Assessing a School Gardening Program as an Integrated Component of a Pilot Farm-to-school Initiative Based in South Carolina

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SUMMARY. South Carolina public schools consistently rank low in academic performance. In addition, 39% of elementary, 40% of middle, and 30% of high school students within the state are classified as overweight or obese. School garden-based learning (GBL) is a low-cost and high-impact initiative that addresses both poor academic performance and childhood obesity. This study examined how school-based gardens, as part of a pilot farm-to-school (FtS) initiative, are administered and used within academic and cafeteria meal programs. An online survey was developed and sent to 102 educators who previously completed an online training course entitled *School Gardening for South Carolina Educators* during the 2012–15 academic school years. Data were collected from 37 educators (36% response rate). Survey results indicate that the majority of these educators, although they completed the training course, were unaware that their garden was a component of an FtS program. Moreover, gardens were not integrated with school-wide programs, especially in the cafeteria: most gardens did not contribute food to the cafeteria and meals offered most often did not align with plants learned about in the gardens. Successes of the pilot program were that the majority of educators started and maintained their garden for over 1 year and they were able to use their gardens during the day for academic instruction in multiple disciplines, including math, science, and nutrition.

Within the United States, the American Legislative Exchange Council ranks South Carolina as the lowest among the states in student academic performance (Ladner and Myslinski, 2014). Former South Carolina Superintendent of Education, Mark Zais, expressed concern about this as research has shown that poor educational opportunities early in childhood contribute to future obstacles for the duration of a child's life (Courrégé, 2011; Datar and Sturm, 2006). Compounding this, South Carolina also ranks second highest among all states for childhood obesity rates (Levi et al., 2014). The Division of Chronic Disease Epidemiology within the South Carolina Department of Health and Environmental Control found that

39% of elementary, 40% of middle, and 30% of high school students in South Carolina were either overweight or obese [defined as ≥ 85 th percentile for body mass index by sex and age (Centers for Disease Control and Prevention, 2012)].

Obesity and overweight status are associated with lowered overall academic performance with studies suggesting that math and reading may be impacted the most (Datar and Sturm, 2006; Hollar et al., 2010). Poor academic performance, especially in the subjects of math and science, is a critical issue as science literacy is of paramount importance for any society. Science is used daily to make informed decisions on changing issues and technologies that form the foundation of society (Klemmer et al., 2005).

Children are impressionable and develop interests early in life, it is important therefore that science literacy be cultivated during the elementary school years (Shapiro, 1994). This requires effective teaching that integrates the curriculum in tandem with a child's own experiences (Dewey, 1997). Experiential science instruction is a method of engaging students with

hands-on activities in hopes that they learn the material more effectively (Mabie and Baker, 1996).

Agricultural learning, specifically, is an example of hands-on, experiential science instruction and has been found to increase students' enthusiasm as well as their science comprehension mastery, skills, and scores (Klemmer et al., 2005). School gardens are potentially where most students have their only interaction with nature (Blair, 2009; Louv, 2008) since 81% of the U.S. population lives in urban areas with low access to nature (U.S. Census Bureau, 2010).

GBL is an agricultural and experiential approach to education that shifts learning from a sedentary to an active experience by enriching basic education and contributing to ecological literacy as well as sustainable development in a variety of socioeconomic settings (Desmond et al., 2004). GBL works by increasing "the horticultural complexity of the schoolyard" (Blair, 2009) and thereby more fully engages students. GBL is shown to have a number of academic, nutritional, and behavioral benefits; the very things that South Carolina needs most. Two meta-reviews of GBL studies found overwhelming positive impacts on students' grades in addition to knowledge, attitudes, and behavior toward food, including socializing and environmentalism (Blair, 2009; Williams and Dixon, 2013). Additional benefits have been demonstrated in the areas of teamwork and self-understanding (Robinson and Zajicek, 2005) and reduced stress (Chawla et al., 2014). Reviews of nutrition intervention literature have suggested that gardens have the potential to increase preference for (Blanchette and Brug, 2005) and knowledge of (Koch et al., 2006) fruits and vegetables. Both are important as fruit and vegetable intake is associated with reduced caloric intake as fruits and vegetables can replace foods that are low in nutrients but high in calories with foods that are nutrient-dense and low in kilocalories (Epstein et al., 2001). Several studies noted that interventions work best with a multi-pronged approach combining curriculum, involved parents, and repeated and positive exposure to fruits and vegetables (Blanchette and Brug, 2005; Ratcliffe et al., 2011). Gardens can be a method of nutritional

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intervention as they provide a positive environment to expose children to fruits and vegetables.

