the "A Garden in Every School" initiative.¹¹ Research has indicated that availability, accessibility, and taste preference are positively associated with fruit and vegetable consumption.¹² Research interventions involving school gardens have demonstrated an increase in taste preference for¹³⁻¹⁵ and improved consumption of fruits or vegetables.¹⁵⁻¹⁸ School gardens, when used as part of academic instruction, may improve performance of students on standardized assessment tests¹⁹ and are useful tools to teach nutrition principles.^{11,20}

In 2006, Assembly Bill 1535 California Instructional School Garden

Program (CISGP) authorized the CDE to award \$15 million for grants to promote, develop, and sustain instructional school gardens.²¹ All public schools were eligible for the grant, which stipulated \$5,000 for schools sites with 1,000 or more students and \$2,500 for schools sites with fewer than 1,000 students. Almost 40% of all California school sites applied ($n = 3,849$; 39.5%) and \$10.9 million was awarded. Though 39.5% of California public schools received funds, by the end of the grant period (June 30, 2009), not all schools had an instructional school garden. However, several schools were successful in creating, sustaining, and using a garden for academic instruction. The purpose of this study was to ascertain and report best practices to provide models for schools implementing or sustaining instructional school gardens.

DETERMINATION OF BEST PRACTICES

Interviews were conducted in person with key school members, ranging from principals to community volunteers, from 10 schools in California awarded a CISGP grant with exemplary instructional school garden programs. A key school member was defined as a person with direct involvement with the success of the school garden, as reported by the

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doi:10.1016/j.jneb.2011.05.005

school principal. An exemplary instructional school garden was defined according to criteria provided by the CDE as a school garden with the following characteristics: (1) incorporation into the academic structure, (2) sustainability for a minimum of 2 years for schools that had a school garden before the grant application period, and (3) known and recognized in the professional school gardening field. The CDE provided a list of professionals in the school gardening field. These individuals were contacted and, by using the criteria listed above, the names of exemplary instructional school garden programs were identified. Representation from different socioeconomic status, grade levels, and garden status was included. Each school was assigned to 1 of 12 groups according to 3 variables. Variable 1, socioeconomic status, was determined by measuring the number of students eligible for free or reduced-price meals at each school during the 2007 to 2008 school year. This information was gathered from DataQuest.²² Schools were split into 2 groups: greater than or equal to 50% of students eligible for free or reduced-price meals and less than 50% of students eligible for free or reduced-price meals. Variable 2, garden status, was determined by whether the school had a school garden on application for the CISGP grant (school either had or did not have a garden during the CISGP grant application period of February to April 2007). Variable 3, grade level of students, had 3 outcomes: elementary (grades 1-6), middle/junior high (grades 6-9), and high (grades 9-12). DataQuest was used to categorize each school.²²

After schools were placed in 1 of 12 categories, each school was assigned a unique number, and a random-number generator was used to choose which school would be interviewed.²³ There were 2 groups for which no schools could be located. Interview questions were developed in conjunction with nutrition education experts from the CDE to identify the practices and environment of each school. There were 2 question levels for each school. Level 1 included information gathering about implementing and sustaining a successful school garden program, and level 2 included infor-

mation gathering about using the school garden to address California State content standards and teach other academic subjects.

Each interview was recorded, transcribed, coded, and analyzed. Results from the analysis of the interviews were used to create best practice models for schools in California and across the United States (US). Transcriptions were entered into NVivo (version 8, QSR International, Ltd, Cambridge, MA, 2009). Data were coded and analyzed with constant comparative analysis (Supplementary Data).²⁴ This study was approved by the University of California, Davis, Institutional Review Board with exempt status.

LESSONS LEARNED

People Committed to Instructional School Gardens

Key school members reported that there were a variety of people and groups committed to sustained, instructional school gardens, including principals, teachers, parent volunteers, community volunteers, garden coordinators, students, parent teacher associations/parent teacher organizations, district staff, and school staff. Seven of 10 schools had people committed to an instructional garden from at least 3 of the following 4 groups: administrators, teachers, parent and community volunteers, and garden coordinators. One teacher stated:

You have to have enough allies. If you don't have the administration and don't have the teachers, and if you determine that you are on your own, then you would need to have the parents come in and community support. You [have] got to have, I think, 2 or 3: community, the administration, the teachers.

Some key school members reported having foundations that provided resources and staff. Some middle and high schools had horticulture or agricultural electives that allowed them to have a teacher fully committed to the garden.

Sources of Funds and Materials

Instructional school gardens require continuous funding and materials.

