

OF VEGETABLES AND MATHEMATICS: THE POSSIBILITIES AND POTENTIAL
PRATFALLS OF IMPLEMENTING A NATION-WIDE IMMERSION BASED NUTRITION
EDUCATION PROGRAM IN AMERICAN SCHOOLS

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I. INTRODUCTION

America is in the grip of an obesity crisis. According to a speech by the former Surgeon General, obesity is the fastest growing cause of death in America.¹ Nearly two out of every three Americans are overweight, and one out of every eight deaths in America is caused by an illness directly related to the decedent being overweight or obese.² Even more troubling, the findings regarding obesity in America do not improve when one focuses on American children, particularly in regards to American children born in the last 20 to 30 years. According to a report published on Forbes.com, the rate of childhood obesity has more than tripled since 1980.³ In addition, a study headed by Cynthia Ogden of the Centers for Disease Control and Prevention (CDCP) found that between the years of 1996 to 2006 the prevalence of overweight and obese American schoolchildren has leveled off at an astounding 32%.⁴

The resulting health effects of childhood obesity can be catastrophic. Dr. David L. Katz, Director of the Yale University School of Medicine Prevention Research Center, has said the following regarding obesity: “It truly is a public health crisis of the first order, driving many of

¹ Richard H. Carmona, Surgeon General, U.S. Public Health Service, Testimony Before the Subcommittee on Education Reform, Committee on Education in the Workplace, and the United States House of Representatives: The Obesity Crisis in America (July 16, 2003).

² *Id.*

³ *Obesity Rates Continue to Climb in U.S.*, FORBES, July 1, 2009, [http:// www.forbes.com/feeds/hscout/2009/07/01/hscout628636.html](http://www.forbes.com/feeds/hscout/2009/07/01/hscout628636.html) [hereinafter Forbes].

⁴ Bryan Walsh, *Child Obesity Rates Level Off*, TIME, May 27, 2008, <http://www.time.com/time/health/article/0,8599,1809829,00.html>.

the trends in chronic disease, in particular the ever-rising rates of diabetes.”⁵ As if to prove his point, doctors are already diagnosing type 2 diabetes, a disease that was once called adult-onset diabetes, in heavy children.⁶ A report issued by the CDCP predicts that one in three kids born in America in the year 2000 will develop type 2 diabetes at some point in their lives.⁷ According to David Ludwig, an obesity researcher at Children’s Hospital Boston, “[t]he childhood obesity epidemic is a tsunami. We’re beginning to see the wave hitting the shore.”⁸

Adding to the problem is the fact that a portion of American youth live in so-called “food deserts”—predominately low-income communities in which it is practically impossible to find fresh fruit or vegetables because large grocery stores are blocks away and difficult to reach.⁹ According to a recent one-year study conducted by the U.S. Department of Agriculture (USDA) at the bequest of Congress and the Food, Energy, and Conservation Act of 2008, 23.5 million people live in low-income areas that are more than a mile from the nearest supermarket or grocery store.¹⁰ According to the report, “[p]eople who live in [food deserts] may be more prone to poor diets and have poor health outcomes, such as obesity or diabetes, because they lack access to healthy foods and may have too easy access to less healthy foods.”¹¹ In an attempt to combat food deserts, the U.S. Government has recently launched a \$400 million program entitled

⁵ Forbes, *supra* note 3.

⁶ *Id.*

⁷ *One in Three U.S. Children Born in 2000 Will Develop Diabetes*, Nov. 10, 2003, http://www.worldhealth.net/news/one_in_three_us_children_born_in_2000_wi/.

⁸ Walsh, *supra* note 4.

⁹ *Fresh Food for Urban Deserts*, NEW YORK TIMES, March 20, 2009, <http://www.nytimes.com/2009/03/21/opinion/21sat4.html>.

¹⁰ United States Dep’t. of Agriculture, *Access to Affordable and Nutritious Food: Measuring and Understanding Food Deserts and Their Consequences*, i, ii (June, 2009) (*available at* <http://www.ers.usda.gov/Publications/AP/AP036/AP036.pdf>) [hereinafter *Food Desert Report*].

¹¹ *Id.* at 6.

the Healthy Food Financing Initiative.¹² First Lady Michelle Obama said that the program, which is based on a successful predecessor initiated in Pennsylvania, “is needed to work alongside efforts to improve the quality of food in school and to educate the public about healthy eating.”¹³

Further exacerbating these situations is the growing complexity of the American food system and the fact that many Americans are isolated from the production of the food which they consume everyday. Nearly a century ago, close to 50% of the nation’s population lived in rural areas, and 30% of the nation’s population was engaged in farming.¹⁴ Currently, only 17% of Americans live in rural areas, and less than 2% of Americans are currently engaged in farming.¹⁵ These factors breed a culture of indifference and ignorance among eaters.¹⁶

Further contributing to the rising tide of childhood obesity and America’s indifference toward their food has been the rise of fast food franchises within the past 50 years. In 1970, Americans spent around \$6 billion of fast food.¹⁷ In the year 2000, Americans had spent over \$110 billion on fast food, and approximately one quarter of the American population will eat fast food everyday.¹⁸ Furthermore, fast food companies aggressively target children and adolescents

¹² John Hurdle, *U.S. Launches Program to End “Food Deserts,”* REUTERS, Feb. 20, 2010, <http://in.reuters.com/article/lifestyleMolt/idINTRE61I5E820100219>.

¹³ *Id.*

¹⁴ National Institute of Food and Agriculture: About Us, <http://www.csrees.usda.gov/qlinks /extension.html>, (last visited Feb. 27, 2010).

¹⁵ *Id.*

¹⁶ Michael Pollan, *Farmer in Chief*, New York Times, Oct. 9, 2009, http://www.nytimes.com /2008/10/12/magazine/12policy-t.html?_r=2&pagewanted=8

¹⁷ Eric SCHLOSSER, *FAST FOOD NATION: THE DARK SIDE OF THE ALL-AMERICAN MEAL 3* (Harper Perennial 2005).

¹⁸ *Id.*; Interview by CBS News with Eric Schlosser, Journalist and Author (Jan. 18, 2001) (*available at* <http://www.cbsnews.com/stories/2002/01/31/health/main326858.shtml>).

in their advertising.¹⁹ A 2007 Federal Trade Commission (FTC) Report concluded that the \$520 million spent on advertising and the toys included with children's fast food meals was more than twice the amount spent by any other food category targeting children under the age of 12 in 2006.²⁰ A report conducted by the Kaiser Family Foundation concluded that children and adolescents see approximately 610 television commercials for fast food every year.²¹ Furthermore, the proliferation of fast food advertising directed toward children and the existence of food deserts combine to place poor inner city youth, especially, in danger of becoming overweight or obese.²²

II. BACKGROUND

Based upon these facts, it is evident that American children are in the throes of an obesity epidemic and that it is imperative that we do something as a country. Fortunately, schools offer a potential avenue in which to educate children about nutrition and reverse this alarming trend, as they are an ideal setting for population-based interventions to address obesity.²³ According to the U.S. Census Bureau, approximately 56 million students are enrolled in the nation's elementary and high schools during the current (2009-2010) academic year.²⁴ Students spend

¹⁹ SCHLOSSER, *supra* note 17, at 42-46.

²⁰ Concurring Statement of Commissioner Jon Leibowitz, Marketing Food to Children and Adolescents: A Review of Industry Expenditures, Activities, and Self-Regulation, 1, 2 (July 29, 2008) (*available at* <http://www.ftc.gov/speeches/leibowitz/080729foodmarketingtochildren.pdf>) [hereinafter Leibowitz].

