

HOURLY EMPLOYEES' PERCEPTIONS ABOUT FARM TO SCHOOL PROGRAM BARRIERS AND KEYS TO SUCCESS: DIFFERENCES BY STATE AND NUMBER OF MEALS SERVED

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ABSTRACT

Farm to school (FTS) programs are growing in popularity among school districts and provide opportunities for school nutrition programs to source ingredients locally. Hourly employees working with FTS programs prepare, promote, and serve local produce to students daily. However, little research has focused on their perceptions of FTS programs. A questionnaire was used to assess barriers and keys to success when implementing and maintaining FTS programs from perspectives of hourly, non-management school foodservice employees. An examination of survey responses suggests differences exist between barriers and keys to success by geographic location and school nutrition program participation rates.

Keywords:

hourly non-management school foodservice employees; farm to school; barriers; participation rates

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INTRODUCTION

The foodservice industry is divided into two major segments; commercial (e.g. fast food and full-service restaurants) and non-commercial (e.g. hospital and school foodservice). Commercial operations are profit driven whereas non-commercial foodservices typically are considered a support unit within a larger organization. The National Restaurant Association forecasted revenue of the non-commercial foodservice industry would reach approximately 58 billion dollars in 2013 (National Restaurant Association, 2013). School foodservice, with forecasted sales of approximately 14.2 billion dollars in 2012 (National Restaurant Association, 2012), represents a large part of the non-commercial foodservice industry. This includes kindergarten through 12th grade schools which, in 2012, served approximately 43.9 million meals per day through the school breakfast and national school lunch programs (United States Department of Agriculture (USDA) Food Nutrition Service (FNS), 2012a, 2012b).

Use of local foods is a popular trend throughout the foodservice industry. Researchers have shown that consumers (Brown, 2003; Schneider & Francis, 2005; Zepeda & Leviten-Reid, 2004) and chefs (Curtis & Cowee, 2009) prefer local foods. Feenstra (1997) identified development of local food systems as a way to revitalize struggling communities. In support of that claim, Bregendahl and Endernton (2013) investigated the impact a state's regional food system could have on the local economy and found farmers reported more than \$10,000,000 from sales of local products and creation of an average

of 7.7 full time job equivalents per \$1,000,000 of local food sales in 2013.

Over the past decade, many school districts and school nutrition programs have begun using farm to school (FTS) programs as a way to support the local economy and help children understand where and how food is produced (National Farm to School Network [NFTSN], n.d.). Specific FTS activities may include; visiting farms, growing school gardens, cooking demonstrations, introducing students to new fruits and vegetables, and/or incorporating local produce into school meals and snacks (NFTSN, n.d.). Popularity of these programs has grown considerably from an estimated 2,000 schools participating in 2010 (NFTSN, n.d.) to more than 38,500 schools estimated participating in FTS activities in the 2012-2013 school year, as indicated by the recent USDA FTS Census (USDA FNS, 2013). FTS programs may also help schools meet new school meal nutrition standards released in 2012 as part of the Healthy Hunger Free Kids Act which requires schools to increase amounts of fruits and vegetables offered, as students will typically prefer fresh forms of produce (USDA FNS, 2011; USDA FNS, 2012a).

Although popularity of FTS programs has increased in recent years, research indicates that some barriers to school nutrition and FTS programs still exist. Barriers to school nutrition programs and local food use include: competitive snack choices (e.g. chips, cookies, candy bars, and sodas) (Litchfield & Wenz, 2011), lack of kitchen equipment necessary for processing fresh fruits and vegetables (Vallianatos, Gottlieb, & Haase, 2004), and lack of training and recipe education among foodservice employees (Cho & Nadow, 2004; DeBlicke, Strohbehn, Clapp, & Levandowski, 2010). Barriers specific to FTS programs have also been identified by school foodservice directors as lack of availability and insufficient quantity (Gregoire & Strohbehn, 2002) as well as cost and procurement regulations (Colosanti, Matts, & Hamm, 2012); food distributors identified budget constraints, a short growing season, and inability to make a profit (Izumi, Wright, & Hamm, 2010a), and farmers identified logistical challenges including small volume sales (Izumi, Wright, & Hamm, 2010b).

In a review of research examining effectiveness of FTS programs, Joshi, Azuma, and Feenstra (2008), referred to foodservice employees as "dietary gate-keepers" (pg. 241) and indicated more research with this audience was needed. Despite this recommendation, little research has focused on the barriers to FTS programs from perspectives of hourly non-management school foodservice employees. These are the employees that prepare, promote, and serve fresh fruits and vegetables purchased as part of FTS programs. They have personal daily contact with the students thus their support is critical to the success of FTS programs. Therefore, the purpose of this study was to assess barriers to FTS programs faced by hourly foodservice employees. The specific research objectives of this

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project were to: (1) identify barriers and keys to success when implementing and maintaining FTS programs; and (2) identify differences in barriers and keys to success based on geographic location and number of meals served.

METHODS

Traditional mail based questionnaires were used for this study due to the potential limited access to and skills with computers among hourly non-management school foodservice employees. According to Dillman, Smyth, and Christian (2009) mail surveys can be effective in obtaining a response rate of 50-70%. A recent study by Ungku-Zainal-Abidin (2013) had a 35% response rate when mailing questionnaires to hourly non-management school foodservice employees. In her study and this study, nutrition program directors were contacted and asked to distribute the survey to hourly non-management foodservice employees. Approval from the appropriate university review board was received prior to conducting this study.

Sample Selection

The target population was hourly non-management school foodservice employees with hands-on experience preparing local produce as part of the FTS program. Because some schools in a district may participate in FTS programs and others may not, individual school buildings were recruited for this study. According to Ary, Jacob, and Sorensen (2010), probability sampling can be difficult and expensive. Therefore, the following non-probability sampling process was used.

