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Child nutrition program managers' evaluation of the Mississippi recipes for success (MRS) guide

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CHILD NUTRITION PROGRAM MANAGERS' EVALUATION OF THE MISSISSIPPI RECIPES FOR SUCCESS (MRS) GUIDE

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ABSTRACT

The Mississippi Department of Education, Office of Child Nutrition (MDE, OCN) has been assisting child nutrition programs with meeting the nutritional needs of the students since 2000. The Mississippi Recipes for Success (MRS) guide is the latest recipe database developed and updated by MDE-OCN. This guide contains a database that is comprised of sets of recipes with nutrient analysis and other online resources that range from menu matrixes to food safety guidelines. A study was conducted with district-level child nutrition program (CNP) directors in Mississippi and their level evaluation of the MRS Guide (Bell et al., 2017). The aim of this study was to further investigate the MRS Guide with school-level CNP managers. Usage, satisfaction, importance, and helpfulness were examined and compared to district-level CNP directors' responses. Using previously validated questions, a web-based survey platform that consisted of Likert scales, multiple choice, and an open-ended question was used.

There were 166 respondents from school districts across the state of Mississippi. Ratings displayed high usage, satisfaction, importance, and helpfulness of MRS Guide features. School-level CNP managers revealed use of the printed (n=148) and online (n=117) formats of the MRS Guide and software (n=132) for the MRS Guide.

Findings from this study can assist MDE-OCN in future updates of the MRS Guide. MRS is an excellent resource for CNP professionals and can be used by other state child nutrition programs as a guide when developing or updating their own menu planning tools and training resources.

LIST OF ABBREVIATIONS

CNP	Child Nutrition Programs
CRM	Community Readiness Model
DOD	Department of Defense
FNS	Food and Nutrition Services
GAO	General Accounting Office
HACCP	Hazard Analysis and Critical Control Point
HHFKA	Healthy Hunger-Free Kids Act
IOM	Institute of Medicine
MsC	Mississippi Cycles
MsC-II	Mississippi Cycles-II
MDE	Mississippi Department of Education
MRS	Mississippi Recipes for Success
NSLP	National School Lunch Program
OVS	Offer Versus Serve
OCN	Office of Child Nutrition
SBP	School Breakfast Program
SMI	School Meals Initiative for Healthy Children
SNDA	School Nutrition Dietary Assessment
SNDA-II	School Nutrition Dietary Assessment II

SNDA-III School Nutrition Dietary Assessment III

USDA United States Department of Agriculture

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CHAPTER I

INTRODUCTION

In 2012, the National School Lunch Program (NSLP) and School Breakfast Program (SBP), aligned the requirements for school meals with the *Dietary Guidelines for Americans* (U.S. Department of Health and Human Services [HHS] & U.S. Department of Agriculture [USDA], 2015). This new meal pattern that resulted from the Healthy Hunger-Free Kids Act of 2010, included more vegetables, fruits, and whole grains and a reduction in sodium, fat and trans-fat. Offer versus Serve (OVS) guidelines were updated requiring students to select, at minimum, a half cup of fruit or vegetable with their meal (USDA Food and Nutrition Services [FNS], 2013). Food safety, preparation techniques, menu development, and standardized recipe utilization all play critical roles in student consumption and waste (Cohen et al., 2012; Cohen et al., 2015; Condrasky, Sharp, & Carter, 2014; Greene, Gabrielyan, Just, & Wansink, 2017; Hager & Turner, 2018; Stephens, 2015; Stephens, Shanks, Roth, & Bark, 2016; Wolfenden et al., 2017; Wunschel, Kingston, Molaison, & Kaur, 2017, USDA FNS, & National Food Service Management Institute, 2002). A diverse recipe database that is approved by students and continuously updated to meet requirements can provide child nutrition programs with the successful tools to increase participation and manage regulation compliance challenges. The USDA has regularly updated its recipe database, incorporating student friendly recipes that meet the new nutritional requirements. However, Rushing & Johnson (2015) found the recipes to lack sodium compliance and budget consideration, and did not reflect the food trends of today. The

