1-1-2017

An Evaluation of the Mississippi Recipes for Success Resource From the Perspective of Child Nutrition Directors

Chelsea L. Bell
University of Mississippi

AN EVALUATION OF THE MISSISSIPPI RECIPES FOR SUCCESS RESOURCE FROM THE PERSPECTIVE OF CHILD NUTRITION DIRECTORS

A Thesis
presented in partial fulfillment of requirements
for the degree of Master of Science
in the Department of Nutrition and Hospitality Management
The University of Mississippi

by

CHELSEA L. BELL

August 2016

ABSTRACT

The Mississippi Recipes for Success (MRS), A Guide for Child Nutrition Programs provides printed and online resources for child nutrition directors. These resources include recipes and methods to assist directors in effectively implementing United States Department of Agriculture (USDA) nutrition standards. The purpose of this study was to investigate if child nutrition directors utilize these resources, as well as assess child nutrition directors' perceptions of the helpfulness, satisfaction, and importance of the various components of the online and 2014 printed versions of the MRS. Data collection for this study involved an online survey that evaluated directors' usage of the resources and their perceived helpfulness, importance, and satisfaction.

The response rate was 68% (N=100). Means for all of the likert-type scales were above three (out of a 4-point scale). Cronbach's alphas showed high internal consistency among items. Overall results indicated high satisfaction with the MRS. Satisfaction remained high among all directors. There were not significant differences in response among directors and size of school districts or the number of years a director worked in child nutrition.

MRS is a valuable resource utilized by child nutrition program (CNP) directors implementing USDA nutrition standards. The Mississippi Depart of Education's Office of Child Nutrition will utilize findings from this study in developing future revisions of MRS resources. The positive ratings by directors of the MRS resource has the potential to serve as a catalyst for future state- and nation-wide initiatives to assist Child Nutrition directors in meeting USDA nutrition standards.

DEDICATION

This thesis is dedicated to everyone who assisted and guided me through this process. In particular, I would like to thank my mother Lorraine and late father Michael Bell, who funded my education. Thank you mom and dad for always supporting me and convincing me that my dreams are worth pursuing.

LIST OF ABBREVIATIONS AND SYMBOLS

CNP – Child Nutrition Program

CNPP – Center for Nutrition Policy and Promotion

DoD – Department of Defense

ERS – Economic Research Service

FBMP – Food-Based Menu Planning Approach

FNCS – Food and Nutrition Consumer Services

FNS – Food and Nutrition Services

HHFKA – Healthy, Hunger-Free Kids Act of 2010

MDE – Mississippi Department of Education

MRS – Mississippi Recipes for Success

MsC – Mississippi Cycles

NFSMI – National Food Service Management Institute

NSLA – National School Lunch Act

NSLP – National School Lunch Program

OCN – Office of Child Nutrition

SBP – School Breakfast Program

SMP – School Milk Program

USDA – United States Department of Agriculture

ACKNOWLEDGEMENTS

I express my deepest appreciation to my advisor, Dr. Laurel Lambert, PhD, RDN, LD and my committee members, Drs. Teresa Carithers, PhD, RDN, LD and Yunhee Chang, PhD. Thank you for taking the time to work with me these past three semesters. I would also like to thank Doris Schneider, Lydia West, and Scott Clements from the Office of Child Nutrition in the Mississippi Department of Education. Thank you for providing me with this research opportunity.

Lastly, I acknowledge the collegial support from my fellow students and faculty within the department. Thank you for enriching my education and experiences with the university.

TABLE OF CONTENTS

LIST OF TABLES

I. INTRODUCTION

The 2010 Healthy-Hunger Free Kids Act (HHFKA) included a series of changes to strengthen the USDA nutrition standards of school meals, as well as combat childhood obesity and food insecurity (Marcason, 2012). Implementation of the HHFKA to the USDA's nutrition standards began in 2012, with all additional standards being incrementally implemented by 2023 (USDA FNS, 2012). Included in the nutrition standards are revised meal patterns focusing on increasing fruits, vegetables, low-fat and fat-free milk, and whole grains availability. Guidelines also focus on reductions in saturated fat, trans fat, and sodium (USDA FNS, 2012).

Although federal policies provide some direction to child nutrition program (CNP) directors, each school district is responsible for interpreting and implementing the changes (Bergman et al., 2015). There are limited financial and material resources for CNP directors as they attempt to incorporate the new USDA nutrition standards into their school foodservice operations. One resource that has been developed by United States Department of Agriculture (USDA) is titled "Recipes for Schools." Based on a recent study by Rushing and Johnson (2015), the USDA recipes assist directors with a variety of requirements but need improvement in menu planning for dark green vegetables and red/orange vegetables, as well as compliance with meal pattern specifications regarding "no added sugar," "no syrup," and "reduced sodium." Directors in this study also reported that the recipes do not support their budgetary needs regarding food cost.

In addressing the recently amended USDA nutrition standards, a resource was developed to specifically meet the needs of CNP directors in Mississippi titled Mississippi Recipes for Success resource (MRS). A product of the Mississippi Department of Education's (MDE) Office of Child Nutrition **(**OCN), the MRS resource provides guidance for CNP directors in meeting the USDA nutrition standards. With both online and printed components, the MRS provides recipes and menu planning resources that may be utilized by all school foodservice personnel (Clements et al., 2015). Limited research has been conducted on resources and tools developed to assist CNP directors in overcoming barriers and challenges in meeting the USDA nutrition standards. Presently, no studies have been published regarding the adequacy or usefulness of MRS resources

II. REVIEW OF LITERATURE

History of Federally Assisted Child Nutrition Programs

State legislation and federal aid for school feeding programs date back to the 1930s. (Gordon, 1971). The catalyst for developing a national school nutrition program was the realization that large numbers of young American men were physically unfit for military service in World Wars I and II due to poor nutrition (Martin, 1996).

Operating on a year-to-year basis, the 79th Congress (1946) recognized the need for a stable and defined legislative foundation for a school lunch program (Gordon, 1971). Signed by President Harry Truman, the National School Lunch Program (NSLP) was founded under the National School Lunch Act (NSLA) in 1946 (79 P.L. 396, 60 Stat. 230). The act was established to promote the health of the nation's youth, as well as encourage, "the domestic consumption of nutritious agricultural commodities and other foods" (Ralston et al., 2008). Since its institution, the program has been administered by the USDA and by state departments of education (Martin, 1996).

