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Development of the FoodCorps Healthy School Progress Report Tool to Measure School Food Programming and Environment

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Why: Many schools have food-related programming. Yet, there is not a valid tool to assess quality and quantity of programming.

Design and Methods: This five phase instrument development process created the FoodCorps Healthy School Progress Report (Progress Report) so that it was based in social cognitive theory, evidence-informed, sensitive to change, and established expert, face, construct, and predictive validity.

Results: The final Progress Report is evidence-informed and valid for a broad range of school programming including nutrition education, school gardens, healthy school food, & a culture of health.

Conclusion: The Progress Report is reflective of FoodCorps programming and can also be used by other organizations who conduct similar food-related programming in schools.

Why the Progress Report was needed

There is increasing interest in the connection between health and learning,[1] making schools a natural place to provide programming to change eating behaviors.[2,3] The Whole School, Whole Community, Whole Child Model (WSCC)[4, 4.5] suggests that schools should provide "opportunities to learn about and practice healthy eating through available foods and beverages, nutrition education, and messages about food in the cafeteria and throughout the school campus."[5] To achieve this, many schools teach nutrition education in the classroom, conduct cooking classes, build school gardens, improve school meals, serve local food when possible, and create a school environment where healthy foods are the norm. [5-8] Research has found strong evidence that the combination of high quality nutrition education with a healthy school food environment leads to higher success in changing eating behavior.[9-10]

FoodCorps is an Ameri-Corps service program that connects kids to healthy food in schools. FoodCorps had a tool to assess their school-based programming, called the Landscape Assessment Tool, which needed updating to be theory-based (See Figure 1), literature informed, and more comprehensive.

The purpose of this study was to develop and validate a new tool, the FoodCorps Healthy School Progress Report (Progress Report) for assessing school-based programming and environment.

Figure 1.
Healthy School Progress Report Theoretical Framing

Healthy School Progress Report Grounding in Social Cognitive Theory

Social cognitive theory addresses three factors: personal, behavioral, and environmental that influence behavior change. Below describes how these factors are incorporated into the Progress Report.

Personal: attitudes and beliefs about the behavior (eating fruits and vegetables at school lunch)

The Hands-on Learning section of the Progress Report addresses the "personal" social cognitive theory constructs:

- **Outcome expectations** – believing benefits will come from a healthy behavior.
  Examples from the lesson activities and best practices list include discussing benefits, building social norms, and decreasing fears of trying new foods. Visits from farmers, chefs, and local heroes as well as field trips to farms or farmers markets can also increase positive outcome expectations.
- **Self-efficacy** – confidence in ones ability to do healthy behaviors.
  Examples from the lesson activities and best practices include sending home recipes for students to make at home and building cultural appreciation.
- **Barriers** – understanding obstacles that may make it hard to change behavior and have strategies for how to overcome them.
  Examples from the lesson activities and best practices include focusing on how to build equity in access and tastings that build preferences (not liking something is an obstacle to overcome).
- **Goal intention** – build awareness or intention to do healthy behaviors.
  Example from the lesson activities and best practices include promoting fruits and vegetables in school lunch, or using MyPlate to encourage making half the plate fruits and vegetables.

Behavioral: confidence and skills to perform the behavior (eating fruits and vegetables at school lunch)

The Hands-on Learning section of the Progress Report also addresses some of the "behavioral" social cognitive theory constructs:

- **Self-regulation processes** – ability to make an action plan to do the behavior and monitor progress on that plan.
  Examples from the lesson activities and best practices are setting personal goals for eating more fruits and vegetables and monitoring progress on those goals.
- **Food and nutrition skills** – information about food, nutrition, cooking, gardening, etc that can help students do healthy behaviors.
  Examples from the from the lesson activities and best practices include comparing ingredients to choose healthy foods and making healthful snacks, learning to work in the garden and how to care for plants, and learning about our farm-to-plate food system.

Environmental: supports and barriers in the environment related to the behavior (eating fruits and vegetables at school lunch)

The Healthy School Meals and Schoolwide Culture of Health sections of the Progress Report address "environmental" social cognitive theory constructs.