MDE, OCN has provided a menu and recipe database for Mississippi child nutrition programs since 2000. This database has been updated over the years to modernize recipes and meet updated nutritional standards (MDE OCN, 2000; MDE OCN, 2005; MDE OCN, 2015). MRS is the current nutrient analyzed recipe guide that is comprised of recipe books and online resources and incorporates features that range from menu matrixes to food safety guidelines (MDE OCN, 2015). A recent study conducted with district-level CNP directors and the MRS Guide indicated a high satisfaction with MRS and its features (Bell et al. 2017). However, many features of the guide were created to be employed at the school level. The purpose of this study is to further investigate the usefulness of the MRS Guide with school-level CNP managers since they utilize the system in the kitchen each day.

CHAPTER II

REVIEW OF LITERATURE

Child Nutrition Programs

Federal child nutrition programs play a critical role in providing nutritious, balanced meals to children (Carter, 2002). From the first unofficial free lunch program in a New York City vocational school (A History of Innovation: Children's Aid, n.d.) to the most recent changes made in accordance with the Healthy Hunger-Free Kids Act 2010 (HHKFA), proper nutrition and quality of food have been founding principles of child nutrition programs in America (DiSiena, 2015). In 1913, there were only 30 cities in 14 states that operated school lunch programs (The Institute of Child Nutrition, 1913). However, on June 4, 1946, President Harry S. Truman signed into law the National School Lunch Act that provided continual federal support to the program. The next big change took place when the Child Nutrition Act of 1966 authorized a two-year SBP pilot leading to its permanent authorization by Congress in 1975 (DiSiena, 2015). Also, in the late 1970s, the *Dietary Goals for the United States* (United States, 1977) were developed to provide guidance to Americans about what to eat to maximize health. Controversy over the goals facilitated a decision to have the USDA and the HHS partner to create the *1980 Dietary Guidelines for Americans* (USDA HHS, 1980) which recommended seven ways to have a good diet including eating a variety of foods, avoiding too much fat and cholesterol and cutting down on sugar and sodium (DiSiena, 2015).

The School Nutrition Dietary Assessment Study (SNDA) was initiated in 1991 to meet the objectives of the NSLP and SBP, providing current information about the effectiveness of the child nutrition programs regarding the nutrient content of the meals served and the contributions of school meals to children's diets. SNDA-I revealed inconsistencies between USDA's dietary guidance and the nutritional profile of school meals leading USDA to launch a reform of school meal programs, collectively referred to as the School Meals Initiative for Healthy Children (SMI) (Fox, Crepinsek, Connor, & Battaglia, 2001). SMI was finalized in 1995 after the passage of the Healthy Meals for Healthy Americans Act of 1994 which required meals under the NSLP and SBP to meet the *Dietary Guidelines for Americans* (Abraham et al., 2000).

Despite the significant evolvement of the NSLP, considerable work remained to improve the eating habits and lifestyles of children in America. A report released by the Institute of Medicine (IOM) in 2004 revealed obesity had increased fourfold for children ages 6 to 11 and tripled for children ages 12 to 19 between 1963 and 2004 (Koplan, Liverman, & Kraak, 2005). Minimal improvement was shown between SNDA-II and SNDA-III studies (Fox, Crepinsek, Connor, & Battaglia, 2001). SNDA-III revealed less than 30 percent of meals provided by the NSLP met the USDA nutritional guidelines for total fat and saturated fat. The sodium content of NSLP meals was above the guidance levels with consumption being as high as 1300 mg per lunch. In addition, competitive foods, foods that competed with school meals as source of nutrients, were widely available on school campuses through vending machine, school stores, snack bars, and other on-campus venues (Gordon & Fox, 2007). At the time of the SNDA-III report, competitive foods were not subject to federal nutrition standards (Bergman & Gordon, 2010). The availability of vending machines had increased from 42 percent to 82 percent since SNDA-I and were available in 97 percent of high schools, 82 percent of middle schools, and 17