Based on the success of the NSLP, President Lyndon B. Johnson signed the Child Nutrition Act of 1966, which established the federally assisted School Breakfast Program (SBP) and School Milk Program (Disiena, 2015). Originally created as a pilot program, the SBP was permanently authorized in 1975, to provide nutritionally balanced breakfasts (U.S. GPO, HHFKA, 2010). Other adopted initiatives include the Child and Adult Care Food Program (1966/1968), Summer Food Service Program (1966), and the Special Supplemental Nutrition

Program for Women, Infants, and Children (1966) (Martin, 1996). The United States Department of Agriculture's Food and Nutrition Services administers all of these programs (USDA FNS, 2016).

Today, the NSLP is the second largest U.S. food and nutrition assistance program (Ralston et al., 2008). Public and private schools and residential childcare institutions may participate in federally funded nutrition programs (USDA, 2013). Schools participating in the NSLP are able to provide free or reduced price lunches to economically disadvantaged children whose family income meets federal program requirements. As part of the program, schools receive cash subsidies and foods, referred to as commodities, from the USDA based on meals served (USDA, 2013).

Although schools are not required to participate in the NSLP, nearly 94% of schools (both public and private) participate in the program (Ralston et al., 2008). Currently, this federally assisted meal program operates in over 100,000 public and non-profit private schools and residential child care institutions (USDA, 2013). In 2014, the NSLP provided free or reduced-price lunches to over 30.3 million children daily. During 2014, nearly two-thirds of approximately 5 billion school lunches served were free or at a reduced price (USDA ERS, 2015).

The Healthy, Hunger-Free Kids Act (HHFKA) 2010

At its inception, the NSLP was designed to provide one third of the Recommended Dietary Allowance (RDA) for school-age children. Lunch patterns were later amended to reflect the Dietary Guidelines for Americans published in 1980 (Martin, 1996). The NSLP was implemented when malnutrition and poverty were major concerns in American families. The

primary reason for implementing school lunch standards during the 1930s and 1940s was to eliminate nutrient deficiency diseases (Martin, 1996).

While poverty is still prevalent among the nation, today's growing concern is the rise in obesity among the nation's youth, particularly children in poverty (Ralston et al., 2008). Although there were some previous nutritional modifications to CNPs, a 2010 bill proposal was the first major reformation to school meals in over thirty years (Disiena, 2015). The bill became known as The *Healthy, Hunger Free Kids Act 2010* (Public Law 111-296). With the final rule published in January 2012, this bill included a series of changes to strengthen the national nutrition standards of school meals, as well as combat childhood obesity and food insecurity (Marcason, 2012).

Changes to the NSLP became effective in July 2012, and changes to the SBP became effective July 2013. The legislation incorporates recommendations from the *Institute of Medicine's report School Meals: Building Blocks for Healthy Children,* as well as the 2005 and 2010 Dietary Guidelines for Americans (McGuire, 2011). The new HHFKA meal patterns focus on increasing fruits, vegetables, low-fat and fat-free milk, and whole grain availability. There are also specific calorie limit ranges for grades K-5, 6-8, and 9-12. Lastly, the new meal patterns focus on reductions in saturated fat, trans fat, and sodium (USDA FNS Final Rule, 2012). Sodium reductions will be targeted in three increments. The first reduction was in the academic year 2014-2015. The last two increments will be over the academic years of 2017-2018 and 2022-2023 (USDA FNS Implementation Table, 2012). Below is a list of specific meal pattern and USDA nutrition standard requirements for specific food groups from the 2012 final rule of the HHFKA (USDA FNS Final Rule, 2012).

- Fruit and Vegetable Consumption
  - Require students to select a fruit or a vegetable as part of the reimbursable meal

- Offer fruits and vegetables as two separate meal components
- Offer fruit daily at breakfast and lunch
- Offer vegetables daily at lunch
  - Include specific vegetable subgroups weekly (dark green, orange, legumes, and others as defined in the 2005 Dietary Guidelines for Americans)
  - Limit quantity of starchy vegetables throughout the week

- Milk
  - Offer milk that is fat-free (unflavored and flavored)
  - Offer milk that is low-fat (unflavored only)
- Whole Grain
  - Half of grains offered should be whole grains
- Meat/Meat Alternate
  - Offer a daily meat/meat alternate at breakfast
- Trans-fat and Saturated Fat
  - Meals should be prepared with food products or ingredients containing zero grams of trans fat per serving.
- Sodium Reductions
  - Sodium will be reduced over a 10-year period through two intermediate sodium targets at two and four years post implementation

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Standardized Recipes

Farm-to-School programs and scratch cooking appear to be gaining popularity in schools (Rushing and Johnston, 2015). The increase in scratch cooking and participation in these programs may increase a need for standardized recipes. One of the primary functions of MRS has been to provide CNP directors with standardized recipes that can be customized for their meal programs. Under the guidelines for HHFKA, all schools are required to develop and follow standardized recipes (Echon, 2014). Since the 1920s, the USDA has assisted in the development of standardized recipes for school lunches (Rushing and Johnson, 2015). Standardized recipes,

usually used in large-scale foodservice operations like schools, are recipes developed to yield large quantities of food that are of consistent quality. Standardized recipes have been proven as effective and reliable tools for meeting specific food service kitchen guidelines (Mitani and Dutcher, 1992). A customary standardize recipe includes important instructions for school foodservice staff, such as information about ingredients, portion sizes, methods of preparation, pan size, holding, cooking temperatures, and sanitation instructions (Mitani and Dutcher, 1992).

In addition to assisting staff, standardized recipes are also helpful in contributing to the success of a foodservice operation in areas of budgeting, forecasting, inventory, and nutrient analysis evaluation. Utilizing standardized recipes provides consistency and helps control waste, purchasing, and inventory (Mitani and Dutcher, 1992).

There are some limitations with standardized recipes. One example is that standardized recipes may not meet the needs of some food production operations. It is difficult to transfer recipes equally among various operations because of differences in sizes, shapes, and models of equipment. Another limitation is that standardized recipes often need to be revised and updated due to changes in federal regulations (Mitani and Dutcher, 1992).

Meeting USDA Nutrition Standards

USDA understood the importance of having CNP directors with foodservice experience or educational background, and in July 2015, established education standards for school nutrition professionals operating the NSLP and SBP. Besides amended hiring standards, all school nutrition professionals must fulfill minimum annual training and continuing education (USDA, 2015).

