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Investigating Food Safety Factors that Influence Child Care Employees' Self-Commitment to Perform Safe Food Handling Practices

Young children are considered a high risk population for foodborne illness. This study aimed to identify which food safety culture and social system factors affected childcare food handler's self-commitment to perform safe food handling practices in South Carolina licensed center-based childcare facilities. Results identified three factors, *manager/coworker support*, the ability to *speak freely*, and *communication* from managers to staff, had the highest correlations with *self-commitment*. However, *speak freely* and *communication* were the only factors with statistically significant effects on *self-commitment*. Conclusions and implications of the study are given.

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The purpose of this research was to investigate the implementation of specialized foodservice software into hospital foodservice departments through a multi-case study design. Five sites were included in the study, 27 employees involved in the implementation were interviewed. Findings included: identification of barriers and facilitators to implementing software, preferred methods of training, and necessary communication tools. Employees of the foodservice department saw value in the use of technology. Foodservice directors need to familiarize themselves with organizational change management prior to major software implementation to smooth the transition and increase the likelihood of new software acceptance.

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Research Contribution

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COLLEGE STUDENTS' PURCHASING PRACTICES FROM FOOD AND BEVERAGE VENDING MACHINES AND NUTRITIONAL VALUE OF ITEMS SELECTED

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ABSTRACT

Access to vending machines, with traditionally low nutritional value snack items, has shown to contribute to weight gain in college students. This study investigated university students' vending purchasing practices and the nutrient values of items purchased using the federal Smart Snacks guidelines. A total of 429 college students were surveyed at point of vending item purchase. Descriptive statistics summarized respondents' demographics and responses. Top reasons for purchases were hunger, convenience, and taste with nutrition as the least reason. A total of 40% beverages and 2% foods purchased were healthy. Future research should investigate increasing healthy food availability and selection.

Keywords: college students, vending items, healthy snacks, Smart Snacks

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INTRODUCTION

Eating nutritiously may be challenging for students entering college as they transition to a more independent stage of their life (Brown, Flint, & Fuqua, 2014; LaFountaine, Neisen, & Parsons, 2006). For the first time, many students are completely responsible for all food purchases and meal preparation (Schwarz, Levandoski, & Edelstein, 2014). The freshmen year, especially, of college has been shown to be a critical period for managing weight due to changing eating behaviors (Anderson, Shapiro, & Lundgren, 2003; Hoffman, Policastro, Quick, & Lee, 2006; Mihalopoulos, Auinger, & Klein, 2008) and is a time when life-long healthy or unhealthy eating behaviors may be established (Brown et al., 2014; Kicklighter, Koonce, Rosenbloom, & Commander, 2010).

Because the university environment provides a wide range of eating venues to a large number of students, it is important to understand the impact of those venues on student health. Influences such as variety of cafeteria foods choices, cost of food choices, and increased snacking, can negatively impact healthy eating and contribute to weight gain (Crombie, Ilich, Dutton, Panton, & Abood, 2009; LaFountaine et al., 2006). Furthermore, snacking and access to vending machines, that traditionally house low nutritional quality food and beverage products, have been identified as contributing to weight gain in college students and to an overall obesogenic food environment (Brown et al., 2014; Byrd-Bredbenner et al., 2012). While few studies have been published on college students' purchasing behavior with vending machines on college campuses, (Ali, Jarrar, Abo-El-Enen, Al Shamsi, & Al Ashqar, 2015; Brown et al., 2014; Caruso, Klein, & Kaye, 2014; Pelletier & Laska, 2013) one study found that almost 50% of students on the college campus purchased items from vending machines at least one or more times per week (Pelletier & Laska, 2013). Reasons cited for purchasing items from vending machines are hunger, convenience, taste, and cost (Caruso et al., 2014). When interviewed, students agreed that access to vending machines contributes to poor eating habits and those who often purchase foods from vending machines gain weight (Smith-Jackson & Reel, 2012).

In an effort to improve healthy food selections offered in vending machines, one state university adopted a vending policy requiring that a certain percentage of healthier vending items be offered. However, it was found that less than 8% of students selected the healthier vending items (Caruso et al., 2014). In another study, vending machine inventory was manipulated to increase the number of healthy items being offered in five targeted vending machines. Nutrition information and encouraging messages to select healthy items were posted near the machines. A pre and post assessment showed that no significant differences were found in decreasing the purchases of the higher calorie and less nutrient dense items across the five vending machines. However, there was a 50% increase in healthy vending items selected although no significance was reported (Brown et al., 2014).

While advocacy for increasing healthy snack items in vending machines at the university level has been seen, support in addressing the nutritional value of vending machine items has largely occurred in primary and secondary school settings with the passing of the Healthy Hunger-Free Kids Act, 2010. As of school year 2014-2015 all foods sold within the school day must meet nutrition standards as stated in Smart Snacks regulations (Food and Nutrition Services, 2014). Food and beverage items must meet the nutrient criteria for total calories and levels of fat, sodium, and sugar in order to be sold in competitive food venues such as a la carte sales in cafeterias, school stores, and vending machines. Earlier studies showed that schools having strong compliance with nutrition standards for competitive foods saw an improvement in the school nutrition environment (Hennessy et al., 2014; Lyn, O'Meara, Hepburn, & Potter, 2012; Metos & Nanney, 2007; Park, Sappenfield, Huang, Sherry, & Bensyl, 2010; Snelling & Kennard, 2009).

While positive outcomes have occurred in primary and secondary schools with competitive food policy compliance, few evaluations of university campus' food venues and potential impact on student health have been published (Brown et al., 2014; Caruso et al., 2014; Pelletier & Laska, 2013). Several organizations have made efforts to bring campus wellness to the forefront. The National Prevention

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Council under the Office of the Surgeon General has developed strategies encouraging colleges and universities to increase the availability of healthy foods in vending machines that require a commitment from the various university stakeholders (Surgeon General, 2014). The American College Health Association established Healthy Campus Coalition 2020 with national health objectives for college and university students. Objectives targeting students include increasing healthy weight, reducing obesity, increasing fruit and vegetable intake, and increasing the number of students receiving nutrition information from their institute (American College Health Association, 2012). With a reported 20.4 million students expected to attend American colleges and universities in the fall of 2017, (National Center for Educational Statistics, 2016), academic campuses would be an impactful venue in addressing weight and health issues.

The purpose of this study was to investigate vending machines food venues by 1) identifying university students' purchasing practices and 2) evaluating the nutrient value of vending items purchased.

METHODS

Procedure

Location of all food and beverage vending machines on two southern public university campuses was provided through each university's contractual services department. At University 1, graduate students who were enrolled in a graduate nutrition education course, during fall 2016, were recruited to collect data from students who purchased items from targeted vending machines. Prior to data collection, the graduate students were trained in research methods for questionnaire data collection. At University 2, a faculty member and graduate student researcher were recruited to oversee and distribute the same questionnaires and collect data during the same time frame using similar methods. All data collectors at both universities completed the CITI Human Subject Research Education Program required by the Universities' Internal Review Boards.

At University 1, paper questionnaires were distributed to students at the point of vending item purchase in all 23 academic buildings, the student union, library, and recreation center. At University 2, a mixed method of distributing paper and online questionnaires was used. Paper questionnaires were distributed to students at 8 of the 22 academic buildings and two library sites which were identified as having the highest usage. To increase participation, the data collector posted signs on the vending machines in all academic buildings and two libraries to access the survey through Qualtrics, an online survey program. Neither University distributed questionnaires to students in buildings with restricted access, such as student dormitories.

At the point of purchase, students were asked by the data collectors to complete a questionnaire about their purchasing practices. The data collectors followed a script which asked each student to provide voluntary verbal consent to participate in completing a two-minute questionnaire. The data collectors confirmed that participants were students and that they had not already completed the questionnaire at another vending machine.

Questionnaire Content

The first section of the questionnaire was completed by the data collectors who documented the product manufacturer, product name, product flavor, size, and price for the vending item selected by the student. The next two questions were based on criteria found in previously published research (Caruso et al., 2014), modified for this study, and completed by the student: 1) frequency of vending purchases and 2) reasons for their selection (taste, price, nutritional value [added], convenience, thirst and/or hunger, other). The next three questions were added: 3) was item purchased considered a meal or snack, 4) if nutrition information would be of interest, and 5) if nutrition information would influence their selection. The questionnaire also requested self-reported demographic information on gender, age, classification (freshmen, etc), full time/part time student status, ethnicity, and on campus or off campus residence.

Prior to the primary study, the questionnaire was pilot tested using a convenience sample of 12 graduate students who were asked to evaluate the questionnaire for clarity and inclusiveness of contents. Based on their input, the questionnaire was minimally revised. This research was approved by both Universities' Internal Review Board prior to the beginning of data collection.

Vending items selected by students were evaluated based on nutrient allowances for high school students established by Smart Snacks nutrition standards (United States Department of Agriculture, n.d.) and were identified as compliant (healthy) or non-compliant. Nutrient information needed for assessment was obtained using the *Alliance for a Healthier Generation's Smart Snacks Product Calculator and Alliance Product Navigator tools product generator* (Alliance for a healthier generation., n.d.), Nutrition Facts labels, and/or food manufacturers' websites. Nutrient standards are for one serving size and are as follows:

Foods

- Whole grain-rich grain product or have as the first ingredient a fruit, a vegetable, a dairy product, or a protein food
- Calorie limits: ≤ 200 calories
- Sodium limits: ≤ 200 mg
- Fat limits: Total fat: ≤35% of calories, Saturated fat: < 10% of calories, Trans fat: zero grams
- Sugar limit: ≤ 35% of weight from total sugars in foods

Beverages

- Plain water (with or without carbonation)
- Unflavored low fat milk, unflavored or flavored fat free milk
- 100% fruit or vegetable juice and 100% fruit or vegetable juice diluted with water (with or without carbonation), and no added sweeteners.
- No more than 20-ounce portions of calorie-free, flavored water (with or without carbonation); Other flavored and/or carbonated beverages that are labeled to contain < 5 calories per 8 fluid ounces or ≤ 10 calories per 20 fluid ounces.
- No more than 12-ounce portions of beverages with ≤ 40 calories per 8 fluid ounces, or ≤ 60 calories per 12 fluid ounces

Data Analysis

Descriptive statistics of means, standard deviations, frequencies, and percentages were used to summarize respondents' demographics and responses (e.g., healthy versus non healthy vending items). Chi-square analysis was used to compare study variables and to evaluate how students responded differently to questions by demographics.

RESULTS AND DISCUSSION

Demographics

A total of 429 questionnaires were completed with 295 questionnaires completed at University 1 and 134 completed at University 2. Table 1 reports student demographics. Numbers of male and female students at University 1 were 52.88% and 47.12% respectively. University 2 had a lower percentage of male than female students with 33.58% to 66.42%, respectively. Ethnicity and living status for students were similar among the two universities. University 2 had a larger percentage of students who were 26 or older. Student data on mean age of graduate and undergraduate students under age 26 at University 1 was 90.80% and at University 2

Table 1: Demographic Characteristics of University Students.

	University 1 (n = 295[a])		University 2 (n = 134[a])	
Characteristics	**n**	**%**	**n**	**%**
Gender				
Male	156	52.88	45	33.58
Female	139	47.12	89	66.42
Classification				
Freshman	39	13.22	18	13.43
Sophomore	48	16.27	8	5.97
Junior	76	25.76	23	17.16
Senior	93	31.53	64	47.76
Graduate	37	12.54	18	13.43
Age				
18	22	7.46	11	8.21
19	49	16.61	7	5.22
20	46	15.59	14	10.45
21	67	22.71	28	20.90
22	39	13.33	26	19.40
23	33	11.19	10	7.46
24	16	5.42	8	5.97
25	6	2.03	6	4.48
26 or older	16	5.42	24	17.91
Ethnicity--				
White	223	75.59	96	71.64
Hispanic or Latino	9	3.05	7	5.22
African American	54	18.31	24	17.91
Native American	1	0.34	1	<.01
Asian/Pacific Islander	3	1.02	5	3.73
Other	4	1.36	0	0
Living Status				
On Campus	64	21.69	31	23.13
Off Campus	230	77.97	103	76.97

[a] Totals may not equal 295 or 134 and percentages may not equal 100 due to missing data and was excluded in analysis.

was 71.40% during fall 2016. The majority of students at University 1 (77.97%) and University 2 (76.97%) lived off campus.

To identify how frequently students purchased from vending machines, they were provided a frequency range from less than 1 time per month to as often as daily (Table 2). Chi-squared analysis showed that students at University 1 made purchases from the vending machine significantly more with 74.24% purchasing vending items at least one time per week compared to 45.52% at University 2 ($\chi^2(4, N = 429) = 47.05, p < .001$). Other studies on purchasing frequency have shown 43%-54% of students purchase vending items daily to three times per week (Caruso et al., 2014; Pelletier & Laska, 2013) . With concerns about freshmen students and weight gain, chi-

Table 2: Vending Purchasing Frequency by University

	University 1 (n = 295)		University 2 (n = 134)	
Frequency	**n**	**%**	**n**	**%**
Less than 1 time per month	16	5.42	22	16.42
1 time per month	15	5.08	17	12.69
2 times per month	45	15.25	34	25.37
1-3 times per week	150	50.85	56	41.79
Daily	69	23.39	5	3.73

x^2 (1, N = 429) = 47.05, $p < .001$

square showed that freshmen did not purchase vending items at a significantly higher frequency than other classmen at both Universities except when compared to graduate students at University 1($x^2(16, N = 429) = 47.74, p < .001$).