percent of elementary schools. Fundraisers centered sales around food or beverage in over half of middle and high schools and over one third of elementary schools. Foods and beverages, not provided through the NSLP, could be purchased in 66 percent of middle and high schools and 33 percent of elementary schools during lunch. Candy was the leading competitive food consumed followed by cakes/cookies/brownies and carbonated beverages and juice. For both participants in NSLP and nonparticipants, consumption of competitive foods increased across all grade levels and was most often consumed at lunch (Gordan & Fox, 2007).

Addressing Nutrition Standards

In 2009, the IOM released recommendations to revise school meal standards and requirements. This was credited with facilitating the reauthorization of child nutrition programs with the HHFKA of 2010 to address the vast need to improve the diets and overall health of America's children (IOM, 2008; USDA FNS, 2013, Haack & Byker, 2014). The legislation authorized funding and set new nutrition standards for all food sold and served in schools. Schools that participated in the NSLP and SBP were required to increase the amount and variety of fruits, vegetables, and whole grains; and reduce saturated fat, trans fat, and sodium in all meals. Minimum and maximum calorie requirements were set based on age and grade level, and milk was mandated to be low fat or fat free. A food-based approach was now required utilizing five meal components: meats/meat alternates, grains, fruit, vegetables, and milk. Fruits and vegetables were no longer interchangeable, and, there was a weekly requirement for red/orange, dark green, starchy, dry beans/peas, and other vegetables. Initially, grains were required to be 100% whole grain. Sodium reductions were based on three different target levels to be incrementally implemented over several years (USDA FNS, 2013). Due to program challenges,

USDA issued an interim final rule in the *Federal Register* in November of 2017 that allowed State agencies to grant whole grain exemptions, requiring only half the offered grains to be whole grain rich. The exemption also allowed sodium requirements to remain in Target 1 for each age/grade group (USDA FNS, 2017).

The new standards combined meal pattern requirements and weighted nutrient analysis to ensure students' overall nutrient needs are met while also assisting them in easily identifying the components for a well-balanced meal. While not required, it was highly recommended for menu planners to conduct a weighted nutrient analysis using a USDA approved nutrient analysis software to assess compliance for calories, saturated fat, and sodium in the meals offered over the course of the week (USDA, 2014). A weighted analysis considers a students' actual selection pattern, giving more weight to foods that are selected, versus representing a simple average of every type of food item offered (USDA FNS, 1998).

The use of nutrient analysis in menu planning practices was found to be mostly positive by the SMI implementation study. More fruits and vegetables were being offered, and the number and variety of menu items also increased. Other positive changes included increased portion sizes by age/grade group, increased marketing of menus, use of centralized menu planning, and availability of OVS in elementary schools (Abraham, 2000). While there are many advantages to this combination approach, drawbacks included increased time and training needs to correctly implement (USDA FNS, 1998; Abraham, 2000; USDA FNS, 2013; USDA, 2014). The menu planner must be able to work all aspect of software and database entry as well as all the factors that can affect the analysis outcome.

Another aspect of program management includes OVS regulations. Under the OVS guidelines, students participating in the NSLP or SBP must select a minimum of one-half cup of