Several states have also released initiatives to assist CNPs in meeting USDA nutrition standards as recently updated by the HHFKA. As part of First Lady Michelle Obama's *Let's*

Move! campaign, there was a push to increase recipe resources and encourage home cooking to families (Herrup et al., 2014). Last year the USDA's Food and Nutrition Consumer Services (FNCS) in collaboration with the Center for Nutrition Policy and Promotion (CNPP) released an interactive recipe tool and website, *What's Cooking? USDA Mixing Bowl.* This interactive tool includes recipes for households, as well as child-care centers and school foodservice operators. In addition to this online resource, USDA also provides recipes through the Institute of Child Nutrition website (http://nfsmi.org/).

A study was conducted to investigate school nutrition professionals' usage and perception of USDA recipes for meeting the nutritional requirements of their programs. Other factors identified in this study were the frequency of usage, factors influencing usage, and the relationship between those variables and school district size. The study found that, irrespective of district size, the USDA recipes adequately assist a majority of CNP directors in meeting the NSLP requirements. However, the study also found that recipes should be further updated and training materials for producing the recipes should be established. Lastly, this study also found that while the USDA provides standardized recipes to meet the nutritional requirements, they are not customized to the various regions and/or cultures throughout the U.S. Based on findings, this study recommended that recipes follow current trends and offer more diverse and appropriate recipes for all regions of the country (Rushing and Johnson, 2015).

"Stepping Up To the Challenge: Creating a Healthy School Environment Program," was another program, recently developed by the USDA, designed to provide CNP directors with the knowledge and skills to implement federal initiatives and policies at the local level. In developing this program, the needs and interests of CNP directors were investigated in a needs assessment questionnaire. The three highest ranked needs were (a) planning cost-effective

menus; (b) reducing calories, sodium, saturated fat, and trans fat in menus; and (c) using USDA foods cost-effectively (Bergman et al., 2015).

In today's technological environment, most resources can be accessed from program websites. A 2011 study used an online survey to investigate nutrition directors' perceptions of technology use in school nutrition programs. Directors were asked to identify which mediums of technology/software they used along with reporting the effectiveness of technology/software in meeting department goals, barriers to purchasing new technology/software, as well as the importance of future technology/software purchases. The study found that directors typically use office and menu related software, which are effective in assisting directors with several regulatory goals. The study also found that older directors with less education, who worked in smaller districts, found inadequate funds, outdated computers, and lack of IT/administrative support to be barriers to purchasing technology/software (Pratt et al., 2011). The researchers concluded that it is central for directors to have adequate access to technology and computer education if they are to embrace technology. Directors with advanced computer skills utilized the technology/software the most, as well as rated it as the most effective. They also had the least barriers to purchasing technology/software.

New nutrition standards implemented in the HHFKA were a major change impacting CNPs. Since enactment of the HHFKA, 2010, nutrition and meal standards are scheduled to be incrementally updated until 2023. A previous study evaluating CNP directors' perspective, attitudes, and approaches to execution of the HHFKA meal regulations found several challenges directors faced when implementing the changes (Bergman et al., 2015). The three major themes researchers identified from directors were readiness to change, challenges in menu planning and understanding the role school nutrition has in children's health.

Most directors in this study reported feeling prepared, but wished they had longer to transition to the new regulations. Directors described developing menus to meet the amended guidelines as increasingly difficult. In particular, calorie limitations and variations among different grade groups were most challenging. Lastly, directors said that maintaining a positive attitude was a priority for implementing the guidelines. A positive demeanor was key to staff training and communications between the school nutrition program and parents (Yon et al., 2016).

It is difficult to legislate a single set of nutrient standards that can accommodate the diverse nutritional needs of children. Therefore, implementation of the new NSLP guidelines provides many research opportunities (Byker et al., 2013). Federal initiatives and policies often provide direction on how to improve the school environment. However, each school district is ultimately responsible for implementing those changes with limited to no funding offered (Bergman et al., 2015).

Mississippi Recipes for Success (MRS)

In an effort to provide (CNP) directors guidance and support in implementing USDA nutrition standards for the NSLP, the Mississippi Recipes for Success resource provides a customized selective menu system for elementary and secondary schools in Mississippi. Originally referred to as Mississippi Cycles I (MsC I), the research and development stage was funded by a Team Nutrition Grant awarded to the Mississippi Department of Education's (MDE) Office of Child Nutrition. The first version of MsC was created to strengthen the training infrastructure of Mississippi CNPs and assist in meeting nutrient standards established. MsC I provided customized selective menu systems, cycle menus with customized charts, and cost/nutrient analysis of menus. Additionally, menus items and ingredients were linked to the

Mississippi Statewide Purchasing Cooperative (Clements et al., 2015). MsC I was developed and distributed from 1996 to1998.

Revised and updated, MsC II provided documentation for meeting USDA regulations, additional menu customization and flexibility, as well as an emphasis on the use of USDA commodities available through the Mississippi Statewide Purchasing Cooperative (Bounds et al., 2013). MsC II was distributed to CNP directors in 2005. Updated again, MsC III was published in 2011with a name change to MRS in 2012. Revisions in MRS included nutrient analysis of recipes specifically using Nutrikids software. The last two MRS updates and distribution of manuals occurred in 2014 and 2015.

Currently, MRS provides an array of printed and online resources for CNPs (Bounds et al., 2013). The development and updates for MRS involve a task force comprised of Mississippi school foodservice directors and state staff. The current printed edition of MRS includes six manuals:

i. Intro – Menu Planning and Cooks Tools
ii. Breakfast – Grains, Meats, and Combos
iii. Sides – Vegetables and Fruits
iv. Sides – Grains and Desserts
v. Entrees – Salads, Sandwiches, Soups, and Vegetarian
vi. Entrees – Beef, Fish & Seafood, Pizza, Pork, and Poultry

The Intro manual includes resources for school foodservice staff and CNP directors and the subsequent five manuals include standardized format recipes for the specified subgroups of grades K-5, 6-8, and 9-12. Ingredients are numbered according to the state of Mississippi's food purchasing guide. The ingredients in the recipes are also items on the Statewide Purchasing Cooperative, USDA commodities, Department of Defense, and Farm to School offerings (Clements et al., 2015).

The online version of the MRS can be accessed through the web-address (http://mrs.mde.k12.ms.us/), which provides a complete database of recipes with ingredient and recipes updates. All MRS materials are available for download. Recipes in the online database can be searched for by ingredient, recipe name, MRS identification number, or by meal component. The website also includes downloadable PDFs of the various sections of the printed edition. The website is updated as recipes in Nutrikids are revised, and as new recipes and products are developed.

The purpose of this study was to determine Mississippi CNP Directors' perception of the helpfulness, satisfaction, and importance of the printed and online versions of the 2014 Mississippi Recipes for Success, A Guide for Child Nutrition Programs. The survey instrument was developed in collaboration with the Mississippi Department of Education, Office of Child Nutrition in an effort to provide the Mississippi Department of Education, Office of Child Nutrition evidence-based input for revisions of the MRS resource.