Almost all students (94.50%) purchased the food or beverage item as a snack. Increased snacking among college students has been shown to contributed to weight gain (Crombie et al., 2009). No significant differences were found between frequency of purchasing and gender or living status within each University. Students at both universities identified, in the same order of prevalence, their main four reasons for vending item selection as 1) hunger or thirst, 2) convenience, 3) taste, and 4) price (Table 3), supporting similar results found by Caruso, Klein, and Kaye (2014). However, taste was selected at a significantly greater percentage at University 2 (x^2 (1, N = 429) = 13.12; $p < .001$).

Nutritional value and "other" where identified as being the least two reasons for purchasing a vending item. Example of comments contributing to the other category included needing caffeine, needing energy, or no time. It has been surmised that nutritional quality of the food item may be important but when considered in tandem with taste and price, individuals may select a less nutritious food (French, 2003). Other explanations for nutritional value not being a higher ranked reason could be that students interested in eating a nutritious snack may seek other food venues that provide healthier food options or students are not aware that items in most vending machines on university campuses have been found to house energy dense low nutrient foods (Byrd-Bredbenner et al., 2012; Kubik, Lytle, & Farbakhsh, 2011; Nickelson, Roseman, & Forthofer, 2010; Park et al., 2010). It may be that students select vending machine items when they want an energy dense low nutrient snack. However, one study did show that if healthy food items are placed in vending machines and identified as healthy, that student selection of those items increases(Brown et al., 2014). It has been reported that that students struggle with eating healthy due to a lack of healthy food choices on campuses and with snacking being used as a coping mechanism (LaFountaine et al., 2006).

Table 3: Reasons for Selecting Vending Beverage or Snack

	University 1(n = 295)			University 2 (n = 134)		
Reason	**n**	**%**	**Ranking**	**n**	**%**	**Ranking**
Hungry/thirsty	193	65.42	1	87	64.93	1
Convenience	173	58.64	2	71	52.99	2
Taste***	78	26.44	3	59	44.03	3
Price	30	10.17	4	18	13.43	4
Other[a]	21	7.12	5	8	5.97	6
Nutritional value	13	4.41	6	9	6.72	5

***x2 (1, N = 429) = 13.12; $p < .001$

[a]Other includes "need energy," "caffeine," "cheaper than P.O.K.," "no time."

Note. Total responses may exceed 295 and 134 due to multiple responses.

Table 4: Students' Preference for Nutrition Information on Vending Items

	University 1 (n = 295)		University 2 (n = 134)	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Would like to have nutrition information				
Males	87 (55.77)	69 (44.23)	24 (53.33)	21 (46.67)
Females	90 (64.75)	49 (35.25)	71 (79.78)	18 (20.22)
Nutrition information would influence my purchasing decision				
Males	81(51.92)	75(48.08)	23 (51.11)	22 (48.89)
Females	92(66.19)	47 (33.81)	61 (68.54)	28 (31.46)

Note. Chi square analysis showed a significant association ($p < .05$) between the following variables: University 1 Nutrition information and gender (x^2 (1, N = 295) = 5.55, $p < .05$)
University 2 Nutrition information and gender (x^2 (1, N = 134) = 10.13, $p < .01$)
University 2 Influence purchasing decision (x^2 (1, N = 134) = 3.88, $p < .05$)
University 1 & 2 Nutrition information and gender (x^2 (1, N = 429) = 5.91, $p < .01$)

While overall the price of the vending item ranked fourth at both universities and it can still play an important role in motivating students to select healthier foods. Even a small reduction in sales price of low fat vending snacks has shown to increase number of purchases (French, 2003). Campus environments that support healthy food choices by increasing their availability at lower prices than less healthy snacks, make it easier for students to achieve and maintain health goals (Byrd-Bredbenner et al., 2012). These actions could be especially impactful since a trend towards healthy eating habits has been shown in undergraduate female students (Schwarz et al., 2014).

Students in this study were asked if they would be interested in having nutrition information provided for vending food and beverage items. Table 4 shows that a greater percentage of females at University 1 (64.75%) and University 2 (79.78%) than males at University 1 (55.77%) and University 2 (53.33%) are in favor of having nutrition information for vending items. For University 1, chi-square showed no significant differences between females and males in their preference for having nutrition information provided, but a significant difference was shown at University 2 with females preferring more than males to have nutrition information available (χ^2 (1, N = 134) =10.13, $p < .01$). A comparison between universities showed that females from University 2 were more interested in having nutrition information than those from University 1 (x^2 (1, N = 429) = 5.91, $p < .01$). Female college students are becoming more interested in healthy eating (Schwarz et al., 2014), but may not take advantage of nutrition information due to; time constraints for reading each vending item nutrition label, lack of interest in food labels, or not knowing how to read food labels (Ali et al., 2015). Additionally, with nutrition information primarily on the back or side of the packaging it is difficult to read nutrition facts labels.

Students were also asked if nutrition information was available for vending food and beverage items, would it influence their item selection. Again, females at Universities 1 and 2 (66.19% and 68.54% respectively) had a greater percentage of agreement than males at Universities 1 and 2 (51.92% and 51.11%, respectively) that nutrition information would influence their vending item selection. Chi-square analysis did show a significant difference between females and males and influence on vending item purchases at University 1 (χ^2 (1, N = 295) = 5.55, $p < .05$) and at University 2 (χ^2 (1, N = 134) = 3.88, $p < .05$). Chi square analysis showed no significant differences between Universities and gender and nutrition information influencing purchases.

Students, at both universities, who responded they were interested in having nutrition information were significantly more likely to respond that having nutrition information would influence their purchasing decisions (χ^2 (1, N = 429) = 191.30, $p < .01$). This supports previous research that reported an increase in the selection of healthier items when nutrient information on vending items was provided. However, since students in this study ranked nutrition as one of the least ranked reasons for the purchasing a vending item, it may be that students are aware that vending machines lack healthy food items and therefore when choosing to purchase a vending food item nutrition is not considered. Students have expressed the need to improve the nutrient quality of vending foods and recommended educational approaches in selecting healthy items by placing nutrition tips on vending machines and using peer education and support (Ali et al., 2015).

The nutritional content of vending items selected by students was evaluated for compliance with Smart Snacks. Table 5 shows that Smart Snack compliance was highest for beverages with 38.57% compliance at University 1 and 45.45% compliance at University 2. There were no compliant food items purchased at University 1 and only 2.22% purchases at University 2. To see if there was a relationship between the student's academic classification and selection of Smart Snack compliant items, a chi square analysis was conducted. The results found there was no significant relationships within either University (University 1: x^2(4, N = 295) = 4.05, p = .39; University 2: x^2(4, N = 134) = 2.31, p = .67).

The higher percentage of beverage compliance among students is not surprising since popular beverages selected were water or sugar-free beverages, such as diet colas and sports drinks which, if an appropriate size, comply with Smart Snack nutrient allowances for high school students. Costs of foods and beverages purchased were collected and found that price was determined by product size and type, not nutritional content. For example, there were no price differences between the same size regular and calorie free carbonated beverages. Juice was selected by five students but did not meet nutrient allowances due to being oversized and/or less than 100% juice. A nutritional assessment on foods and beverages sold in vending machines on 11 university campuses located in the U.S reported that the majority of snacks offered were high in calories and

Table 5: Healthy Snack Selection Compliance

	Compliant n (%)	Non-Compliant n (%)
University 1		
Beverage	81 (38.57)	129 (61.43)
Snack	0 (0)	85 (100)
University 2		
Beverage	20 (45.45)	24 (54.55)
Snack	2 (2.22)	88 (97.78)

fat and the majority of beverages were high in calories and sugar (Byrd-Bredbenner et al., 2012).

Neither University in the study had policies established for nutrient requirements of vending items. Few colleges have nutrition policies regarding healthy vending (Brown et al., 2014) but as of July 26, 2017, (extended com0pliance from December 1, 2016) all businesses that own or operate 20 or more vending machines must clearly post caloric content of all vending machine items (Food and Drug Administration, 2014). It will be interesting to see if calorie content information alone has any impact on vending item selection since past studies have shown that nutrition information coupled with marketing did not significantly decrease sales of poor nutritional quality foods (Brown et al., 2014).

CONCLUSION AND APPLICATIONS

In addressing overweight and obesity, much attention and support have been given to primary and secondary schools' nutrition environment through policies included in the Healthy Hunger-Free Kids Act, 2010, and more recently, Smart Snack nutrition standards for competitive foods. When students transition from high school to college, they may for the first time be solely responsible for their food purchases. They may not have the skills or knowledge for purchasing healthy foods (Schwarz et al., 2014). At this time no federal regulations address nutrition standards for any college campus food venues. While organizations such as the National Prevention Council and the American College Health Association Healthy Campus Coalition 2020 have established standards and goals providing guidance to universities in addressing students' health, it is university administrations' prerogative to implement such standards.

There is evidence that offering a greater variety of healthier foods, reducing energy dense low nutrient foods, encouraging the purchase of healthy foods through lower prices, and providing nutrition information can have a positive effect on healthier vending selections (Brown et al., 2014; Caruso et al., 2014; French, 2003). As recommended by the American College Health Association, strategies should be developed on how to provide nutrition education to all university students. However the most effective way to do this has not yet been established. This research showed that the majority of students would like (for whatever reason) nutrition information provided for vending items and if it were, it would influence their selection.

An assessment of all vending items in vending machines located on University 1's campus was conducted in a separate study not yet published. Preliminary results showed two percent of vending snacks and 40% of vending beverages met Smart Snack nutrition standards. These results coincide with previous research showing that the majority of vending items are energy dense low nutrient foods and beverages (Byrd-Bredbenner et al., 2012; Caruso et al., 2014). So, while students had the opportunity to purchase Smart Snack compliant beverages at some machines, less than 40% of total beverages purchased were compliant.

Now is the time for university foodservice management administrators to champion change by taking the lead in fostering healthy food offerings in all food venues. Strategies to improve the university food nutrition environment can begin with benchmark assessments of the various food venues and their healthy food offerings. These assessments can provide valuable input to university administrators, campus wellness programs, and students who want to establish campus policies to promote healthful eating (Byrd-Bredbenner et al., 2012). Improvement can begin by using a multi-layered approach of 1) providing a greater number of healthier options in vending machines and/or, providing dedicated machines with only healthy options, 2) marketing healthy options by providing nutrition information and education to students, and 3) incorporating pricing strategies to encourage healthy selections. Vending machines could be viewed as a tool available for teaching and supporting students in healthy eating habits. However, it most likely will take financial and policy support by university administrations to improve the nutritional quality of campus food and beverage vending.

Data collection for this research was limited to only two southern universities and a small percentage of university students so it cannot be generalized to the overall university population or to other individual universities. While data was collected on students' ranking of reasons they purchased from vending machines, a more in-depth investigation as to the importance and influence of their reasons for purchasing vending items would provide greater insight on how changes can be made to motivate students to purchase healthier items. Additionally students were not asked what type of nutrition information they would like or what would influence them to select healthier items. Assessing and addressing students' nutrition education needs and best delivery methods could facilitate the demand by students for healthier vending options. Data was not collected from vending machines housed in restricted access buildings such as campus housing. Students who have access to vending machines 24 hours a day may have different reasons for purchasing vending items.

Further research should address these limitations in an effort to improve the nutritional make-up in the vending items students are purchasing. In addition, efforts should be made to address other campus food venues, assessing the nutrition environment as a whole and students' overall access to healthier food items.

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Research Contribution

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INVESTIGATING FOOD SAFETY FACTORS THAT INFLUENCE CHILDCARE EMPLOYEES' SELF-COMMITMENT TO PERFORM SAFE FOOD HANDLING PRACTICES

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ABSTRACT

Young children are considered a high risk population for foodborne illness. This study aimed to identify which food safety culture and social system factors affected childcare food handler's self-commitment to perform safe food handling practices in South Carolina licensed center-based childcare facilities. Results identified three factors, *manager/coworker support*, the ability to *speak freely*, and *communication* from managers to staff, had the highest correlations with *self-commitment*. However, *speak freely* and *communication* were the only factors with statistically significant effects on *self-commitment*. Conclusions and implications of the study are given.

Keywords: Childcare; Food safety; Organizational culture, Social system

INTRODUCTION

In 2013, over 15.6 million children under the age of five were in licensed center-based childcare facilities (i.e., commercial, church, and preschools) or home-based childcare facilities in the United States (U.S. Census Bureau, 2013). A licensed center-based childcare facility is defined as providing care and education to 13 or more children in a non-residence setting, operating more than four hours a day and more than two days a week (South Carolina Child Care, 2016). On average, children attending child care spend 33 hours per week in some type of childcare setting (U.S. Census Bureau, 2013). Breakfast, lunch, and snacks are prepared and served at most childcare facilities. Childcare employees are often involved in food preparation, serving, and cleanup which makes the need for safe food handling practices throughout the flow of food paramount (Todd, Greig, Bartleson, & Michaels, 2007).