fruit and/or vegetable for schools to comply and be reimbursed (USDA FNS, 2013). OVS is a concept that applies to menu planning and allows students to decline two of the five meal components offered to reduce food waste (USDA FNS, 2015). However, a plate waste study conducted on 304 elementary school lunch meals found that over the course of one week, 51.4 percent of the vegetables served were wasted (Byker, Farris, Marcenelle, Davis, & Serrano, 2014). Strategies to improve consumption and waste are needed to ensure child nutrition programs succeed at reaching their objective. Different tactics have been tried to increase student selection and consumption such as implementing a chef-based model to enhance school menu quality and palatability (Cohen et al., 2012; Condrasky, Sharp, & Carter, 2014); altering preparation techniques to reduce waste and increase consumption (Wunschel et al., 2017; Stephens, Shanks, Roth, & Bark, 2016; Wunschel, Kingston, Molaison, & Kaur, 2017); increasing amount of time to eat lunch (Cohen et al., 2015); and implementing promotional strategies (Greene, Gabrielyan, Just, & Wansink, 2017).

Standardized recipes can also reduce waste and aid in increased student satisfaction because they ensure consistent food quality (USDA FNS, & National Food Service Management Institute, 2002). In several studies evaluating the importance of using standardized recipes, it was found that the lack of use or misuse of standardized recipes was the primary cause of quality issues in the food being prepared (K. Kim, M. Kim, & Lee, 2010) and most important in managing yield and maintaining consistent food products (Patil & Pol, 2014).

Standardized recipes are also beneficial when evaluating menus against nutritional standards and making nutrient analysis less tedious (USDA FNS, & National Food Service Management Institute, 2002). Since the 1920's, USDA has devised standardized recipes for schools and has continued to improve the recipes according to current nutritional standards. One

study revealed that 74.6% of child nutrition directors used USDA recipes. However, the recipes in the database were not compliant with sodium and dark green vegetable requirements and were also costly. Forty percent of directors found the recipes to lack trend evolvement as well (Rushing & Johnson, 2015). This study signifies the importance of a diverse standardized recipe database that is student tested and continuously updated while meeting USDA guidelines.

Food Safety

Ensuring safe meals for the millions of students participating in school meal programs is imperative. In 2009, a final rule in the *Federal Register* was passed requiring School Food Authorities (SFAs) participating in the NSLP and SBP to implement a food safety program based on the Hazard Analysis and Critical Control Point (HACCP) system (USDA FNS, 2009). This piece of legislature stemmed from a study conducted by the General Accounting Office (GAO) regarding foodborne outbreaks in school meal programs. Between 1990 and 1999, 194 foodborne outbreaks in schools were reported. Inaccurate food preparation and handling practices were major contributors (U.S. GAO, 2003). HACCP classifies menu items and/or recipes into three processes based on how many times the item moves through the temperature danger zone during preparation (USDA FNS, 2005). An evaluation of the implementation of the new HACCP regulation requirement, utilizing online surveys from a total of 2,716 respondents, indicated 35% directors had not classified their menu items into one of the three processes. The percentage of those that had not implemented the menu item classification process increased from the district level (12.2%) to the school level (14.9%) indicating a lack in communication, training, and follow-up. The study concluded the need for food safety education materials and training programs, and insurance that standardized recipes include HACCP processes (Stinson, Carr, &

Nettles 2010). The complexity of HACCP classification process reinforces the need for a standardized recipe database that can be utilized by child nutrition programs.

Training

As part of the HHKFA, professional standards for state and local school nutrition professionals were created requiring (for the first-time) annual continuing education and training that is job-specific and national hiring standards. The number of annual training hours changes based on job class and must incorporate one or all of the four key areas: nutrition, operations, administration, and/or communications and marketing (USDA FNS, 2015). Alternate training approaches such as online training are being used to meet the diversity of the workforce. Online training allows for flexibility while delivering information in small amounts which assist in information retention. Online training programs also better engage employees (Trout, 2016). In a national survey that investigated school nutrition directors' experience with online training and interest in online training, 95% of survey respondents indicated that they would participate in online training and identified flexibility, self-directed learning, location, and cost savings as benefits (Zoellner, 2009). It is important to consider these characteristics and alternate training approaches when planning and implementing training to school nutrition professionals.