First, the state with the largest estimated number of schools with FTS programs according to the NFTSN (farmtoschool.org, 2013) from each of the eight NFTSN regions (West [California], Mid-Atlantic [Maryland], Midwest [Oklahoma], South [Texas], Southwest [New Mexico], Great Lakes [Minnesota], Northeast [Connecticut], and Southeast [North Carolina]) was selected. Second, the state contact for the FTS program (listed on farmtoschool.org) was contacted and asked to provide a list of schools participating in FTS programs as well as contact information for the school foodservice or child nutrition director at those schools. Five of the eight states (California, Texas, New Mexico, North Carolina, and Connecticut) responded to the request and provided contact information for schools in their state participating in FTS programs. Potential participant information for the remaining three states (Minnesota, Maryland, and Oklahoma) was obtained from the state FTS website or the USDA FTS Census (USDA FNS, 2013). The researchers were unable to make contact with any foodservice directors in New Mexico. Therefore, Colorado, the state with the next largest number of schools participating in FTS from that region, was selected to participate.

Contact information for potential participant school districts ($n = 238$) was gathered using a search engine (Google) to locate school district websites and contact information for the foodservice directors. Schools from urban and rural areas in each state were selected in order to have representation of small (0-200 meals served daily), medium (201-400 meals served daily), and large (more than 400 meals served daily) schools. This same method of school size categorization was used in a similar study by Smith, Wleklinski, Roth, and Tragoudas (2013).

An email describing the purpose and objectives of the study was sent to the foodservice director from each of the potential participant school districts previously identified within each of the size categories. Directors were then asked if they were willing to distribute questionnaires to their employees. Directors who agreed ($n = 21$) were sent an email and asked to provide the following

information: (1) list of all elementary schools in their districts preparing local produce from FTS programs for school meals, (2) number of hourly non-management school foodservice employees at each school with hands on experience preparing and serving local produce, (3) approximate number of years each school had been participating in FTS, and (4) addresses for use in mailing questionnaires. Researchers then used this information and selected 12 schools from each state. Due to variance in the number of districts willing to participate from each state, one state had all 12 schools from the same district while others were from multiple districts. When selecting individual schools within a district, researchers used location (schools from different cities) and number of employees (schools with largest number of employees) as criteria. This was done in order to increase variance amongst school locations.

Questionnaire Content

The questionnaire covered several topics examining employees' perceptions of barriers and keys to success when implementing and maintaining FTS programs. Specifically, it was comprised of the following items: two items concerning participant's basic knowledge of FTS programs, 11 items concerning perceived benefits to using local produce in schools, 23 items concerning perceptions of influences on the success of using local produce in school meals, 13 items concerning basic information about the participant's school and the district's school meals programs, 18 items concerning perceptions of differences in using local produce as compared to non-local produce in school meals, six items concerning perceptions of the quality of local produce compared to non-local produce, and 12 items requesting demographic information of the participants. Perceptions about benefits, successes, differences, and quality of local produce compared to non-local produce were all gathered using a five point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). As suggested by Ary, Jacobs, and Sorensen (2010), the internal reliability of the measurement scales was determined using Cronbach's alpha. The measurement scales for benefits ($\alpha=0.86$, $n=11$), keys to success ($\alpha=0.942$, $n=23$), barriers ($\alpha=0.800$, $n=18$), and quality ($\alpha=0.920$, $n=6$) were all found to have internal reliability (George & Mallery, 2003 [as cited in Gliem & Gliem, 2003]).

Pilot Test

Following the suggestions of Dillman, Smyth, and Christian (2009), a pilot test was conducted in order to ensure the questionnaire was ready to be used with a large sample. The questionnaire was completed and reviewed first by five experts in the field of school nutrition and foodservice management, and then by 12 hourly non-management school foodservice employees who had hands-on experience working with local produce in FTS programs. Suggestions from experts and hourly employees were incorporated into the questionnaire before distribution. For example, it was suggested that a "don't know" option be added to the scale for measuring barrier items; this option was added as suggested.

Questionnaire Distribution

Questionnaires were distributed by mail to all school foodservice or child nutrition directors using the suggested steps outlined by Dillman, Smyth, and Christian (2009) and found successful by Ungku-Zainal-Abidin (2013). First, prior to the questionnaire being sent a pre-notice email was sent to the recruited foodservice directors notifying them that a packet of questionnaires would be arriving shortly. Second, hard copies of the questionnaires were sent to the foodservice director along with a letter describing the method for distribution and collection. The foodservice director was instructed to distribute the questionnaires to all hourly foodservice employees who

had hands-on experience using local produce from the FTS program. After completing the questionnaire, employees were instructed to fold and seal the questionnaire prior to placing it in a large collection envelope. After one week, the foodservice director collected all completed questionnaires and placed them in a large postage paid business reply envelope and placed them in the mail. This distribution and collection process was used to ensure participant confidentiality and to help participants feel comfortable in providing open and honest feedback as their directors were unable to see responses.

Data Analysis

Data from questionnaires were entered and analyzed using a statistical software package (SPSS 21) for analysis. Data coding and entry followed guidelines from Salant and Dillman (1994). Frequencies were computed and data were verified to ensure proper coding and manual entry. Descriptive statistics (frequencies, means, and standard deviations) were used to analyze the distribution of the data. Means for each of the variables (barriers and keys to success) were calculated and used to identify the most common perceived barriers and keys to success for implementation and maintenance of FTS programs. ANOVA was then used to determine differences in barriers and keys to success among geographic regions and number of meals served.

RESULTS AND DISCUSSION

Demographics

A total of 369 questionnaires were mailed to 21 foodservice directors of participating schools. A total of 213 usable questionnaires were returned for a response rate of 58%. The majority of participants were female (94.8%, n=202) and almost half (41.8%, n=89) between the ages of 50-64. The largest percentage of participants had a high school diploma (45.5%, n=97) or some college (30%, n=64), had been involved with FTS programs for more than 2 years (54.9%, n=117), and worked 30-40 hours per week (51.6%, n=110) (Table 1). In Strohbehn, Jun, and Arendt's (2014) national survey of hourly school foodservice employees, similar participant demographics were found with 95% female participants, and over 50% of participants between the ages of 41-60. Table 2 contains participation data by state including information concerning the number of districts, schools, and participants from each state. For example, participants from California worked at eight different schools within three districts; there were a total of 21 employees from California who participated in the study. The number of employees from each of the eight California schools varied from one to five. Participants working at schools in all eight of the selected states participated in the study with largest percentage from the Midwest, 17.8%.

