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REAL School Gardens Program: Learning Gardens and Teacher Training to Improve Student Engagement and Academic Performance in Low-Performing Elementary Schools

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The cyclical links between poverty, educational achievement, and health have been well established. Parents with fewer years of education are more likely to head families that live below the poverty line,¹ and families below the poverty line tend to have higher rates of obesity and have higher mortality rates² than their more affluent peers. Children who grow up in poverty are less likely to graduate high school, enter college, and find economically rewarding careers, meaning that they are more likely to head families that live below the poverty line, just like their parents.³

One approach to help break this cycle is to improve the educational opportunities provided to children of low-income households. By improving the effectiveness of elementary academic instruction while simultaneously providing children with moderate physical activity, and exposure to healthy foods and information about healthy eating habits, REAL School Gardens is working to impact children's long-term academic success and health habits.

REAL School Gardens builds learning gardens in low-income elementary schools and then provides extensive teacher training proven to prepare educators to increase academic engagement among high-need students. First, we create an outdoor learning environment by uniting students' parents and teachers to work together to design the learning garden and then build it in just one day. Once the learning garden is built, teachers spend three years in our on-the-job training program; we send our educators out to the school to work side-by-side with the teachers, a training model that third party evaluators have proven is successful at increasing teacher preparedness and student engagement.

Over the past nine years, REAL School Gardens has partnered with 92 low-income schools in five Texas school districts and has seen impressive results for teachers and students. Our ongoing evaluation, conducted by PEER Associates, has shown statistically significant increases in teacher preparedness and job satisfaction as a result of our program. Preliminary findings also show that 84% of students experiencing hands-on academic lessons in a REAL school garden report high levels of engagement, specifically in math and science. Another study demonstrated that REAL School Gardens' partner schools exhibit, on average, standardized science test score pass rates 5.5% higher than non-partner schools, controlling for other school characteristics. REAL School Gardens' partner schools achieved these gains despite spending less per student, having a higher student-teacher ratio, and having higher percentages of students with Limited English Proficiency and/or in free or reduced lunch programs.

Project Design

The REAL School Gardens program provides schools with three-year partnerships that include an integrated set of services designed to create sustainable outdoor learning programs on their campuses. In designing our program, we have drawn upon a large body of research which demonstrates that children excel in lessons through hands-on learning opportunities in the outdoors; that educators most readily adopt new teaching strategies when they are provided with on-the-job training and support; and that new learning initiatives on school campuses become sustainable when a broad group of stakeholders plays an active role in implementation. Our program is delivered in four phases over a three-year time period:

1) Design and Build Phase: New school partnerships begin by uniting the school community, including parents, educators, neighbors, and local business owners, who will design the garden and engage and activate the wider community. When this is complete, hundreds of parents and community volunteers come together for a day of service to build the garden. In addition to growing produce and flowers, our ADA-accessible learning gardens contain at least twelve distinct learning features through which children connect their lessons to the real world.

2) Initial Training Phase: Once the garden is installed, we hold day-long trainings on-site for the whole staff to prepare teachers at each school to begin using the garden as an outdoor classroom. We facilitate activities in the garden that directly address cross-curricular student expectations in the Common Core or State Standards. Because our activities are developed for specific standards in each grade and training takes place in the teachers' own garden, rigorous academic connections are immediately relevant and applicable. Teachers also receive easy-to-implement, grade-level-specific lesson plans that are aligned to the Common Core and state standards.

3) Supportive Training Phase: During the next two years, each school receives additional lesson plans and on-the-job training in the form of model teaching visits from REAL School Gardens' educators. Over the course of three Teacher-to-Teacher sessions in a school year, each teacher becomes increasingly confident and capable to lead outdoor learning activities independently.

4) Final Training Phase: In the spring/summer of a school's third and final year of partnership, we conduct an outdoor group training including teachers from multiple schools, and providing advanced techniques for outdoor instruction in math, science, and language arts, as well as targeted methods for encouraging and managing student-driven

inquiry. After the initial three years of training and support, schools have access to an assortment of training sessions.

Program Goals

Our integrated, three-year program model is designed to promote long-term sustainability for these outdoor learning programs. By providing a rich, engaging learning space and the teacher training to utilize it regularly and effectively to increase student success, we work to embed our learning gardens as a valued instructional resource at each school.

Increasing student engagement with their academic lessons is one of the cornerstones of the REAL School Gardens program. Drawing from Niemiec and Ryan,⁴ we define student engagement as the degree to which students experience autonomy (feeling they can direct their own learning) and competence (developing a personalized understanding of the subject matter through direct observation and multiple learning pathways). Their research shows a consistent positive relationship between student engagement and academic performance. Skinner et al.⁵ go further to demonstrate that the unique environment of a school garden promotes student engagement and positively impacts student learning.