Mississippi Recipe Systems

Mississippi Cycles (MsC) is a customizable, selective menu system that was developed by the OCN as part of the SMI to implement the nutrition standards at the time and incorporate the Mississippi Child Nutrition Statewide Purchasing Program while meeting the satisfaction of the Mississippi student population. MsC included customizing charts as well as cost and nutrient

analysis through a USDA-approved database. Due to the extent of involvement and training, MsC laid the groundwork for building a strong training infrastructure for Mississippi child nutrition staff (MDE OCN, 2000). The MsC was updated five years later (MsC-II) to modernize and supplement existing recipes and expand the current cycle menu by one week (MDE OCN, 2005). As part of the HHFKA new meal pattern requirements, the MRS guide was created, replacing MsC-II. Due to the change in nutrient standards being a weighted average over the week, MsC-II was no longer compatible in meeting the requirements. The MRS Guide is a three-part system comprised of recipe books, nutrient analysis database via *Nutrikids*™, and an online resource. Standardized recipes, various menu matrix for breakfast and lunch, training materials for meal planning, and food safety guidelines are all features the MRS Guide incorporates. Each recipe encompasses an ingredient list of items that are available on the Mississippi Child Nutrition Statewide Purchasing Program, USDA Foods, and the Department of Defense (DOD) Fresh Fruit and Vegetable Program. Recipes in the meal planning system include meal component contribution, nutritional data, and pictures of preparation and presentation, and are available in print or online (MDE OCN, 2015).

A recent study was conducted with district-level CNP directors' satisfaction with the MRS Guide, as well as the importance and helpfulness of the various features the guide includes, found a high-level of satisfaction with its features (Bell et al. 2017). While the satisfaction of district-level CNP directors is very useful, a large portion of the systems' features were created to be utilized at the school level such as preparing recipes and following HACCP procedures.

The purpose of this study was to investigate the use, satisfaction, importance, and helpfulness of MRS' features to determine what percentage of school-level CNP managers will identify as using the printed and online MRS Guide and software for the MRS Guide and how

will school-level CNP managers evaluate satisfaction, importance, and helpfulness of MRS guide features. The MRS Guide aims to be a useful guide for all CNP staff despite the variations in school-level CNP staff characteristics such as level of management, the number of students served each day, and experience. One goal of this study is to show that there is no correlation between school-level CNP managers evaluation of MRS features and years worked in CNPs, school level, or average daily participation. While district-level CNP directors and school-level CNP managers carry different work responsibilities, this study aims also to show no significant differences between school-level CNP managers' and district-level CNP directors' evaluation of the usage, satisfaction, importance, and helpfulness as well as use of printed and online MRS Guide and software for the MRS Guide.

CHAPTER III

METHODOLOGY

Participants and Recruitment

This study was conducted with school-level CNP managers in Mississippi. There are approximately 928 schools and over 1000 CNP managers in Mississippi. CNP Directors were contacted to provide email addresses for CNP managers. Three hundred and thirty manger emails were obtained and sent an anonymous link to participate in the survey. The recruitment email can be found in Appendix A. Participants were given the option to participate in a raffle to receive one of five twenty-dollar gift cards as an incentive to participate.

Instrument

A web-based survey was developed to identify CNP managers' degree of satisfaction with the online and printed versions of the MRS Guide as well as the importance and helpfulness of the various features the MRS Guide provides (Appendix B). Minor revision were made to a validated web-based survey used by Bell et al. (2017) to obtain CNP directors' evaluation of the MRS Guide. Questions were tailored to CNP managers and their use of the MRS Guide. Fourteen questions included in the survey come directly from Bell et al.'s (2017) survey and includes using Likert-type scales, multiple choice for measured responses, and an open-ended question. The survey has the same qualifying questions included in Bell et al. (2017) in which CNP managers must be 18 years or older to participate and have knowledge of or use either version (printed or online) of the MRS Guide. The survey was evaluated for clarity,

understanding, wording, and suitable length by CNP managers in one local district that was excluded from the survey. The survey was uploaded to Qualtrics®, an online survey service, and was accessible to CNP managers from February 19, 2019 until March 5, 2019.