Table 3 contains characteristics of the participating schools. Participants worked at schools that were mostly self-operated (69.5%, n=148) and served an average of 201-400 (54.9%, n=117) lunch meals per day. When indicating the number of years that the school supported a farm to school program, 4.2% (n=9) of participants indicated one year or less, 9.4% (n=20) indicated one to two years, 20.7% (n=44) indicated two to three years, and 26.8% indicated more than three years. Interestingly, 34.7% indicated that they didn't know how long their schools had been participating in the FTS program. However, some employees may have previously worked at a school with a FTS program because more than half (54.9%, n=117) indicated they had been involved with FTS for more than two years. This lack of knowledge could be a result of hourly kitchen employees' lack of involvement in administration and management of the FTS program or aspects of FTS concentrated outside of the school meals program. When identifying FTS activities that schools participated in, 73.2% (n=156) identified "incorporating local produce into the school lunch

program" as an activity in which their school currently participated. However, because this was a requirement for study participation and verification was done prior to recruitment, this finding indicates a lack

Table 1: Demographic Characteristics of Participants (n=186-213)^a

Characteristics	n	%
Gender		
Male	8	3.8
Female	202	94.8
Age		
18-25 years	4	1.9
26-34 years	25	11.7
35-49 years	77	36.2
50-64 years	89	41.8
65 years and over	12	5.6
Education		
Some high school	11	5.2
High school diploma (or equivalent)	97	45.5
Some college	64	30.0
Associate's degree	27	12.7
Bachelor's degree	8	3.8
Graduate degree	2	0.9
Ethnicity		
American-Indian or Alaska Native	2	0.9
African-American or Black (Non-Hispanic origin)	18	8.5
Asian	2	0.9
Caucasian/White	152	71.4
Hispanic	28	13.1
Multiracial	5	2.3
Other	1	0.5
Number of years involved with farm to school programs		
1 year or less	36	16.9
1 to 2 years	33	15.5
2 to 3 years	43	20.2
More than 3 years	74	34.7
Number of hours worked per week		
Less than 10 hours	15	7.0
10 to 19 hours	34	16.0
20 to 29 hours	42	19.7
30 to 40 hours	110	51.6
More than 40 hours	7	3.3
Personal connection to food production^b		
I grew up on a farm	35	16.4
I currently have a garden	69	32.4
My family grew a garden when I was growing up	117	54.9
I currently can or freeze garden produce for later use	73	34.3
I currently live on a farm	8	3.8
Other (please specify)	28	13.1
Frequency of visits to seasonal farmers markets for personal reasons		
Twice a week	2	0.9
Weekly	27	12.7
Bi-weekly	20	9.4
Monthly	58	27.2
Twice a year	34	16.0
Once a year	24	11.3
Never	48	22.5

^a Totals may not equal 213 and percentages may not equal 100 due to missing data.

^b Total responses may exceed 213 due to multiple responses.

Table 2: Participation by Region/State

State	School Districts	Schools	Total Respondents	Range of Respondents Per School
California	3	8	21	1 - 5
Colorado	2	11	19	1 - 3
Oklahoma	3	12	39	1 - 5
Minnesota	3	9	26	1 - 4
Texas	3	6	29	4 - 6
North Carolina	3	7	28	3 - 5
Maryland	1	7	25	1 - 7
Connecticut	3	7	26	3 - 5
Total	21	67	213	

of knowledge on the part of hourly employees concerning implementation of FTS programs in their schools.

From a given list, activities indicated by participants as frequently conducted were: “purchasing fresh produce from local farmers” (68.5%, n=146), and “educating students about local produce” (48.8%, n=104). Among the least reported activities were: “Farmers visiting classrooms” (3.3%, n=7), “chefs visiting classrooms” (5.6%, n=12), and “visits to farmer’s markets” (8%, n=17). Interestingly, when asked about their personal connection to food production, the majority (54.9%) indicated that although their family had a garden while they were growing up, only 32.4% indicated that they currently grow a garden and 22.5% indicated that they never visit farmer’s markets for personal reasons.

Barriers to Farm to School Programs

Participants were asked to rate their levels of agreement to a list of 18 barriers related to the use of local produce versus non-local produce in school meals using a five point Likert-type scale (1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree). Participants were also given the option to select “don’t know”. Table 4 includes mean scores and standard deviations for all 18 barrier items. Those barrier items respondents most agreed with included “local produce has a different appearance than non-local produce” (mean rating of 3.67 ± 0.90), “the quality of local produce is better than non-local produce” (3.61 ± 0.96), and “local produce is less available than non-local produce” (3.34 ± 0.96). Those items respondents most disagreed with as barriers included “there are no differences between local and non-local produce” (2.65 ± 1.00), “it is difficult to serve local produce items to a diverse student body” (2.45 ± 0.78), and “staff are less knowledgeable about how to serve local produce compared to non-local produce” (2.42 ± 0.92). The majority of barriers were rated between the “neutral” and “disagree” range indicating participants did not agree with the barriers listed. In another study (Stokes & Arendt, manuscript in progress), school foodservice employees who were interviewed appeared reluctant to identify any challenges or barriers about FTS programs but upon asking probing follow up questions, employees did discuss several barriers to FTS programs.

Keys to Success to Farm to School Programs

The same five point Likert-type scale was used to assess participants’ levels of agreement to 23 items regarding keys to success when implementing FTS programs. Table 5 contains complete details concerning mean scores for keys to success items. Participants agreed (mean score of 4 or 5) with five of the 23 items including: “staff encouraging students to try local produce” (4.15 ± 0.78), “exposing students to local produce consistently” (4.08 ± 0.72), “presenting local produce attractively to students” (4.08 ± 0.74), “using appropriate preparation methods to prepare local

produce” (4.04 ± 0.77), and “incorporating local produce into existing recipes” (4.01 ± 0.75). The remainder of the success items were rated in the neutral range with the three lowest being, “explaining to students how to prepare local produce” (3.67 ± 0.90), “serving local produce with condiments” (3.66 ± 0.82), and “there is positive peer pressure amongst students to try local produce” (3.21 ± 1.01). The lowest mean score was for positive peer pressure; this could be related to employees’ job duties and lack of student contact at the time when peer pressure occurs. For example, employees may be focused on serving on the lunch line and not hear positive and or negative peer pressure taking place amongst students, or peer pressure may occur in the lunch room where foodservice employees are not present. Although participants were generally neutral towards many of the success items, they did not disagree with any. These results imply that hourly employees have a generally positive outlook toward the success of FTS programs and believe that things can be done in order to make the program a success. These results are consistent with findings from Deblieck, Strohbehne, Clapp, and Levandowski (2010) who also indicated that hourly employees of a college FTS program had generally positive attitudes toward FTS programs.