Previous studies have shown that teachers use school-based gardens for academic purposes (DeMarco et al., 1999; Graham and Zidenberg-Cherr, 2005) and have integrated most school subjects into their garden-based curriculum. Additional uses of the school-based gardens have included social development, recreational use, therapeutic use, and provision of edible produce to schools (DeMarco et al., 1999; Graham et al., 2005). Literature studies examined certain grades and subjects more often than others. Most studies reviewed focused on third through sixth grade (Blair, 2009; Williams and Dixon, 2013). A majority of GBL curricula included science, environmental education, math, language arts, and nutrition (Azuma et al., 2001; Graham and Zidenberg-Cherr, 2005; Graham et al., 2004; Skelly and Bradley, 2000). Furthermore, most academic instruction within the garden was limited to 1–2 h per week, often with intervention periods of several weeks to a few months (Mabie and Baker, 1996; Skelly and Bradley, 2000; Smith and Motsenbocker, 2005). The class was typically taught by the teacher in 91% of the cases with parent volunteers and community volunteers teaching 7% and 2%, respectively (DeMarco et al., 1999).

Given the benefits of GBL and the educational attainment and nutritional needs of students in South Carolina, a pilot FtS initiative was launched in 2012. The first program goal was to establish gardens in Title I schools in Berkeley, Charleston, and Dorchester counties to demonstrate efficacy, and then expand throughout the state. In the pilot GBL program, educators were trained how to implement and sustain school-based gardens using a 5-week online course that incorporated a hands-on training and technical assistance from Master Gardeners for 1 year and were then provided with a four-bed starter garden. This study shows the results of the first 3 years of the pilot GBL program. Data were collected through an online survey targeting all educators who completed training. The purpose of the survey was to determine how educators within a pilot FtS initiative used a school-based garden provided to them after completing the

online training program. This was assessed through responses to four overarching questions: 1) What are the characteristics of the gardens and the schools where they are located? 2) When are the gardens used, for what subject, and how are those subjects taught using the garden? 3) How are the gardens integrated with school meals? and 4) Do the gardens have financial and managerial support? Survey findings contribute to the body of knowledge about school garden administration, garden integration with academic programming, and garden integration with school meals. In some cases, survey findings reveal major disconnects between these factors.

Materials and methods

PARTICIPANTS. Study participants included 37 of 102 (36.3%) South Carolina educators with a valid e-mail address who completed *School Gardening for South Carolina Educators* (Dabbs and Snipes, 2015), during the 2012–15 academic school years. *School Gardening for South Carolina Educators* is a 5-week online course that prepares educators to implement and sustain a school-based gardening program. The goal of this training is to foster a comprehensive curriculum statewide for Title I and Title I-equivalent schools in a manner that alleviates preventable, negative health conditions by enabling student access to and knowledge of healthy, local foods.

INSTRUMENTS. An online survey was deployed using online survey software (Qualtrics, Provo, UT). Our survey was modified and adapted from the California School Garden Survey, which was developed and tested by a research and evaluation team based in California (Life Lab, 2015). The survey was active between Oct. 2015 and Jan. 2016. Educators received a broadcast e-mail asking them to complete the survey. Three reminder e-mails were sent out to nonresponsive educators over the course of the survey activation time period. The survey was closed on 31 Jan. 2016. The survey was used to assess school-based gardens in four overarching areas. The first survey section included questions regarding characteristics of the school in which the educator taught, as well as physical characteristics of the garden they used, such as garden size, age of the

garden, and the types of plants grown within the garden. The second section included questions that ascertained how the educator used the garden in terms of time spent in the garden and for what academic purposes. These questions included time of day the garden was used, the number of hours per week spent in the garden, percentage of the student body visiting the garden, academic subjects taught in the garden, and teaching methodology. The third section included questions that examined how the educator thought the garden was integrated with the overall school, especially in the cafeteria. The final section asked questions about garden finances and overall management and responsibility for the garden.

Survey questions were an assortment of “select all that apply,” “select top choice,” and open-ended. Participant characteristics were collected including the name of the school the educator was associated with as well as the educator’s role in supporting the garden. Raw survey data were downloaded in comma separated value (.csv) format, then cleaned to remove extraneous and inaccurate data (e.g., respondents who did not teach science answering science questions).