²¹ Kaiser Family Foundation, Food For Thought: Television Food Advertising to Children in the United States, 1, 3 (March, 2007) (*available at* <http://www.kff.org/entmedia/upload/7618.pdf>).

²² Leibowitz, *supra* note 20, at 2.

²³ Gary D. Foster ET AL., *A Policy-Based School Intervention to Prevent Overweight and Obesity*, 121 PEDIATRICS e794, e794 (2008).

²⁴ U.S. Census Bureau: Back to School 2009-2010, http://www.census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/013847.html, (last visited Feb. 27, 2010).

approximately half their waking hours in school, and schools provide one to two meals daily.²⁵ Furthermore, our country has previously addressed health concerns involving our children by empowering and encouraging our schools to provide education and activities specifically aimed at these particular health issues. Nearly fifty years ago, President Kennedy announced an initiative that would put more emphasis on the teaching of physical education in our nation's schools.²⁶ He pressured states to make physical education a requirement.²⁷ Similarly, more needs to be done in our nation's schools to teach our children about healthy eating.

One way in which our nation can achieve this is goal by overhauling the nutritional education offered in our schools. In particular, a nation-wide policy could be implemented in which every school in the nation would offer an immersive nutrition education program that would develop behavior-focused skills such as requiring their students to demonstrate an understanding of concepts like caloric intake, food labels, and an understanding of the way in which companies market food to them; would provide students with the opportunity to grow and/or prepare their own food; and would integrate the nutrition education into core subjects such as language arts, science, and social studies.²⁸ Finally, every nutrition education program offered in public schools should also contain methods for evaluating and measuring its success.²⁹ Such steps would go a long way to mitigating the obesity epidemic that currently plagues our country.

²⁵ Foster, *supra* note 23, at e794.

²⁶ Pollan, *supra* at 16.

²⁷ *Id.*

²⁸ See Bridging the Gap, Local Wellness Policies: Assessing School District Strategies for Improving Children's Health, 27 (July, 2009) (*available at* <http://www.ers.usda.gov/Publications/AP/AP036/AP036.pdf>) [hereinafter Bridging the Gap].

²⁹ *Id.* at 27.

Currently, there are several different types of nutrition education programs that meet all of these criteria, and all have been shown to be effective at producing the skills and awareness children need to combat obesity. Probably the most immersive type of nutrition education program would be the so-called Edible Schoolyards—gardens existing on school grounds that are cultivated by the students themselves. Because the Edible Schoolyard Program is the most intensive of all the different types of immersive nutrition education programs recently implemented, a discussion of these programs should start with an examination of Edible Schoolyards.

The concept of Edible Schoolyards started around twenty years ago at the Martin Luther King Jr. Middle School in Berkeley, California.³⁰ Alice Waters, a chef living in the area, frequently passed by the school on her way home from her Berkeley Restaurant.³¹ Noticing how sad and lonely the building looked at night, Waters conceived the idea of converting an unused acre on the eastern side of the schoolyard into a garden in which the school children would grow their own food.³² In Water's vision, the garden should be organic, ecologically sound, and wholly integrated into the school's curriculum and lunch program.³³ Waters collaborated with teachers and community leaders, and by the 1996-1997 school year, sixth and seventh graders

³⁰ Judith Weinraub, *The Edible Schoolyard: From an Unsightly Lot Came a Resolve That Good Eating Habits Start With Good Growing Habits*, WASHINGTON POST, June 29, 2005, at F1.

³¹ *Id.*

³² *Id.*

³³ *Id.*

were working in the garden several times a month.³⁴ As Waters has said about the program, “It worked. When the children grew [food] and cooked it, they wanted to eat it.”³⁵

Through the use of Edible Schoolyards, students plant and grow various vegetables, learning about nutrition and healthy eating habits in the process.³⁶ Furthermore, through the use of Edible Schoolyards, students engage in hands-on lessons that connect food, health, and the environment.³⁷ In addition, these types of programs are linked to the academic curriculum through lessons and activities that incorporate math, science, and the humanities.³⁸

Another example of a nutrition education program that meets the four criteria outlined above and has been successful at combating childhood overweight and obesity is the School Nutrition Policy Initiative (“SNPI”).³⁹ The SNPI was developed and delivered by The Food Trust, a community-based organization based in Philadelphia and Reading, Pennsylvania, and was funded by the U.S. Department of Agriculture.⁴⁰ The SNPI is comprised of several different components, including nutrition education.⁴¹ The educational component was designed to be both integrative and interdisciplinary, and also included behavior-focused skills such as making solid food choices and understanding food labels.⁴²

³⁴ The Edible Schoolyard: History, <http://www.edibleschoolyard.org/history#1996>, (last visited Feb. 27, 2010).

³⁵ Weinraub, *supra* note 30.

³⁶ *See Id.*

³⁷ The Edible Schoolyard: Mission & Goals, <http://www.edibleschoolyard.org/mission-goals>, (last visited Feb. 27, 2010).

³⁸ *Id.*

³⁹ Foster, *supra* note 23, at e794-95.

⁴⁰ *Id.* at e795.

⁴¹ *Id.*

⁴² *Id.*

Another example of a successful nutrition education program would be the Integrated Nutrition and Physical Activity Program (“INPAP”). INPAP stresses, among other things, food preparation and classroom cooking as vital components of the program, and the lessons from INPAP have been integrated into core subjects such as science and math.⁴³ Studies have show INPAP to be successful at both rural and urban schools.⁴⁴

Based upon this information, it would seem that implementation of a National Policy which required schools to provide a nutrition education that developed behavior-focused skills, was integrated into the mainstream curriculum, enabled students to interact directly with the production and/or preparation of food, and that had methods in place by which it could be evaluated and measured would be an effective tool to combat America’s obesity epidemic. However, questions remain regarding the validity and effectiveness of such a National Policy. First, through what legal process or justification would the federal government be able to mandate that all public schools participate in such a policy, and how would such a program be implemented into a school’s curriculum? Second, how effective would such programs be in combating overweight and obesity, and what type of research has been conducted regarding their effectiveness? Finally, what type of impact would such a program have upon a school’s ability to teach its students in the “core” subjects and meet the requirements of No Child Left Behind? This paper will examine each of these questions before determining whether or not a nationwide policy regarding nutrition education is truly the solution for America’s obesity epidemic.

⁴³ Elaine S. Belansky ET AL., *Adopting and Implementing a Long-Term Nutrition and Physical Activity Curriculum to a rural, Low-Income, Biethnic Community*, 38 J. of Nutrition Educ. Behavior 106, 107 (2006).

⁴⁴ *Id.*

III. ANALYSIS

A. *Legal Process by which an Immersive Nutrition Education Program could be Implemented*

1. National Implementation Policy

Before the potential strengths and weaknesses of Immersive Nutrition Education Programs are discussed in any detail, an analysis of the legal and policy considerations must first be addressed. To put the issue more specifically, what are the existing polices, programs, and/or laws which the federal government could use to justify the creation and utilization of such a program?

The most obvious program that could be used to justify the creation of an Immersive Nutrition Education Program may be the National School Lunch Program (“NSLP”). Devised in 1946 after an investigation into the health of young men showed a correlation between physical deficiencies and childhood malnutrition, the NSLP gives schools cash reimbursements if the school provides nutritious meals to children.⁴⁵ The School Breakfast Program (“SBP”) began in 1966 and works much the same way as the NLSP.⁴⁶

In both programs, the federal government guarantees funding for all participating students.⁴⁷ Funding is determined based upon the income level of the students’ families.⁴⁸ As such, student lunches and breakfasts are divided into three categories: free, reduced price, or full

⁴⁵ Federal Food Programs: National School Lunch Program, http://www.frac.org/html/federal_food_programs/programs/nslp.html, (last visited Feb. 27, 2010). [hereinafter Federal Food Programs].