Differences between Barriers and Keys to Success

Geographic Location: Significant differences in mean scores based on geographic location were identified for both barriers and keys to success items at a significance level of $p < 0.05$; results are shown in Table 6 and Table 7. Significant differences were identified between the following states (representing each of the eight NFTSN geographic regions) for levels of agreement as to impact of these barriers: (1) “students have never been exposed to some of the local produce items” ($p = 0.028$; Colorado [2.61] and Minnesota [3.67]), (2) “local produce is less available than non-local produce” ($p = 0.008$; Oklahoma [3.18] and Connecticut [4.00]), (3) “a substitute is needed because an insufficient amount of local produce is received” ($p = 0.002$; Connecticut [3.62] with North Carolina [2.43] and Maryland [2.74]), (4) “local produce is not as clean as non-local produce” ($p = 0.001$; Minnesota [3.86] with Oklahoma [2.82], North Carolina [2.95], Maryland [2.68], and Connecticut [2.73]), (5) “there are no differences between local and non-local produce” ($p < 0.0001$; Connecticut [2.00] with California [2.94], Oklahoma [2.91], North Carolina [3.05] and Maryland [2.95]; Minnesota [2.15] with Oklahoma [2.91] and North Carolina [3.05]), (6) “it is more difficult to receive sufficient amounts of local produce compared to non-local produce” ($p < 0.0001$; Connecticut [4.10] with California [3.13], Oklahoma [3.00], North Carolina [2.89], and Maryland [3.00]).

Significant differences regarding mean scores of levels of agreement to keys to success items were also identified. The following success items had significant differences at the $p < 0.05$ level: (1) “students sampling local produce” ($p = 0.004$; Maryland [4.32] and North Carolina

Table 3: Characteristics of Schools (n=190-213)^a

Characteristics	N	%
Foodservice management		
Self-operated	148	69.5
Contract Managed	42	19.7
Number of years with farm to school program		
1 year or less	9	4.2
1 to 2 years	20	9.4
2 to three years	44	20.7
More than three years	57	26.8
I don't know	74	34.7
Average number of meals served during lunch each day		
0 to 200	28	13.1
201 to 400	117	54.9
401 to 600	53	24.9
601 to 800	5	2.3
801 to 1000	4	1.9
more than 1000	5	2.3
Participation in farm to school activities^b		
Educating students about local produce	104	48.8
Incorporating local produce into a la carte offerings	68	31.9
Chefs visiting classrooms	12	5.6
Offering local produce as part of "snack time"	55	25.8
Visits to farmer's markets	17	8.0
Incorporating local produce into the school lunch program	156	73.2
Purchasing fresh produce from local farmers	146	68.5
Taking students to visit farms	43	20.2
Incorporating local produce into school breakfast program	92	43.2
Farmers visiting classrooms	7	3.3
Taste testing local produce	69	32.4
Growing a school garden	39	18.3
Other (please specify)	7	3.3
Geographic region^c		
West (Alaska, California , Hawaii, Idaho, Nevada, Oregon, Washington, Montana)	21	9.9
Southwest (Colorado , Utah, Wyoming, Arizona, New Mexico)	19	8.9
Midwest (North Dakota, South Dakota, Nebraska, Kansas, Oklahoma , Missouri, Iowa)	38	17.8
Great Lakes (Minnesota , Wisconsin, Illinois, Indiana, Michigan, Ohio)	26	12.2
South (Arkansas, Louisiana, Mississippi, Alabama, Texas)	27	12.7
Southeast (Florida, Georgia, Kentucky, North Carolina , South Carolina, Tennessee)	25	11.7
Mid-Atlantic (Delaware, District of Columbia, Maryland , New Jersey, Pennsylvania, Virginia, West Virginia)	23	10.8
Northeast (Connecticut , Maine Massachusetts, New Hampshire, New York, Rhode Island, Vermont)	23	10.8

^a Totals may not equal 213 and percentages may not equal 100 due to missing data.

^b Total responses may exceed 213 due to multiple responses.

^c Bolded state indicates state chosen for study.

[3.48]), (2) "slowly incorporating local produce into the menu" (p=0.015; Maryland [4.32] and Minnesota [3.48]), (3) "employees desire to increase use of local produce" (p=0.020; Maryland [4.41] and North Carolina [3.64]), (4) "offering local produce during "snack time" (p=0.006; North Carolina [3.24] and Oklahoma [3.97], Minnesota [4.00] and Maryland [4.04]), (5) "explaining to

students how local produce can be served" (p=0.032; Maryland [4.18] vs. Connecticut [3.39]).

These results indicate that geographic location may affect employee's perceptions of barriers and keys to success when using local produce as part of the FTS program. For example, employees in Minnesota agreed that local produce was not as clean as non-local produce while employees in Oklahoma, North Carolina, Maryland, and Connecticut disagreed. Although it is difficult to know exactly what caused these differences many factors could contribute. Varied climates between regions, types of local soil, availability of local produce, local infrastructure to support FTS programs, and employee perceptions of FTS programs are just a few examples. It is also interesting to note that the three states located in northern regions (Connecticut, Maryland, and Minnesota) had the most significant differences with other states. This could possibly be explained by shorter growing seasons in these areas as compared to states with longer growing seasons (California, Texas, North Carolina, and