- **Socio-structural factors** – patterned relationships between students and their school environment that promote healthy behaviors.
  Examples in the Healthy School Meals section include having tastings of fruits and vegetables in the cafeteria, particularly when food is served by the principal, teachers or students and voting on how students like the food is displayed, role modeling in the cafeteria, and breakfast promotion.
  Examples in the Schoolwide Culture of Health section include loudspeaker announcements about and posters about eating fruits and vegetables and opportunities for family, staff and community members to engage in classroom nutrition education; school garden; and the cafeteria.
- **Facilitators** – structures in the environment that make healthy behaviors easy and acceptable.
  Examples in the Healthy School Meals section include setting up appealing lunch lines, displaying fruit in bowls or baskets, making fruits and vegetables the right size, and giving them appealing names.
  Examples in the Schoolwide Culture of Health section include class snacks and celebrations with healthy food and fundraisers with healthy focused or non-food items.
- **Impediments** – structures in the environment that make healthy behaviors more difficult. These decrease healthy behavior.
  Examples in the Schoolwide Culture of Health section unhealthy foods at school events and fundraisers, especially when these are featured.

The development process for the Progress Report

Version 1: April 2015

Established an evidence-informed tool: Initial framework for the Progress Report was informed by a literature review of relevant nutrition education research and interviews with 7 FoodCorps service members on their experiences with the prior Landscape Assessment tool. This Version contained 4 (knowledge, engagement, access, culture) domains with 5 indicators per domain (See Box 1).

Box 1.
4 Domains

I. Knowledge
1. All students have nutrition education lessons
2. Students have at least 10 nutrition education lessons
3. Classroom lessons include tasting fruits and vegetables
4. Lessons contain content that is specifically about getting students excited
5. Lessons contain content that is specifically about building skills

II. Engagement
1. All students participate in garden based activities
2. Students have at least 10 experiences in the garden
3. Students taste food that are grown in the garden
4. Data on garden participation is collected to the core curriculum
5. In the garden students learn skills related to gardening, cooking, or setting goals to eat more fruits and vegetables.

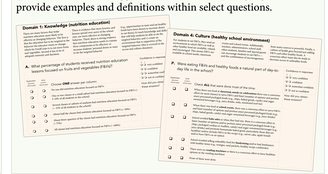
III. Access
1. Meal time at up to promote fruit and vegetable consumption
2. Salad bar is present with high quality food and a wide variety
3. Students participate in tastings
4. Food from local farms or from school garden is served and promoted
5. The cafeteria atmosphere set up to be conducive to eating

IV. Culture
1. School has standards that are well implemented
2. School has a wellness council or equivalent
3. School administration and leaders embrace food, nutrition, health, and wellness
4. Physical environment is conducive to health
5. Family involvement and education
6. "Farm to school" integration into school culture.

Version 2: Early June 2015

Established expert and face validity: First full version with four 4 domains, 20 questions each on a 5-point scale. We got feedback from various stakeholders to establish expert validity (6 faculty members in nutrition) and face validity (28 FoodCorps stakeholders, 12 FoodCorps state partners and fellows, and 18 FoodCorps Service Members).

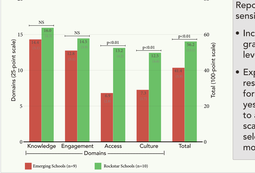
We also conducted a process evaluation to receive feedback on questions. The main suggestions were to clarify language and provide examples and definitions within select questions.



Version 3: Late June 2015

Established construct validity: Refined based on feedback from Version 2. We conducted a pilot and demonstrated that total Progress Report scores were significantly higher for 10 "rockstar" (high programming) schools compared to 9 "emerging" (low programming) schools (See Figure 2). We also conducted a process evaluation (See Box 2).

Figure 2.
Construct Validity: Comparison of Emerging and Rockstar Schools on Spring Progress Report Scores



Box 2.
Progress Evaluation: suggestions to make Progress Report more sensitive to change:

- Incorporated grade-specific level detail.
- Expanded response options for select yes/no questions to a 4-point scale. (e.g., never, seldom, often, most days).