The CNP managers were asked about the use of the online and printed versions of the MRS Guide and software for the MRS Guide and the availability at their school site. CNP managers indicated how often they used six features of the MRS Guide to train employees, using a 5-point Likert scale (5=Daily to 1=Never). CNP managers rated their satisfaction of MRS Guide features including variety, formatting, and illustrated steps using a 5-point Likert scale (5=Most Satisfied to 1=Least Satisfied) with an optional selection of "I do not use this feature." Next, managers provided their level of importance (5=Very Important to 1= Not Important) of features comprising of student acceptability, skill level of staff, and equipment needed. The 'Cooks' Tools' section of the MRS Guide was evaluated by CNP managers on the level of helpfulness (5=Very Helpful to 0=Not Used). The last question in the survey pertaining to the MRS Guide asked CNP managers to rate their level of satisfaction (5=Most Satisfied to 1=Least Satisfied, with an optional selection of "I do not use this feature") of features specific to the online version of MRS including organization of website, updates, and search engine. To finish, the CNP managers were asked how long they have worked in child nutrition programs, the level of management they are currently working, and the number students fed at their school site on average daily.

Analysis

All data was analyzed using the statistical package SPSS, version XXV. Descriptive statistics were obtained for each question in the survey to obtain means, percentages, and

standard deviations. Analysis of variance (ANOVA) identified associations between CNP managers' demographics and responses for satisfaction, importance, and helpfulness of the MRS Guide features. Independent t-test were used to compare school-level CNP managers' and district-level CNP directors' evaluation of satisfaction, importance, and helpfulness of MRS Guide features. Generally, the probability of rejecting the null hypothesis (α) was set at 0.05 but actual probabilities are reported for all statistical testing. In order to match the scales for t-test comparison, the 5-point scale for CNP managers' satisfaction and helpfulness was converted to a 4-point scale using the following formula: $Y = 0.75 * X + 0.25$ where X is the value on the 5-point scale and Y is the corresponding 4-point scale value. For level of importance, CNP directors used the same 5-point scale and therefore no adjustments were needed for comparison.

This study was approved by the University of Mississippi Internal Review Board for Human Subjects prior to survey distribution (Appendix C).

CHAPTER IV

RESULTS

Respondents

Of the 330 CNP managers from across the state of Mississippi who were sent an electronic survey, 166 (50%) responded. One hundred and twenty-four respondents had more than five years of experience in child nutrition programs, with 35 reporting more than 20 years of experience. There were79 elementary school managers, 29 middle school managers, 31 high school managers, and 13 attendance center managers. The average daily participation (ADP) varied across respondents with the majority having an ADP between 201 and 600 (n=104). Twenty-five respondents provided qualitative feedback regarding their use of the MRS Guide which can be found in Table 1.

MRS Usage

CNP managers are using all formats of the MRS Guide. Printed binders (n=111) and accompanying nutrient analysis software (n=104) that contains MRS recipes are being used daily. While 25% (n=40) of CNP managers reported not having online access to MRS at the school site, CNP managers who did have online access (n=118) are using the online resource at least monthly. These findings satisfied the following research question: What percentage of school-level CNP managers will identify as using the printed and online MRS guide and software for the MRS guide?

Several features of the MRS Guide can be used for training CNP staff; such as food safety, USDA regulations and requirements, and portion control. The majority of CNP managers reported using MRS features for training on a monthly (n=22), weekly (n=13) and daily (n=108) basis. The features used most often for training were *Serving Sizes and Utensils* (*M*=4.69, *SD*=0.94) and *Recipe Components* (*M*=4.63, *SD*=1.00). *Food Safety-Critical Control Points* was reported as the feature used less often for training (*M*=2.88, *SD*=0.80).