⁴⁶ The School Lunch/School Breakfast Programs, <http://www.pahunger.org/html/hunger/ref5.pdf>, (last visited Feb. 27, 2010).

⁴⁷ 42 U.S.C. § 1752 (2010); 42 U.S.C. § 1774 (2010); The School Lunch/School Breakfast Programs, *supra* note 46.

⁴⁸ School Lunch Programs, 42 U.S.C. §§ 1753, 1759(a) ; *See* The School Lunch/School Breakfast Programs, *supra* note 46.

price.⁴⁹ Children who are below 130% of the national poverty level are eligible for free meals; children who are above the national poverty level by only 130% to 180% percent are eligible for reduced meals.⁵⁰ Federal and state governments then reimburse local schools for the meals they serve to the children.⁵¹ For instance, during the 2007-08 academic year, if the child received a free lunch, the basic rate of reimbursement to the school was \$2.68.⁵² If the child received a reduced lunch the basic reimbursement rate to the school was \$2.28.⁵³ Also, if the child paid full price for his or her lunch the basic rate of reimbursement to the local school was \$0.25.⁵⁴ Finally, if 60% or more of the students qualified for free or reduced lunch, the school received an extra .02 cents on the above figures.⁵⁵ Likewise, schools were also reimbursed for each child's breakfast they provide, receiving significantly more money if the child's breakfast was free or reduced than if the child paid full price for the meal.⁵⁶

Typically, the NSLP provides much more funding to local school meal programs than do the states.⁵⁷ For instance, during the 2007-08 academic year, Pennsylvania invested \$31 million in school breakfast and lunch programs.⁵⁸ By way of comparison, during the same time period

⁴⁹ The School Lunch/School Breakfast Programs, *supra* note 46

⁵⁰ Federal Food Programs, *supra* note 45.

⁵¹ School Lunch Programs, 42 U.S.C. §§ 1753, 1756-57; 42 U.S.C. § 1774; The School Lunch/School Breakfast Programs, *supra* note 37.

⁵² The School Lunch/School Breakfast Programs, *supra* note 46.

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ 42 U.S.C. § 1753.

⁵⁶ The School Lunch/School Breakfast Programs, *supra* note 46.

⁵⁷ *See Id.*

⁵⁸ *Id.*

Pennsylvania received \$306 million in federal funds for the NSLP and the SBP.⁵⁹ Therefore, the federal funds Pennsylvania schools receive through the NSLP and SBP are a vital component of each school's lunch and breakfast program.

On June 30, 2004, President Bush signed into law the Child Nutrition and WIC Reauthorization Act of 2004.⁶⁰ The 2004 version of the Act, however, did something that its predecessors had not. In particular, the 2004 embodiment of the Act required schools that participated in the NSLP and/or the SBP to enact a wellness policy by the beginning of the 2006-07 academic year that addressed the following: (1) goals for nutrition education; (2) goals for physical activity; (3) nutrition guidelines for all food available at the school; (4) goals for other school-based activities designed to promote student wellness; and (5) plans for evaluating implementation of the policy.⁶¹ Conceivably then, the 2004 version of the Act required schools to be more accountable regarding the health-based education they were providing for their students. If schools failed to have an adequate wellness policy in place, one that provided students with, *inter alia*, education regarding nutrition and school activities that would promote student wellness, then that school would lose the federal funding that was so important to its meal programs. Immersive Nutrition Education Programs would be an effective component of any wellness policy that complied with federal regulations.

Unfortunately, while having wellness policies in place in our nation's schools is a step in the right direction, the nutritional education component in many of these policies is lacking.

According to a report issued by Bridging the Gap, a nationally recognized research group,

⁵⁹ *Id.*

⁶⁰ Federal Food Programs: Local School Wellness Programs, http://www.frac.org/html/federal_food_programs/programs/school_wellness.html (last visited Mar. 1, 2010).

⁶¹ Child Nutrition and WIC Reauthorization Act of 2004, 42 U.S.C. § 1751 (2004).

though 90% of students were enrolled in schools that, at the beginning of the 2007-08 academic school year, included nutritional goals in their wellness policies, there was a great degree of inconsistency in how districts actually addressed nutrition education in their policies.⁶²

According to the report, only about 33% of students were enrolled in a district that had a “strong” nutritional education curriculum in its policy.⁶³ Furthermore, a full third of our nation’s children were enrolled in schools that did not address a nutrition curriculum in its policy.⁶⁴

In addition, at the beginning of the 2007-08 academic year, more than half of our nation’s children were enrolled at schools that did not integrate nutrition education into the core subjects.⁶⁵ This is important because integrating nutrition into core subjects may be a key component in creating healthier kids. Two recent studies at the elementary level found that integrating nutrition education into other subjects was associated with significant shifts in body mass index to a healthy range, better academic achievement, improved nutrition-related behavior (e.g., increased fruit and vegetable intake), and improved nutrition-related knowledge (e.g., food guide pyramid, fat content of different foods).⁶⁶

Finally, the study found that more than 30% of our nation’s students were enrolled in districts whose nutrition education policy deemphasized or was weak in regards to behavior focused skills.⁶⁷ Furthermore, another 25% of our nation’s children were enrolled in schools

⁶² Bridging the Gap, *supra* note 28, at 27.

⁶³ *Id.* at 23.

⁶⁴ *Id.*

⁶⁵ *Id.* at 25.

⁶⁶ *Id.*

⁶⁷ *Id.* at 26.

whose nutrition education policy failed to teach behavior-focused skills.⁶⁸ These skills include those that demonstrate an understanding of things like caloric intake, food groups and the food pyramid, food labels, and an understanding of the food industry's efforts to promote their products to children through the use of targeted advertisements.⁶⁹ Behavior-focused education has been linked to improved nutrition knowledge and lower rates of overweight and obesity—in other words, the very things that would help America combat the obesity plague among its young people.⁷⁰ Hands-on food preparation has also been shown to be an effective teaching method for increasing knowledge related to nutrition at the elementary level.⁷¹ Finally, though empirical evidence is admittedly somewhat limited, studies have also found that nutrition education involving a school garden was linked with increased produce intake and willingness to taste fruits and vegetables among elementary students.⁷²

If tying nutritional education into a school's core curriculum and focusing on teaching behavior-focused skills in the context of a nutritional education are effective ways to change student attitude towards foods, then why are more schools not implementing these strategies? One likely reason is because the federal legislation required that wellness policies include general goals—but not specific requirements.⁷³ Therefore, the plans themselves can be drafted in such a way as to meet the requirements of the Act but not effectuate any tangible change in student nutritional behavior.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.* at 27.