Version 4: August 2015

Established sensitivity to change and predictive validity: Refined based on feedback from Version 3. Domains were renamed to "Focus Areas." Sections were added on general information, institutionalization (Staying Power), and Policy. Established sensitivity to change with a pre-post study (n= 298 schools) that administered the Progress Report in Fall 2015 and Spring 2016 after an academic year of FoodCorps Programming. Demonstrated that 75.5% of the schools increased their pre-post score. The average increase was 8 points on the 100 point scale (See Table 1). Provided all schools with a report on their scores (See Figure 3). Established predictive validity through a cross-sectional study (n=20 schools) that found a correlation between Hands-on Learning—Knowledge and fruit and vegetable consumption at school lunch (See Table 2 and also Poster P-104). Conducted process evaluation with teams from nine schools and FoodCorps collecting feedback from key stakeholders (See Box 3).

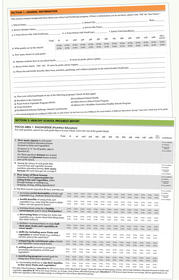


Table 1:
Sensitivity to Change: Scores on Progress Report in Fall 2015 and Spring 2016 for the four Focus Areas

	Fall	Spring	Change	
	Mean (SD)	Mean (SD)	Sig. Change (p)	p*
Hands-on Learning—Knowledge (0-25)	**12.46** (5.1)	**15.36** (5.1)	**83.4**	**18.9**	**20.5**	**<0.001**
A. Classes have nutrition education (0-5)	2.88 (1.7)	3.27 (1.6)	44.3	12.4	43.3	<0.001
B. Number of nutrition education lessons (0-5)	2.88 (1.7)	3.78 (1.5)	30.0	30.0	30.0	<0.001
C. Opportunities for tasting during nutrition education (0-5)	1.87 (1.5)	2.44 (1.6)	44.8	15.4	38.9	<0.001
D. Kinds of activities included in nutrition education (0-10)	4.83 (2.1)	6.27 (2.1)	32.7	17.1	32.2	<0.001
Hands-on Learning—Engagement (0-25)	**10.31** (5.2)	**12.62** (5.1)	**98.4**	**20.8**	**22.8**	**<0.001**
E. Classes have garden-based activities (0-5)	1.86 (1.6)	2.82 (1.7)	90.9	13.1	37.0	<0.001
F. Number of garden-based activity lessons (0-5)	2.34 (1.7)	2.78 (1.6)	40.0	20.1	36.0	<0.001
G. Opportunities for tasting during garden-based activities (0-5)	1.38 (1.4)	1.81 (1.6)	37.9	20.5	41.6	0.001
H. Kinds of activities included in garden-based activities (0-10)	4.76 (2.1)	5.54 (2.1)	46.0	15.4	38.8	<0.001
Healthy School Meals (0-25)	**12.64** (5.1)	**15.48** (5.1)	**83.4**	**18.9**	**20.5**	**<0.001**
I. Serve Lunch (Y/N)	313 (98%)	307 (94.5%)				
J. Lunch line set-up (0-5)	3.80 (1.1)	4.18 (1.0)	26.5	12.4	41.1	0.002
K. Salad Bar exists (Y/N)	145 (45.5%)	145 (45.8%)	*	*	*	*
L. Salad bar (0-5) (all schools)	1.88 (2.1)	3.25 (2.1)	14.8	5.4	76.8	0.364
L. Salad bar (0-5) (schools with salad bar)	3.85 (1.1)	3.84 (1.1)	28.1	16.2	39.7	0.216
M. Tastings in cafeteria (0-5)	2.48 (1.6)	3.09 (1.6)	28.0	12.4	39.4	0.001
N. Tastings in cafeteria norm (Y-N)	113 (34.9%)	190 (61.1%)	*	*	*	*
O. Tastings (0-5) (all schools)	5.48 (3.5)	3.78 (3.1)	34.9	8.1	57.3	<0.001
O. Tastings (0-5) (schools with tastings)	5.34 (3.5)	5.58 (3.0)	42.3	10.5	42.3	0.001
P. Local food served (0-5)	2.30 (2.0)	2.62 (2.0)	20.1	5.4	74.9	<0.001
Schoolwide Culture of Health (0-25)	**9.26** (5.1)	**11.93** (5.1)	**60.1**	**13.1**	**28.8**	**<0.001**
Q. Healthy food the dominant choice (0-5)	2.63 (1.4)	2.77 (1.7)	27.8	10.0	57.5	0.010
R. Rewarding healthy eating (0-5)	1.80 (1.6)	1.73 (1.5)	22.5	8.4	76.1	0.001
S. Encouraging families (0-5)	1.80 (1.6)	2.58 (1.6)	34.7	8.7	46.7	<0.001
T. Wellness opportunities (0-5)	1.80 (1.6)	2.58 (1.6)	34.7	8.7	46.7	<0.001
U. Additional opportunities (0-5)	1.23 (1.6)	2.27 (1.8)	84.4	21.1	45.8	<0.001
Overall (0-100)	**43.98** (19.1)	**55.40** (19.1)	**75.5**	**14.4**	**11.1**	**<0.001**