III. METHODOLOGY

Participants

The survey was administered to 146 of the 148 CNP directors for Mississippi school districts. Two directors that participated in the piloting of the survey were excluded from the final study. The Office of Child Nutrition provided contact information for the directors. Each director was emailed an anonymous link to the survey.

Instrument

The instrument for this study was a web-based survey. Developed in collaboration with the Mississippi Department of Education, Office of Child Nutrition (OCN), this survey examined directors' perceptions of the MRS regarding helpfulness, satisfaction, and importance of its various features. The survey for this study included likert-type scales, multiple choice, and open-ended questions. It ranged from sixteen to twenty-one questions, depending on which formats of MRS each director used (printed, online, or both). The survey was coded and uploaded using Qualtrics survey software.

To pilot the survey, a hard copy that included all questions for the printed and online MRS format usage, was sent to two child nutrition directors and the previous director of the ICN (formerly known as NFSMI). The two directors chosen to pilot the study participated in the task force that developed the MRS manuals. One represented a smaller district (less than 10 schools) and one represented a larger district (greater than 15 schools), First, the directors were asked to evaluate the survey for clarity, wording, and comprehension. Secondly, they were asked to

determine if the questions and/or survey were too long. Lastly, they were asked to address if the survey appropriately assessed directors' perceptions of satisfaction, usefulness and helpfulness of the features in the various MRS sections addressing meal planning and child nutrition operations. Based on their evaluations, only a few changes were made to the likert-type scales in some of the questions.

Questions in the web-based survey used a forced response design, which would not allow directors to continue to the next question without an answer selection. Although directors were required to answer a question before proceeding to the next, they were able to withdraw at any time without completing the survey. Following a description of the study and a statement of consent, the survey began with three qualifying questions. Directors were excluded from completing the entire survey if they were (1) under 18 years of age, (2) unfamiliar with the 2014 version of the MRS, or (3) indicated that they did not use a format of the MRS. All directors met the first two criteria, and only one director indicated that they did not use the MRS.

Directors were provided a series of questions based on the MRS format used. If the directors used both the printed and online versions, they were first prompted to answer questions about the printed version and then the online version. Directors were asked how often they or their central staff used MRS, at which locations MRS was available, how many schools used each version, and how often MRS was used in training employees.

The next series of questions asked directors their satisfaction level with 10 features included in the printed MRS resource and fourteen features included in the online MRS resource (Table 1). The four additional features included in the online MRS resource were specific to the MRS website. A 4-point scale was used (4= Very Satisfied, 3=Satisfied, 2=Neutral, 1=Dissatisfied) with an optional selection of "I do not use this feature." The Office of Child

Nutrition guided the scale development for survey questions in their collaboration with this study.

A 5-point Likert-type scale (5=Very Important, 4=Important, 3=Neutral, 2=Low Importance, 1=Not Important) was used for the second series of questions asking directors to indicate the level of importance of thirteen features when choosing a recipe from the MRS resource (Table 2). Included were features such as: ease of following recipe directions, affordability of ingredients, student acceptability of recipe, and food safety information.

The third series of questions asked directors to indicate how helpful the MRS resource was in assisting them in meeting ten different nutrition requirements established by the 2014 Federal Nutrition Requirements for Child Nutrition Programs (Table 3) Helpfulness was measured using a 4-point scale (4=Very Helpful, 3=Helpful, 2=Neutral, 1=Not Helpful) with an optional selection of "Not Used."

The last series of questions asked directors to evaluate the helpfulness of the "Cook's Tools" section included in the MRS resource This section contains reference materials and charts that can be posted to assist staff in meal operations such as customizing recipes, common measurements, and portion control. The same 4-point scale to measure helpfulness was used and also included the optional selection of "Not Used."

Next, directors were asked if they use the recently distributed 2015 printed version of MRS and nutrient analysis software to analyze their menus. Lastly, the survey asked how long directors worked in CNPs, and how many schools were in their district. Unlike other questions that forced a response before continuing, these two questions were optional and provided interval ranges to choose from. Per the requests of OCN and due to the concerns with anonymity and response rates, no demographic questions were asked.

At the end of the survey directors could leave comments and feedback. Following completion of the survey, directors were led to a second survey to disassociate them from their responses. They were provided with the opportunity to enter their names and contact information to win 1 of 4 $50 Wal-Mart cards. The identifiable data (name, telephone number, and email address) in this second survey could not be linked with the directors' responses in the main survey.

Data Collection

The on-line survey was available for participation from April 14th through May 11th, 2016. The director of the OCN emailed a memorandum to all CNP directors alerting them to the survey and the purpose of the study. While the survey was active, three reminder emails were sent to directors. The study was reviewed and approved as exempt by the University of Mississippi's Institutional Review Board. Participation was voluntary and submissions were anonymous.

Statistical Analysis

All data was analyzed using Version 19 of Statistical Package for the Social Science software (SPSS) sponsored by the University of Mississippi. Directors that began but did not complete the survey were excluded from analysis. Only one participant began but did not complete the survey. Descriptive statistics were obtained for each question in the survey to obtain means, percentages, and standard deviations. Cronbach alphas were determined to measure internal consistency among the different questions within a measure. Lastly, two one-way ANOVAs were run for each of the variables in the last two questions about director characteristics.

IV. ARTICLE FOR SUBMISSION

AUTHORS: Bell, C., Lambert, L., Chang, Y., Carithers, T., Schneider, D., and West, L.

Department of Nutrition and Hospitality Management, University of Mississippi, University, MS

ABSTRACT

Purpose/Objectives

A State Meal Planning System (MPS) with a customizable selective menu system resource was developed for child nutrition program (CNP) directors to comply with USDA nutrition regulations. The resource is available in printed and online formats and includes recipes, menu matrixes, food safety, and training materials for meal planning. The purpose of this study was to investigate CNP directors' perceptions of their satisfaction with as well as the importance and helpfulness of the various features included in the MPS.

Methods

An electronic survey was developed in collaboration with the State Department of Education, Office of Child Nutrition (OCN) and sent to CNP directors in spring of 2016. Directors rated MPS features using a 4-point scale for satisfaction and helpfulness, and a 5-point scale for importance. Data analysis included descriptive statistics and one-way ANOVAs to measure associations.