A close look at the relevant section of the law confirms that this is indeed true. According to Section 204 of the Child Nutrition and WIC Reauthorization Act of 2004, a school's wellness policy should "[include] goals for *nutrition education*, physical activity and other school-based activities that are designed to promote student wellness in a manner that the local educational agency determines is appropriate."⁷⁴ Though the language in the section may appear to be effective at first glance, upon closer inspection one finds that it is vague and unenforceable. The school's policy should include "goals" for nutrition education, but there is no real way to measure whether or not a school is effectively implementing policies that will achieve these goals.⁷⁵ Indeed, a statewide assessment of local wellness policies in Pennsylvania public school districts found that districts need assistance in the areas of policy measurement and evaluation.⁷⁶ Furthermore, the goals and activities used to promote student wellness are decided by the local educational agency, resulting in a complete lack of federal oversight in the implementation of these wellness policies.⁷⁷

Because of the obesity epidemic currently plaguing the nation and the failure of a large percentage of schools to initiate steps that would effectively combat it, Congress should require schools to impose tougher standards on the nutrition education component of their wellness policies. Fortunately, this is an opportune time for Congress to act. The current version of the Act, signed into law by President George W. Bush, will expire on September 30, 2010, and

⁷⁴ 42 U.S.C. § 1751 (emphasis added).

⁷⁵ See *Bridging the Gap*, *supra* note 52, at 27.

⁷⁶ V. Fekete, E. McDonnell, L. Schilling & J.E. Weirich, *Statewide Assessment of Local Wellness Policies in Pennsylvania Public School Districts*, 108 J. Amer. Dietetic Ass'n. 1497, 1500 (2008).

⁷⁷ See 42 U.S.C. § 1751.

Congress is working on its reauthorization.⁷⁸ Currently, the U.S. Senate Committee on Agriculture, Nutrition and Forestry has approved a reauthorization of the Act entitled the Healthy, Hunger-Free Kids Act of 2010.⁷⁹ The current version of the Bill would strengthen the oversight powers of the Secretary of Agriculture regarding schools' wellness policies.⁸⁰ For instance, the Bill would allow the Secretary to "promulgate regulations that provide the framework and guidelines for local educational agencies [in] establish[ing] local school wellness [policies]."⁸¹ In addition, the Bill would allow the Secretary to provide assistance in the form of evaluating local school wellness policies and overcoming barriers to the adoption of local school wellness policies.⁸² These types of oversight powers were absent from the 2004 version of the Act and represent, at the very least, the possibility of increased federal oversight regarding school wellness policies.

One potential criticism of a federally mandated tightening of a school district's wellness policy is the traditional notion that there should be strong local and state control over individual school districts, as opposed to federal control. A particularly noteworthy example of this principle would be the outcome the United States Supreme Court reached in *San Antonio Indep. Sch. Dist. v. Rodriguez*.⁸³ In that case, the Court rejected the Plaintiff's claim that the Texas school system's interdistrict disparities in wealth and education programs violated Equal

⁷⁸ School Nutrition Association, 2009 Child Nutrition Reauthorization, <http://www.schoolnutrition.org/Content.aspx?id=2402> (last visited Mar. 7, 2009).

⁷⁹ See United States Senate Committee on Agriculture, Nutrition & Forestry, *Current Legislation*, (2010), <http://ag.senate.gov/site/legislation.html>.

⁸⁰ See Healthy, Hunger-Free Kids Act of 2010, S. 10218, 111th Cong. § 204 (2010).

⁸¹ *Id.*

⁸² *Id.*

⁸³ See, e.g., *San Antonio Indep. Sch. Dist. v. Rodriguez*, 411 U.S. 1, 50-51 (1973).

Protection Clause based largely on the Court’s observation of the importance of local control in educational governance.⁸⁴ However, by requiring schools to strengthen their wellness policies through the auspices of the Child Nutrition and WIC Act, Congress is allowing the states and local school boards to exercise control.⁸⁵ These local agencies can choose whether or not to strengthen their wellness policies in order to continue receiving federal funds under the NLSP. It is a well-established principle that Congress, though it may not be able to compel participation in certain endeavors, may establish conditions upon which an entity must abide in order to receive a distribution of federal funds.⁸⁶

Certain provisions of The No Child Left Behind Act (“NCLB”), passed by Congress in 2001, are based upon this principle of establishing conditions in order to receive funds, and this is the type of formula that Congress should follow when tightening the nutritional education standards for school wellness policies.⁸⁷ Take, for instance, the current state of Title 1 of the Elementary and Secondary Education Act since the passage of NCLB. Though NCLB increased the amount of funds available under Title 1 to \$11.7 billion in 2003 alone, an increase of 33 percent since the passage of NCLB, conditions do apply for a school to be awarded these funds.⁸⁸ One example of this would be if a school finds itself needing “School Improvement”

⁸⁴ *Id.*

⁸⁵ *See* 42 U.S.C. § 1751.

⁸⁶ *See* United States v. American Library Ass’n, 539 U.S. 194, 211-12 (2003) (holding that the Children’s Internet Protection Act did not impose an impermissible condition on public libraries in violation of the First Amendment by requiring libraries, as condition of receipt of federal assistance to provide Internet access, to install software to block obscene or pornographic images); *See also* Rust v. Sullivan, 500 U.S. 17, 194 (1991) (holding that “when the government appropriates public funds to establish a program it is entitled to define the limits of that program”).

⁸⁷ *See* 20 U.S.C. § 6303 (2001).

⁸⁸ U.S. Department of Education, No Child Left Behind: A Parent’s Guide, (2003) (*available at* <http://ed.gov/parents/academic/involve/nclbguide/parentsguide.pdf>).

funds to achieve adequate yearly progress under NCLB.⁸⁹ First, in order to receive the funds the school district must show that it has a large population of low-income students and that the school district is “underachieving” as defined by the NCLB.⁹⁰ Second, once a school district receives these funds, it must use them to implement *specific and measurable* objectives to ensure that its students will become proficient on the state’s academic achievement tests.⁹¹ School districts should similarly be held to specific and measurable conditions when implementing a wellness policy by which they mean to satisfy the requirements necessary to receive federal funds under the NLSP.

A critic of this approach may point out that the funding for NCLB works slightly differently than the funding for the NSLP. Under NCLB, the funds allotted to an under-performing school are directly used to raise that school’s academic performance and satisfy the requirements of NCLB.⁹² Under the approach being advanced in this paper, the funds being received by the school district are not used to improve a school’s wellness policy, but rather are used to reimburse the school for serving healthy meals to students. However, upon closer inspection this distinction between the two funding mechanisms is trivial. First, the policy structure being advanced in this paper has already been in place for the past six years.⁹³ Schools are already required to have a wellness policy in place in order to receive federal funds for their meals programs.⁹⁴ However, the requirements under the Act need to be strengthened so that its

⁸⁹ See 20 U.S.C. § 6303.

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² See 20 U.S.C. § 6303.

⁹³ See 42 U.S.C. § 1751.

ultimate purpose can be met. Second, the NSLP was originally created by Congress “to safeguard the health and well-being of the nation’s children.”⁹⁵ Therefore, strong school wellness policies fall squarely under the purpose of the program. A nation of children who have been educated about nutrition, and are thus able to make informed decisions regarding their caloric intake and daily food choices, is possibly the strongest way in which we can fight off the obesity epidemic in American and safeguard the health of our nation’s children.

A similar approach to that of having the local districts establish their own wellness policies that align to the federal standards would be to have the states create one state-wide wellness policy based on the federal standards. This would be similar to the approach taken by NCLB in which it is the responsibility of each state to demonstrate that it has adopted both challenging academic content standards and challenging student academic standards.⁹⁶ Under this variation, each state would create the wellness policy based on the federal requirements and the local schools would then follow that policy. Again, this is similar to the current state of the academic achievement standards of NCLB; each state creates the test to be used and the school districts teach their students the skills necessary to score either advanced or proficient on the test.⁹⁷

An advantage of this type of state-led approach is that the local districts would more easily be able to follow a policy to ensure they would meet the federal requirements, as opposed to creating their own wellness policy from scratch. Local schools may very well favor this approach. For instance, many states have developed some type of nutrition educational

⁹⁴ *Id.*

⁹⁵ The School Lunch/School Breakfast Programs, *supra* note 46.