Young children are considered a high risk population for foodborne illnesses (FBI) (Food and Drug Administration [FDA], 2009) because their immune systems are not fully developed, they have low body mass and reduced stomach acid production (Pew Health Group, 2014); as well as a lack of control over food handling practices (Center for Disease Control and Prevention, 2013). In 2010, the Center for Disease Control and Prevention (CDC), using population-based surveillance for laboratory-confirmed cases of infection, found that children ages four years and younger have 4.5 times the number of infection incidents transmitted through food than adults aged 20-49 years. Furthermore, children in licensed center-based childcare facilities are 3.5 times more likely to contract FBIs in comparison to children cared for in their own home (Lu et al., 2004). Yet, this could be drastically higher as many small FBI outbreaks go unreported (Painter et al., 2013). The size of the facility also impacts the frequency of infectious disease (Brady, 2005).

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In the final phase of a ten-year study, the FDA observed within foodservice establishments a low level of compliance with food safety policies; the three highest non-compliance factors were time and temperature abuse, poor personal hygiene, and cross contamination (FDA, 2009). Yet, each of these non-compliance factors could be mitigated by improving employee food handling practices. However, research findings indicate that knowledge and training alone are not enough to improve safe food handling practices (Roberts et al., 2008; York et al., 2009). Food safety practices are influenced by more than just proper knowledge and attitudes; food safety practices are partly influenced by the prevailing cultural norms found within foodservice environments (Yiannas, 2015).

Food Safety Culture

Schein (1992) detailed organizational culture as "the pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration which have worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to other problems" (p. 12). Within the last two decades there has been a shift in emphasis in safety literature, moving away from individual-level accident antecedent factors (e.g. error or non-compliance with safety procedures), and moving towards broader organizational factors (e.g. safety culture) (Zohar, 2010). "In safety culture the concept of organizational culture is taken and applied to one specific area of a business' activities, i.e. the safety of people working within a business or people who could be adversely affected by its existence, products or services" (Griffith, Livesey, & Clayton, 2010a, p.429).

Food safety research has only recently started to examine food safety practices through the organizational lens. Yiannas (2009) identified food safety culture as a specific form of organizational culture in which there are shared perceptions of food safety policies and procedures among members of an organization. Previously assessed food safety culture factors are identified in Table 1. In previous studies there are three major recurring factors of safety culture; management and coworker support, communication, and employees' attitudes and behaviors.

Management and Coworker Support. Hofmann and Morgeson (1999) defined perceived organizational support as a measure of the level of support that employees perceive the organization has provided to them. Medeiros, Cavalli, and Proenca (2012) identified specific managerial and organizational behaviors including providing supervisory and peer support, adequate resources, training, and a positive management culture. Management effectiveness was a significant overall factor contributing to the prevention of FBI outbreaks (Griffith, 2010). Furthermore, the strength of a food safety culture was correlated with how important management perceives food safety to be (Griffith, 2010).

Table 1: Previously Assessed Food Safety Culture Factors

Authors	Factors of food safety culture	Area adapted/Assessment instrument
Ball, Wilcock, & Colwell (2010)	Management commitment; work unit commitment; food safety training; infrastructure; and worker food safety behavior	Food safety culture questionnaire
Cooper (2000)	Subjective internal psychological; and food safety behaviors; situational and environmental	Food safety culture questionnaire, observations, audits
De Boeck, Jacxsens, Bollaerts, & Vlerick, (2015)	Leadership; communication; commitment; resources; and risk awareness	Food safety culture questionnaire
Griffith et al. (2010a)	Management systems; leadership; communication; commitment; environmental and risk awareness; and perception and risk taking behavior	Food safety management
Jespersen, Griffiths, Maclaurin, Chapman, & Wallace (2016)	Perceived value; people systems; process thinking; technology enabled; and tools and infrastructure	Food safety maturity model
Neal, Binkley, & Henroid (2012)	Management commitment; and worker food safety behavior	Food safety culture questionnaire
Nyarugwe, Linnemann, Jan Hofstede, Fogliano, & Luning (2016)	organizational and administrative characteristics; technical facilities/resources; employee characteristics; food safety policy/procedure characteristics; and food safety performance	Food safety culture
Taylor (2011)	Knowledge; attitude/psychological; external; and behavioral.	Food safety management
Thogaru (2015)	Commitment; control; communication; and competence	Food safety culture questionnaire, audits
Ungku Fatimah et al. (2014b)	management and coworkers support; communication; self-commitment; environment support; work pressure; and risk judgment	Food safety culture questionnaire
Yiannas (2009)	Leadership; employee behavior; management support; accountability; and communication	Food science
Yiannas (2015)	Leadership; commitment; communication; continuous training; and attitude/psychological	Food science

Communication. Communication was a necessity in any discussion of culture. Yiannas (2009) argues that the way in which food handling practice messages are presented is crucial. Griffith (2010) reported the need for food handlers to "know what they need to know." It was essential for communication to occur to ensure food handlers have knowledge of food safety practices and how to use that knowledge. Knowledge of food safety/hygiene alone does not always translate into implementation of food safety practice, thus constant communication for new and tenured employees was needed (Griffith, 2010). Important to note was the significance of communicating to new employees who are learning the food safety culture (Griffith et al., 2010a).

Employees' Attitudes and Behaviors. Griffith et al. (2010a) stated that food safety culture requires contributions from people at all levels. Two variables found to be significant in foodservice employees' safe food handling practices were their attitude toward food safety and their level of perceived control (Clayton & Griffith, 2008). Cooper (2000) identified that different subcultures will emerge and form around different position levels in an organization. It has been shown that these subcultures may compete for priority within the organization. Griffith et al. (2010a) identified that a major barrier to food safety culture was a culture of saving money.

Social System. The aspects of the social system important to food safety culture include work pressures and environmental support. "The actual behavior of individuals, their symbolically oriented actions, may be to a widely varying degree congruent with the meanings of the cultural system" (Parsons, 1972, p. 255). The organizational environment has an influence on motivation and self-commitment to follow proper food safety practices (Yiannas, 2009). Work pressure and stress has an impact on work performance, behavior, practices or behavioral norms (Griffith et al., 2010a). Previous research has shown that self-commitment is a key factor in influencing an organizations food safety culture (Ungku Fatimah, Strohbehn, and Arendt, 2014b).

Assessing Food Safety Culture and Social System

Griffith, Livesey, and Clayton (2010b) listed multiple reasons to assess food safety culture and social system: (1) to assess potential compliance with safety management systems to avoid error and food poisoning costs; (2) raise awareness of food safety; (3) benchmark for future comparisons; (4) make informed decisions about training; (5) promote commitment; and (6) identify weaknesses and evaluate risk. Assessing food safety culture will help foodservice organizations understand food handler behaviors (Ungku Fatimah et al., 2014b; Yiannas, 2009). Once an organization has identified which food safety factors positively influence employee's self-commitment to following recommended food safety practices, modifications should be made that will align the current culture with the identified influential factors. No known research has been conducted in regards to food safety culture and social system within childcare facilities. Thus, the purpose of this study was to investigate food handling employees' perceptions of food safety culture and social system in licensed center -based childcare facilities using a quantitative research approach. The specific research objective for the study was to identify which food safety culture and social system factors affect childcare food handling employee's self-commitment to perform safe food handling practices.

METHODS

Research Design

A quantitative approach, utilizing two separate paper-based questionnaires, was used to complete the study's research objectives. A childcare director questionnaire was used to collect childcare

facility organizational characteristics as well as food safety policies and training practices. A childcare food handling employee questionnaire was used to collect perceptions of food safety culture factors and employee demographics. Once both types of surveys were collected, director survey data (for each facility) was entered into the corresponding facility employee survey data. Approval from the Human Subjects Review Board was obtained prior to data collection.

Sample

The target population for this study was South Carolina licensed center-based non-supervisory childcare employees involved in food handling, as these employees handle food which the children consume. The setting for this study was South Carolina licensed center-based childcare facilities including commercial, church, and preschools. Licensed center-based childcare facilities provide care and education to 13 or more children in a non-residence setting, operating more than four hours a day and more than two days a week. All exempt (i.e. only operated less than 4 hours per day or on school holidays or no licensing or inspections required by law) facilities were eliminated as they are not required to be licensed or inspected by law. Additionally, home-based childcare facilities were eliminated as this type of facility often only has one or two employees, thus assessing food safety culture would be difficult.

As one of the study objectives was to compare food safety culture based on operational characteristics (size of childcare facility), a stratified random sampling technique was used to ensure the sample represented the population of 1,400 South Carolina licensed center-based childcare facilities (South Carolina Child Care, 2016). Maximum child capacity was the characteristic used to divide the 1,400 South Carolina licensed center-based childcare facilities into three separate strata: (1) small facilities (0-100 children); (2) medium facilities (101-200 children); and (3) large facilities (201+ children). From each of the three strata, 33 South Carolina licensed center-based childcare facilities were randomly selected to participate in the current study (total facilities=99). Random selection was conducted by alphabetically listing all South Carolina licensed center-based childcare facilities for each strata. Then starting at the fourth licensed center-based childcare facilities listed, each fifth facility was selected until 33 facilitates per strata were obtained.

Each of the 99 facilities were sent a packet containing one director questionnaire and ten employee questionnaires, therefore a total of 99 director questionnaires and 990 employee questionnaires were sent to licensed center-based childcare facilities for completion.

Research Instruments

Director. Based on the review of literature of childcare studies and food safety studies (Enke, Briley, Curtis, Greninger, & Staskel, 2007; Wohlgenant et al., 2014), the childcare director questionnaire was developed. The director questionnaire consisted of 21 questions to evaluate *childcare facility demographics, and childcare facility food safety policies and training practices.* The childcare facility demographics section contained 13 questions including: legal status (i.e. for profit, nonprofit); type of childcare facility (i.e. independently owned or operated, chain/franchise); number of full-time and part-time foodservice employees; number of food handling employees; number of meals served (i.e. breakfast, lunch, dinner); type of meal service; program affiliation (i.e. Head Start, Child and Adult Care Food Program [CACFP], National Association for the Education of Young Children [NAEYC]); child maximum capacity; and current enrollment. The childcare facility food safety practices section contained 8 questions pertaining to food safety policies (3 questions); food safety training (4 questions); and food purchasing (1 question).

Employee. The childcare employee questionnaire consisted of two sections. The first section assessed childcare food handlers' perceptions of factors pertaining to the organizational culture of food safety in describing their current childcare facilities. Respondents were asked to rate their level of agreement to each of the 31 statements which described their current work environment, using a seven-point Likert-type scale (1 = Strongly Disagree; 7 = Strongly Agree). The instrument was previously developed and validated in school and hospital foodservice settings (Ungku Fatimah, Arendt, and Strohbehn, 2014a). The 31 statements consisted of 7 food safety culture factors including *management and coworker support; speak freely; communication; self-commitment; environment support; work pressure; and risk judgment.* The factors *speak freely* and *communication* were previously one factor, called *communication*. The factors were separated to better assess the nuances of communication that occurs in the childcare setting. The following are descriptions of factors (Ungku Fatimah, et al., 2014a):

1. Management and coworkers support (10 statements) – This factor was related to managers and management roles in encouraging safe food handling practices and teamwork among coworkers.
2. Speak freely (2 statements) – This factor was related to management creating an environment in which employee's feel comfortable discussing food safety.
3. Communication (4 statements) – This factor was related to communication between management and employees as well as communication among coworkers.
4. Self-commitment (5 statements) – All items in this factor reflected employees' internal motivation to perform safe food handling.
5. Environment support (4 statements) – This factor represented measures on adequacy and quality of infrastructures that support safe food handling practices.
6. Work pressure (3 statements) – This factor described pressures in the workplace associated with time, work load and staff adequacy that affect safe food handling practices.
7. Risk judgment (3 statements) – This factor was associated with organization risk taking decisions when implementing and complying with food safety rules and regulations.

The second section consisted of 12 demographic questions to evaluate *childcare employee demographics*: sex, age, years' experience (4 questions), work status (2 questions), job title, and food safety training (3 questions).

Data Collection

Prior to data collection, experts in the area of food safety (n=3), child development (n=1), and survey design (n=1) reviewed the instruments. Minor modifications were made upon experts' feedback to better assess the food safety culture in the childcare setting. A pilot test was conducted with childcare employees (n=9) at one childcare facility to assess clarity of wording for both survey instruments.

Prior to survey distribution a gatekeeper sent an announcement email to all licensed center-based childcare facility directors detailing the study purpose, to "be on the look-out", and request participation. Additionally, a paper-based invitation letter was sent to the director of each selected license-based childcare center. A recruitment flier was also included, which detailed purpose and benefits of participating in the study as well as detailing process for completion and identifying a token of appreciation.

To reduce sampling error and increase participation rates a survey implementation plan was utilized (Dillman, Smyth, & Christian, 2014). In the first mailing a large packet, containing one director packet and

ten employee packets, was sent to each licensed childcare facility director. Childcare directors then distributed the employee packets to childcare employees fitting the following selection criteria: (1) participants must be a minimum of 18 years of age; and (2) participants must be involved in food handling (this could be food preparation and/or food service).

Follow-up contacts, spaced approximately one week apart for three weeks, were used to recruit participants (Dillman et al., 2014). A final telephone contact to childcare directors was made to those childcare facilities who had not yet responded. A five dollar electronic Target gift card was given to childcare food handling employees after returning a completed questionnaire, as well as a summary of results were offered to childcare directors who returned a completed questionnaire.