Grants were common sources of funds, with 7 of 10 schools receiving funding for their gardens from grants other than the CISGP grants. Of those 7 schools, 3 had parents, 1 had an administrative assistant, and 1 had a foundation that applied for grants. Key members reported that their schools found or were provided grant opportunities through many different avenues, including the district garden coordinator, Network for a Healthy California, master gardener Web site,²⁵ California School Garden Network,²⁶ garden associations, administrative assistants, educational funding Web sites, city and local businesses, and local farm bureaus. A key school member provided some insight about applying for grants:

... I do weekly searches; basically for grants...my approach to the garden covers all aspects of the curriculum. I can get social science grants, I can get math grants; I can get any kind of grant, not just garden grants. I think that is the mistake that some people make...they put in the search words 'garden' and that's wrong. What you are looking for is a math grant.

Some schools did not rely heavily on grants. Local foundations had been established for 2 schools, and these foundations provide funds annually for their school's garden. Booster clubs or parent teacher associations/parent teacher organizations provided funds for 4 of 10 schools. In combination with the parent teacher associations/parent teacher organizations, 1 key school member reported that the school district held an annual fund raiser that provided "\$20,000 or \$30,000." Selling plants or produce from gardens also provided funds; 2 schools held weekly plant sales. Obtaining local corporate sponsorship was the goal of 2 schools, and 1 school hosted a garden fundraiser sponsored by a local business.

The amount of funding a school garden requires depends on the amount of materials a school needs to purchase. One way to reduce the costs of implementing and sustaining a school garden is allocating resources for free or reduced cost. Key school members reported various ways of obtaining free materials, including

forming partnerships with the grounds crew or head custodian, donations from national seed companies (ie, Burpee) and local nurseries, donations of damaged or unwanted goods from national corporations (ie, Orchard Supply Hardware, The Home Depot, etc), and local garden-related businesses, donations from local universities, participation in seed swapping with other local garden clubs, and donations from parent and community volunteers. A key school member summarized the way she obtained materials through her connections with local garden clubs:

...because they [garden clubs] will also send out alerts to funding or opportunities or seed swaps or seedlings available. There is a lot of sharing that goes on within the gardening community, and I think it's important to reach out beyond the school gardens and contact people in community gardens and local gardening clubs. I have also contacted all of the retailers in this area—all the big box stores, the local nursery stores if they have damaged goods—if they have goods that are unsalable in any way, if they're just old seeds, I'll take them.

In addition, one high school used its industrial arts class to help reform donated railroad ties to create garden beds.

Garden Coordinator

A garden coordinator is defined as someone who spends time, either volunteer or paid, sustaining the garden and facilitating its use. The garden coordinator may be a teacher volunteer, parent volunteer, community volunteer, or paid position (ranging from 10% to 50% time). Hourly wages range from \$10 to \$20 in California. Community gardeners average \$44,000 per year, according to national statistics.²⁷ Of the 10 schools, 9 reported having a part- or full-time garden coordinator. The reported responsibilities of the garden coordinator varied from sustaining the garden on daily, to facilitating a student garden club, to creating standards-based, garden-enhanced lessons.

Role of Master Gardener Program

The Master Gardener Program in California is administered locally by University of California Cooperative Extension county offices and is a volunteer organization of experienced gardeners who provide voluntary services in a variety of venues.²⁸ Master gardeners are available in more than 40 California counties and throughout the US. Supported by state Cooperative Extension Services and organized mainly at the county level, volunteers receive a sound and extensive training in mostly horticultural topics.²⁹ Master gardeners play an important role in implementing and sustaining instructional school gardens. Of the 10 schools, 5 had master gardeners help sustain the garden, and one school was actively requesting master gardeners. Master gardeners provide free technical assistance when first implementing a garden and have a wealth of knowledge and experience. As one teacher said, "You cannot survive without the master gardening program in whatever state you are doing your garden in."

Using the Garden for Academic Instruction

Using a school garden for academic instruction requires similar multifaceted efforts. Key school members reported that collaboration between the garden coordinator and teachers was essential to use the garden to teach California State content standards and academic subjects. The level of teacher involvement varied in the 10 schools. Some teachers created their own standards-based lessons, some worked with the garden coordinator to create lessons, and others only gave permission for their classes to participate in the garden while the garden coordinator created and taught the lessons. A key school member explained:

You really need to develop a partnership between the person who is going to be in the garden with classes and the teachers and the support of the administration...and involving parents is really helpful.

Only 2 schools had specific standards-based garden curriculum; one was obtained from a university and the other from an agriculturally based education foundation.^{30,31} All other lessons were created by the garden coordinator, parent volunteers, or teachers and were based on standards-based textbooks. When asked about the garden complementing academic instruction, one key school member responded:

...We use it as a hands-on method of teaching kids. Any concept that you can [find] in the textbook [you can] bring...to life with the hands-on approach in the school gardens.

The subject areas taught with the garden varied from school to school. Some key school members reported using the garden to teach science, mathematics, and visual and performing art. Others reported teaching social science, nutrition, and language arts. Key members were asked what would be the most ideal curriculum for teachers to use, and the response was to create quick, easy lessons based on state content standards that were clearly laid out. One key school member emphasized:

Develop quick, easy lessons that, you know, could go over a 6-week...growing period....This is what you are going to learn, this is how you teach the lesson, this is the standard.