⁹⁶ 20 U.S.C. § 6303 (2001).

⁹⁷ *See Id.*

standards which school districts can use a framework for developing their nutrition curriculums.⁹⁸ In these instances, well over 80% of public schools followed these state nutrition education guidelines when creating their curriculums.⁹⁹ In Pennsylvania, 87.2% of school's nutrition education programs align with the state's academic standards.¹⁰⁰

Though this type of approach may be successfully implemented provided there are federal standards, the problem with implementing this type of strategy without federal standards is that many of these state nutrition standards are vague and practically unenforceable. For instance, Pennsylvania's Academic Standards for Health, Safety & Physical Education merely "describes[s] what students should know and be able to do by the end of third, sixth, ninth and twelfth grade."¹⁰¹ The standards themselves fail to contain anything regarding measurement and evaluation of a district's nutrition education.¹⁰² On the positive side, the standards do seem to incorporate nutrition education goals that are behavior-related; however, the goals could be more specific. For example, according to the standards, by the end of the sixth grade a student should be able to "[a]nalyze nutritional concepts that impact health."¹⁰³ These concepts are listed as follows: (1) caloric intake of foods, (2) relationship of food intake and physical activity, (3) nutrient requirements, (4) label reading, (5) healthful food selection.¹⁰⁴ Obviously, many of these concepts relate directly to skills and behaviors, particularly the skills of label reading and

⁹⁸ Bridging the Gap, *supra* note 28, at 23.

⁹⁹ *Id.*

¹⁰⁰ Fekete, *supra* note 76, at 1501.

¹⁰¹ Pennsylvania Department of Education, Academic Standards for Health, Safety and Physical Education, 1 (July 18, 2002) (*available at* <http://www.allentownsd.org/Standards/pdf/PAHealthSafetyPE.pdf>).

¹⁰² *See Id* at 1-19.

¹⁰³ *Id.* at 3.

¹⁰⁴ *Id.*

the behavior of selecting healthful foods. However, the standards fail to incorporate any methods by which a district can measure whether a student actually exhibits any of these skills or behaviors.¹⁰⁵ A school district could meet the current Pennsylvania Standards merely by having students read a worksheet or two a month dealing with nutrition. Conversely, the standards could also be met having the students engage in an Edible Garden program in which the students actually grow their own fruits and vegetables and then prepare their own food. Delegating the responsibility directly to states to create a state-wide wellness policy that is aligned to tougher federal guidelines will ensure that these statewide wellness policies or guidelines will be less vague and capable of being measured and evaluated.

2. Historical Perspective Regarding a National Policy

The current national crisis regarding childhood obesity closely resembles the national crisis in the 1950's and 1960's that existed regarding a lack of exercise and physical fitness in American children. In the years after World War II, many jobs in the nation required less physical labor.¹⁰⁶ In addition, new forms of entertainment emphasized watching instead of doing.¹⁰⁷ This caused many to become concerned about the fitness of U.S. citizens, particularly the young.¹⁰⁸ Today, many Americans share a similar concern regarding the health of American children. A recent nationwide poll released by the University of Michigan found that Americans consider obesity to be the number one problem facing children in the U.S., outranking concerns

¹⁰⁵ *See Id* at 1-19.

¹⁰⁶ John F. Kennedy Presidential Library & Museum, The Federal Government Takes on Physical Fitness, <http://www.jfklibrary.org/Historical+Resources/JFK+in+History/The+Federal+Government+Takes+on+Physical+Fitness.htm> (last visited Mar. 10, 2010).

¹⁰⁷ *Id.*

¹⁰⁸ *Id.*

about drug abuse, smoking and tobacco, teen pregnancy, and internet safety.¹⁰⁹ Furthermore, much like in the 1950's and 1960's when American children became less active, children today often tend to neglect exercise, spending an average of 7.5 hours a day watching TV and movies, using cell phones and computers, and playing video games.¹¹⁰

In the 1960's, President Kennedy's solution was simple: he empowered the Council on Youth Fitness, a vestige of the Eisenhower Presidency that had previously been limited in scope and power, to create a nationwide fitness curriculum and aggressively market this curriculum to the nation's schools, and he declared that fitness—physical fitness---was *very much* the business of the federal government.¹¹¹

President Obama's response to the current obesity epidemic has been very similar to President Kennedy's push to strengthen physical fitness in America's schools, and it should remain so. For starters, President Obama and the First Lady are squarely facing the obesity epidemic, starting a national public awareness campaign entitled "Let's Move" and creating an "Obesity Task Force" all with the goal of solving the problem of childhood obesity within a generation.¹¹² The Obesity Task Force contains members from the USDA, Office of the First Lady, Office of the Interior, Office of Education, and the National Honor Society, among others, and will be responsible for first conducting a review of every single program relating to child nutrition and then developing a national action plan that maximizes federal resources and

¹⁰⁹ Jessica Soulliere, *Obesity Remains No. 1 Health Problem for Kids in 2009*, UNIVERSITY OF MICHIGAN HEALTH SYSTEM NEWSROOM, Aug. 10, 2009, <http://www2.med.umich.edu/prmc/media/newsroom/details.cfm?ID=1247>.

¹¹⁰ United States Department of Agriculture, *First Lady Michelle Obama Launches Let's Move: America's Move to Raise A Healthier Generation of Kids*, Feb. 9, 2010, http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB?contentidonly=true&contentid=2010/02/0058.xml (hereinafter *Let's Move*).

¹¹¹ John F. Kennedy Presidential Library & Museum, *supra* note 106.

¹¹² *Let's Move*, *supra* note 110.

establishes benchmarks toward the goal of eradicating childhood obesity.¹¹³ One of the major purposes of this Task Force should be recommending measures in which our nation's schools can improve their nutrition education programs.¹¹⁴

In addition, one of the major goals of Let's Move and the Administration's response to childhood obesity is the reauthorization of the Child Nutrition and WIC Act.¹¹⁵ The Administration is requesting an additional \$10 billion over ten years to improve the quality of the NSLP, increase the number of kids participating, and ensure schools have the resources to make program changes.¹¹⁶ While the bulk of this money would go toward ensuring that schools supply quality meals to their students, a focus on teaching nutrition education should accompany these changes in the quality of foods being served in schools.

With the current national concern over childhood obesity, the creation of a nationwide Obesity Task Force, and the creation of the Let's Move obesity awareness campaign, now is the perfect opportunity for the Administration to aggressively move to improve nutrition education in our schools. During the 1961-62 academic school year, when the Counsel of Youth Fitness engaged in a sweeping drive to get the nation's schools to participate in a nationwide fitness curriculum, 50% more of American children passed a physical fitness test than had done so a year earlier.¹¹⁷ Now is the time to fuel that same type of passion into a nationwide movement to

¹¹³ The White House: Office of the Press Secretary, *Presidential Memorandum—Establishing a Task Force on Childhood Obesity*, Feb. 9, 2010, <http://www.whitehouse.gov/the-press-office/presidential-memorandum-establishing-a-task-force-childhood-obesity>.

¹¹⁴ Let's Move, *supra* note 110.

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ John F. Kennedy Presidential Library & Museum, *supra* note 106.

reduce obesity by ensuring that all kids have access to a quality nutrition education program in their schools.