Quantitative responses were then coded from numerical values into text responses for ease of understanding. Qualitative open response questions were coded into categories. Once cleaned and coded, the survey data were combined with school level data for Title I designation and student population and grades served (South Carolina Department of Education, 2015a, 2015b). After the data preparation, data were analyzed using IBM SPSS Statistics package (version 22.0; IBM Corp., Armonk, NY). Descriptive statistics, such as frequencies and percentages, were calculated for all quantitative data. Survey data were categorized by overarching topic: school and school-based garden characteristics, school-based garden use, garden integration with school, and garden sustainability.

Results and discussion

This pilot FtS initiative placed gardens at 52 schools. Primary data were collected from 37 educators across 27 schools and secondary data were collected from the South

Carolina Department of Education for 48 of the 52 schools.

SCHOOL AND SCHOOL-BASED GARDEN CHARACTERISTICS. Of the 52 schools in the study, all but one of the schools was public, and 50% of the public schools were officially designated as Title I-schools. About half of schools (49%) were located in rural areas, followed by 31% suburban and 20% urban. The grades served by these schools were primary [prekindergarten and kindergarten (1.9%)], elementary [kindergarten to grade 5 (50.0%)], middle [grades 6 to 8 (31%)], and high school [grades 9 to 12 (17%)]. Forty percent of schools enrolled between 500 and 1000 students, whereas 29% enrolled 1000 or more students. Twenty-three percent of schools enrolled between 250 and 500 students, and only 8% of schools enrolled fewer than 250 students.

Findings from this study of educators employing school-based gardens are largely consistent with those of other researchers and provide important implications for educational research translation into educational practice and policy. School gardening programs that have been evaluated to date are most often located in urban, public schools (Azuma et al., 2001; Graham and Zidenberg-Cherr, 2005; Mabie and Baker, 1996; Ratcliffe et al., 2011; Smith and Motsenbocker, 2005; Williams and Dixon, 2013). Our study finding differs from the results of this as 49% of pilot FtS initiative schools were designated as rural. Grades served and school size are not typically mentioned in the literature; however, several studies noted that most gardens are used by third through sixth grade students (Blair, 2009; Williams and Dixon, 2013). This finding aligns with results of the current study, as 50% of schools served kindergarten through fifth grade students. Most school gardens evaluated in previous studies were established for an undocumented period of time or less than 1 year (Skelly and Bradley, 2000). Results from the current study showed that 66% of gardens had been sustained for at least 1 year. Moreover, most school gardens evaluated in previous studies contained flowers (71%), followed closely by vegetables (67%) and herbs (50%) (Graham and Zidenberg-Cherr, 2005). The current study found that

vegetables (92%) and herbs (78%) were the most common plants grown.

SCHOOL-BASED GARDEN USE. As shown in Table 1, although 33% of participants reported using their garden for 1 year or less, $\approx 67\%$ of participants reported using their garden for more than 1 year. Plants grown in the garden included vegetables (92%), fruits (32%), herbs (78%), and other (62%), which included ornamental species, species supporting wildlife habitat, and other responses. Garden size is based on the total number of raised beds that the educator used. Each raised garden bed had ≈ 12 ft² (1.1 m²) of growing area. Small gardens (34% of surveyed gardens) had up to four raised beds, medium gardens (27%) ranged from five to eight beds, and large (30%) were above nine beds.

Literature indicates that educators face significant, but unspecified, difficulty in finding time to use the garden during the school day (DeMarco et al., 1999). When using the garden, educators typically only had only 1–2 h per week to work with students (Mabie and Baker, 1996; Skelly and Bradley, 2000; Smith and Motsenbocker, 2005). Educators in the current study did not have the same issue with time of day as a garden use barrier as 73% of educators taught in the garden during class time, as shown in Table 2. Respondents' ability to use the garden during class time may be a result of the completed online training. The reason for this could be 2-fold: the online training had a fee and therefore represented an investment on the part of the school,

Table 1. Descriptive characteristics of school-based gardens implemented in South Carolina based on survey responses from 52 South Carolina educators.