Statistical Analysis

Data were analyzed using SPSS (Version 23.0). Descriptive statistics including frequency, mean, and standard deviation were used to summarize the data. Negatively worded items were reverse coded. Reliability of the instrument was determined by measuring the internal consistency of each factor using the Cronbach's alpha. Alpha coefficients for each factor ranged from 0.713 to 0.892, all were above the 0.70 threshold for standard of reliability as suggested by Nunnally (1978). A bivariate correlation analysis was conducted to assess the relationship between each food safety culture factor (independent variables) and employee self-commitment (dependent variable) to following food safety practices. Furthermore, regression analysis was used to examine which food safety culture factors impact self-commitment to following food safety practices. Self-commitment was the dependent variable. Independent variables were the food safety culture factors. The 0.05 level of significance was used for analysis.

RESULTS

Of the 990 employee questionnaires sent, 287 were returned, with 271 being usable, resulting in a response rate of 27.4%. Of the 99 childcare directors contacted, 71 completed the director questionnaire, for a director response rate of 71.1%. All childcare facilities where the director completed the questionnaire at least one employee also completed a questionnaire. Employee questionnaires returned and usable ranged between one and 10 per facility.

Employee and Operational Characteristics

Childcare food handling employee respondents' (n=271) characteristics are shown in Table 2. The majority of respondents were female (97.8%) and between the ages of 18 and 29 (76.8%). Over half had between 1-4 years' food handling experience in childcare facilities. Respondents (77.1%) reported working in their current facility for less than 5, years and the majority (65.3%) stated having less than one year of foodservice experience. Only 5.5% reported working part-time. Respondents identified their job title as cook (6.6%), teacher (63.5%), assistant teacher (28.8%), and aide (1.1%). The majority (83.8%) reported receiving food safety training, yet only 8.1% reported a food safety certificate. Hours of training per year were identified as: none (16.6%), only periodic on-the-job (58.7%), less than 1 hour (17%), 1-2 hours (6.6%), and 3-5 hours (1.1%).

Of the 71 participating facilities (table 3), 97% of directors reported having food safety policies, yet only 74.5% reported having written food safety policies. Majority of directors (83.8%) reported receiving food safety training, with 70.8% also receiving food safety certification. Directors reported conducting food safety training on cross contamination (46.9%), cleaning and sanitizing (85.2%), temperature danger zone (53.5%), handwashing (77.1%), glove use (62%), allergens (35.1%), and proper food storage practices (9.2%).

Table 2: Child Care Food Handling Respondents' Demographic Characteristics (n=271)

Characteristic	n	%
Gender		
Male	6	2.1
Female	265	97.8
Age		
18-29 years	208	76.8
30-49 years	40	14.8
50-60 years	15	5.5
More than 60 years	8	3.0
Years of child care experience		
Less than 1 year	67	24.7
1-4 years	142	52.4
5-8 years	43	15.9
9-12 years	11	4.1
More than 12 years	8	3.0
Years of current child care facility experience		
Less than 1 year	98	36.2
1-4 years	142	52.4
5-8 years	21	7.7
9-12 years	8	3.0
More than 12 years	2	0.7
Years of food handling experience in child care		
Less than 1 year	67	24.7
1-4 years	142	52.4
5-8 years	43	15.9
9-12 years	11	4.1
More than 12 years	8	3.0
Years of experience in foodservice		
Less than 1 year	177	65.3
1-4 years	80	29.5
5-8 years	13	4.8
9-12 years	0	0
More than 12 years	1	0.4
Work status		
Full-time	256	94.5
Part-time	15	5.5
Hours worked weekly		
Less than 10 hours	1	0.4
10-20 hours	9	3.3
21-30	5	1.8
31-40	256	94.5
Job title		
Cook	18	6.6
Teacher	172	63.5
Assistant Teacher	78	28.8
Aide	3	1.1
Received food safety job training		
Yes	227	83.8
No	44	16.2
Received food safety certification		
Yes	22	8.1
No	249	91.9
Food safety training hours per year		
None	45	16.6
Only periodic on-the-job	159	58.7
Less than 1 hour	46	17.0
1-2 hours	18	6.6
3-5 hours	3	1.1

Over two-thirds of facilities were considered for profit (79.7%), and reported being independently owned/operated (64.9%). The majority of facilities had less than two full-time foodservice employees (77.9%), and less than two part-time foodservice employees (95.6%). However, 28.2% of facilities did not have a full-time or part-time foodservice employee. Although, 68% had over 11 food handling employees. Nearly all facilities reported serving morning snack, lunch, and afternoon snack. Facilities predominantly used family-style (82.2%) or pre-plated in kitchen (17%) meal service. Respondents worked in CACFP (50.5%), Head Start (12.9%), and NAEYC (4.4%) affiliated facilities, with some employees working in facilities that had several affiliations. While the remaining 40.2% worked in facilities with no program affiliation.

Food Safety Culture Factors

All statements per food safety culture factor were computed to identify each food safety culture factors overall mean scores. Each factor had an overall mean score above 5.0 (1=Strongly Disagree; 7=Strongly Agree) and Cronbach's alpha scores above 0.80 (see Table 4).

Correlation Results

The results of the bivariate correlation analysis showed that *management/coworkers support*, the ability to *speak freely*, and

Table 3: Childcare Facilities' Organizational Characteristics (n=271)

Characteristic	n	%	Characteristic	n	%
Food safety policies			**Estimated breakfasts served daily**		
Yes	263	97.0	Fewer than 25	25	9.2
No	8	3.0	26-50	48	17.7
Written food safety policies			51-100	22	8.1
Yes	202	74.5	101-150	33	12.2
No	69	25.5	151-200	2	0.7
Director received food safety training			More than 200	0	0.0
Yes	227	83.8	Don't serve breakfast	141	52.0
No	44	16.2	**Estimated lunches served daily**		
Director received food safety certification			Fewer than 25	33	12.2
Yes	192	70.8	26-50	42	15.5
No	79	29.2	51-100	69	25.5
Food safety training topics[a]			101-150	76	28.0
Cross contamination	127	46.9	151-200	43	15.9
Cleaning and sanitizing	231	85.2	More than 200	6	2.2
Temperature danger zone	145	53.5	Don't serve lunch	2	0.7
Handwashing	209	77.1	**Estimated dinners served daily**		
Glove use	168	62.0	Fewer than 25	4	1.5
Allergens	95	35.1	26-50	0	0.0
Proper food storage practices	25	9.2	51-100	0	0.0
Legal Status			101-150	0	0.0
For profit	216	79.7	151-200	0	0.0
Non-profit	55	20.3	More than 200	0	0.0
Type of childcare operation			Don't serve dinner	271	98.5
Independently owned/operated	176	64.9	**Type of meal service**		
Chain/franchise	95	35.1	Family-style	223	82.2
Number of full-time foodservice employees			Pre-plated in kitchen	46	17.0
0	104	38.4	Lunch box	2	0.7
1	107	39.5	**Program affiliations**[a]		
2	57	21.0	Head Start	35	12.9
3	3	1.1	CACFP	115	42.4
Number of part-time foodservice employees			NAEYC	12	4.4
0	172	63.5	None	109	40.2
1	87	32.1	**Child maximum capacity**		
2	12	4.4	1-100	61	22.5
Number of food handling employees			101-200	130	48.0
Fewer than 5	28	10.3	More than 200	80	29.5
5-10	59	21.8	**Current child enrollment**		
11-15	89	32.8	1-100	98	36.2
16-20	24	8.9	101-200	134	49.4
21-25	21	7.7	More than 200	39	14.4
More than 25	50	18.5			
Meal periods served[a]					
Breakfast	114	42.1			
Morning snack	246	90.8			
Lunch	269	99.3			
Afternoon snack	267	98.5			
Dinner	4	1.5			

[a]Multiple responses provided

communication from managers to staff have moderate positive correlations with *self-commitment* (see, Table 5). As the aim of this study was to assess the relationship between food safety factors and self-commitment, further analyses of other correlating factors were not conducted, analyses of these factors will be reported in a forthcoming manuscript.

Regression Estimation

Preliminary evaluation of our model using linear regression revealed a negative valence for the parameter estimate of environmental support on self-commitment. This outcome, in conjunction with variance inflation factor related to this estimate, provided sufficient indication of collinearity to suggest that we combined the factors *environmental support* and *work pressures* into a single factor, entitled *social system*. This newly combined factor reflects the nature of the social system (i.e., quantity and quality of supplies and equipment, time to get work completed, and number of staff). The Cronbach's alpha score for this new factor was 0.843.

Food Safety Culture and Social System Factors Effect on Self-commitment

Upon further analysis the overall regression was significant. The analysis of variance was able to predict values of the outcome variable, F=27.541, p=0.000, and adjusted R^2 = 0.330. As the analysis of variance demonstrated significance, coefficients for the regression model were computed and presented in Table 6. The finding illustrates that two factors, *speak freely* (t=2.783, p=0.006) and *communication* (t=4.796, p=0.000) had significant effect on self-commitment to perform proper food safety practices. This analysis included assessments of collinearity and power. The variance inflation factor (VIF) indicates the extent to which the variance of a parameter

Table 4: Employee's Mean Agreement Scores for Food Safety Culture Factors (n=271)

Factor and item	Mean[a] ± SD
Factor 1: Management and coworker support (α = 0.891)	**5.59 ± 1.20[b]**
There is good cooperation among employees to ensure that children receive safely prepared food.	5.89 ± 1.33
When lots of food preparation and service work needs to be done quickly, employees work together as a team to get the tasks completed safely.	5.82 ± 1.47
My coworkers are supportive of each other regarding food safety.	5.75 ± 1.50
Employees remind each other about following food safety practices.	5.68 ± 1.65
New employees and experienced employees work together to ensure food safety practices are in place.	5.66 ± 1.61
Employees are disciplined or reprimanded when they fail to follow food safety practices.	5.59 ± 1.70
My supervisor watches to see if employees are practicing safe food handling.	5.51 ± 1.72
Supervisor(s) enforce food safety rules consistently with all employees.	5.43 ± 1.91
My supervisor inspires me to follow safe food handling practices.	5.34 ± 1.98
My supervisor is actively involved in making sure safe food handling is practiced.	5.28 ± 1.90
Factor 2: Speak freely (α = 0.713)	**5.72 ± 1.60[b]**
I can freely speak up if I see something that may affect food safety.	5.72 ± 1.62
I am encouraged to provide suggestions for improving food safety practices.	5.71± 1.57
Factor 3: Communication (α = 0.845)	**5.31 ± 1.89[b]**
All of the necessary information for handling food safely is readily available to me.	5.48 ± 1.80
My supervisor generally gives appropriate instructions on safe food handling.	5.46 ± 1.79
My supervisor provides adequate and timely information about current food safety rules and regulations.	5.28 ± 1.92
All supervisors give consistent information about food safety.	5.02 ± 2.05
Factor 4: Self-commitment (α = 0.838)	**6.02 ± 1.03[b]**
I am committed to following all food safety rules.	6.10 ± 1.20
I keep my work area clean because I do not like clutter.	6.08 ± 1.28
I follow food safety rules because it is my responsibility to do so.	6.08 ± 1.25
I follow food safety rules because I think they are important.	5.96 ± 1.38
Food safety is a high priority to me.	5.88± 1.50
Factor 5: Environment support (α = 0.869)	**5.55 ± 1.39[b]**
I am provided with quality supplies (e.g. gloves, serving utensils) that make it easy for me to follow safe food handling practices.	5.61 ± 1.76
Facilities are of adequate quality to follow safe food handling practices.	5.60 ± 1.59
Equipment items needed to prepare/serve food safely (e.g. handwashing sinks) are readily available and accessible.	5.53 ± 1.62
Adequate supplies are readily available to perform safe food handling practices.	5.47 ± 1.60
Factor 6: Work pressure (α = 0.845)	**5.56 ± 1.48[b]**
My work load does not interfere with my ability to follow safe food handling practices.	5.57 ± 1.71
The number of staff scheduled at each shift is adequate for me to get my work done and handle food safely.	5.57 ± 1.67
I always have enough time to follow safe food handling procedures, even during rush hours.	5.56 ± 1.71
Factor 7: Risk judgement[c] (α = 0.892)	**5.15 ± 1.87[b]**
I am sometimes asked to cut corners with food safety so we can save costs when preparing food.[c]	5.30 ± 2.07
When there is pressure to finish food production/service, supervisors sometimes tell us to work faster by taking shortcuts with food safety.[c]	5.20 ± 1.98
I believe that written food safety policies and procedures are nothing more than a cover-up in case there is a lawsuit.[c]	4.96 ± 2.13

[a]7-point Likert scale used (1 = Strongly Disagree; 7 = Strongly Agree)
[b]Overall factor mean
[c]Items were reverse coded

Table 5: Food Safety Culture and Social System Factors Correlation (n=271)

Food safety culture factor	Self-commitment	Management/ coworker support	Speak freely	Communication	Environmental Support	Work pressures	Risk judgement
Self-commitment							
Correlation	1	0.447**	0.493**	0.493**	0.155**	0.353**	0.220**
Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
Management/ coworkers support							
Correlation	0.447**	1	0.598**	0.631**	0.260**	0.498**	0.347**
Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000
Speak Freely							
Correlation	0.493**	0.598**	1	0.647**	0.258**	0.456**	0.251**
Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000
Communication							
Correlation	0.550**	0.631**	0.647**	1	0.218**	0.449**	0.345**
Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000
Environmental support							
Correlation	0.155*	0.260**	0.258**	0.218**	1	0.389**	0.082
Sig. (2-tailed)	0.011	0.000	0.000	0.000		0.000	0.177
Work pressure							
Correlation	0.353**	0.498**	0.456**	0.449**	0.389**	1	0.268**
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000
Risk judgement							
Correlation	0.220**	0.347**	0.251**	0.345	0.082	0.268**	1
Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.177	0.000	

** Correlation is significant at 0.01 level (2-tailed)
* Correlation is significant at 0.05 level (2-tailed)

estimate for an independent variable might be affected by the extent of its correlation with other independent variables in the regression model (Belsley, Kuh, & Welsch, 1980). Typically, a VIF of 10 or above is interpreted as a reason to use caution in relying upon regression results, although recent research indicates that much higher scores for VIF do not necessarily indicate significant problems with collinearity (O'Brien, 2007). As shown in Table 6, the VIF's for our model variables ranged in size from 1.174 to 2.115. Statistical power for multiple regression indicates the probability that a test correctly rejects the null when, at a stated level of the alpha, the null should be rejected. Given the sample size here of 271 and the relatively few number of independent variables, the power of our estimation procedure is high (.99).