B. Effectiveness of Immersive Nutrition Education Programs at Combating Obesity

Of course, before the country begins a nation-wide nutrition program, it makes sense to scrutinize the program. When reviewing the effectiveness of nutrition education in equipping students with the skills and knowledge to combat obesity, this paper will begin with the most immersive of these programs, the Edible Schoolyards and other garden based school activities. Research does suggest that these types of programs do provide students with certain skills in avoiding overweight and obesity; in particular students in these programs displayed a heightened willingness to eat fruits and vegetables, though researchers warn that the research is still in the preliminary stages.¹¹⁸ Therefore, while current results are promising, researchers have concluded that further studies need to be done to investigate the full impact of garden-based nutrition education programs have on the dietary outcomes among students.¹¹⁹

Though more research needs to be undertaken, several reports examining the impact of garden-based programs on student's nutrition skills have already been completed and will be briefly summarized. One particularly interesting research project evaluated the impact of a twelve week in-school intervention on fruits and vegetables among sixth-grade students in three southeast Idaho elementary schools.¹²⁰ What made the research so interesting was the type of nutrition education each school received and the ultimate results. One school, the "control

¹¹⁸ Stephanie Heim ET AL., *Impact of Garden-Based Youth Nutrition Intervention Programs: A Review*, J. AMERICAN DIETETIC ASS'N. 273, 273 (2009).

¹¹⁹ *Id.*

¹²⁰ *Id.* at 276.

group,” received no nutrition education during the twelve week period.¹²¹ Students at the second school received a nutrition education alone, with no garden related activities.¹²² Students at the third school received an immersive nutrition education that was also combined with food preparation and gardening activities, including weeding, watering, and harvesting several types of fall crops.¹²³ The ultimate results from this study suggest that students from this third group benefitted at a much higher level than students from the other two schools. Students from the third school increased significantly their daily intake of fruits and vegetables, from 1.9 at the onset of the program, to 4.5 servings daily by the conclusion of the program.¹²⁴ By way of comparison, students who only received the nutrition education without any hands-on or garden related activities, made only a negligible improvement, from 2.1 to 2.2 servings daily.¹²⁵ Finally, the students in the control school actually regressed in their daily intake of fruits and vegetables, going from 2.4 at the beginning of the program, to 2.0 at its conclusion.¹²⁶

A similar study also found that students who were exposed to a garden-based nutrition education continued to prefer eating certain types of vegetables than both students who received no nutrition education and students who received a nutrition education but without the gardening aspect. To conduct the study, three California elementary schools were divided into the three different categories as described in the preceding sentence.¹²⁷ The program ran for 17 weeks,

¹²¹ *Id.*

¹²² *Id.*

¹²³ *Id.*

¹²⁴ *Id.*

¹²⁵ *Id.*

¹²⁶ *Id.*

and upon its completion students from all three schools were asked to complete a questionnaire as well as a vegetable preference survey.¹²⁸ Results taken immediately after the program showed that students at both the school that offered the nutrition education program and the school that offered the garden-based nutrition education preferred carrots and broccoli at a much higher percentage than did the students who received no nutrition education.¹²⁹ However, students who were exposed to the garden-based nutrition education showed a significantly higher rate of preference for snow peas and zucchini than did students from the students who received no nutrition education and the students who received a nutrition education without any garden-based activities.¹³⁰ In addition, the preference spike for carrots and broccoli for students in the regular nutrition education program dropped significantly after six months.¹³¹ However, students who were exposed to the garden-based nutrition education program retained this significantly higher rate of preference after six months for broccoli, snow peas, and zucchini.¹³²

Several other studies involving garden-based nutrition education have also yielded similar promising results. One study conducted at two California elementary schools found that students who had participated in a garden-based nutrition education program were more willing than students who receive no nutrition education at all to taste spinach, carrots, peas, broccoli, zucchini, and red bell pepper.¹³³ Another study conducted in five Texas elementary schools

¹²⁷ Jennifer L. Morris, Sheri Zidenberg-Cherr, *Garden-Enhanced Nutrition Curriculum Improves Fourth-Grade School Children's Knowledge of Nutrition and Preference for Some Vegetables*, 102 J. AMERICAN DIETETIC ASS'N. 91, 91 (2002).

¹²⁸ *Id.* at 91-92.

¹²⁹ *Id.* at 93.

¹³⁰ *Id.*

¹³¹ *Id.*

¹³² *Id.*

found that students who had engaged in a garden-based and food preparation nutrition education program showed improvements in vegetable preferences and preferences for fruits and vegetables over another snack item.¹³⁴

Teachers working at schools in which there was a garden-based nutrition education program in place had predominantly positive views regarding its impact on nutrition-related behavior in their students.¹³⁵ Respondents to a questionnaire delivered to fourth grade teachers in California who taught at schools containing a garden-based program generally thought it to be somewhat effective to very effective in promoting healthy eating habits, one commenting that the “garden has provided children the experience of fresh veggies versus fast food, which has made a huge difference in diet, nutrition education, and pride in growing food.”¹³⁶ Furthermore, 47% of responding teachers actively used the garden to teach nutrition related skills and behavior.¹³⁷

Based upon these results, one can be reasonably optimistic that a garden-based nutrition education program would have positive effects in helping children to engage in healthy eating habits. However, more research is needed to examine the full range of benefits a garden-based nutrition education will impart upon students.

Other types of Immersive Nutrition Education Programs which do not involve a garden have also been studied. One such program is the Integrated Nutrition and Activity Program (“INPAP”). INPAP is actually the school component of a larger program entitled PACT

¹³³ Jennifer L. Morris ET AL., *First Grade Gardeners More Likely to Taste Vegetables*, CALI. AGRICULTURE 43, 43-47 (2001).

¹³⁴ S. Lineberger & J. Zajicek, *School Gardens: Can A Hands-on Teaching Tool Affect Students’ Attitudes and Behaviors Regarding Fruit and Vegetables?*, 10 HORTTECHNOLOGY 593, 593-97 (2000).

¹³⁵ Heather Graham & Sheri Zidenberg-Cherr, *California Teachers Perceive School Gardens as an Effective Nutritional Tool to Promote Healthful Eating Habits*, 105 J. American Dietetic Ass’n. 1797, 1797-1800 (2005).

¹³⁶ *Id.* at 1798.

¹³⁷ *Id.*

(Parents, Advisors, Children Together).¹³⁸ As previously mentioned, INPAP stresses food preparation and classroom cooking as a vital component of the program, and the lessons from INPAP have been integrated into core subjects such as science and math.¹³⁹ The INPAP was adapted from a successful Integrated Nutrition Education Program that was run in Denver area schools.¹⁴⁰ However, INPAP was modified for a rural, biethnic, and low-income county in Colorado.¹⁴¹ Another important aspect of the INPAP program was that local teachers had a great deal of input into its implementation.¹⁴² This resulted in more localized lessons regarding nutrition. For example, locally grown vegetables such as carrots, mushrooms, and five varieties of potatoes were used in many of the lessons. In addition, students prepared local dishes such as a calabacitas, a Mexican dish made with baby pumpkins, when participating in the lessons.¹⁴³ The program lasted for two years, during which the students were exposed to a total fifty-six lessons on nutrition, twenty-eight lessons while they were in second grade, and twenty-eight lessons while they were in third grade.¹⁴⁴

At the end of each year, the students were asked to complete a forty question survey which was designed, among other things, to measure how much they had learned in regards to nutrition.¹⁴⁵ The results were encouraging. After completing the second grade, children

¹³⁸ Belanksy, *supra* note 43, at 107.

