This Isn't Just a School Garden: A Preliminary Evaluation

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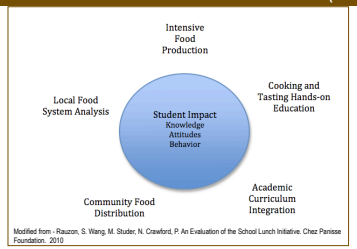
ABSTRACT

An evaluation was performed on an innovative, multi-component urban agriculture program for high school aged adolescents in Richmond, California. The Urban Agriculture Institutes (UAI) are a comprehensive program featuring intensive food production, distribution of grown produce into the community, hands-on tasting and cooking, food system classroom lessons, and local food system analysis. While the program was designed to change students' relationship with food and generate empowerment through food production, the goal of the program evaluation was to determine the effect of the exposure to the Urban Agriculture Institute on students': a) knowledge about nutrition and food, (b) attitudes about food, the environment and healthy eating, and (c) eating behaviors. Students in the program showed an increase in fruit and vegetable consumption from 3.9-5.2 servings *(p<.70)*, a fruit and vegetable variety measure increase from 13.6 to 14.9 (95%CI -6.49 to 3.9) *(p<.51)* representing the number of different types of fruits and vegetables eaten over the preceding two weeks. Students also showed a decrease of .61 servings of sugar-sweetened beverages and an increase of 15% and 23% respectively in students who read nutritional labels and think about the origin of foods before they eat. Only one measure resulted in statistical significance – the proportion of students compared to controls that reported drinking zero or one sugar-sweetened beverages per day. *(p<.01)*

PROGRAM: URBAN AGRICULTURE INSTITUTES (UAI)



The Urban Agriculture Institutes (UAI) were developed by Urban Tilth, a Richmond, California non-profit. The institute is a multi-component, food-production-focused, intervention in a high school in Richmond. A "multi-component" program means that students are growing significant amounts of produce, serving their community through the distribution of the produce in an applicable business model, periodically cooking with that food, taking some of it home, and learning about the food system, in which they are now actors and stakeholders.

Program objectives included: increasing healthy food habits, cultivating leadership, job skills training and teen empowerment through food production.

The study measured: fruit and vegetable consumption, dietary attitudes, habits and behaviors of a thirteen-student cohort who participated in a 16-week program and a twenty-student control cohort.

FIGURE 1: CONCEPTUAL MODEL – PROGRAM EVALUATION

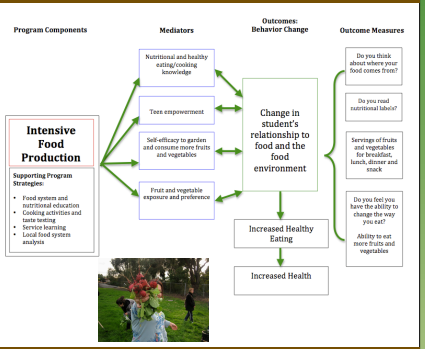
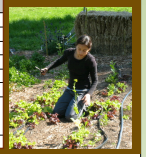


TABLE 1: DEMOGRAPHIC DATA

	Program (n=13)	Control (n=20)
Grade		
9th Grade	0	45% (9)
10th Grade	15% (2)	0
11th Grade	38% (5)	55% (11)
12th Grade	46% (6)	0
Gender		
Male	61.5% (8)	65% (13)
Female	38.5% (5)	35% (7)
Ethnicity		
Latino	84.6% (11)	90% (18)
African-American	7.8% (1)(1)	5% (1)(1)
Asian	0	0
White	0	5% (1)(1)
Other	7.8% (1)	0
Fruit and Vegetable Consumption		
Baseline Consumption	3.84 servings	5 servings
Free or Reduced Lunch at School**		
Yes	77%	95%
No	23% (3)	5% (1)
Family Members with Diabetes		
Zero	23% (3)	35% (7)
One	38% (5)	20% (4)
Two	8% (1)	15% (3)
Three	23% (3)	10% (2)
Four	8% (1)	5% (1)
More than four	0	15% (3)

* Program Participants enrolled in a 16-week semester food production course titled "Urban Agriculture and Food Systems." The control group did not participate in the program.
** Free and reduced lunch is part of of the National Lunch Program where students who meet low income eligibility requirements receive a free or reduced price breakfast and lunch.



Methods

Design - Quasi-experimental with intervention/control pre/post design. Four-month intervention with baseline and post measures for control and intervention students. 13 intervention students and 20 controls.