DISCUSSION

The purpose of this study was to assess food safety culture factors effect on childcare food handlers' self-commitment to perform safe food handling practices. Results showed that *management/coworkers support*, the ability to *speak freely*, and *communication* from managers to staff had the highest correlations with employees' *self-commitment* to following proper food safety practices. Researchers have previously shown "The manager plays a key role in the food safety culture by establishing policies and standards, expecting accountability, serving as a role model, controlling rewards and punishment, providing training, and providing needed resources to follow food safety practices," (Arendt, Paez, & Strohbehn, 2013, p. 126).

Table 6: Food Safety Culture and Social System ANOVA and Regression Analysis (n=271)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	98.436	5	19.687	27.541	0.000[b]
	Residual	189.431	265	.715		
	Total	287.867	270			

coefficients

Factor[a]	*β*	*t*	*p*	*VIF*
Management/coworkers support	0.089	1.266	0.207	2.003
Speak freely	0.195	2.783	0.006*	1.973
Communication	0.348	4.796	0.000*	2.115
Social system	0.040	0.688	0.492	1.343
Risk judgement	0.012	0.216	0.829	1.174

[a]Dependent Variable: Self-Commitment
[b]Predictors: Risk Judgment, Social System, Speak Freely, Management/coworkers support, Communication
*$p<0.05$

Regression analysis showed that the two variables related to communication (*speak freely* and *communication*) are the only two variables with statistically significant effects on *self-commitment*. The factor *speak freely* pertained to food handling employees ability to openly speak about food safety and give suggestions to improve food safety practices. For example, the need to establish an environment in which childcare food handlers feel comfortable discussing food safety issues with coworkers and the director. Griffith (2006) detailed the need for active engagement on many fronts, including two-way communication between management and employees about food safety practices.

The factor *communication* pertained to the way management (i.e. director) communicates to employees about food safety information. For example, ensuring that all necessary food safety information is given to employees as well as in a timely manner. This factor also relates to directors giving appropriate instruction as well as constancy of food safety information given. Similar to previous findings (Arendt et al., 2013), the current study shows the need for proper communication from childcare directors not just on the "how" but also the "why" childcare food handlers should follow proper food safety practices is important. Previous research identified that effective management communication was a significant overall factor contributing to the prevention of foodborne illness outbreaks (Griffith, 2010).

The influence of the director on food safety practices is important through their support in encouraging safe food handling practices and consistent communication about proper food safety practices. A cost effective approach to ensuring consistent food safety communication is through written food safety policies. Previous research has examined hygiene and sanitation practices in childcare facilities (n=51), which results showed less than half of facilities examined had written food safety policies (Wohlgenant et al., 2014). With written food safety policies consistent information is possible. Additionally, Rajagopal, Arendt, Shaw, Strohbehn, and Sauer (2016) developed and observed the use of minimal-text educational food safety posters in foodservice operations, findings identified the use of the posters had a positive impact on both microbial levels and food safety behaviors. This would suggest that the use of posters may be a good tool for increasing communication about food safety. Previous microbial analysis of childcare facilities with and without written food safety policies showed the lack of written procedures for food preparation and service areas to be a potential reason for high-microbial contamination. Findings showed the need for written policies as well as ongoing training to ensure these policies are being followed (Li et al., 2014). Food safety policies must be documented and clearly defined for new and current employees to fully understand what proper food safety practices are and why they must be followed (Yiannas, 2009). Yet, sometimes management (director) "actions speak louder than words." Directors must also remember that "leading by example" is a non-verbal form of communication. Directors can communicate proper food safety practices by performing these practices properly themselves.

Respondents were predominantly woman between the ages of 18 and 29 with less than five years childcare experience. Taylor, Adams, and Ellis (2008) identified that inexperienced childcare employees need further communication and assistance from more vested employees to assist in decision-making *for controlling enteric illness in the childcare settings.* Therefore, directors should be mindful that these less experienced employees may need additional attention and communication than more tenured employees.

The majority of childcare food handlers reported being teachers or assistant teachers. It is important to note that childcare food handling employees have many responsibilities in addition to handling food safely, primarily caring for the children and ensuring their safety. Thus, food safety practices are likely not the principal responsibility. During meal service food handling employees often have many responsibilities including serving children, educating on proper feeding cues, and encouraging appropriate eating habits (Ramsay, et al., 2010). The American Academy of Pediatrics recommends director communicate to employees the importance of prevention of foodborne illness contamination during food preparation and family-style meal service (Aronson & Shope, 2013).

Additionally, directors reported 28.2% of participating facilities did not have a designated full-time or part-time foodservice employee (i.e., cook). Thus, many facilities require childcare food handlers (teachers and assistant teachers) to have several jobs, such as preparing food and caring for children in the same day. This situation is distinctly different than commercial foodservice establishments (i.e., restaurants), in which the foodservice employees are primarily responsible for preparing the food and not serving and cleaning. Understanding this, directors should make efforts to continuously encourage food handling employees to follow safe food handling practices and communicate consistently regarding food safety practices as well as create an atmosphere where staff feel comfortable in speaking freely.

CONCLUSIONS AND APPLICATIONS

This study assessed food safety culture factors in licensed center-based childcare facilities affecting food handling employees' self-commitment. Findings showed factors related to employee's ability to speak freely about food safety practices and communication from directors to employees had an effect on employees' self-commitment to follow food safety practices. Therefore, directors should reevaluate their level of engagement about food safety practices with their food handling employees and remain consistent on food safety information communicated. Directors need to ensure employee perceive an open line of communication between employees and management. Increased communication about food safety practices has to start at the management level. Yiannas (2009) stated only management can truly influence, strengthen, or change safety culture; "they're the leaders."

Childcare directors should review these findings to help develop interventions aimed at increasing communication from all employees in childcare facilities. For example, food safety signage that communicates important food safety topics can be placed in strategic positions. Hedin, Petersson, Cars, Beckman, and Hakansson (2006) showed through the use of food safety related posters in childcare facilities communication between parents and teachers increased and food safety prevention knowledge increased. Using signage could be an inexpensive and effective way to create discussions about food safety and help to facilitate speech about food safety issues that food handling employees may have.

Another intervention approach to increase food safety communication could be having a brief meeting each day during nap hours with each room to discuss food safety topics. This time could also be used to encourage employees to speak freely about food safety concerns or areas for improvement. In turn this will potentially increase their self-commitment to perform food safety practices.

Additionally, directors should develop written food safety policies, this will help directors ensure consistent food safety information is

being distributed to all employees. It is important to note, that developing food safety policies is one form of communication that may increase employees' self-commitment and does not incur any cost to the facility. With directors communicating proper food safety practices along with coworker support and a culture of encouragement pertaining to openly speaking about food safety issues and potential improvements, employee self-commitment to following safe food handling practices can potentially be improved.

This study has some limitations. First, the sample population was contained to South Carolina and generalization of results to other states should be done with caution as regulations are different from state-to-state. Additionally, only center-based facilities were included in this study, therefore generalizations to other types of childcare setting (i.e. home based) cannot be inferred. Combining the factors environmental support and work pressure due to (multi) collinearity during regression analysis hindered the ability to interpret the nuances of these factors independently. Finally, the use of a quantitative survey based design only gathered the food safety culture and social system for one moment in time and results are not able to identify the prevailing food safety culture and social system over time. Therefore, future studies could use a qualitative approach and collect observations and interviews to further explain results of this study. Other research in the childcare setting could assess barriers and key motivators to following food safety practices, as identification of these could help directors to improve overall food safety.

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Research Contribution

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CHARACTERISTICS AND PRACTICES INFLUENCING THE IMPLEMENTATION OF HOSPITAL FOODSERVICE SOFTWARE

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ABSTRACT
The purpose of this research was to investigate the implementation of specialized foodservice software into hospital foodservice departments through a multi-case study design. Five sites were included in the study, 27 employees involved in the implementation were interviewed. Findings included: identification of barriers and facilitators to implementing software, preferred methods of training, and necessary communication tools. Employees of the foodservice department saw value in the use of technology. Foodservice directors need to familiarize themselves with organizational change management prior to major software implementation to smooth the transition and increase the likelihood of new software acceptance.

Keywords: hospital foodservice, diet office, change management, technology implementation,

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INTRODUCTION

Implementing change to achieve excellent quality is vital in current hospital foodservice environments (Jacoby & Berger, 2013). Changes to patient meal services can affect not only patient foodservices, but the entire foodservice department (Stein, 2000). Tools, such as specialized software, are available to assist hospital foodservice directors in improving quality and efficiency. Training and skill building are often a focus of leaders during change; however, employees' emotional responses to change needs to be addressed as well (Atkinson, 2014). Common dynamics often present during change that can impact employee emotional wellbeing include: internal political forces, work modifications, emotional responses, uncertainty, and conflict.

Implementation of an innovation, such as computer software, as part of a planned change is most successful when it is comprehensive and systematic. Those involved in implementing are most effective when they listen, question, and clarify their concerns at the beginning of the change process (Cameron & Green, 2004). Forces that drive change (facilitators) and forces that restrain change (barriers) effect implementation of innovations. Lewin (1964) found that success at a group level often facilitates change at the individual level. Barriers hinder innovation and are categorized as cultural, social, organizational, and psychological (Surry & Ely, n.d.). They often stem from employees': 1) perceptions that the change will decrease their ability to perform their job as they envision; 2) concern that they do not possess the skills necessary to accomplish the change or 3) feelings of threat due to the change (Ford, Heisler, & McCreary, 2008). Decreasing barriers can help change progress more effectively than increasing facilitators (Gregoire, 2013).

There is no specific formula that leads to the successful adoption, implementation, and institutionalization of an innovation. Surry and Ely (n.d.) found a systematic approach and use of a change agent to coordinate the steps of the process facilitated success. Ely (1990) reviewed successful implementations in educational technology; identifying eight factors influencing successful implementations: 1) dissatisfaction with the status quo; 2) adequate knowledge and skills; 3) resources available; 4) time available; 5) rewards or incentives available; 6) expected participation; 7) commitment to the implementation; and 8) evident leadership.

Chustz and Larson (2006) followed the adoption of a policy change in a small rural hospital in Louisiana. The researchers identified four areas for implementation success: 1) the implementation process needs to be planned well in advance; 2) employee accountability to implement the new policy is expected; 3) a change agent is present, recognized as the leader, and has responsibility to ensure change is occurring; 4) frontline employees affected by the change need to be guided throughout the entire process, including post-implementation (Chustz & Larson, 2006).

General managers of hotels within a large hotel company undergoing an innovation implementation were contacted by Enz (2012), 53 responded and completed surveys investigating techniques used by the general managers. The varied implementation strategies included 26 techniques. Meeting one-on-one with employees was the tactic that correlated most significantly with innovation success (Pearson Correlation 0.434). Other tactics significantly associated with innovation success included the use of rewards (0.366); benchmarking (0.363); focus groups (0.344); employee involvement (0.333); review process (0.291); trial or experiment (0.291); and a point person (0.290). Popular techniques that did not seem to aid in success included the use of an idea champion, staff meetings, and informal networking.

An innovation is communicated over time through individuals or channels in a social system. This process is known as diffusion (Rogers, 1995). Four components comprise the Diffusion of Innovations (DOI): the innovation itself, the communication channels, time, and the social system (Rogers, 1995). In alignment with this process, Davidoff (2008) found successful change management starts with a defined purpose and vision. Communicating the change as a positive move for the organization and the employees help reduce resistance (Ford et al., 2008); noting it is important to clearly communicate not only what is going to change, but also what is not going to change. Kanter (2000) recommends communicating change as an aspiration thus appealing to the betterment of each person to become greater. Change often ends in failure if the value and essential need for the innovation are not communicated to those affected (Ford et al., 2008).

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The purpose of this research was to investigate how a significant technological change in hospital foodservice is received by employees and how to navigate the change process to increase success and acceptance of the change. The objectives of this study were to: 1) determine diet office employees' expectations and level of readiness for change related to the implementation of diet office software; 2) identify barriers and/or facilitators when implementing foodservice software; and 3) analyze department employees perceptions of communication prior to and during software implementation.

METHODS

Qualitative research methods were used to conduct this research. A multi-case study design was used and followed a single case study methodology; whereby, the same study is conducted at multiple sites (Yin, 2003). Five hospitals were studied in depth, all part of a healthcare division of 17 hospitals and geographically grouped. Hospital characteristics are provided in Table 1. This collection of hospitals is one of several corporate divisions within a large healthcare corporation. Institutional Review Board (IRB) approval was obtained prior to the study being conducted. In order to be granted access to the hospital sites, IRB approval was required by the healthcare division.