Table 4: Barriers to FTS Programs (n= 165-187)^a

Barriers	Mean ^b	SD
1. Local produce has a different appearance than non-local produce	3.67	0.90
2. The quality of local produce is better than non-local produce	3.61	0.96
3. Local produce is less available than non-local produce	3.34	0.96
4. Students have never been exposed to some of the local produce items	3.32	1.05
5. It is more difficult to receive sufficient amounts of local produce compared to non-local produce	3.28	0.92
6. It is hard to know whether students prefer local produce raw or cooked	3.24	0.89
7. The amount of time required to wash local produce is longer than non-local produce	3.22	1.13
8. The size of local produce is less consistent than non-local produce	3.22	0.89
9. It is difficult to know student's preferences for local produce	3.18	0.85
10. It is easier to get students to try local produce than non-local produce	3.07	0.85
11. Local produce is not as clean as non-local produce	3.06	1.01
12. Processing (e.g. peeling, cutting, packaging) local produce takes more time	3.04	1.14
13. A substitute is needed because an insufficient amount of local produce is received	3.02	0.95
14. Local produce has a shorter shelf life than non-local produce	2.89	1.00
15. It is difficult for staff to identify local produce items compared to non-local produce	2.78	1.00
16. There are no differences between local and non-local produce	2.65	1.00
17. It is difficult to serve local produce items to a diverse student body	2.45	0.78
18. Staff are less knowledgeable about how to serve local produce compared to non-local produce	2.42	0.92
Overall Mean Score	3.09	0.46

^a The actual number of responses varied due to missing data

^b Likert-type scale was used as follows: 1= Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly Agree

Table 5: Keys to Success for FTS Programs (n= 199-211)^a

Keys to Success	Mean ^b	SD
1. Staff encouraging students to try local produce	4.15	0.78
2. Exposing students to local produce consistently	4.08	0.72
3. Presenting local produce attractively to students	4.08	0.74
4. Using appropriate preparation methods to prepare local produce	4.04	0.77
5. Incorporating local produce into existing recipes	4.01	0.75
6. Employees desire to increase use of local produce	3.98	0.83
7. Getting support from teachers and staff	3.98	0.93
8. Students sampling local produce	3.97	0.80
9. Employee motivation to serve local produce	3.94	0.87
10. Offering a substitute when an insufficient amount of one item is available	3.91	0.79
11. Training for staff on how to prepare local produce	3.90	0.87
12. Slowly incorporating local produce into the menu	3.87	0.84
13. Consistency in serving size of local produce	3.87	0.82
14. Explaining to students how local produce can be served	3.85	0.79
15. Knowledge of kitchen staff who are more experienced	3.79	0.74
16. Offering local produce during “snack time”	3.78	0.86
17. Getting support from parents	3.77	0.91
18. Getting support from students	3.76	0.86
19. Employees personal beliefs aligning with ideals of the FTS program	3.72	0.78
20. Getting to know local farmers	3.72	0.90
21. Explaining to students how to prepare local produce	3.67	0.90
22. Serving local produce with condiments	3.66	0.82
23. There is positive peer pressure amongst students to try local produce	3.21	1.01
Overall Mean Score	3.89	0.54

^a The actual number of responses varied due to missing data

^b Likert-type scale was used as follows: 1= Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly Agree

Oklahoma). Although differences in barriers have not been identified in previous research, research has identified availability of local produce, infrastructure, and perceptions towards FTS programs as barriers (Izumi, Wright, & Hamm, 2010; USDA FTS Team, 2011). It is also possible that differences amongst states from different regions may be related to other reasons not explored in this research such as local school infrastructure (e.g. staff, facilities, space, and equipment), policies related to FTS, and specific FTS activities (e.g. school garden, chef visits, and farm visits). Variation in the number and size of districts and schools participating from each state could also possibly explain differences. For example, all 25 participants (11.7% of all respondents) from Maryland came from one district whereas most other states (5 of the 8) were represented by at least three districts. Given that policies and procedures are likely the same or similar for different schools in the same district, this could explain some of the findings.

Number of Meals Served: Significant differences in mean scores for barriers were also found based on number of meals served; the same categorization scheme was used by Smith, Wleklinski, Roth, &

Tragoudas (2013) to identify small, medium and large schools based on number of meals served (Table 8). Significantly different mean scores were found for the following success items: (1) “the amount of time required to wash local produce is longer than non-local produce” (p=0.009; medium [3.06] and large [3.59]), (2) “it is easier to get students to try local produce than non-local produce” (p=0.001; small [2.88] and large [3.41]; medium [2.93] and large [3.41]), and (3) “processing (e.g. peeling, cutting, packaging) local produce takes more time” (p=0.037; medium [2.87] and large [3.35]). It is interesting to note the three barriers with significant differences all dealt with hands on preparation or serving of local produce. Findings also exhibited differences between large and medium or large and small schools. This is likely a result of large schools preparing, and serving more local produce. Therefore, because employees who work at smaller schools typically prepare smaller amounts of local produce, they might be less likely to perceive these items as barriers. It is also likely that larger schools have greater segmentation by function area in the kitchen so that only those employees designated for salad prep would be handling FTS produce. Thus, the impact of the FTS program would be greater on those specific employees. No significant differences between mean scores related to keys to success and number of school meals were identified.

CONCLUSIONS AND APPLICATIONS

This study focused solely on the perceptions of hourly non-management foodservice employees in identifying barriers and keys to success when implementing and maintaining FTS programs. The study also assessed differences between barriers and keys to success based on geographic location and number of school lunches served daily in respondents’ schools. Hourly non-management foodservice employees prepare, promote, and serve local produce to students as part of FTS programs on a regular basis. Therefore, understanding barriers and keys to success from the view of hourly non-management school foodservice employees is important to school nutrition directors and school nutrition managers. Mean scores of agreement to listed barrier items indicated that hourly foodservice employees did not generally agree with barriers to FTS programs identified in previous research; most previous research summarized perspectives of managers and foodservice directors rather than foodservice employees (Colosanti, Matts, & Hamm, 2012; Gregoire & Strohbehn, 2002; Izumi, Wright, & Hamm, 2010a; Izumi, Wright, & Hamm, 2010b). Thus, the findings from this study can help foodservice managers in devising implementation and sustainable steps for FTS programs. Generally, respondents in this study had a positive outlook towards FTS programs and were of the opinion that using local produce in school meals was not an insurmountable challenge. This research also found that hourly employees do believe that there are certain keys to success when implementing FTS programs, such as support from teachers and staff. Therefore, foodservice directors could ensure that teachers and staff are well informed concerning the FTS program and seek out their support during implementation and continuation of related activities. Findings suggest that hourly foodservice employees felt valued by their contribution to students’ health with FTS activities; further research is needed in this area regarding the role of school meals program staff and the school health environment