Physical and student utilization characteristics	n (%)
Age of school-based garden (years) (n = 36)	
Less than 1	12 (33.3)
Between 1 and 3	16 (44.4)
More than 3	8 (22.2)
Plants grown in the garden (n = 37)	
Vegetables	34 (91.9)
Fruits	12 (32.4)
Herbs	29 (78.4)
Other	23 (62.2)
Garden size (no. raised beds) (n = 32)	
Small (1–4)	11 (34.4)
Medium (4–8)	10 (27.0)
Large (more than 8)	11 (29.7)
Time of day or year of garden usage (n = 37)	
During class instruction time	27 (73.0)
During recess	6 (16.2)
During lunchtime	1 (2.7)
Before or after school	18 (48.6)
Weekends	2 (5.4)
Summer school programs	3 (8.1)
Time of academic instruction students receive in garden (hours per week) (n = 37)	
0–2	19 (51.4)
2–4	4 (10.8)
4–6	2 (5.4)
6+	12 (32.4)
Proportion of student body using garden for academic instruction (%) (n = 30)	
Less than 30	17 (56.7)
Between 30 and 50	8 (26.7)
Between 50 and 70	0 (0.0)
More than 70	5 (16.7)
Academic instructor for students in garden (n = 31)	
School teacher	27 (87.1)
Master Gardener	2 (6.5)
Other	2 (6.5)

Table 2. Integration methodologies used for core and noncore academic subject integration with South Carolina school-based gardens based on survey responses from 52 South Carolina educators.

Academic subjects and instructional methodology	n (%)
Core academic subjects taught using the garden (n = 37)	
Social sciences/history	6 (16.2)
Science	26 (70.3)
Mathematics	11 (29.7)
English-language arts	7 (18.9)
Noncore academic subjects taught using the garden (n = 37)	
Art	7 (18.9)
Health and nutrition	14 (37.8)
Physical education	2 (5.4)
Agricultural/environmental studies	11 (29.7)
Other ^z	22 (59.4)
How science concepts are taught using the garden (n = 37)	
Concepts taught lesson prior or after to garden time	13 (35.1)
Concepts are reinforced through garden instruction	22 (59.5)
Explicitly taught in the garden	9 (24.3)
Students create and conduct their own science projects in the garden	6 (16.2)
How math concepts are taught using the garden (n = 37)	
Concepts taught lesson prior or after to garden time	7 (18.9)
Concepts are reinforced through garden instruction	18 (48.6)
Explicitly taught in the garden	0 (0.0)
How English-language arts concepts are taught using the garden (n = 37)	
Concepts taught lesson prior or after to garden time	4 (10.8)
Concepts are reinforced through garden instruction	10 (27.0)
Explicitly taught in the garden	7 (18.9)
How social sciences/history concepts are taught using the garden (n = 37)	
Concepts taught lesson prior or after to garden time	7 (18.9)
Concepts are reinforced through garden instruction	10 (27.0)
Explicitly taught in the garden	2 (5.4)

^zOther noncore subjects include computer science, foreign language, home economics/cooking, special education, and service learning.

both in teacher's time to develop and work with students in the garden as well as the cost of the training program. Second, the training showed how to integrate curricula into the usage of the garden, thereby allowing traditionally classroom-based subjects to be taught in the garden during the normal class time.

Time spent in the garden for education was similar in this survey to what was found in previous studies, with 51% of educators using the garden for up to 2 h per week. Promisingly, 32% of educators stated that they used the garden for 6 h or more per week. In addition, 57% of educators stated that 30% or less of the student body visited the garden at least once throughout the academic year. This finding represents a major missed opportunity for schools. Developing interesting and creative ways to engage a much higher percentage of the student body in the school gardens will help schools address a range of issues

including health and academic achievement.

GBL is conducted mainly by teachers, with several previous surveys indicating that over 86% of those using the garden for education are school teachers rather than Master Gardeners or other volunteers (DeMarco et al., 1999; Graham and Zidenberg-Cherr, 2005; Robinson and Zajicek, 2005). These results align with the current survey in that 87% of garden educators were school teachers.