Results

The response rate was 68% (N=99). Overall results indicated high satisfaction with the MPS and its various features. Features with highest ratings for satisfaction, usefulness, and helpfulness were *Number of Meal Components found in Recipes* (M = 3.45, SD=.56), *Easy-to-follow Recipe Directions* (M = 4.74, SD = .47), and *Portion Sizes for age/grade groups* (m= 3.64, SD=.52), respectively. Directors (95%) reported using the MPS for training with 53 (54%) using it on a daily, weekly or monthly basis. Number of schools in a district and directors' number of years of experience in child nutrition, did not significantly affect responses.

Applications to Child Nutrition Professional

Findings from this study can be utilized by the OCN in updating future editions of the MPS resource. Their findings also have the potential to serve as a template for other state OCNs to provide directors with menu planning tools that are customizable and meet cultural needs, while ensuring compliance with USDA nutrition standards.

INTRODUCTION

The 2010 proposal for the Healthy Hunger-Free Kids Act (HHFKA) was the first major reformation to the National School Lunch Program (NSLP) in over thirty years (Disiena, 2015). This bill included a series of changes to strengthen the national nutrition standards for school meals, as well as combat childhood obesity and food insecurity (Marcason, 2012). Implementation of the HHFKA and updated USDA nutrition standards for school meals began in 2012, and will continue incrementally over the next several years (USDA FNS, 2012).

One requirement of the HHFKA is that schools develop and follow standardized recipes (Echon, 2014). USDA supports resources to assist CNP directors in meeting nutrition requirements such as the Team Nutrition Initiative and the Institute of Child Nutrition [(ICN) formerly the National Food Service Management Institute]. Specific programs such as *What's Cooking? USDA Mixing Bowl* has been useful as an interactive recipe tool and website developed in collaboration with the Center for Nutrition Policy and Promotion (CNPP) for the purpose of supporting CNP directors in developing standardized recipes (Bergman et al., 2015).

In addressing current available resources, one study found that although USDA initiatives and programs have provided direction on how to meet the HHFKA school meal nutrient standards, CNP directors wanted recipes that could be customized to their various regions and/or cultures. Based on their findings, it was recommended that recipes should be routinely updated to follow current trends and offer more diverse and culturally appropriate meals for all regions of the country (Rushing and Johnson, 2015).

Another recent study evaluating CNP directors' perceptions on implementing federal meal guidelines found that most felt prepared for the new regulations. However, concerns among directors included financial implications due to increased food costs, possible decreased revenue

from declines in participation, and certain challenges with menu planning. This study found that directors reported regional differences and the ability to procure specific products that would comply with whole grain-rich foods and age-appropriate portion sizes. They also struggled with menu development that complied with the calorie ranges for different age groups (Yon et al., 2016).

Training is also an important component in adhering to CNP regulations. As reported in Stephens and Shanks (2015), school food service professionals are an important part of implementing CNPs. They report that research is still needed on training practices. Past training initiatives for school food service personnel have included hiring chefs to assist in training and menu development. As part of a ten-year initiative to improve the school food environment in New York City, the Department of Education developed menu items that could be produced in all schools, even those with lack of kitchen space and/or equipment. To accomplish this, registered dietitians and executive chefs were hired to work with each of the boroughs' schools to enhance aesthetic appeal of menu items, increase the staff efficiency, and train them in the utilization of standardized recipes (Perlman et al., 2012). Another two-year study in Boston school districts utilized chefs to train kitchen staff in preparing healthier school lunches that focused on enhancing specific aspects of the menu (more whole grains, fresh/frozen fruits and vegetables, and decreasing sugar, salt, saturated fats, and trans fats) (Cohen et al., 2012).

In addressing the meal standards, only a few states have developed and/or implemented resources to provide standardized recipes to assist in meeting the HHFKA nutrition requirements (Bergman et al., 2015; Stephens et al., 2016). One such resource is the State Meal Planning System (MPS) [Real title blinded for review] that provides a customized selective menu system for elementary and secondary schools in [STATE NAME]. This resource was first developed in

1998 and has been updated in 2005, 2014 and 2015 to meet changing USDA regulations. This resource provides menu customization and flexibility using foods that are available through the (State Name) Statewide Purchasing Cooperative and incorporates USDA Foods (Bounds et al.,2013).

One of the primary functions of MPS has been to provide CNP directors with standardized recipes that can be customized, updated to meet current trends and student tastes, and meet the nutrient standard requirements for school meal programs. The MPS also includes nutrient analysis of recipes specifically using USDA approved software and is available in print and online. It was important to provide the resource online. In today's technological environment, most directors have access to computers to assist in program management. Directors are also provided a database of ingredients and recipes to use to create school meal menus using USDA approved nutritional approved software. A study investigating CNP directors' perceptions of technology use in school nutrition programs, found that directors typically use office and menu related software, which are effective in assisting them with several regulatory goals (Pratt et al., 2011).

The printed edition of MPS includes an introductory manual titled Intro-Menu Planning and Cooks Tools, and five recipe manuals divided into 1) Breakfast – Grains, Meats, and Combos, 2) Sides – Vegetables and Fruits, 3) Sides – Grains and Desserts, 4) Entrees – Salads, Sandwiches, Soups, and Vegetarian, 5) Entrees – Beef, Fish & Seafood, Pizza, Pork, and Poultry. The Intro manual provides sample weekly menus, matrixes worksheets based on age/grade groups to assist in menu planning, recipe customization, and purchasing formulas.

The online version of the MPS provides the same information as the printed but allows for more frequent recipes updates that can be downloaded. Recipes in the online database can be

found by ingredient, recipe name, MPS number, or meal component. When recipes are modified or new products are introduced, consultants, hired through the State Department of Education, Office of Child Nutrition, update the recipe information. The purpose of this study was to investigate CNP directors' perceptions of the satisfaction, importance and helpfulness of the various components of the MPS.

METHODOLOGY

Sample

Access to the web-based survey was distributed to 146 of the 148 CNP directors of [STATE NAME] school districts. Directors identified themselves as users of printed, online, or both MPS resources. Two directors that participated in the piloting of the survey were excluded from the final study. The State Office of Child Nutrition (OCN) provided contact information for the directors. Each director was emailed an anonymous link to the survey.

Instrument

A web-based survey was developed in collaboration with the OCN to identify CNP director's level of satisfaction, importance and helpfulness of the MPS resource based on their use of the printed, online, or both MPS resources. The survey included Likert-type scales, multiple choice, and open-ended questions to measure the different attributes. It ranged from sixteen to twenty-one questions, depending on which MPS format(s) directors used (printed, online, or both). To pilot the survey, a hard copy that included all questions for the printed and online MPS format usage was sent to two CNP directors and the previous director of the ICN. Directors were asked to evaluate the survey for clarity, wording, comprehensiveness, and appropriateness of survey length. The survey was well received and only a few changes were made.