Participants from this study demonstrated a lack of knowledge concerning management of the FTS programs. Therefore, foodservice directors should educate staff concerning managerial issues related to these programs. This might include increased communication regarding availability and/or specifications of upcoming local menu items or staff in-service training on how to safely prepare unique varieties of fruits and vegetables and why it is important to students’ health. Further, given that about a third of participants currently

Table 6: Differences in mean ratings of barriers by geographic location (n=165-211)^a

Geographic Location	Mean ^b ± SD								P-Value ^c
	California	Colorado	Oklahoma	Minnesota	Texas	North Carolina	Maryland	Connecticut	
Local produce has a different appearance than non-local produce	3.71±0.77	3.79±0.92	3.44±0.98	4.08±0.86	3.65±0.78	3.39±0.94	3.57±0.94	3.82±1.00	0.167
The amount of time required to wash local produce is longer than non-local produce	3.72±0.67	3.00±1.19	3.21±1.08	3.63±1.25	3.24±1.18	3.05±0.90	3.00±1.16	2.86±1.36	0.145
It is easier to get students to try local produce than non-local produce	3.14±0.91	3.05±0.62	2.78±0.91	3.12±0.83	2.95±1.00	3.50±0.51	3.17±0.94	3.00±0.93	0.205
Students have never been exposed to some of the local produce items	3.07±1.00	2.61±1.09	3.34±0.94	3.67±1.17	3.06±1.06	3.40±0.88	3.40±1.05	3.74±1.10	0.028*
The quality of local produce is better than non-local produce	3.61±0.85	3.68±0.95	3.74±0.90	3.48±1.05	3.40±1.19	3.48±0.75	3.55±1.06	3.81±1.08	0.850
It is hard to know whether students prefer local produce raw or cooked	3.11±0.83	3.00±0.60	3.41±0.80	3.17±0.96	3.00±1.05	3.32±0.75	3.71±0.72	3.00±1.07	0.086
Staff are less knowledgeable about how to serve local produce compared to non-local produce	2.75±1.13	2.33±0.84	2.50±1.02	2.31±0.88	2.79±0.86	2.27±0.77	2.50±0.96	2.05±0.81	0.186
Local produce is less available than non-local produce	3.07±0.92	3.28±0.83	3.18±0.98	3.71±1.20	3.14±0.79	3.16±0.60	3.09±0.81	4.00±1.05	0.008*
The size of local produce is less consistent than non-local produce	3.63±0.96	3.44±0.98	3.00±0.86	3.68±0.85	3.00±0.78	2.95±0.62	2.95±0.62	3.10±1.12	0.009*
A substitute is needed because an insufficient amount of local produce is received	3.19±0.66	2.75±0.93	2.97±0.95	3.23±0.87	3.22±1.00	2.43±0.98	2.74±0.87	3.62±0.87	0.002*
It is difficult to know student's preferences for local produce	3.53±0.94	3.00±0.91	3.16±0.72	2.96±0.79	3.45±0.76	3.17±1.04	3.26±0.73	3.05±0.95	0.330
Local produce is not as clean as non-local produce	3.47±0.72	3.06±1.06	2.82±0.92	3.86±0.94	3.10±1.04	2.95±0.89	2.68±0.89	2.73±1.08	0.001*
It is difficult to serve local produce items to a diverse student body	2.38±0.72	2.58±0.77	2.58±0.85	2.24±0.78	2.70±0.98	2.47±0.70	2.40±0.75	2.26±0.65	0.491
Processing (e.g. peeling, cutting, packaging) local produce takes more time	3.25±1.21	2.79±0.98	3.09±1.21	3.33±1.28	2.86±1.04	3.10±0.97	3.10±1.14	2.74±1.29	0.615
It is difficult for staff to identify local produce items compared to non-local produce	3.00±1.00	2.79±0.79	2.75±1.08	2.58±1.14	3.09±1.04	2.42±0.77	2.89±0.94	2.70±1.03	0.428
Local produce has a shorter shelf life than non-local produce	3.31±1.20	3.16±0.77	2.67±1.08	2.95±1.02	2.82±1.01	3.06±0.80	2.79±0.86	2.36±0.90	0.071
There are no differences between local and non-local produce	2.94±1.00	2.78±1.00	2.91±1.00	2.15±1.05	2.55±0.74	3.05±0.92	2.95±0.90	2.00±0.62	0.000*
It is more difficult to receive sufficient amounts of local produce compared to non-local produce	3.13±0.92	3.28±0.83	3.00±0.84	3.48±0.93	3.45±0.83	2.89±0.90	3.00±0.87	4.10±0.85	0.000*
Overall mean score	3.18±0.32	2.93±0.30	3.01±0.63	3.31±0.35	3.18±0.66	3.05±0.48	3.04±0.41	3.06±0.33	0.453

^a The actual number of responses varied due to missing data and "don't know" response allowed for barriers^b Likert-type scale was used as follows: 1= Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly Agree^c Results of the analysis of variance (ANOVA) were statistically significant

*(p<.05)

Table 7: Differences in mean ratings of keys to success by geographic location (n=165-211)^a