¹³⁹ *Id.*

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

¹⁴² *Id.*

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ *Id.* at 109.

significantly improved in their ability to eat healthy food and self-efficacy for food preparation and eating.¹⁴⁶ After receiving the INPAP nutrition education for two years, students showed further increases in these skills.¹⁴⁷ In addition, students were able to retain these skills even as fourth-graders as they exhibited significantly higher levels of nutrition knowledge on the food guide pyramids and fat in foods compared to students who had not been involved in the study.¹⁴⁸ Therefore, based upon these findings, it appears that the INPAP program was successful in creating healthy eaters.

Finally, research was conducted on the School Nutrition Policy Initiative (“SNPI”), which is interactive and integrates nutrition education lessons into other subject areas. As noted previously, the nutrition education program of the SNPI included behavior-focused skills such as making solid food choices and understanding food labels.¹⁴⁹ The purpose of the program was to show how food choices are tied to personal behavior, individual health, and the environment.¹⁵⁰ The study was conducted in ten schools located in Philadelphia and lasted two years, and the grades represented by the students in the study ranged from fourth grade to sixth grade.¹⁵¹

The main point of difference between this study and the previous ones was that this study eschewed surveys and questionnaires and directly measured the incidences of overweight and obesity in children who were exposed to the program and compared these results against students

¹⁴⁶ *Id.* at 110.

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ Foster, *supra* note 23, at e795.

¹⁵⁰ *Id.*

¹⁵¹ *Id.* at e794.

from the control schools.¹⁵² Using these results as a measurement, the program appears to have been an unmitigated success. After two years, the unadjusted prevalence of overweight had decreased by 10.3% in the schools where students had been exposed to the program.¹⁵³ In the control schools, the unadjusted prevalence of overweight had increased by a whopping 25.9%.¹⁵⁴ Furthermore, after controlling for qualities such as gender, race, ethnicity and baseline prevalence, the predicted odds of overweight prevalence were 35% lower for the students who had been exposed to the program.¹⁵⁵ African-American students who participated in the program were 41% less likely to be overweight than African-American students in the control schools.¹⁵⁶ Thus, based on the results of this study, a strong case can be made that the program was instrumental in reducing the prevalence of overweight and obesity among students.

Taken as a whole, the accumulated data supports the conclusion that nutrition education programs that develop behavior-focused skills, provide students with an opportunity to grow and/or prepare their own food, and are integrated into the core classes are an effective way in which to equip students with the skills to combat overweight and obesity. The research shows that students who have participated in these types of Immersive Nutrition Education Programs are more likely to prefer vegetables than their control group counterparts. Furthermore, students who participate in one of these more immersive programs are more likely than students who participated in a more traditional nutrition education program to retain their preferences for vegetables months after the program. In addition, students who have participated in one of these

¹⁵² *Id.*

¹⁵³ *Id.* at e798.

¹⁵⁴ *Id.*

¹⁵⁵ *Id.*

¹⁵⁶ *Id.*

Immersive Nutrition Education Programs improved in their ability to eat healthy foods and their self-efficacy for food preparation. Finally, students who participate in one of these Immersive Nutrition Education Programs are more likely to avoid becoming overweight or obese than other students.

However, despite all these positive findings, there still are questions to be answered. First, despite the fact that Edible Gardens and other types of Immersive Nutrition Education Programs seem to be effective at encouraging students to eat more fruits and vegetables, there is still an overall lack of scientific research regarding their ultimate effectiveness. In addition, more long term research should be conducted to determine if students retain these skills years after they have been involved in the program. Despite these questions, however, the current research does suggest that these Immersive Nutrition Education Programs can be effective at combating the obesity epidemic currently plaguing the nation.

C. Impact of an Immersive Nutrition Education Program on a School's Ability to Teach to the "Core" Subjects and the No Child Left Behind Requirements

In an article entitled *Cultivating Failure*, author Caitlin Flanagan offered several criticisms of the Edible Schoolyard program, the most meritorious being the possible negative impact an Edible Schoolyard may have on students' ability to perform well on the state achievement test.¹⁵⁷ Though the evidence Ms. Flanagan gives in support of this is anecdotal,¹⁵⁸ the concern is a very plausible one and needs to be examined. Furthermore, the same criticisms applied to Edible Gardens can also be applied to the other nutrition education programs described in this paper because of their significant degree of immersion. Research does suggest,

¹⁵⁷ See Kaitlin Flanagan, *Cultivating Failure*, THE ATLANTIC, Jan. 2010, <http://www.theatlantic.com/magazine/archive/2010/01/cultivating-failure/7819/>.

¹⁵⁸ See *Id* (the author cites as evidence the fact that students at one school with a garden-based curriculum performed worse on the California assessments tests than did students at a school without a garden-based curriculum).

however, that the use of garden-based education programs are often used to teach student about other academic areas, often more effectively than in a more traditional learning environment.¹⁵⁹

In addition, Immersive Nutrition Education Programs, whether or not they are garden-based, can be successful at boosting students' academic achievement, though, for this to occur, the programs need to be successfully implemented.¹⁶⁰

Research suggests that both principals and educators consider an Immersive Nutrition Education Program to have positive results for their students' academic achievements, and are using these programs to achieve this goal. A survey completed by principals based in California confirmed the fact that the majority of gardens are used for the "enhancement of academic instruction."¹⁶¹ The survey was distributed to all principals in California, regardless of whether their school had a garden program, and a 43% response rate was achieved.¹⁶² Of those principals that responded, 85% stated that the garden was used for academic instruction.¹⁶³ Science, Nutrition, and Agriculture-Related Studies were the subjects primarily taught through the use of gardens, regardless of grade level.¹⁶⁴ Furthermore, the majority of principals (69%) believed the program to be moderately effective to very effective at enhancing science skills.¹⁶⁵ In addition, 53% of teachers believed that a garden-based program was somewhat effective to very effective

¹⁵⁹ Deborah Lane Beall ET AL., *Use of School Gardens in Academic Instruction*, 37 J. Nutrition Educ. Behav. 147, 147 (2005).

¹⁶⁰ See C.D Klemmer ET AL., *Growing Minds: The Effect of a School Gardening Program on the Science Achievement of Elementary Students*, 15 HortTechnology 448, 449 (2005); David Foulk & Samuel A. Spiegel, *Reducing Overweight through a Multidisciplinary School-based Intervention*, 14 Obesity, 86, 95 (2006).

¹⁶¹ Beall, *supra* note 159, at 147.

¹⁶² *Id.*

¹⁶³ *Id.* at 148.

¹⁶⁴ *Id.*

¹⁶⁵ *Id.*

at teaching students science, while only 5% of teachers thought the garden was not effective in this regard.¹⁶⁶ Thus, the perception among educators seems to be that garden-based programs are effective at teaching students science-related skills.

Studies seem to agree with educators' positive perceptions of these types of programs. Substantial evidence exists that students learn about science more effectively and engage in higher levels of critical thinking if they engage with the material in an interactive environment, and this bodes well for both garden-based education programs and other immersive-based nutrition education programs.¹⁶⁷ One such study involved students from second through fourth grade involved in an on-campus nature program in Santa Fe, New Mexico.¹⁶⁸ The students participated in the hands-on study of such things as insects, weather, soil, and water.¹⁶⁹ Activities included such things as a soil texture exercise, an insect scavenger hunt, an exercise labeling insect anatomy, and an exercise on the force of water.¹⁷⁰ Surveys were completed by the students at the end of the project and the results indicated that students could synthesize and evaluate different math and science-related concepts—skills that represented a high level of critical thinking.¹⁷¹ Other studies have found similar results when students learn curriculum through the aid of an outdoor-based or interactive environment rather than through traditional teaching methods.¹⁷²

¹⁶⁶ Graham, *supra* note 135, at 1798.