Barriers

Schools encounter a variety of barriers when implementing, sustaining, and using instructional school gardens. Many key school members (7 of 10) reported that time was a barrier. Some key school members (3 of 10) identified lack of funds as a barrier. Other barriers reported by key school members included uncooperative administration, burned-out teachers, lack of long-term volunteers, and not having a paid full-time garden coordinator. One principal from an elementary school with less than 50% of students eligible for free or reduced-price meals lamented that the school was not eligible to participate in the Network for a Healthy California and

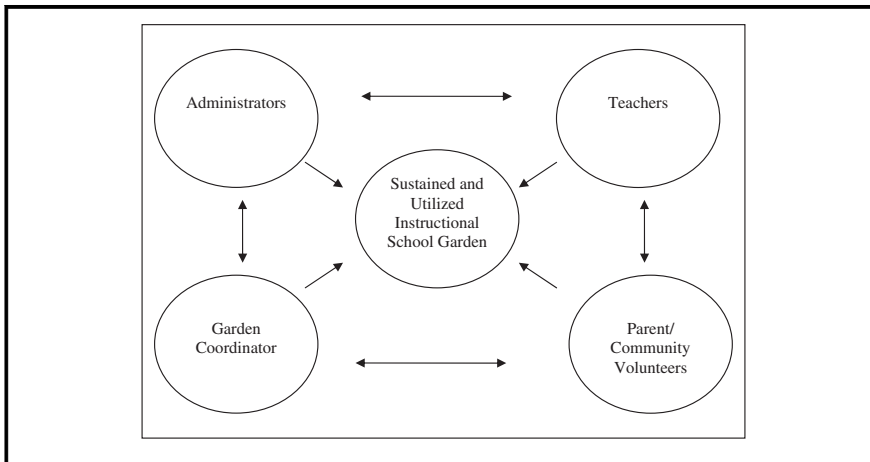


Figure. Key components of a successful and sustained instructional school garden. This figure highlights the 4 components of a sustained and used instructional garden and how each component is connected to the whole.

other programs for low-income schools. The US Department of Agriculture Supplemental Nutrition Assistance Program provides funding for programs such as Network for a Healthy California in schools across the US if they have at least 50% of students eligible for free or reduced-price meals.³²

DISCUSSION

This study identified key practices occurring in 10 diverse schools across California that had implemented, sustained, and used instructional school gardens. These findings highlight 4 fundamental and interrelated areas of instructional school gardens: people, funds, materials, and instruction. Attempting to implement and sustain a garden without including committed people and without obtaining funds and materials can lead to failure and discouragement. Implementing and sustaining a garden while lacking standards-based garden curricula may diminish the functionality of the school garden. When considering the development, implementation, sustainment, and use of an instructional garden, school administrators and teachers may consider the following recommendations.

The creation of a committee or a collaborative committed to the school garden is the first and most important step. The committee should be composed of members from these 4 groups: school administrators,

teachers, parent/community volunteers, and the garden coordinator (Figure). This committee should strive to work together to ensure that the garden is sustained and used. In this way, the garden becomes a shared responsibility, limiting the possibility of failure because of a burned-out teacher, staff member, or volunteer. Furthermore, the committee can diversify tasks, with some members locating and applying for grants while others focus on acquiring discounted materials. The structure of the committee can serve to maintain consistency, negating the effect of parent volunteers cycling out on their children's graduation and easing the recruitment of new parent volunteers.

In a previous study, the top 3 reported barriers to using a garden for academic instruction were time, a lack of curricular materials linked to academic standards, and lack of teachers' interest, knowledge, experience, and training in relation to gardening.¹⁰ These barriers must be addressed to use the garden for academic instruction. One possible way to overcome some of these barriers is working with local Cooperative Extension programs and using their curricula.³¹ The Cooperative Extension system is a nationwide, noncredit, educational network. Each US state and territory has a state office at its land-grant university and a network of local or regional offices. There are more than 50 county offices across California, many of which provide services such as the Master Gardener

or Nutrition, Family, and Consumer Science programs. In addition, several garden-enhanced, standards-based nutrition education curricula to facilitate school gardens for academic instruction have been developed in partnership with Cooperative Extension and other programs throughout the country.³⁰

IMPLICATIONS FOR RESEARCH AND PRACTICE

Schools with the greatest success in overcoming these barriers have a part- or full-time garden coordinator collaborating with teachers to create and implement standards-based garden lessons. Furthermore, schools also receive support from the principal and other administrators who recognize and value the benefits of using the garden for academic instruction. The administration also encourages teachers to participate in the school garden. Sustaining and using an instructional school garden requires many key players contributing time, effort, and energy.

SUPPLEMENTARY DATA

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.jneb.2011.05.005.

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