Geographic Location	Mean ^b ± SD								P-Value ^c
	California	Colorado	Oklahoma	Minnesota	Texas	North Carolina	Maryland	Connecticut	
Knowledge of kitchen staff who are more experienced	3.55±0.83	3.89±.74	3.89±.67	3.96±0.68	3.78±0.75	3.67±.75	3.73±.83	3.86±.71	0.616
Students sampling local produce	4.19±0.68	4.00±0.58	4.08±0.91	4.12±0.97	3.67±0.78	3.48±0.92	4.32±0.65	4.09±0.52	0.004*
Slowly incorporating local produce into the menu	4.05±0.89	3.79±0.71	4.06±0.67	3.48±1.19	3.92±0.74	3.88±0.78	4.32±0.57	3.57±0.95	0.015*
Exposing students to local produce consistently	4.16±0.83	4.00±0.88	4.17±0.56	4.16±0.75	4.00±0.78	3.84±0.80	4.32±0.57	4.22±0.60	0.393
There is positive peer pressure amongst students to try local produce	3.30±1.17	3.11±0.94	3.33±0.96	2.84±1.07	3.30±0.99	3.08±1.02	3.45±0.91	3.48±0.99	0.370
Presenting local produce attractively to students	4.05±1.00	4.05±0.85	4.08±0.68	4.19±0.63	4.07±0.73	3.88±0.73	4.27±0.70	4.13±0.76	0.789
Employees desire to increase use of local produce	3.81±1.03	3.95±0.52	4.03±0.88	4.04±0.79	3.78±0.93	3.64±0.76	4.41±0.50	4.30±0.82	0.020*
Staff encouraging students to try local produce	4.19±0.68	3.89±0.94	4.05±0.91	4.38±0.57	4.04±0.81	3.96±0.74	4.39±0.58	4.52±0.67	0.038*
Serving local produce with condiments	3.62±1.12	3.79±0.71	3.64±0.90	3.68±0.85	3.78±0.70	3.58±0.78	3.86±0.79	3.48±0.79	0.839
Employees personal beliefs aligning with ideals of the FTS program	3.47±0.96	3.68±0.58	3.81±0.86	3.84±0.75	3.70±0.78	3.65±0.78	3.95±0.79	3.63±0.76	0.638
Offering local produce during “snack time”	3.72±0.75	3.68±0.75	3.97±0.83	4.00±0.76	3.96±0.76	3.24±1.05	4.04±0.71	3.44±0.86	0.006*
Using appropriate preparation methods to prepare local produce	4.10±0.94	4.00±0.47	4.14±0.68	4.24±0.66	3.96±0.71	3.71±0.86	4.39±0.58	3.87±0.97	0.062
Getting support from teachers and staff	3.86±1.15	3.84±0.96	3.89±1.02	4.28±0.84	3.96±0.85	3.61±0.99	4.26±0.69	4.17±0.78	0.162
Incorporating local produce into existing recipes	4.10±0.79	4.05±0.62	4.16±0.69	4.16±0.69	4.00±0.68	3.71±0.75	4.22±0.67	3.70±0.93	0.072
Consistency in serving size of local produce	3.57±1.08	3.79±0.86	3.97±0.73	4.00±0.91	3.85±0.66	3.78±0.74	4.09±0.81	3.83±0.83	0.532
Getting support from parents	3.38±1.12	3.74±0.81	4.03±0.81	4.00±1.00	3.81±0.92	3.54±0.98	3.96±0.88	3.61±0.72	0.119
Employee motivation to serve local produce	3.65±1.23	4.16±0.50	4.03±0.91	4.00±0.76	3.93±0.83	3.68±0.90	4.05±0.84	4.26±0.69	0.216
Explaining to students how local produce can be served	3.90±0.97	3.79±0.54	3.97±0.75	3.96±0.79	3.85±0.77	3.61±0.89	4.18±0.66	3.39±0.78	0.032*
Getting to know local farmers	3.85±1.04	3.79±0.71	3.75±1.00	3.84±0.85	3.89±0.75	3.43±0.90	3.86±0.64	3.30±1.15	0.212
Explaining to students how to prepare local produce	3.85±0.99	3.79±0.63	3.65±1.01	3.56±0.92	3.70±0.87	3.65±0.78	4.00±0.85	3.18±1.05	0.147
Getting support from students	3.60±1.27	3.79±0.71	3.70±0.85	3.92±0.91	3.74±0.81	3.57±0.90	4.00±0.74	3.82±0.59	0.684
Training for staff on how to prepare local produce	4.00±0.92	3.84±0.60	3.86±0.92	3.96±0.79	4.11±0.70	3.50±0.98	4.17±0.72	4.09±0.95	0.150
Offering a substitute when an insufficient amount of one item is available	3.55±1.05	3.84±0.50	3.89±0.77	4.00±0.71	3.96±0.76	3.79±0.72	3.96±0.88	4.35±0.71	0.082
Overall mean score	3.83±0.77	3.84±0.47	3.98±0.43	3.94±0.52	3.88±0.61	3.73±0.78	4.20±.54	3.76±.37	0.187

^a The actual number of responses varied due to missing data and “don’t know” response allowed for barriers

^b Likert-type scale was used as follows: 1= Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly Agree

^c Results of the analysis of variance (ANOVA) were statistically significant

*(p<.05)

Table 8: Differences in mean ratings of barriers and keys to success based on meals served (n= 165-211)^a