The main use for most school gardens has been one of an academic nature, with most academic subjects being taught in the garden (DeMarco et al., 1999; Graham and Zidenberg-Cherr, 2005). Of all academic subjects taught in the garden, science has been found to be the most frequent, followed by environmental education (Azuma et al., 2001; DeMarco et al., 1999; Graham and Zidenberg-Cherr, 2005; Skelly and Bradley, 2000). Survey results from this study show that 70% of educators used the garden

for science instruction. The topics of agriculture and environmental science combined were used by 30% of educators who completed this survey. In addition, 38% of educators who completed this survey used the garden for health and nutrition education. Aligning with the previous studies listed earlier, the current survey results provided here indicate that gardens were used to teach a wide range of topics beyond the traditional science and agricultural or environmental subjects. These topics include social studies and history, math, English-language arts, art, and physical education. It is interesting to note that for every subject category asked about in the current survey, the teaching approach taken by 60% of respondents was to use the garden instruction to reinforce concepts taught in the classroom. Lessons taught explicitly in the garden are much less common. This result may also represent an opportunity for schools to broaden their curricula by developing and delivering new garden-centered content for students.

GARDEN INTEGRATION WITHIN SCHOOLS. As shown in Table 3, many participants used the edible plants in the garden for tasting programs (57%), and/or consumption during garden instruction (65%). None of the participants sold the edible plants grown in the garden-to-school food services, but 11% reported donating the food. Interestingly, among the participants who responded to a question asking if they identified their school as part of an FtS program, most indicated that they would not identify their school garden as part of an FtS program or had not heard of the term FtS (60%). In addition, most participants indicated that their cafeteria did not source local produce from farmers or that they were unsure how to answer the question (88%). Furthermore, most participants indicated garden education was not aligned with cafeteria marketing/promotion of fruits and vegetables (83%). Most gardens described in previous studies are not integrated with the school's cafeteria, which is not surprising given one study's finding that only 39% of gardens grew produce (Graham and Zidenberg-Cherr, 2005). Educators who participated in this study, on the other hand, used their gardens to produce edibles in 65% of cases, though the

Table 3. Farm-to-school-related programming and school meal integration with South Carolina school-based gardens based on survey responses from 52 South Carolina educators.

Food programming integration information	n (%)
What is done with the edible plants grown in the garden? (n = 37)	
Used in tasting programs	21 (56.8)
Used for academic study	13 (35.1)
Sold to school food services	0 (0.0)
Donated to school food services	4 (10.8)
Harvested for consumption and eaten during garden time	24 (64.9)
Sold to somewhere other than food school service	0 (0.0)
Donated to somewhere other than food school service	3 (8.1)
Other	5 (13.5)
Educator defines school garden as part of farm-to-school programming? (n = 25)	
Yes	3 (8.1)
No	17 (45.9)
Not heard of farm-to-school	5 (13.5)
Does your cafeteria source local produce from farmers? (n = 37)	
Yes	3 (9.4)
No	11 (34.4)
No, but want to	1 (3.4)
Unsure	17 (53.1)
Garden education aligned with cafeteria promotion of fruits and vegetables? (n = 29)	
Yes	5 (17.2)
No	24 (82.8)

produce was consumed during class time. Garden integration into the community was also lacking in the literature, with only 14% of gardens in one study having an established relationship with a farm or farmer (Azuma et al., 2001). Similarly, only 9% of educators in this study indicated that their cafeteria sourced local foods. This is interesting given that 49% of schools were rural and thus often associated with agricultural areas. Perhaps the sourcing of local food might be difficult due to the large amount ($\approx 90\%$ to 95%) of produce that South Carolina exports (Parker, 2016). Another technique school gardens can employ is aligning garden education with promotion of the same fruits and vegetables in the cafeteria (Graham and Zidenberg-Cherr, 2005; Ozer, 2007). Educators who participated in the current study indicated that this had not been widely implemented, with only 17% indicating that GBL had been aligned with cafeteria marketing of produce.

GARDEN SUSTAINABILITY. School garden funding has been identified as a constraint within the literature (Azuma et al., 2001; Blair, 2009; DeMarco et al., 1999; Graham and Zidenberg-Cherr, 2005; Ozer, 2007).

As shown in Table 4, educators who participated in the current study indicated modest budgets for their gardens with 47% having budgets between a mere \$1 to \$500 per year; however, 35% of educators reported having no budget at all. School-based gardens with budgets remained highly reliant on outside funding sources such as donations (Ozer, 2007). One study found garden funding came from donations (70%), grants (49%), or the teachers themselves (52%) (Skelly and Bradley, 2000). Reliance on grants and donations was also evident in survey results from this study, with 24% of educators indicating funding from community or business donations, and 29% of educators indicating grant or foundation support. Only 12% of participants obtained funds from their school district. No teachers in this survey were supporting the gardens through their own finances. Lack of funding has been found to contribute to abandonment of school-based gardens in many instances (Azuma et al., 2001).