Significance

Though teacher-training programs are common and school gardens are common, the REAL School Gardens program is unique because we have developed a hands-on learning garden/teacher-training program independently proven to increase student engagement and academic success. Our exceptional approach harnesses under-utilized resources (outdoor space and teachers) in high-need schools, and we have measurably improved them, positively impacting student performance.

Since teacher quality is widely recognized as the most influential in-school factor affecting student achievement, we focus a great deal of effort on providing educators with the tools and curriculum integration support they need to utilize outdoor learning as a part of their practice.

The intensive, experiential training that we provide for educators is critical to academic success at the elementary level. According to Wenglinsky et al⁶ teachers' instructional practices can have the same level of impact on student learning as student socioeconomic status, the main statistical predictor of academic achievement. Elementary-level educators in STEM subjects stand to benefit most from targeted training given that these teachers typically do not have a content specialty or degree in these fields. In addition, while many teachers are interested in new strategies for hands-on learning, they often do not have the time or skills necessary to

implement these strategies on their own. We designed our educator training programs based on our direct knowledge of experiential methods and following best practices which have emerged from the broader educational community. Studies⁷⁻¹⁰ have shown that educator training which strengthens teachers' knowledge of the subject matter; involves active, reflective learning including group sessions, peer mentoring and modeling; aligns closely with actual classroom conditions; is directly applicable to educators' practice; and is consistent with curriculum standards leads to improved student achievement. Our training helps educators at varying levels of comfort with and expertise in teaching outdoors build their skills and confidence and has been shown to boost educator preparedness and morale.

Hands-on learning makes a profound impact on student achievement, especially in math and science, subjects in which low-performing schools are at an even greater disadvantage than their peers. Experiential outdoor education is shown to enhance student achievement, particularly in the STEM subjects.¹¹⁻¹³ Going beyond tested objectives, garden-based learning is also shown to foster critical thinking and group problem-solving,¹⁴ responding to students' need for experience that prepares them for higher education and the modern workplace.¹⁵ Cross-curricular learning, which fosters creative, adaptive thinking and deepens comprehension,¹⁶ comes naturally in school gardens with a diverse array of features and opportunities for real-world experiences. Before the garden is even in the ground, it often provides the impetus for practical lessons in measurement, as students learn to draw scale maps of their campuses for the garden design competition. Once installed, the number of math, science, and language arts lessons the garden will enhance is limitless.

In addition to improving student performance, hands-on outdoor learning also provides a holistic approach to enhancing non-cognitive abilities such as teamwork, leadership, perseverance, and an internal vs. external motivation to learn. Several other studies have shown that experiential outdoor education enhances student achievement, particularly in the STEM subjects.¹¹⁻¹³ Garden-based learning has also been shown to foster critical thinking and group problem-solving,¹⁴ providing experience that prepares students for higher education and the modern workplace.¹⁵ Further, cross-curricular learning, which fosters creative, adaptive thinking and deepens comprehension,¹⁶ comes naturally in school gardens, with a diverse array of features for real-world experiences.

Health Benefits

In addition to improving children's academic achievement levels, putting them on the path to long-term economic stability, which in turn would improve their chances at living a healthy life, REAL school gardens also have a direct positive impact on children's health, both now and in the future. School gardens can reap tangible benefits in terms of children's health, mobility, and future quality of life. Medical researchers have examined the health benefits of activity outdoors and suggested links to positive impacts on blood pressure and cholesterol levels.¹⁷ Furthermore, research indicates children coping with ADD and ADHD are better able to manage their symptoms after time spent in green spaces.¹⁸ The use of outdoor natural spaces is particularly important to the health of young people from impoverished backgrounds, like the majority of the children served by REAL School Gardens.¹⁹ Researchers have found that exposure to natural spaces even could play a vital role in reducing health inequalities between these children and their middle-income peers.²⁰

School gardens offer a particularly powerful means of combatting the childhood obesity epidemic. Research suggests that children who grow their own food are more likely to eat fresh fruits and vegetables, an important behavior to cultivate within elementary-aged students.^{21,22} We have witnessed students adventurously tasting new vegetables or carrying their excitement about fresh foods from the garden to the grocery store to the family dinner table. And as budget shortfalls and high-pressure testing environments require schools to eliminate physical education programs and replace recess with preparation time for standardized exams, time spent exploring school gardens also provides essential activity for young bodies, while offering opportunities for engaged learning at the same time.²³

Conclusion

While there is no silver bullet to solve all the challenges children face as a result of living in poverty, schools and communities have access to immediate, practical, and effective measures to begin to close the gap in educational achievement and overall health, both in the short and long term. By embedding holistic programs such as REAL School Gardens into the school and the community, children in low-income families will have access to educational enrichment and healthy practices that will help them succeed.

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