*Wilcoxon Signed Rank Test

Figure 3:
Sample Progress Report Summary Provided to Schools



Table 2:
Predictive Validity: Correlation of Progress Report Score and Fruit and Vegetable Consumption at School Lunch

Process	On Grey	Ate any (any serving vs 0 servings)	Eaten on Grey (any serving vs 0 servings)	Eaten when Grey (any serving vs 0 servings)
H1/H2	**Diff** 95% CI	**Diff**	**r**	**p**
Fruit and Vegetables				
Overall Progress Report	0.97 (0.931-1.014)	1.02 (0.988-1.060)	0.0098	0.018	0.004	0.118
Hands-on Learning—Knowledge	0.97 (0.933-1.141)	**1.14*** (1.032-1.260)	0.035	0.419	**0.022**	**0.004**
Hands-on Learning—Engagement	0.91 (0.810-1.021)	1.02 (0.942-1.112)	0.001	0.798	0.598	0.200
Healthy School Meals	0.88 (0.790-1.000)	1.03 (0.956-1.102)	0.002	0.742	0.697	0.001
Schoolwide Culture of Health	0.98 (0.923-1.125)	1.02 (0.988-1.105)	0.002	0.800	0.005	0.079
Fruit						
Overall Progress Report	0.99 (0.904-1.104)	1.02 (0.988-1.060)	0.0097	0.384	0.003	0.102
Hands-on Learning—Knowledge	1.02 (0.930-1.142)	**1.14*** (1.006-1.247)	0.034	0.303	**0.018**	**0.004**
Hands-on Learning—Engagement	0.98 (0.894-1.092)	1.02 (0.948-1.092)	0.004	0.162	0.006	0.166
Healthy School Meals	0.88 (0.807-1.040)	1.03 (0.930-1.109)	0.001	0.758	0.898	0.33
Schoolwide Culture of Health	1.00 (0.906-1.085)	1.01 (0.930-1.114)	0.002	0.732	0.002	0.731
Vegetables						
Overall Progress Report	1.01 (0.955-1.062)	1.02 (0.984-1.054)	0.0002	0.929	0.003	0.148
Hands-on Learning—Knowledge	0.99 (0.923-1.183)	1.12 (0.948-1.247)	0.0003	0.892	**0.018**	**0.038**
Hands-on Learning—Engagement	0.95 (0.857-1.087)	1.04 (0.950-1.109)	0.0010	0.884	0.007	0.259
Healthy School Meals	1.00 (0.908-1.210)	1.04 (0.918-1.197)	0.000	0.936	0.007	0.102
Schoolwide Culture of Health	1.10 (0.985-1.285)	1.01 (0.888-1.197)	0.000	0.971	0.004	0.002

*Wilcoxon Signed Rank Test; **Pearson Correlation Coefficient; ***Fisher's Exact Test; ****Chi-Square Test; Bolded values are significant at p<0.05; Bolded values are significant at p<0.05; Italicized values are significant at p<0.10; Diff = Difference; CI = Confidence Interval; r = Correlation Coefficient; p = p-value; Ate any = Ate any serving vs 0 servings; Eaten on Grey = Eaten any serving vs 0 servings; Eaten when Grey = Eaten any serving vs 0 servings

Box 3.
Suggestions from process evaluation:

- Change questions to statements to make it seem less like a test and more like a series of programming ideas.
- Continue to collect grade level data for programming, despite the increase in respondent burden.