It is important to note that participants in this survey were limited to those who trained in the pilot FtS initiative and subsequently received supplies and funding, thus they may

receive more support than is typical for the general population of educators managing or teaching with a garden.

Conclusions and recommendations

This study revealed several disconnects between school-based gardening and the school environment as a whole. First, educators were unaware that the garden they use is a component of an FtS program. Second, the gardens existed in isolation. The school-based gardens were not integrated with the school at large, especially since the cafeteria did not operate synergistically with the garden. Cafeteria meals did not match the plants students learned about in the garden and very few gardens supplied the cafeteria with produce, which may be due to federal and state regulations and restrictions. In addition, most educators were unaware of what their students were eating, much less if the food was local. However, given the newness and lack of integration of the gardens with the school as a whole, a surprising number of students did visit and made use of the garden, showing potential for growth as the garden becomes more integrated. Garden exposure has lasting benefits, although there is room for improvement in increasing the number of students visiting the garden and the duration of students' exposure.

School-based gardening is a low-cost and high-impact initiative that addresses two key issues South Carolina has been facing: high rates of obesity and poor academic performance. School-based gardens are inexpensive compared to other education reform initiatives; it takes about \$2000 to set up and support a garden for 1 year, and only about \$500 per year thereafter, to continue maintaining the garden. One-third of the schools surveyed in this study lacked a budget, and of those that had any budget, most were not supported by their school district and thus must instead rely on community and business donations or grants. This leads to a major issue these educators will face: how do educators effectively communicate with administration that teaching in the garden is a good use of time and money? This must be addressed if the school-based garden is to become an integrated

Table 4. Funding and maintenance plans for South Carolina school-based gardens based on survey responses from 52 South Carolina educators.

Funding and maintenance plans	n (%)
Total school garden budget, including materials and supplies (n = 17)	
\$0	6 (35.3)
\$1–\$500	8 (47.1)
\$500–\$1,000	2 (11.8)
\$1,000 or more	1 (5.9)
Funding sources for garden (n = 17)	
School district	2 (11.8)
Individuals	0 (0.0)
Community/business donations	4 (23.5)
Grants and/or foundations	5 (29.4)
Parent teacher organization funds	3 (17.6)
Other	3 (17.6)
Maintenance responsibility for the garden (n = 31)	
Master Gardener	2 (6.5)
Teacher	27 (87.1)
Other	2 (6.5)
Garden maintained during summer (n = 25)	
Yes	21 (84.0)
No	4 (16.0)

component of education in South Carolina.

There are several key takeaways from the current survey. Online training enables integration of academics into a garden or outdoor classroom, thereby promoting its use. It is an inexpensive and broadly available platform that increases educator knowledge and usage of GBL. Initial support in the form of training, money, setup, and materials is important. Most gardens fail within the first year, while in this study most gardens are over 1 year old. This training period can provide time to prove to school administration that GBL is a viable method for teaching and learning. Proving this might also encourage the schools to increase investments in their gardens as most do not contribute to the garden budget.

Most GBL is taught by school teachers who may have limited gardening knowledge or skills. Incorporating outside expertise in the form of Master Gardeners or members from a local garden club could provide the experience and support that teachers lack. It may also free them to teach in the garden more rather than doing basic maintenance.

Schools should see GBL as an opportunity to broaden the curriculum and learning they offer their students beyond the current practice of using the garden almost exclusively to reinforce classroom-based learning by developing garden-based content and

lessons. Gardens remain an underused resource at most schools, with only 30% or less of students visiting the garden even once a year. Increasing the ways that the garden can be used and opportunities for students to be active in the garden will increase the educational return on the modest investment a garden requires.

This study helps meet the informational needs of public health, health, and educational professionals by providing suggestions for the development, implementation, and evaluation of school-based initiatives, such as FtS, that incorporate the experiential learning component of a school garden. The exploration of the impacts of FtS experiential learning activities on youth health and educational outcomes should be considered in future work to identify best practices for promoting positive youth development among at-risk populations in particular. School gardening and farming programs designed to ultimately promote positive youth development should be implemented as a component of larger FtS initiatives whenever possible.

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