The survey was uploaded to Qualtrics, an online survey service, and the emailed link was accessible to CNP directors from April 14th through May 11th, 2016. The survey used a forced response format, which would not allow directors to continue to the next question without an answer selection. The survey began with three qualifying questions. Directors were excluded from entering the survey if they were (1) under 18 years of age, (2) unfamiliar with the MPS, or (3) indicated that they did not use any MPS format.

Directors were asked how often the MPS was used by their staff, at which locations the MPS was available, how often the MPS was used, and if the MPS was used in employee training. The next series of questions asked directors their satisfaction level with 10 features included in MPS resource using a 4-point scale (4= Very Satisfied to 1=Dissatisfied) with an optional selection of "I do not use this feature." A 5-point Likert-type scale (5=Very Important to 1=Not Important) was used for the second series of questions asking directors to indicate level of importance placed on features such as student acceptability of recipes and food safety information included when choosing a recipe from the MPS resource. The third series of questions asked directors to indicate how helpful the MPS resource was in assisting them in meeting nutrition requirements. Helpfulness was measured using a 4-point scale (4=Very Helpful to 1=Not Helpful) with an optional selection of "Not Used." The last series of questions asked directors to evaluate the helpfulness of the "Cook's Tools" section. The same 4-point scale to measure helpfulness was used and included the optional selection of "Not Used." Lastly, directors were asked how long they have worked in CNPs, and how many schools were in their district. Due to concerns with anonymity, demographics were not obtained. The study was reviewed and approved as exempt by the University of [STATE NAME]'s Institutional Review Board.

Statistical Analysis

All data was analyzed using the statistical package Version 19 of SPSS. Descriptive statistics were obtained for each question in the survey to obtain means, percentages, and standard deviations. Cronbach alphas were determined to measure internal consistency among the different questions using the Likert-type scale. Two one-way ANOVAs identified associations between the variables and directors' characteristics.

RESULTS AND DISCUSSION

The response rate from directors was 68% (n = 99). Twenty-one reported using the printed version only, two used the online version only, and seventy-six used both formats of MPS. A higher percentage of directors (91%) reported using the printed format at least monthly compared to 74% of directors using the online format.

School districts ranged in size from one school to greater than twenty-five schools. The majority of directors (92%) had ten or fewer schools in their district. The greatest number of directors (n = 31) reported having over twenty years of experience working in child nutrition with only five directors reporting working less than one year. When directors were asked if they used the MPS for training, 95% (n = 94) reported they do with 54% (n =5 3) using the MPS for training on a daily, weekly, or monthly basis.

Directors were asked to indicate their level of satisfaction with ten features and/or aspects of the MPS resource reflected in both printed and web-based versions (Table 1). Included in the table are features such as meal planning, recipe layout/formatting, and recipe components with four additional features to measure satisfaction of directors who also access the web-based MPS. The two features receiving the highest satisfaction were *Number of Meal Components found on Recipes* (M = 3.45, SD=.56) and *Organization of food categories found in the binders* (M= 3.43,

SD=.61). Each recipe not only list the meal components at the top of the page, but also uses large colorful icons for quick identification of meal components when meal planning. Dividing the food components into to five separate binders makes the MPS more manageable in accessing and easily locating the different recipes for meal planning. Additionally, the individual binders allow for portability around the kitchen.

The lowest satisfaction was *Menu Planning and Menu Matrixes Guide* (M = 3.12, SD = .73) with eight directors reporting they do not use this feature. The menu matrixes are based upon USDA meal patterns (USDA FNS, 2012). The matrixes are divided into breakfast and lunch and age/grade groups. The directors in this study who do not use this feature may be relying primarily on nutrient analysis software for menu planning. Only USDA-approved software may be used when analyzing nutrient content of meals (USDA, 2016). Presently there are fifteen software programs approved for use in school meal programs with 98% (n = 96) directors reporting using an approved USDA nutrient analysis software program. In the comments section of the survey one director reported using MPS mainly through Nutrikids® to access recipes and print them. Perhaps this is because Nutrikids® allows directors to customize the yields of recipes, which is not offered through MPS. Having the mechanism to customizing yields of recipes could be a consideration when updating the online MPS.

Although directors appear to be satisfied with the feature, *Variety of Recipes found in Each Category,* it was one of the lower rated features (M=3.15, SD=.79). In a position paper from the Academy of Nutrition and Dietetics, improving variety of recipes was noted as an important aspect of school meals (Bergman, 2010). Rushing and Johnson (2015) reported several deficiencies when evaluating the USDA recipe system including variety along with the availability of recipes meeting today's trends, cultural diversity, regional appropriateness, and

student acceptability. Variety is an area that could be one of the focuses on the next revision or update of the MPS.

The lowest rating for the online features was the *Frequency of Website Updates* (M=3.14, SD=.74). Presently there is not a planned schedule for updating the MPS printed or website resources. The website is updated as new ingredients are added or removed or as the makeup of ingredients is altered. Per discussion with the MPS resource developers, the website is updated on an as-needed basis. Although seventy-six directors were using the online version of MPS, twenty-one used the printed version only. Although many people appreciate resources in an online format in this digital age, print resources still continue to be a popular format. A 2014 study of print and e-book use of the e-Duke scholarly collection found that print remained a popular medium and was actually still preferred by most individuals over digital formats (Goodwin, 2014). Although the majority of directors used the online version, there still appears to be a need to continue publishing the printed format.

Table 2 shows features included in the recipes such as affordability of ingredients, acceptability of the recipes, accuracy of recipe yields, and directors' ratings of their perceived level of importance placed on feature when choosing a recipe. The features receiving the highest level of importance were *Easy-to-follow Recipe Directions* (M = 4.74, SD = .47), *Accuracy of Recipe Yields* (M = 4.65, SD = .58), *Student Acceptability of Recipe* (M = 4.65, SD = .60), and *Food Safety – Critical Control Points* (M = 4.65, SD = .50). Recipes all follow the same standardized directions, include productions notes, and draw the employees' attention to food safety by highlighted the critical control points within the recipe directions. Since directors who use the MPS rated student acceptability of the recipe as one of the most important features, future studies of the MPS should identify recipe acceptability from the students' perspectives

both on selection and consumption of meal items. This is especially timely since student acceptability was identified as a deficiency in the USDA recipe system (Rushing and Johnson, 2015).