¹⁶⁷ P. Logan, *Exploring the Impact of Outdoor Environmental Activities on Children Using a Qualitative Text Data Analysis System*, 13 HortTechnology 684, 684 (2003).

¹⁶⁸ *Id.*

¹⁶⁹ *Id.* at 685.

¹⁷⁰ *Id.*

¹⁷¹ *Id.* at 685-86.

Applying this general principal to the context of a garden-based education, there is evidence that these types of programs can enhance the science achievements of elementary students.¹⁷³ A study done on students from seven elementary schools in Texas found that students who are taught science through a garden-based program perform at a statistically significant higher level on a science achievement test than students who learned the same science material through a traditional method.¹⁷⁴ In addition, other research suggests garden-based education may lead to improved academic achievement in the sciences.¹⁷⁵

Evidence also exists to support the fact that garden-based programs and other immersive types of nutrition education can have a positive effect on students' academic achievement, though they may be under-utilized in other academic areas besides science. For instance, 46% of teachers who worked in schools with a garden-based program thought it was somewhat effective to very effective at helping to teach students the language arts curriculum, double the amount of teachers who thought a garden-based program was only slightly effective or not effective.¹⁷⁶ However, a troubling statistic from the study is that 32% of these teachers had no opinion on whether a garden-based program would be effective in helping to teach students to learn language arts, a finding that becomes even more perplexing when one considers that, because of

¹⁷² See e.g., LINDA L. HOODY & GERALD A. LIEBERMAN, STATE EDUCATION AND ENVIRONMENT ROUNDTABLE, CLOSING THE ACHIEVEMENT GAP: USING THE INTERNET AS AN INTEGRATING CONTEXT FOR LEARNING (1998), <http://www.seer.org/pages/research/execsum.htm>; NATIONAL ENVIRONMENTAL EDUCATION & TRAINING FOUNDATION, ENVIRONMENT-BASED EDUCATION: CREATING HIGH PERFORMANCE SCHOOLS AND STUDENTS (2000), <http://www.seer.org/pages/research/NEETFEBE2000.pdf>; STATE EDUCATION AND ENVIRONMENTAL ROUNDTABLE, THE EFFECTS OF ENVIRONMENT-BASED EDUCATION ON STUDENT ACHIEVEMENT (2005), <http://www.seer.org/pages/research/CSAPII2005.pdf>.

¹⁷³ Klemmer, *supra* note 160, at 451-52.

¹⁷⁴ *Id.*

¹⁷⁵ C. Motsenbocker & L. Smith, *Impact o Hands-On Science through School Gardening in Louisiana Public Elementary Schools*, 15 HortTechnology 439-443 (2005).

¹⁷⁶ See Graham, *supra* note 135, at 1798.

the interdisciplinary nature of such programs, they can provide instruction and practice in many of the reading and writing skill sets assessed by state tests.¹⁷⁷

There are a couple reasons why teachers may be reluctant to fully utilize these programs, both in the context of nutrition education and the rest of the curriculum: a lack of teacher training and curriculum-related materials. For all of the successful results listed in the above studies, teachers received healthy dosages of training, whether or not the nutrition education program was garden-based, before the school actually implemented it.¹⁷⁸ For example, in both the SNPI and the INPAP programs discussed above, significant time and resources were spent in teacher training and preparation.¹⁷⁹ The need for effective teacher training was further reflected by the California principal's responses to a statewide survey regarding garden-based programs.¹⁸⁰ Seventy percent of principals indicated that teachers' lack of interest, knowledge, and experience was a barrier against using gardens to teach academic instruction.¹⁸¹ Teachers themselves strongly agreed with this assessment, as a majority of those who responded to survey on garden-based instruction said that teacher training for the garden would assist in it being used for academic instruction.¹⁸²

In addition, both teachers and principals who teach in schools that use a garden-based program feel that more materials linking the program to curriculum standards would be helpful. Sixty percent of principals who responded to the survey strongly agreed that resources such as

¹⁷⁷ *Id.*; David Foulk & Steven Spiegel, *Reducing Overweight through a Multidisciplinary School-based Intervention*, 14 *Obesity* 88, 95 (2006).

¹⁷⁸ See Klemmer, *supra* note 160, at 449

¹⁷⁹ Belanksy, *supra* note 43, at 107; Foster, *supra* note 23, at e795.

¹⁸⁰ Beall, *supra* note 159, at 149.

¹⁸¹ *Id.*

¹⁸² Graham, *supra* note 135, at 1799.

curriculum materials linked to academic instruction would be helpful in using the school garden for academic instruction.¹⁸³ Teachers also strongly agree that resources connecting garden activities to the curriculum would assist them in using it for academic instruction.¹⁸⁴ Therefore, if Immersive Nutrition Education Programs are going to be implemented in such a way as to improve student performance in the core curriculum, it is imperative that teacher training and curriculum linking these programs to the core curriculum and state standards be provided.

The good news concerning this is that lesson plans for both nutrition education and other curriculum can be created and easily circulated. For instance, Agriculture in the Classroom, a grassroots program coordinated by the U.S. Department of Agriculture, has links to numerous different sites that will provide lesson plans and aid to classroom teachers.¹⁸⁵ The Pennsylvania branch of the program has a “Mobile Ag Lab,” a 32 ft. trailer complete with 12 work stations and lessons that are aligned to the Pennsylvania Science Standards and endorsed by the PA Department of Education.¹⁸⁶ If lesson plans that are aligned to the state standards can be created for the “Ag Lab,” they can surely be created for Immersive Nutrition Education Programs that may incorporate some of the same materials. Furthermore, Project PA, a collaboration between Pennsylvania State University’s Department of Nutritional Sciences and PA Department of Education, have already published a list of sites for implementing a nutrition education, some of which are already interactive and develop reading skills.¹⁸⁷ Lesson plans and other curriculum

¹⁸³ See Beall, *supra* note 159, at 149.

¹⁸⁴ Graham, *supra* note 135, at 1799.

¹⁸⁵ About Agriculture in the Classroom, <http://www.agclassroom.org/aitc/index.htm> (last visited Mar. 14, 2009).

¹⁸⁶ Pennsylvania Farm Bureau, *Mobile Ag Lab*, <http://www.pfb.com/programs/mobile-ag-lab/index.htm> (last visited Mar. 14, 2009).

related materials can also be created whether on the local, state, or national level and distributed to teachers as part of a training regiment.

IV. CONCLUSION

Immersive Nutrition Education Programs, whether garden-based or not, can be extremely effective at providing students with the skills and knowledge necessary to combat the obesity epidemic currently plaguing our country, provided that teacher training and curriculum materials are provided. Because the Child Nutrition and WIC Reauthorization Act is currently due for renewal, now is the opportune time to strengthen the way we teach children in this country about nutrition. By requiring schools to offer an immersive nutrition education program that develops behavior-focused skills such as requiring their students to demonstrate an understanding of concepts like caloric intake, food labels, and an understanding of the way in which companies (especially including fast food chains) market food to them; provides students with the opportunity to grow and/or prepare their own food; and integrates the nutrition education into core subjects such as language arts, science, and social studies, Congress can make a strong push to ending the obesity crisis that threatens our country's youth.

¹⁸⁷ PROJECT PA, YOUR SCHOOL WELLNESS POLICY: WHAT YOU NEED TO KNOW (2008), www.portal.state.pa.us/portal/server.pt?open=18&objID=357261...2