TABLE 2: EATING BEHAVIORS

	Baseline	Post-Survey	Change	*p-value*
Proportion Meeting "Healthy People 2010" Recommendations (Servings of 5 fruits and vegetables per day)				
Urban Agriculture Institutes	38%	46%	12%	*P<.71*
Control Group	45%	60%	15%	
Vegetable Preference and Variety (Number of different vegetable items eaten in last two weeks)				
Urban Agriculture Institutes	13.6	14.9	1.3 *95% CI (-6.49 to 3.90)*	*P<.70*
Control Group	14.9	15.2	*.3 95% CI (-5.1 to 4.5)*	
Total Fruit and Vegetable Consumption (including snack)				
Urban Agriculture Institutes	3.9 servings	5.2 servings	1.4 servings	*P<.46*
Control Group	5 servings	5.45 servings	.45 servings	
Sugary Beverage Consumption (Proportion consuming one or zero SSB's per day)				
Urban Agriculture Institutes	53.9%	92%	+38%	*P<.01*
Control Group	36.8%	31.6%	- 5.2%	
Fast Food Consumption Frequency (Times Visited Per Week)				
Urban Agriculture Institutes	1.78	1.62	.16	*P<.68*
Control Group	1.44	1.16	.28	

INTERVIEW WITH ANA ARAUJO

What do you think were the best parts of the Urban Agriculture Institute?

In general, well, I really like the harvest day when we collected the food and we put it in boxes and weighed it. And I really like planting and like taking care of the garden in general. I've always liked that kind of stuff.

Why do you like that stuff?

It seems fun, putting plants, seeing them grow. You did that. You planted that. You saw it grow, you gave it water. You watched it grow. You did something for the community. And like, it felt good.

Has your family changed anything about the way they eat?

Yeah, it has. I've told my dad and my brother and my mom, look, let's do this, let's eat at home. It's cheaper, its easier, we could always eat the leftovers and my dad agrees to it. My great grandpa died because of diabetes, my grandma has diabetes on my mom's side. And my grandpa, just recently died on my dad's side, he had diabetes. So, it's on both sides, so I'm really worried about that. I got myself checked over the summer. I don't have diabetes, but I'm watching out, what I eat and stuff, because it could happen to me.

TABLE 3: Food Attitudes

	Baseline	Post-Survey	Change	*p-value*
"When I buy a packaged product in the supermarket, I (sometimes or always) read the nutritional labels."				
Urban Agriculture Institutes	31%	46%	15% 95%CI (-26% to 57%)	*P<.35*
Control Group	32%	26%	-6% 95%CI(-31% to 20%)	
"When I buy food in the supermarket, I (sometimes or always) think about where it came from (what country or what part of the U.S.)"				
Urban Agriculture Institutes	38%	62%	24% 95%CI(-3.4% to 49.5%)	*P<.25*
Control Group	26%	32%	6% 95%CI(-14.2% to 24.7%)	
Self Efficacy - "I can change the things I eat"				
Urban Agriculture Institutes	87%	93%	5%	NS
Control Group	92%	92%	NC	
Teen Empowerment: "The community values what teens are doing with their time."				
Urban Agriculture Institutes	41%	33%	8%	*P<.75*
Control Group	38%	22%	17%	

DISCUSSION

How does teen empowerment play a role in the formation of attitudes and behaviors related to healthy eating?

The present industrial food system allows people make consumer choices without understanding where, how, or with what their food is made. Thoughtless consumption is a pattern encouraged and developed by our current food system. This program accomplished levels of understanding that can create empowerment Students involved in this program developed new levels of understanding which empowered them to become actors in the food system. Through hands-on food production, students learned how food is grown. Some students did not even know that lemons were fruits, others did not understand that produce like beans and peas came from the flowers of a plant. This understanding alone could change students' viewpoint on food, but the program also placed our present industrialized food system within the context of agriculture throughout the history of humankind and laid out for the students how food is produced, processed, packaged and brought to us. The adolescents in this program were exposed to a lot of information from which to become more conscious decision-makers in the food system.

STRENGTHS & LIMITATIONS

Strengths: This study expands the limited size of the peer-reviewed literature on school gardens and nutrition interventions where school-gardens are involved. It introduces food-production gardens as a distinct category, separate from the common school-gardens that are present in many elementary schools. This separation allows them to be thought of in a different way, to study their challenges as an independent program within schools and to study their impact on students. Studies should begin looking at the number of growing programs for high school age adolescents. Because older adolescents have different abilities with respect to growing food in a garden, including physical strength, ability to process information and take directions. Their level of empowerment may differ, which, because of more autonomous relationship with the food system may create different types of changes than with a younger child, who's eating decisions are largely controlled.

Limitations - *Small Sample:* The limitations of this study are clear; samples sizes did not allow for a statistically significant relationship to be observed in many measures. This limitation is being addressed because each new cohort will increase the sample size that has engaged in the program. The 2010-2011 cohort (yet to be completed) has, in effect, tripled the sample size of program participants.

CONCLUSIONS

There is a growing trend in schools to reconnect youth with food. Governments, schools and non-profits are experimenting with a wide range of methods, from improved school food and school gardens to farm to school programs, nutrition education, and/or structural changes to the school food environment. Many programs are coalescing around certain themes including: students growing food, cooking with food, serving more healthy options and receiving classroom instruction on issues related to the food environment. These innovative programs remain a growing, but, mostly unevaluated area of study. This study, while too small in sample size to demonstrate significance should encourage more evaluation of these programs in schools across the United States.