The two food safety features, *Critical Control Points* (M = 4.65, SD = .50) and *Recipe HAACP Process* (M = 4.64, SD = .52), were rated as very important among the directors. Food safety is an important component of the HHFKA. Although food safety programs have always been included in school meal program requirements, the HHFKA further requires that all food safety programs be based on Hazard Analysis Critical Control Point (HACCP) principles (USDA, 2014). Acknowledging the importance of food safety, the most recent update of the MPS (2015) offers enhanced critical control points and recipe HACCP processes features for each recipe.

The two lowest rated recipe features were *Staff Acceptability of Recipe* (M = 4.24, SD = .77) and *Picture of Recipe* (M = 4.24, SD = .80). Directors may focus more on meeting USDA regulations to ensure meal standards are achieved and may overlook staff perspectives. Gathering staff input on acceptability may provide additional insight and serve as guidance for future MPS revisions. As for pictures, if directions are easy-to-follow and staff is proficient in preparing the item, a picture of the completed recipe may not be as important. Not including pictures may also decrease printing costs. No director rated any of the features as "Not Important."

Table 3 shows the mean rating of directors' perception of the level of helpfulness the MPS provides in meeting USDA nutrition standards. The four nutrient requirements perceived as most helpful were, *Portion Sizes for age/grade groups* (m= 3.64, SD=.52), *Calorie Ranges for age/grade groups* (M = 3.55, SD=.56), *Meeting Vegetable Subgroup Requirements* (M = 3.47,

SD = .69), and *Sodium Targets* (M = 3.43, SD = .67). These are important finding since it was reported that directors struggle with ensuring age-appropriate portions sizes and calorie ranges for the different age groups when developing menus (Yon et al., 2016). The MPS also addresses the vegetable subgroup through the various icons to assist directors in menu planning. The different icons identify vegetables that qualify for the following subgroups; red/orange, beans/peas, dark green, starchy, and "other." Additionally, many of the recipes are "made from scratch" recipes allowing for careful regulation of sodium. As identified in the study from Rushing and Johnson (2015), they found that directors struggled most with sodium regulations plus menu planning for dark green vegetables and red/orange vegetables.

Table 4 shows the mean rating of directors' perceptions of the level of helpfulness with the MPS section referred to as *Cook's Tools*. The *Cook's Tools* provides resources and guides to assist CNP directors in menu planning and cooking. They were developed to adhere to USDA National School Breakfast and Lunch Programs and the State Board Policies of the [STATE NAME] Department of Education. This section had the greatest number of directors who stated that they did not use features in *Cook's Tools*. Of the six sections in the *Cook's Tools,* four sections contained two to five directors that did not use the resource.

One-way ANOVA was used to see if significant differences were found between the directors' responses based on their characteristics. One-way ANOVA between number of years working in child nutrition and the total sum of the questions regarding satisfaction [$F(5, 92) = .52$, $p = .763$], importance [$F(5, 92) = 1.04$, $p = .401$], helpfulness [$F(5, 92) = .44$, $p = .821$], Cook's Tools [$F(5, 91) = .54$, $p = .748$], and the website [$F(5, 72) = .32$, $p = .902$] indicated that CNP directors' ratings of the features of the MPS did not significantly vary based on the number of years a director worked in child nutrition.

In the second one-way ANOVA, the numbers of schools in each district were sorted into three groups (1-10 schools, 11-20 schools, >20 schools). The one-way ANOVA between number of schools in each CNP director's district and the total sum of the questions regarding satisfaction [$F(3, 94) = .31$, $p = .815$], importance [$F(3, 94) = .29$, $p = .832$], helpfulness [$F(3, 94) = .48$, $p = .697$], Cook's Tools [$F(5, 91) = 1.82$, $p = .148$], and the website [$F(5, 72) = 2.68$, $p = .053$] indicated that CNP directors' ratings of the features of the MPS did not significantly vary based on the number of schools in a CNP director's district.

CONCLUSIONS AND APPLICATION

Limitations of the Research

This study used a survey platform that was web-based. Although web-based surveys have several advantages, this method has been evaluated as having a response rate approximately 10% lower than a mail-in or telephone survey (Fan and Yan, 2010). The response rate for this study may have been higher if a different platform was used. Other possible reasons could be the questionnaire length, email firewalls blocking the receipt of the emailed survey link or the large number of emails that CNP directors receive.

Although the directors appeared satisfied with many features provided by the MPS and rated features as important and helpful, it was not determined to what extent the MPS resource is used and if it actually improves adherence to the USDA nutrition standards. It was also not identified whether other tools are being used to support directors in implementing and following the new USDA nutrition standards. Future research could compare the MPS resource to other resources being used by in child nutrition programs in assessing satisfaction, usefulness and helpfulness in menu planning. Forty-five directors did not respond to the survey and it is unknown if they use the MPS and if not, what resources they are using in meal planning. This

research surveyed CNP directors from one southern state, using one meal planning resource, and therefore is limited in scope.

Applications

Implementing changes in USDA nutrition regulations for CNPs can be difficult for various reasons including limited resources, lack of funding from federal and state agencies, additional training, difficulty in acquiring new or alternative products, and meeting regional and cultural needs. The recipes and menu planning tools provided by the MPS, were developed to assist CNPs in the implementation and adherence to USDA nutrition standards and provide an array of printed and online resources that are state specific. Recipes and menus also support customization and local cultural needs.

It was found that the majority of directors have adequate access to technology to take full advantage of the online MPS. However, twenty-one directors only used the printed format showing the need to continue providing printed materials and perhaps further investigation as to why they did not access the online resource. Format used, size of district, and years working in a district did not affect the positive ratings by directors regarding the satisfaction, importance, and helpfulness with all the MPS features. This resource appears to be utilized and appropriate for directors with all levels of experiences and size of school districts. This indicates that MPS resource is a valuable tool for a wide audience of CNP directors; new and experienced, as well as directors of small and large districts.

The MPS was developed to help child nutrition programs develop healthy menus and utilize standardized recipes that comply with federal guidelines. In lieu of hiring chefs or personnel for training, this resource can be used as a training tool. Recipes in the MPS include

CCPs, instructions, pictures, and purchasing guidelines that can all increase staff and program efficiency. Future studies should inquire more about the use of this tool in training.

Along with being well received and utilized, a printed copy of the MPS resource is distributed to all school directors and each of their schools in the state. The online resources are free to any individual with Internet access. This unique statewide initiative provides options to meet geographical and cultural needs. All ingredients in the recipes are items found in the CNP Statewide Purchasing System.