Case Study Overview

The foodservice departments of the division hospitals went through a mandatory software implementation. The implementation of the software into all 17 hospitals was completed over a 12 month period through a phased process. The first phase consisted of the adaptation of software for the division. A customized version of the software was copied from another division within the healthcare company. Customization included: menu items, menus, diet orders, diet restrictions, and recipes. These data were modified at the division level before allowing software access to the implementation teams at each hospital. The customization including inputting patient and cafeteria menus written at the division level, additional recipes, diet restrictions, and diet orders.

The second phase of the implementation involved initiating the use of the software at the individual hospital sites. The first foodservice department started using the software in month 4 of the process and the last hospital in the sequence started using the software in month 12. Pre-implementation training included webinars and conference calls provided by the software company. A team at each hospital was selected by the foodservice director to go through the training. The webinars provided informational sessions about the software, how to customize the software specific to the hospital and how to navigate certain areas of the software. The sites went through a pre-implementation training and software customization process for three to four months, with a minimum of eight training sessions.

This time frame was used to help the individuals at each site learn the software as well as provide time for the sites to input data into the system specific to their foodservice operation, such as room numbers, patient tray ticket printing sequence, and menu modifications. During the week in which the initial use of the software in the foodservice department was scheduled, a trainer from the software company came onsite to the department and conducted face-to-face training with the end users of the software (i.e. diet clerks, clinical dietitians, and foodservice directors). The trainers were present during the first two days of software use to troubleshoot and provide guidance for the end users of the software.

Interviews

In-depth face-to-face interviews were conducted with key hospital foodservice employees. All interviewees volunteered to participate. Once agreement to participate was obtained, each participant signed an informed consent form prior to participating. Interviewees included diet clerks (DC), clinical dietitians (RD), supervisors of the diet office (DO), and foodservice directors (FSD). Interview guides were developed based on the literature review, the research questions, and previous experience of the primary investigator. The guides were reviewed by industry experts for clarity and depth. The interviews consisted of main questions asked consistently from interview guides as well as follow-up questions designed to illicit more information or to gain clarification and improve understanding (Rubin & Rubin, 2012).

Examples of interview guide questions are provided below:

- What obstacles did you encounter during the implementation of [the software]? (FSD Interview guide)
- Was there any information you know now about [the software] that you feel should have been communicated to you differently? (FSD Interview guide)
- What challenges did you encounter during the implementation of [the software]? (DC Interview guide)
- What information would you have liked to know, but did not, prior to "Go Live"? (DC Interview guide)
- What has been the greatest challenge related to [the software]? (DO Interview guide)
- How would you describe the communication you received regarding the [the software] implementation? (DO Interview guide)
- What obstacles did you encounter during the implementation of [the software]? (RD Interview guide)
- How would you describe the pre-implementation communication you received regarding [the software] and the implementation of the software? (RD Interview guide)

Pilot Study

A pilot of the study was conducted at a hospital foodservice department undergoing the division initiated software implementation, but was not one of the five case study hospitals. The interview guides for the clinical dietitians, and diet clerks were pilot

Table 1: Hospital Characteristics

	Hospital Size	Director Credentials	Menu Service Pre-Implementation	Diet Office Pre-Implementation Process
Site 1	250+ Beds	Registered Dietitian	Hybrid (some floors rooms service, others traditional trayline)	Automated System
Site 2	50-149 Beds	Certified Dietary Manager	Traditional Trayline operation (provided menus for patients to order, but operated traditional trayline)	Manual
Site 3	150-249 Beds	Executive Chef	Traditional trayline	Manual
Site 4	50-149 Beds	Certified Dietary Manager	Traditional trayline	Manual
Site 5	50-149 Beds	Certified Dietary Manager	Room Service	Automated; Call Center

tested. The pilot test site did not have a foodservice director or supervisor of the diet office in place at the time of the pilot test. The pilot allowed the primary investigator to test the interview questions and practice conducting semi-structured interviews. Minor language modifications to questions were made secondary to the pilot test.

Data Analysis

Interviews were recorded, professionally transcribed, and verified. Three researchers independently read and analyzed all 27 transcripts. Using cross-checking, as described by Creswell (2009), each researcher identified codes which were then grouped into categories and over-arching themes identified. Following the process recommended by Saldana (2009), the analysis of transcripts, including themes and categories, were discussed between researchers and agreed upon.

Member checking was completed as ten of the 27 interview participants were contacted post-analysis of the transcripts and the researchers' interpretation and accuracy of the transcripts were discussed. Each contacted interview participant validated the accuracy of their transcript and agreed with the interpretation of the interviews as recommended by Creswell (2009) and Maxwell (2013).

RESULTS AND DISCUSSION

A total of 27 interviews were conducted at five hospitals. Participants included eleven diet clerks, three diet office supervisors, eight clinical dietitians, and five food and nutrition service directors. Ninety-two percent of the participants held positions during the entire implementation process. Participant comments in the results and discussion are unedited quotes from the interviews.

Expectations and Readiness

The expectations and readiness of employees were influenced by their prior knowledge of diet office software, previous experience with computers, and training received. Many participants indicated that seeing the software operating in another diet office, prior to their hospital's implementation, would have been helpful. None of the FSDs visited hospitals that had previously adopted the software. Site 1 and Site 3 were very early in the sequence of the software implementation, thus their opportunity was limited. Sites 2, 4, and 5 were in the middle or toward the end of the implementation cycle and therefore would have had opportunity to visit other sites but did not.

Interview participants indicated a range of expectations from positive to negative and other participants indicated no expectations or had given no thought to the software and its effect on their work life. Several participants stated they were "looking forward" to the software. Common themes included expected: ease of use of the software, less manual work, and the software completely programmed and ready-to-go. DC6 stated "I think that originally… perception was that it was gonna eliminate a lot of clerical work. Well, it doesn't eliminate it. It just shifts it." Participants did acknowledge they expected issues related to change and that there would be a "learning curve" related to the new process. Others did not envision how the software was going to affect their daily duties. "I don't know if it made me feel like it was gonna change my job" stated DC5.

DC6 actively sought information related to the software prior to the implementation process. During the interview DC6 stated, "As soon as I…heard that we were… lookin' into [the software], I called the company…and I said, 'Is there any, any resources I could find to see how it works?'"

Readiness of the diet office employees varied from "somewhat" ready to "very" ready and was influenced by training. Repeatedly during interviews, the DCs discussed needing more hands-on experience with the software, or wanting to observe the software in use at another facility prior to their hospital's implementation. DC6 illustrated this request, "It's easy to send somebody a video, have somebody train, but I think someone should go to a hospital that uses it and see it [in use]". FSD3 further explained, "Any kinda technology, it's good to play around with it before…it's real"; and DC9 stated, "I wish we coulda had like maybe two, three days before we went live [with the software]…just that one day [of classroom training], I felt that wasn't long enough." Readiness for the software was also influenced by the employee's comfort level with computers. DC8 discussed her trepidation, "The computer. I'm getting into it. I don't have one at home, but I'm learning." Along these same lines DC7 stated, "The only thing I worried about was being able to do it, [I'm] not computer savvy."

Two department directors discussed moving individuals who were diet clerks prior to the software implementation into different departmental roles post-implementation. The employees were not able to effectively use the software and perform the modified diet clerk duties. Both individuals stayed as full-time employees in their foodservice department, but worked in areas other than the diet office. FSD5 stated, "We had a diet office staff that just couldn't cut it anymore and they've worked in the diet office for years."

Barriers and Facilitators

Participants were interviewed regarding specific items they felt impacted the implementation of the software. A list of ten barrier themes and nine facilitator themes were identified (see Table 2). The barriers identified through the analysis of the interviews were: a poorly defined vision; a lack of support such as tools, resources, and staffing; a skills and knowledge deficit of diet office staff; the implementation timeline; the software programming; equipment issues including a lack food preparation equipment and technology equipment issues; employee emotional barriers; the functionality of the software program; issues with the standardized menu programmed in the software and specific barriers due to previous departmental operations.

Identified facilitators to the implementation of the software were: recognized leadership, a commitment to the hospital patients by the foodservice department staff; instances of motivating the employees through cheerleading, providing inspiration; the engagement of registered dietitians in the process; awareness of the departmental staff that the process was going to be challenging; employee characteristics; the ability of the diet office staff to learn; and tools and resources provided to help with the process.

Communication

Effective communication during a large project or change is a necessary component to make the transition less stressful for employees of the department and results in a more accepted and successful implementation (Van den Heubel, Demerouti, Bakker, & Schaufeli, 2013; Gregoire, 2013). When interviewed, most participants indicated both positive and negative aspects related to the communication provided. Having a vision and a true picture of the implementation process is cornerstone for successful change management (Davidoff, 2008). DO3 expressed a need for a vision stating, "Hey, give me the big picture so I can share my big picture with everyone." Participants were asked why they thought the software was implemented. Answers ranged from patient safety, improved working conditions, to cost savings. The range of answers

illustrated the lack of a cohesive plan or vision or, at minimum, the lack of communication regarding the plan or vision. The FSDs were under pressure to lead this change and continue to perform the daily functions of the foodservice department uninterrupted. FSD3 explained "The reality of it is you have to answer to whole levels of people, first and foremost your patients. Second your nurses. So it was that immense pressure that was put, and then your CEO's asking 'what the hell's going on in dietary'." A well-defined vision with expected outcomes can help the department leadership teams answer the questions being asked of them by their employees and stakeholders.

Table 2: Identified Barriers and Facilitators to Software Implementation

Themes		Themes	
Barriers	**Illustrative Quotations[1]**	**Facilitators**	**Illustrative Quotations[1]**
Poorly Defined Vision	"you're talking about… registered dietitians who know a lot about food, who know a lot about how tray service…But I feel like we had no clue, really, what it was gonna be like until the moment that it happened." (RD8) "[needed] somebody driving the bus that had been through it before [implementing the software]…I mean they didn't have the whole picture." (FSD1)	Leadership	"Director tried to make me as comfortable as possible" (DC11) "I was super happy that we had already planned on it [staying to help the diet office] ourselves" (FSD3)
Lack of support, tools, resources, staffing	"What are renal's supposed to get this meal?...if we had…a diet manual that had all of the, must have all of the basic diets and what exactly they're supposed to get at each meal each day. We did not have that." (DC2) "They didn't fix it quick enough for us…I don't know how many hospitals went online all at the same time, but she said there's one person at [division to] handle it." (DC6)	Commitment to patients	"taking care of people [patients] and makin' sure that they're happy" (DC2)
Skills, Knowledge	"We had a diet office staff that just couldn't cut it anymore and they've worked in the diet office for years." (DO3) "You have some people in our kitchen who are not the strongest when it comes to literacy." (RD5) "The biggest challenge in the diet office are their [diet clerks] clinical knowledge of the diets." (RD5)	Cheerleading	"make everybody comfortable and say 'Look, we can do this! It's not a big deal.'" (DO2)
Implementation Timeline	"Well, we didn't, it wasn't going live with [hospital software] until four days before we went live so I couldn't test the [software] to see what it was doing." (RD5)	Registered Dietitian Engagement	"when this system went into play, I was workin' on the line. I was washin dishes. I was answering the phone. I was callin' the patients, taking orders from my desk." (RD8)
Software Build	"Don't try to take somebody else's menu and try to go live…We serve different stuff." (FSD1) "At one point…it [software) was just addin' rolls or slices of bread to the diabetic cause that was the first thing it found." (RD4) "this menu is a bit more liberal, it seems, so that's been kinda hard for us just because we knew this person couldn't have this thing before and now the software says, 'oh, it's ok if it fits and everything else." (DO2)	Awareness	"I was really excited. I thought that it was great. But I knew that there would be some struggles…"(DO2)
Equipment Barriers	"I have old eyes…so I've gotta…and the diet office supervisor fixed it where I can see closer, the screen is bigger." (DC8) "The grilled chicken on a bun. Oh, that's the disaster because we have no grill here, so we have a chicken breast that's been cooked in the oven that looks terrible." (FSD1)	Managing	"I did have help [from the supervisors], like a little…more of a week that someone was with me." (DC8)

[1]The table consists of unedited comments from study participants.

Table 2: Identified Barriers and Facilitators to Software Implementation (Continued)

Themes Barriers	Illustrative Quotations[1]	Themes Facilitators	Illustrative Quotations[1]
Emotional Barriers	"I was like, "Oh my God, I'm never gonna get this.' But as I was doin' it…actually doin' it, it just came natural." (DC5) "I was so nervous. I was just nervous, I wasn't gonna get the hang of it." (DC11) "As much as we hated circling, doing everything by hand, we know that worked. Just kinda everyone's like 'OK, we'll trust in your program,' was probably the hardest thing for most people." (DC6)	Employee Characteristics	"a certain percentage of 'em [employees]…were super excited because they got it. And those are my real high performers. They knew that it would overall improve our patient care. So, you know, for the folks who had their head where I would prefer all of us to be…they were excited"(FSD3) "If you don't hop on board, you're gonna get left behind." (DC4)
Software Function	"You can have bacon for breakfast, but if you want a bacon burger for lunch, it doesn't let you offer it… We have patients that want breakfast for lunch which is doable…we can't put it in." (DC3)	Ability to Learn	"Once you get it, you got it." (DC11) "One of our diet clerks that is our strongest that understood the system best 'cause she just kinda had the mind where 'Oh, this is what it's thinkin' this is why I need to change it.'" (RD5)
Menu	"I understand that [using a standard menu], but there are aspects that we just aren't able to do in our facility." (DO2) "We had somethings that were just like 'Why is this on this menu?' We still have some kinks that we still work through daily. Just odd things that show up on menus." (DO2)	Tools/Resources	"She [software trainer] gave us like sheets to say you do this. Where you get started in the computer." (DC8)
Departmental Barriers	"Take something [diet office software] that worked well and change it…to me, I didn't see the point." (RD7) "If we had [the software] folks here for another week maybe, it woulda been a much more effective, much more calm startup." (FSD4)		

[1]The table consists of unedited comments from study participants.