The final version

Version 5: July 2016

Created final version of Progress Report for FoodCorps to use during 2016–17 school year: Refined based on feedback from Version 4. The Progress Report was integrated into the Healthy Schools Toolkit in which schools set goals for change, create action plans to implement their goal, and track their progress (See Box 4).

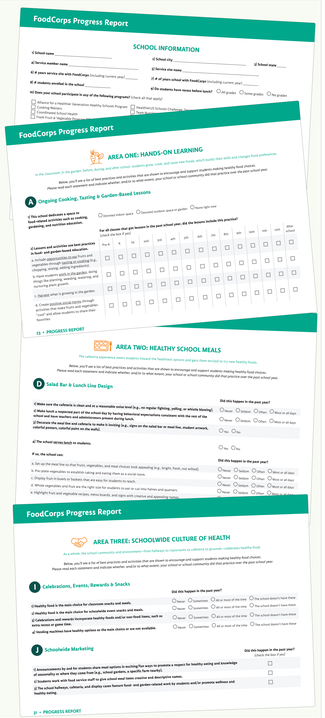
Box 4.
Key features of Version 5:

- Redesigned using FoodCorps Style Guide
- Renamed and updated Focus areas:
  - Focus Areas 1 and 2 combined into **Area one: Hands-on Learning**. Theory-based constructs asked with 17 sub-questions (See *Best Practices in Hands-on Learning* below). Items such as fieldtrips and farmer and chef visits from Focus area 4 moved to this section.
  - Focus Area 3 renamed **Area Two: Healthy School Meals**. Items on fine and salad bar items combined and breakfast promotion added.
  - Focus Area 4 renamed **Area Three: Schoolwide Culture of Health**. Overall shorter than in Version 4.
- Staying Power and Policy sections reorganized but questions stayed the same.

Best Practices in Hands-on Learning

a. Include opportunities to eat fruits and vegetables through tastings and cooking
b. Create positive social norms that make fruits and vegetables cool
c. Decrease fears of trying new foods
d. Focus on health benefits of eating fruits and vegetables
e. Compare the nutritional value of healthful and less healthful snacks
f. Use MyPlate visual to encourage students to make half their plate fruits and vegetables
g. Promote eating fruits and vegetables at school lunch
h. Help students set personal goals for eating more fruits and vegetables
i. Have students monitor progress toward their goals to eat more fruits and vegetables
j. Share recipes for students to take home to prepare with their family
k. Include activities that build cultural appreciation
l. Create appreciation for plants by exploring what they need to grow and their lifecycle
m. Have students work with plants in the garden
n. Harvest what is grown in the garden
o. Introduce the concept of composting and provide opportunities to compost
p. Teach students how our "farm to plate" food system works
q. Focus on inequity in access to healthy foods and resources that build toward equity





Discussion

The final Progress report is unique because it comprehensively assesses the wide range of food-related programming being conducted in schools. Other tools are comprehensive to health and have a small section on nutrition. The Progress Report:

- Is an evidence-informed tool since it was based on a review of the literature and on social cognitive theory.
- Has expert validity, since experts who work in school-based nutrition education and gardening reviewed it and made suggestions for change.

Table 3.
Using the Progress Report Score to Determine Level of Programming in the School

Levels	Progress Report Score (Areas of Service,1-100)	Staying Power Score (0-60)
Planting Seeds *laying the foundation*	0-32	0-19
Starting to Grow *making progress*	33-52	20-31
Flourishing *significant strides*	53-100	32-60

- Has face validity because FoodCorps stakeholders who are the primary users of the Progress Report reviewed it and made suggestions for change.
- Has construct validity because schools with lower levels of programming scored significantly lower on the Progress Report that schools with high levels of programming.
- Has predictive validity since there was a significant correlation between the Hands-on Learning—Knowledge score and fruit and vegetable consumption at school lunch.
- Is sensitive to change as 75% of the FoodCorps schools had an increase, with average increase being 8 points on the 100-point scale.

The Progress Report can classify a school based on three levels of programming which we described as Planting Seeds (low programming), Starting to Grow, (medium programming) and Flourishing (high programming), as a guide for the level of FoodCorps programming in schools (See Table 3). Schools can also be encouraged to use the Progress Report as a menu of options for programming ideas.

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