Findings from this study can be utilized by the State Department of Education's Office of Child Nutrition to update future editions of MPS. Future studies should include the perspectives of CNP managers and their school staff. Future studies could also investigate the practicality of developing a MPS-type resource to meet the needs of other states. Based on the favorable perception of the MPS resource, this study may encourage other states to create their own resources to assist CNPs in meeting USDA nutrition standards.

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APPENDICES

Table 1.

Mean Ratings of Level of Satisfaction with the Following Features

Features	N	M	SD
Menu Planning and Menu Matrixes Guide	90	3.12	.73
Organization of food categories found in the binders	97	3.43	.61
Variety of recipes found in each category	98	3.17	.79
Formatting or layout of recipes	98	3.35	.63
Clarity of Recipe Directions	98	3.30	.72
Pictures of 'Illustrated steps for Preparation of' recipes	98	3.28	.73
Pictures of the recipe finished product	98	3.24	.79
Nutrient analyses of recipes	98	3.30	.69
Using recipes to meet USDA Nutrition standards	98	3.38	.62
Number of Meal Components found on Recipe	98	3.46	.56

Mean Ratings of Level of Satisfaction with the following features – ONLINE VERSION

Features	N	M	SD
Organization of website	77	3.26	.62
Frequency of website updates	76	3.14	.74
Printables and resources on website	76	3.42	.64
Search options for finding recipes	76	3.20	.75

Mean ratings in this section are based on a 4-point rating scale: 4= Very Satisfied, 3=Satisfied, 2= Neutral, and 1= Dissatisfied

** Directors who responded, "I do not use this feature" were not included in the N.*

Table 2.

Mean Ratings of Level of Importance of Feature When Choosing a Recipe

Features	N	M	SD
Easy-to-follow Recipe Directions	98	4.73	.47
Accuracy of Recipe Yields	98	4.64	.58
Affordability of Ingredients	98	4.31	.74
Availability of Equipment needed to prepare recipe	98	4.39	.60
Adequate staffing needed to prepare recipe	98	4.30	.78
Skill level of staff needed to prepare recipe	98	4.24	.80
Student Acceptability of Recipe	98	4.64	.60
Staff Acceptability of Recipe	98	4.23	.77
Nutrients that the recipe Provides	98	4.50	.61
Number of Meal Components met by recipe	98	4.47	.64
Picture of Recipe	98	4.24	.80
Food Safety – Recipe HAACP Process	98	4.63	.52
Food Safety – Critical Control Points	98	4.64	.50

Mean ratings in this section are based on a 5-point rating scale: 5=Very Important, 4=Important, 3=Neutral, 2=Low Importance and 1=Not Important.

Table 3.

Mean Ratings of Level of Helpfulness in Meeting the Following Nutrition Requirements

Nutrition Requirements	N	M	SD
Portion sizes for age/grade groups	97	3.65	.52
Calorie ranges for age/grade groups	98	3.55	.56
Saturated fat limits	96	3.40	.62
Trans fat limits	96	3.36	.62
Variety of meat and meat alternate recipes	98	3.38	.63
Variety of whole grain recipes	98	3.24	.76
Variety of fruits	98	3.39	.67
Variety of vegetables	98	3.39	.65
Meeting vegetable subgroup requirements	98	3.47	.69
Sodium targets	97	3.42	.75

Mean ratings in this section are based on a 4-point rating scale: 4=Very Helpful, 3=Helpful, 2=Somewhat Helpful, 1=Not Helpful

***** *Directors who responded, "I do not use this feature" were not included in the N.*

Table 4.

Mean Ratings of Level of Helpfulness of the following sections of 'Cooks Tools' as found in Binder 1 or on the website

Sections of 'Cooks Tools'	N	M	SD
Abbreviations and Common Measures	98	3.48	.63
Portion Control	98	3.52	.60
Purchasing Formula	93	3.30	.72
Customizing Recipes	93	3.34	.68
Crediting Grains	94	3.37	.66
Fresh/Frozen/Canned Vegetable Conversions	96	3.40	.62

Mean ratings in this section are based on a 4-point rating scale: 4=Very Helpful, 3=Helpful, 2=Somewhat Helpful, 1=Not Helpful.

** Directors who responded, "I do not use this feature" were not included in the N.*

Table 5.

One-way Analysis of Variance of Number of Years Working in Child Nutrition

Total Sum of		*df*	*SS*	*MS*	*F*	*p*
Satisfaction						
	Between Groups	5	68.17	13.63	.52	.763
	Within Groups	92	2428.93	26.40		
	Total	97	2497.10			
Importance						
	Between Groups	5	154.75	30.95	1.04	.401
	Within Groups	92	2749.21	29.88		
	Total	97	2903.96			
Helpfulness						
	Between Groups	5	70.97	14.19	.44	.821
	Within Groups	92	2984.86	32.44		
	Total	97	3055.84			
Cook's Tools						
	Between Groups	5	45.36	9.07	.54	.748
	Within Groups	91	1539.97	16.92		
	Total	96	1585.34			
Website						
	Between Groups	5	16.03	3.21	.32	.902
	Within Groups	72	730.19	10.14		
	Total	77	746.22			

Table 6.

One-way Analysis of Variance of Schools in District

Total Sum of		*df*	*SS*	*MS*	*F*	*p*
Satisfaction						
	Between Groups	3	24.83	8.27	0.31	0.815
	Within Groups	94	2472.28	26.30		
	Total	97	2497.10			
Importance						
	Between Groups	3	26.73	8.91	0.29	0.832
	Within Groups	94	2877.22	30.63		
	Total	97	2903.96			
Helpfulness						
	Between Groups	3	46.161	15.39	0.48	0.697
	Within Groups	94	3009.68	32.02		
	Total	96	3055.84			
Cook's Tools						
	Between Groups	3	88.02	29.341	1.82	0.148
	Within Groups	93	1497.32	16.10		
	Total	97	1585.34			
Website						
	Between Groups	3	73.21	24.40	2.68	0.053
	Within Groups	74	673.004	9.09		
	Total	77	746.22			

ACKNOWLEDGEMENTS

This publication was produced in addendum to a Masters Thesis from the Department of Nutrition and Hospitality Management at the University of Mississippi. The Mississippi Department of Education's Office of Child Nutrition supported research for this publication. All opinions and findings in this manuscript are the result of independent research. This material does not necessarily reflect opinions that coincide with the University of Mississippi, the U.S. Department of Agriculture Food and Nutrition Services or the Mississippi Department of Education. Any mention of trade names, commercial products, or organizations does not imply endorsement of any kind.

VITA

The University of Mississippi, Master of Science, (Anticipated Graduation) 2017

The College of William and Mary, Bachelor of Arts, 2013