Motivational communication was noted during several interviews. The leaders of the departments often acted as cheerleaders and provided motivational words to their employees. FSD3 stated, "Publically, I was a cheerleader because, for better or worse, it is what we were changing to and it is better to get behind it and push it instead of have it run you over." FSD4 motivated by being available, "I tried to answer all their questions. Tried to calm any fears." DC6 motivated fellow diet clerks by stating, "AHHH, We're gonna do this for a couple of weeks. It's gonna be hectic but we'll get through it". FSD3 explained that a Clinical Dietitian provided motivation to him by acknowledging that "[clinical dietitian's name] was basically my safety blanket. Like anything I don't know, she…was just there to say, 'You won't look like a fool. It's OK.'"

A void that was noted by several of the FSDs was that their input was not solicited by the hospital division leaders. FSD4 stated, "If we coulda had some input on that [the software data build] it woulda helped." And FSD3 indicated, "It's better to know that you've been heard." These statements indicated the directors wanted to be heard, have their ideas considered, and to provide input to this project that was going to significantly impact their departments.

Participants thought that there was enough communication regarding the forewarning of the change to the software. RD4 explained "…the communication was fine, you know, as far as what was gonna happen and how it was gonna happen." RD2 elaborated "we had plenty of foreknowledge...that it was coming." However, many participants believed they were not adequately informed about the details and where the software was in functionality related to the programming of the software at the division level. DO2 illustrated this in her comment, "We copied the (division) menus. No one actually sat down and said, 'OK, this is what we're gonna do." RD5 agreed that the communication on how to customize the software was for the individual site not clear "It's like they didn't communicate like, 'This is a room service menu so don't keep all of these,' so I was goin' and deleting all these things, and then like, 'OK, well, we need a salad option, we need a… (communication regarding) using the program kinda was a little muddled."

Ford et al. (2008) found that information or aspects of the change that may have negative impact, must be handled transparently and directly. In many interviews, participants discussed the issues with the software build of the data and that the program was not finished prior to implementation. The need for the users of the software to know where the software was in the data build became evident during the interviews. The end users because they were unaware of the issues with the completeness of the software build had added stress and there was pushback from the sites to division regarding the software. FSD3 explained, "If I know something isn't perfect right off the bat, that's ok. I can deal with it. But if there's no warning shot, and it's just boom, this lands in your lap, that causes problems."

Several of the participants discussed the need for a more defined implementation process and tools to help improve the process. DO3 wanted more visuals and outlines of the expectations of the implementation. She stated "I would've done more like visuals to say 'This is the expectations today. This is the expectations we're gonna be doing the next day. And this is the next." DO2 agreed and stated she would have liked to have had a step by step plan; "This is how it's gonna be done. And it shoulda been laid out step by step."

Training

In the interviews with the participants regarding training, the webinars were often noted as ineffective. RD8 illustrated this, "It was good to have those conferences calls [webinars], but a lotta what you learned on the conference calls, you couldn't process it at first because you didn't even have any basis for knowing what they were telling you at the moment." FSD4 adds, "We did a lot of online training sessions. I think if we had known more information and understood more, had better explanations about stuff, about creating all these modules and stuff, I think if we'd had some more information on that, it woulda helped too."

The training was perceived as fragmented and difficult to assimilate. DO3 quoted, "They explained very small bits and pieces of the program, and never really gave a big picture overview." The FSD4 explained, "The training we got was good, looking back on it, but when we were getting the training we weren't sure how we were gonna apply all of it." At the end of the training FSD4 commented on the confusion felt by him and his staff. "It was just like 'ok, this is a training. We're done. I don't even know what I'm doing yet so…" FSD2 stated "there was a lotta stuff I felt like they coulda told us prior to [implementation day]. So it was like a hit and miss situation."

Being sensitive to the audience was an aspect of the webinar trainings that appeared to be an issue. When undergoing a change, communicating messages with sensitivity to the receivers is essential for effective communication (Gregoire, 2013). Several interview participants indicated that the webinars were not developed for those receiving the web-based training. FSD5 elaborated, "I still felt like the webinars were more sales pitches than 'this is how it's really gonna work.'"

The face-to-face training was seen as beneficial by almost all interview participants. This was the preferred method of the training offered and was seen as very helpful. Participants recommended the training be extended, ranging from adding one additional day to extending training to a work week. The participants also wanted training to include more problem solving and covering unusual situations. DO2 explained, "I just wish we would've had more time with the trainer. I think that would've been very beneficial." FSD2 added "Once you have a good week of trainin', then test everybody to see what they know." DC11 believed she didn't have access to the software trainer for long enough, "We really didn't get to ask as many questions that we needed answered…it just felt like a rush job." FSD3 stated, "They had not enough practical time with someone standing there to troubleshoot questions." Momoh, Roy, and Shehab (2010) noted poor or incomplete training was noted as a barrier to effective change and that appears to be illustrated in this study given the webinar training, and to some extent the overall training process, was perceived to cause issues and hinder the implementation process.

CONCLUSIONS AND APPLICATIONS

This study investigated the effect of the implementation of specialized hospital foodservice software on hospital foodservice departments. Automation was perceived by most of the research participants to be a positive change for the departments; however, there were issues and concerns regarding the current use of the software as well as the implementation process itself.

One theme that became evident was the need for leadership and a vision. The perspective of who should provide that leadership was influenced by whether the employee was a frontline employee or an employee with supervisory responsibilities. The hospital foodservice department directors, some clinical dietitians, and diet office supervisors looked to the division foodservice director and division clinical analyst, to provide leadership and guidance. Diet office clerks looked to their immediate supervisors. As Davidoff (2008) indicated, a strong purpose and vision is the beginning of successful change. Clear and concise communication of the vision becomes the starting point for implementing change in hospital foodservice. Educators of future foodservice professionals need to discuss the purpose of a well -defined vision and illustrate the impact a poorly defined vision can have toward implementing innovation.

Communicating the process and expectations is as important as who is delivering the message. Employees looked for guidance from their direct supervisors, so providing the information and giving the tools to supervisors to communicate the process is essential. Though one diet clerk pressed the point that too much information could have resulted in the diet clerks having more fear, being transparent and upfront with information related to the implementation is important. Remembering the audience who is receiving the information and what is pertinent to them would be beneficial. When educating future foodservice leaders, it would be important to discuss and simulate the process of releasing information to employees to provide the information needed, but not to overwhelm or increase stress or fear.

The directors, dietitians, and diet office supervisors emphasized the need for a systematic plan and the need for the "big picture" of what this implementation was going to provide, do, and how it would change the diet offices and departmental operations. Though this was a software change in the diet office, it was noted that the software impacted patient trayline operations as well as food preparation.

For large projects, tools and processes need to be in place to help those implementing the change to recognize progress as well as provide a method to help those involved in the implementation to keep up with the processes scheduled and those that have been completed. Since the software company is the expert in the implementation of their software, many of the tools should be developed and provided to the users of the software by the software company. In negotiations with the software company, a foodservice professional should actively seek detail regarding the training methods, materials, and tools available to facilitate the implementation process. Educating how to manage the process of implementing change including developing and analyzing tools to assist in the process are skills needed by those involved.

Another result was the noted need for directors and leaders of the departments to have input into what was going on and the software build. The directors wanted to know how the data was built and wished for a more collaborative approach toward the setup of the system. Foodservice leaders must be confident to stop a process they believe is not beneficial or does not reflect the needs of their department.

All five of the sites were unique including the knowledge of the staff and the equipment available in each department. It became apparent

that each site had unique challenges related to overall staff knowledge and computer skills as well as available equipment. Site 1 had challenges in preparing some menu items because they did not have a grill or steam kettle. Sites 2, 3, 4, and 5 all indicated that the lack of computer skills of some of the DCs was a barrier that had to be overcome. Sites 3 and 5 both indicated the nutritional knowledge base of the diet clerks had to be elevated due to the automation of the diet office, thus the skill level of the diet clerk position changed.

One challenge with a universal implementation is providing a product that works for many different environments. Communicating what processes are part of the change that can be modified and what areas that cannot be modified is important to define prior to implementation. Educating the management skills that allow individuals to see the whole picture of a large project and learning to foresee potential issues will help a project move forward.

This study had limitations. The study took place in five for-profit hospitals undergoing a mandatory implementation of specialized software. The hospitals belonged to one corporate division within a healthcare corporation. This stdy did not include non-profit hospitals or foodservice departments going through an implementation of the software in which the decision to implement was made at the hospital level. The study followed one type of software implementation, there are other software programs available for the automation of diet offices. Thus the findings may not be generalizable to all hospital foodservice software implementations.

The in-depth investigation into the implementation of specialized hospital foodservice software into hospital foodservice departments is unique. As mobile devices, software upgrades, additional software platforms, and innovative equipment in foodservice operations becomes more common place, recognizing and managing the process of implementing these changes is a needed skill set of foodservice professionals. The lessons learned through this case study can be used to educate current and future leaders.

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Pedagogy

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MARKETING THE NEW EASTERN MICHIGAN UNIVERSITY DEMONSTRATION KITCHEN THROUGH A CULINARY EVENT

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ABSTRACT
A special event "Spring into Summer at the EMU Demonstration Kitchen" was held to promote a new demonstration kitchen to the campus and local community and increase its use. A faculty member mentored a graduate student who planned, organized, and implemented a marketing plan for the event using funds from an entrepreneurial grant. The event featured culinary demonstrations; it was well attended and evaluations were positive. The student applied entrepreneurial knowledge and skills and awareness of the demonstration kitchen increased. The project outcomes will provide ideas for educators with on-campus demonstration kitchens and/or nutrition services who are interested in enhancing students' marketing skills and marketing their services.

Keywords: Demonstration kitchen, culinary demonstration, entrepreneurship, event planning, event marketing

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INTRODUCTION

Eastern Michigan University (EMU) is a public university in Ypsilanti, Michigan that currently serves 23,000 students. This university offers more than 300 majors and supports students pursuing undergraduate, graduate, specialist, and doctoral degrees, and certificates (Eastern Michigan University, 2016). The EMU College of Health and Human Services (CHHS) offers a Master of Science in Human Nutrition and a Coordinated Program (CP) in Dietetics at the bachelor and master level. The CP curriculum focuses on preparing students for careers as registered dietitians while providing 1,200 hours of supervised practice experience (Eastern Michigan University, 2016).

The EMU CP is unique as it is one of only two schools of 56 CPs in Dietetics in the U.S. with a business entrepreneurial concentration. Undergraduate and graduate students in the CP are required to take Dietetics 459 or Dietetics 659, Development of the Entrepreneurial Dietitian, in the summer semester following the first year in the CP. Both courses focus on planning and marketing businesses and include writing a business plan. The textbook, The Entrepreneurial Nutritionist, is used for both courses (King, 2010). The book includes chapters on creativity, marketing, and Internet promotions. Additionally, entrepreneurial-based journal articles from the Journal of the Academy of Nutrition and Dietetics are included as readings for the course.

EMU has an Office of Nutrition Services (ONS) under the direction of a registered dietitian to provide CP students with entrepreneurial-focused supervised practice while providing nutrition services to staff, faculty, students, and the community. The ONS offers nutrition counseling, analysis of three-day food records, dual-energy x-ray absorptiometry, bioelectrical impedance analysis, and outreach on campus and in the community (Eastern Michigan University, 2016).

Due to the growth of the CHHS and increased participation in nutrition education programs on campus, ONS moved into a newly-designed space in October, 2015. The dietetics program director, faculty, and staff from EMU Dining Services were involved in planning the space. The new space includes offices, a focus group room, counseling rooms, and a demonstration kitchen designed for CP students to conduct culinary demonstrations and nutrition education presentations during their dietetics courses, including community nutrition and seminar in dietetics. Development of culinary skills enhances students' ability to educate others, including community members and foodservice employees.

Description of EMU Demonstration Kitchen

The demonstration kitchen features marble countertops with a tiled backsplash and wall of cabinetry including a stainless steel refrigerator, two convection ovens, and a two-bay sink. In front of this cabinetry is an island constructed to support the ergonomic flow of culinary demonstrations. The island is equipped with under-the-counter refrigerators, a hand washing sink, and a gas stove top with a discrete ceiling fire suppression system and hood system. In addition, it features a camera system that permits video recording and the ability to display culinary demonstration techniques from desired angles on three large, flat-screen televisions. The demonstration kitchen also includes a walk-in pantry and scullery equipped with a dishwasher, three-compartment sink, washer, dryer, and mop sink.

The kitchen seats 26 in its unique three-tier seating arrangement. The space where attendees sit features portable tables that extend across the room to create three rows. The rows of tables are positioned at gradual increasing heights, with the highest table positioned along the back of the room. Adjustable chairs allow attendees to position themselves for optimal viewing purposes. The kitchen is available for rent by EMU faculty, staff, students, and members of the community. The kitchen had been used for a limited number of occasions, but needed to be marketed to expand use of the kitchen to promote community nutrition and wellness and to increase income for ONS.