Number of meals served	Mean ^b ± SD			P-Value ^c
	Small (0-200)	Medium (201-400)	Large (more than 400)	
Barriers				
Local produce has a different appearance than non-local produce	3.70±0.72	3.56±0.92	3.84±0.96	0.166
The amount of time required to wash local produce is longer than non-local produce	3.00±0.96	3.06±1.15	3.59±1.07	0.009*
It is easier to get students to try local produce than non-local produce	2.88±0.52	2.93±0.90	3.41±0.81	0.001*
Students have never been exposed to some of the local produce items	3.13±0.87	3.32±1.09	3.41±1.08	0.572
The quality of local produce is better than non-local produce	3.88±0.82	3.55±1.03	3.58±0.94	0.289
It is hard to know whether students prefer local produce raw or cooked	2.91±0.61	3.19±0.92	3.43±0.89	0.053
Staff are less knowledgeable about how to serve local produce compared to non-local produce	2.13±0.80	2.47±0.93	2.43±0.94	0.244
Local produce is less available than non-local produce	3.48±1.20	3.39±0.92	3.18±0.93	0.324
The size of local produce is less consistent than non-local produce	3.46±0.66	3.12±0.93	3.28±0.88	0.209
A substitute is needed because an insufficient amount of local produce is received	3.04±0.94	3.11±0.93	2.85±0.98	0.278
It is difficult to know student's preferences for local produce	3.05±0.74	3.24±0.89	3.11±0.82	0.524
Local produce is not as clean as non-local produce	2.92±1.09	2.98±1.03	3.22±0.90	0.296
It is difficult to serve local produce items to a diverse student body	2.52±0.73	2.43±0.82	2.47±0.75	0.873
Processing (e.g. peeling, cutting, packaging) local produce takes more time	2.96±1.31	2.87±1.14	3.35±1.01	0.037*
It is difficult for staff to identify local produce items compared to non-local produce	2.63±0.97	2.89±1.03	2.63±0.92	0.212
Local produce has a shorter shelf life than non-local produce	2.85±1.05	2.81±1.02	3.02±0.93	0.488
There are no differences between local and non-local produce	2.48±0.87	2.74±1.01	2.58±0.93	0.383
It is more difficult to receive sufficient amounts of local produce compared to non-local produce	3.30±0.82	3.33±0.99	3.16±0.84	0.574
Overall Mean Score	3.04±0.34	3.04±0.52	3.18±0.42	0.332
Keys to Success				
Knowledge of kitchen staff who are more experienced	3.79±0.74	3.80±0.70	3.75±0.83	0.913
Students sampling local produce	4.11±0.83	3.96±0.82	3.94±0.78	0.629
Slowly incorporating local produce into the menu	3.81±0.92	3.88±0.78	3.88±0.92	0.926
Exposing students to local produce consistently	4.15±0.53	4.10±0.73	4.03±0.78	0.751
There is positive peer pressure amongst students to try local produce	3.11±0.99	3.26±0.96	3.16±1.11	0.683
Presenting local produce attractively to students	4.04±0.64	4.13±0.72	4.02±0.81	0.567
Employees desire to increase use of local produce	4.15±0.60	3.98±0.80	3.91±0.96	0.448
Staff encouraging students to try local produce	4.32±0.61	4.08±0.85	4.20±0.73	0.279
Serving local produce with condiments	3.63±0.84	3.66±0.81	3.67±0.85	0.975
Employees personal beliefs aligning with ideals of the FTS program	3.85±0.72	3.72±0.75	3.65±0.88	0.541
Offering local produce during "snack time"	3.42±0.76	3.87±0.86	3.77±0.88	0.058
Using appropriate preparation methods to prepare local produce	4.00±0.61	4.02±0.75	4.09±0.85	0.794
Getting support from teachers and staff	4.21±0.83	3.97±0.94	3.89±0.95	0.306
Incorporating local produce into existing recipes	4.14±0.65	3.98±0.76	4.02±0.76	0.598
Consistency in serving size of local produce	3.86±0.81	3.82±0.80	3.97±0.89	0.494
Getting support from parents	3.79±0.79	3.78±0.94	3.72±0.93	0.908
Employee motivation to serve local produce	4.08±0.74	3.92±0.87	3.92±0.92	0.700
Explaining to students how local produce can be served	4.04±0.76	3.81±0.76	3.83±0.85	0.409
Getting to know local farmers	3.63±0.84	3.69±0.94	3.81±0.87	0.589
Explaining to students how to prepare local produce	3.74±0.90	3.54±0.96	3.87±0.77	0.056
Getting support from students	3.96±0.81	3.74±0.79	3.72±1.00	0.425
Training for staff on how to prepare local produce	4.04±0.81	3.85±0.85	3.94±0.93	0.571
Offering a substitute when an insufficient amount of one item is available	3.85±0.66	3.90±0.73	3.95±0.94	0.837
Overall Mean Score	3.94±0.45	3.88±0.51	3.88±0.63	0.871

^a The actual number of responses varied due to missing data and "don't know" response allowed for barriers

^b Likert-type scale was used as follows: 1= Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5= Strongly Agree

^c Results of the analysis of variance (ANOVA) were statistically significant

*(p< 0.05)

garden or process garden harvest for later use, hourly staff at schools with FTS programs might benefit from engagement in other activities (e.g. trips to local farms, chef demonstrations) of the program beyond serving local produce in school meals. These suggestions align with findings from DeBliek, Strohbehn, Clapp, and Levandowski (2010) who found that informational posters and development workshops increased hourly foodservice employee's awareness of a university FTS program.

Differences between barriers and keys to success based on geographic location as well as by respondents in schools serving a small, medium or large number of school lunches were identified in this study. This information can be helpful to foodservice directors or FTS leaders by helping them understand that barriers may be specific to particular areas of the country. Although this study included participants from several different regions across the United States, the sample from each region was relatively small; thus caution should be taken in interpretation of findings. Future research could focus on surveying a larger sample of hourly school foodservice workers from each specific region and further exploration of region specific barriers. Future research could also investigate differences in employee perceptions of FTS based on kitchen work areas due to possible differences in work load segmentation depending on the amount of local produce prepared at each school. Differences in barriers were identified for washing, preparing, and serving local produce by respondents at schools with a large number of school lunches served with staff at these schools more strongly agreeing that noted tasks were a barrier (3.18 overall mean score compared to 3.04 overall mean score from small and medium schools). Because staff in larger schools serving more students often has designated responsibilities, such as produce preparation, and because FTS activities in school meals typically involve use of fresh produce, this higher mean agreement score could be due to fewer people in the school bearing a greater burden. Directors can use this information to help develop strategies for processing and serving large populations of students such as redesigning job duties within the kitchen, hiring extra staff, or recruiting volunteers to assist with produce preparation. Data were collected spring of 2014, which was during a time of recent changes to nutritional requirements implemented as part of Healthy Hunger Free Kids Act. Future research could investigate other possible reasons for differences in barriers and keys to success such as local school infrastructure (e.g. space, equipment, and staff), FTS policies, Wellness policies, management (self-operated versus contract-managed) and specific FTS activities (school garden, classroom education, and farm visits). Research to assess effectiveness of developed strategies designed to overcome identified barriers and assessing effectiveness of different training techniques for school staff involved with FTS should also be explored.

This study was limited by the number of school districts participating from each region. Because most regions only had two or three school districts that distributed questionnaires to participants from multiple school buildings in the district, it should be noted that respondents from the same district will likely have similar perceptions toward the FTS program. Using several different districts from each region would be beneficial. Another limitation to this study was that the majority of schools participating had been involved with FTS programs for two or more years. Schools that have had programs for one year or less may perceive barriers and keys to success differently. Efforts should be made in future research to include a larger number of new FTS programs.

This study is the first known that addresses the views of hourly non-management school foodservice employees with hands-on

experience preparing local produce as part of a FTS program. Given the expanding efforts to incorporate FTS programs into schools, a knowledge of the successes and barriers to these programs is important. Findings from this study indicate the importance of maximizing successes and addressing barriers in order to improve implementation and maintenance of FTS programs.

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