Demonstration Kitchens at Universities

Many universities have demonstration kitchens for education and community outreach. Drexel University has a residential housing project that is geared toward students attending the school's

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hospitality and sports management programs (Kostelni, 2016). The project features a food laboratory and a commercial kitchen. The space can be used by student chefs as well as a place to host demonstrations by celebrity chefs. Furthermore, an incubator, pop-up restaurant concept and garden for the kitchen and food laboratory are in the project's design.

Purdue University features a demonstration kitchen on campus where students teach attendees about culinary techniques, nutrition, and food sanitation (Purdue, 2016). Courses are offered to attendees at a low rate and cover topics such as super foods, clean eating, protein shakes and snacks, vegetarian meals, and Mediterranean cuisine. The University of North Dakota features a similar demonstration kitchen in their Health and Wellness Center called *Culinary Corner* ("University of North Dakota", 2016). The kitchen offers cooking classes and hosts nutrition presentations and speakers. Cooking class instructors include University of North Dakota students and guest chefs from the community. Another event, *Team Cook-Off*, offers a friendly competition based on the Food Network television show *Iron Chef America*.

Demonstration Kitchens in Other Settings

Other non-educational institutions are following this trend by adding demonstration kitchens to their facilities (Henry Ford Hospital, 2016). Henry Ford West Bloomfield Hospital in Michigan has a demonstration kitchen and offers healthy cooking classes for adults and children. Their healthy cooking classes include samples, tips, recipes and advice from dietitians and physicians.

The Nutrition Resource Center at Boston Medical Center features a similar demonstration kitchen (Boston Medical Center, 2014). The kitchen was created to teach patients how to prepare foods consistent with a healthy lifestyle. Culinary demonstrations are hosted by a chef-dietitian and capture condition-specific nutrition education for an array of diseases and groups including cancer, diabetes, weight management, and cardiac rehabilitation.

University Partnerships

Utah State University (USU) created a partnership between the athletic department and university dietitians, providing a fueling station near the weight room of their sports performance center (Taylor, 2016). The fueling station offers a variety of snacks based on training needs, with donations supplied by local food companies and the university creamery. Dietetic, exercise science, and food science majors have all volunteered to give presentations to USU athletes.

Universities and hospitals are finding unique ways to reach out to their students, student-athletes, and community members, through hands-on food experiences. Using spaces like demonstration kitchens, fueling stations, gardens, and pop-up restaurants can be an innovative way to conduct presentations, provide culinary demonstrations, and offer cooking classes, teaching individuals about food, nutrition, and food preparation.

Demonstration Kitchen Research

Little research has been done with regard to demonstration kitchens and how they can be used to host successful culinary events. Although, Warmin (2009) found that execution of a culinary nutrition program by a nutrition educator and chef was an effective way to teach college students about food and nutrition at Clemson University. Students improved their cooking knowledge and self-efficacy related to techniques and behaviors. At Colorado State University, Levy and Auld (2004) found that cooking classes and a supermarket tour were more effective than a cooking demonstration for teaching cooking and nutrition. However, cooking demonstrations were found to be less expensive and less time consuming. These results indicate a need for additional research on the topic of cooking demonstrations and demonstration kitchens.

Objectives

A special event "Spring into Summer at the EMU Demonstration Kitchen" was held to promote the new demonstration kitchen to the community. The three objectives of the event were to:

1. Provide students with opportunities to apply their entrepreneurship knowledge and skills.
2. Market the EMU demonstration kitchen to the campus and local community.
3. Measure outcomes of the event through a survey of attendees.

METHODS

Along with courses, EMU CP students need real-world opportunities to practice their entrepreneurial knowledge through skill development. Planning and executing marketing plans for the demonstration kitchen are valuable tools to meet these outcomes. To assist in students' entrepreneurial skill development, a dietetics faculty member received a $1,000 EMU College of Business Faculty Entrepreneurship Grant; the grant required a peer-reviewed journal article as an outcome and included $700 for the faculty member's time and $300 for student mini grants. The faculty member had proposed offering $150 mini grants to assist dietetics students in developing and executing marketing plans but the timing of the grant award did not allow the faculty member to incorporate the project into the entrepreneurship courses.

A call for mini-grant proposals sent to dietetics students via email and announced in a CP foodservice management class yielded no submissions from the students. Therefore, the faculty member who was awarded the Faculty Entrepreneurship Grant contacted a graduate student enrolled in the EMU Master of Science in Human Nutrition program who was also a practicing registered dietitian and enrolled in a local community college culinary certificate program. The graduate student was interested in the opportunity and met with the faculty member to plan an event, develop a marketing plan, and develop an evaluation survey. The event plans were the student's original ideas and the faculty member mentored the student and assisted in execution of the marketing plan publicity.

The event, "Spring into Summer at the EMU Demonstration Kitchen", was designed to include two culinary demonstrations by the student and a guest speaker. It was marketed through a number of electronic routes. To begin with, a promotional flyer created by the student was sent to selected faculty, staff, and students. Concurrently, the faculty member distributed event information through the university calendar, daily campus email, EMU Today electronic newsletter, electronic billboards on campus, and the EMU website. In addition, the faculty member secured approval for students who chose to attend the event to gain one EMU general education Learning Beyond the Classroom credit toward their general education requirements. Furthermore, the event was promoted on social media through the EMU ONS Facebook and through the graduate student's personal Facebook, Twitter, and Instagram accounts.

Along with EMU-based electronic advertising, the graduate student promoted the event through other effective avenues. For example, a press release was submitted to the Ypsilanti Area Convention and Visitors Bureau marketing campaign program, *#YpsiREAL,* in order to share event information on their social media sites. Additionally, flyers were posted on community business bulletin boards and distributed at local campus events, including the EMU ONS Annual Open House and 5K in March. The flyers were also available at the

American Cancer Society Relay for Life campus event and the Growing Hope *Building Blocks for the Food Entrepreneur* series at SPARK East Business Incubator in Ypsilanti, Michigan.

The student contacted local businesses to provide donations to use as handouts and take-home bags. Donated items included 50 insulated tote bags which were filled with spatulas, measuring cups, pens, and recipe booklets. Materials donated were distributed among the insulated tote bags and given to attendees upon arrival to the event. In addition, donated bottled water and individual fruited Greek yogurts were provided as snacks for attendees.

To evaluate if objectives were met and the success of the event, a survey was created with a five-point Likert scale to measure outcomes of the event (Figure 1); survey question options included strongly disagree, somewhat disagree, undecided/neutral, somewhat agree, and strongly agree. The survey was divided into three sections: What Did You Learn?; How Effective was this Presentation?; and, How Effective was the Speaker, Guest Speaker, Venue, and Handouts/ Gifts? At the bottom of the survey, blank space was provided as a comment section for additional feedback.

RESULTS

The event was held on April 18th from 5:00-7:30 pm at EMU Demonstration Kitchen. The event consisted of two one-hour culinary demonstrations with a 30-minute intermission. The intermission was originally scheduled to have a 15-minute presentation from a guest

	Strongly Agree	Somewhat Agree	Unsure/ Neutral	Somewhat Disagree	Strongly Disagree
What Did You Learn?					
I learned new information about nutrition, the nutrient benefits of specific foods, and/or how to maintain a general healthy diet.					
I learned new food preparation techniques (meat fabrication, knife skills, etc.) and/or cooking skills (sautéing, steaming etc.).					
I learned new information about food safety.					
I learned about healthy, affordable food sources (grocery stores, food pantries, etc.) in the community.					
I learned techniques to cut food costs and save money on groceries.					
I learned new recipes.					
How Effective Was This Presentation?					
I will eat more fruits and vegetables as a result of this presentation.					
I will eat more whole grains as a result of this presentation.					
I will eat more lean proteins and low-fat dairy (and/or alternative dairy) foods as a result of this presentation.					
I will add at least one of the nutritious foods used or discussed in this presentation to my diet.					
I will practice at least one of the food preparation techniques (meat fabrication, food pantries, etc.) and/or cooking skills (sautéing, steaming, etc.) as a result of this presentation.					
I will visit at least one of the healthy, affordable food sources discussed in the community (grocery stores, food pantries, etc.) as a result of this presentation.					
I will apply at least one of the grocery cost saving techniques discussed as a result of this presentation.					
I will try one of the recipes I learned today at home as a result of this presentation.					
How Effective was the Speaker, Guest Speaker, Venue, and Handouts/ Gifts?					
The main speaker executed the culinary demonstration successfully and the presentation was easy to follow and understand.					
The main speaker was knowledgeable on the topics presented.					
The main speaker effectively answered my questions (if any).					
The guest speaker provided valuable information to me.					
The guest speaker effectively answered my questions (if any).					
The guest speaker was knowledgeable on the topics presented.					
The EMU Demonstration kitchen is an effective venue to conduct this presentation and similar presentations.					
The gifts and handouts provided were related to the topics presented and I will utilize these materials to apply what I learned today.					
I would attend another event like this at the EMU Culinary Demonstration Kitchen.					

Figure 1. Evaluation Survey for "Spring into Summer at the EMU Demonstration Kitchen"

speaker to share information about local food sources and growing food at home, followed by a 15-minute break for event attendees. Unfortunately, the guest speaker was unable to attend so the first culinary demonstration was extended for an additional 15 minutes.

The budget for this event provided $300; $107 for groceries and supplies and $193 to the graduate student as a professional fee. Supplies and groceries for the event were purchased from local grocery stores and a produce market.

Two EMU undergraduate dietetic students, a friend of the graduate student, and the faculty member assisted on the day of the event. The dietetic students were completing supervised practice hours in the ONS.

The event was planned for a maximum of 50 attendees and additional chairs were on hand from the ONS to supplement the demonstration kitchen's 26 seats. Attendees (n=40) were a diverse group of faculty, staff, students, and a few friends and family of the graduate student (Figure 2). Almost all attendees were students or employees of the university. Twelve attendees were students from various academic majors who received one university Learning Beyond the Classroom credit as a result of attending the event. Remaining insulated bags were given to dietetics program preceptors.

During the event, attendees sat and watched, but questions and open dialogue were encouraged throughout by the presenter. The culinary demonstrations focused on teaching audience members healthy eating tips based on the 2015-2020 Dietary Guidelines for Americans, the United States Department of Agriculture's MyPlate, food safety and sanitation recommendations, knife skills, nutrition facts, and research associated with the recipes' ingredients. The first culinary demonstration was designed to teach attendees chicken fabrication, stove-top pan cooking, whole grain preparation, and soft drink beverage alternatives. Recipes prepared during the first demonstration included chicken scallopine, farro, sautéed kale, watermelon salad, and carbonated cranberry juice soda. The second culinary demonstration focused on knife care and meat thermometer use. Recipes prepared during the second presentation included a Southwest-themed salad and blackened chicken.

Survey Results

Thirty-two attendees completed the survey at the end of the event. Twenty-nine attendees (90.6%) strongly agreed with the statement, "I learned new information about nutrition, the nutrient benefits of specific foods, and/or how to maintain a general healthy diet." and 96.9% (n=31) strongly agreed with the statement, "I learned new food preparation techniques and/or cooking skills." Furthermore, 93.8% (n=30) of attendees who responded to the survey strongly agreed and somewhat agreed that they learned new information about food safety; 96.9% (n=31) strongly agreed and somewhat agreed that they learned about healthy affordable food sources in the community; and 96.9% (n=31) strongly agreed and somewhat agreed that they learned new techniques to cut food costs and save money on groceries.

In the "How Effective was this Presentation?" section of the survey, attendees responded that they would engage in healthy eating habits as a result of the presentation. Approximately, 78% (n=25) strongly agreed that they will eat more fruits and vegetables as a result of the presentation. Over 84% (n=27) strongly agreed that they will eat more whole grains as a result of the presentation. Furthermore, 71.9% (n=23) of attendees responded that they strongly agreed that they will eat more lean proteins and low-fat dairy foods as a result of the event.

Figure 2. Photo of "Spring into Summer at the EMU Demonstration Kitchen" event

All of the attendees (n=32) strongly agreed that the EMU Demonstration Kitchen is an effective venue to conduct the "Spring into Summer" event and similar events, and that attendees would attend another event at the EMU Demonstration Kitchen. Although evaluation results of this single event cannot be generalized, they were very positive and there is reason to believe that similar events would lead to positive results and increased nutrition knowledge for attendees.

CONCLUSION AND APPLICATIONS

The faculty member strengthened mentoring skills and event planning skills. Although the faculty member intended to involve more than one student, the lack of response from students necessitated an alternate plan; educators are skilled in changing plans to accommodate unforeseen circumstances. The student-created evaluation survey was long and the faculty member doubted whether attendees would complete it but the response rate was high. The survey did not address the marketing of the event and ease of finding the kitchen; this was an oversight. The faculty member offers the following tips for educators:

- Be flexible when original plans change
- Allow student creativity to flourish
- Support student initiatives and special events
- Proofread student-created flyers and other materials
- Trust students to create evaluation surveys

This successful event allowed the graduate student and faculty member to work closely together in accomplishing the objectives of the project. Through the planning and execution of this event, the graduate student strengthened entrepreneurial skills including planning, marketing, public relations, and culinary demonstration presentations. The student was also able to co-author and revise a peer-reviewed journal article. Educators can use the results of the project to create opportunities for student and educator collaborations that will enhance application of entrepreneurial knowledge and marketing skills as well as build awareness of dietetics services and facilities.

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