The following sections provide an explanation of the following research question: How will school-level CNP managers evaluate satisfaction, importance, and helpfulness of MRS guide features?

MRS Satisfaction

Managers were asked to indicate their level of satisfaction with eight MRS features (Table 2). Managers were highly satisfied with the *Organization of the Food Categories in the Binders* (*M*=3.63, *SD*=0.57) and the *Nutrient Analysis of Recipes* (*M*=3.59, *SD*=0.65). While all features received a mean rating of satisfied or higher, the features that received the lowest satisfaction rating were *Pictures of Illustrated Steps for Preparation of the Recipes* (*M*=3.30, *SD*=0.08) and *Pictures of the Recipe Finished Product* (*M*=3.30, *SD*=0.83).

All the features of the MRS Guide are also available in an online resource. CNP managers indicated their level of satisfaction with these features as well (Table 1). Of the four online features, managers were most satisfied with the *Printability and Resources on Website* (*M*=3.63, *SD*=0.58) and least satisfied with *Search Options for Finding Recipes* (*M*=3.51, *SD*=0.67).

Independent t-test revealed a significant difference in measures with school-level CNP managers' satisfaction rating (Table 1) of *Organization of Food Categories* (*M*=3.63, *SD*=0.57)

higher than CNP directors' rating of satisfaction of *Organization of Food Categories* (*M*=3.43, *SD*=0.61) conditions; t(97)=2.0, *p*<0.05). A significant difference in measures was also shown with CNP managers' satisfaction rating of *Recipe Variety in Categories* (*M*=3.48, *SD*=0.69) higher than CNP directors' rating of satisfaction of *Recipe Variety in Categories* (*M*=3.15, *SD*=0.81) conditions; t(98)=2.78, *p*<0.05).

MRS Importance

Table 3 indicates CNP managers' rating of importance of features such as acceptability and accuracy when choosing a recipe from the MRS Guide. The feature with the highest mean rating was *Food Safety-Critical Control Points* (CCP) (*M*=4.75, *SD*=0.05). The feature with the lowest mean rating was *Food Safety-HACCP* (*M*=4.09, *SD*=0.09).

Independent t-test presented a significant difference with CNP managers' rating of importance (Table 3) of *Staff Acceptability of Recipe* (*M*=4.37, *SD*=0.96) lower than CNP directors' rating of importance of *Staff Acceptability of Recipe* (*M*=4.65, *SD*=0.60) conditions; t(98)=-2.51, *p*<.05). Ratings of importance of *Picture of Recipe* also displayed a significant difference with CNP managers (*M*=4.54, *SD*=0.81) reporting higher importance than CNP directors (*M*=4.24, *SD*=0.80) with conditions; t(98)=2.59, *p*<.05).

One-way analysis of variance (ANOVA) was used to identify associations between CNP managers' level of management, years of experience and ADP and their responses for the MRS Guide features. Significant findings are presented in Table 4 and Table 5. There were no significant differences in years of experience and ADP and school-level CNP managers' evaluation of the MRS Guide, accepting a part of the hypothesis: there is no correlation between school-level managers evaluation of MRS features and years worked in CNPs, school level, or

average daily participation. However, significant findings were shown between school level of management.

There was a significant difference between management school level on the importance of *Accuracy of Recipe Yield* at the $p<.05$ level for the three conditions [$F(3, 146) = 2.98$, $p=0.03$]. Post hoc comparisons using the Turkey HSD test indicated that the mean score for elementary school CNP managers ($M=4.55$, $SD=0.82$) was significantly different than high school CNP managers ($M=3.90$, $SD=1.25$). These findings suggest that high school CNP managers do not find the recipe yield accuracy to be as important when choosing a recipe as elementary school CNP managers.

Although the difference between management at the school level on the importance of *Student Acceptability of Recipe* was not significant at the $\alpha = 0.05$ level for the three conditions [$F(3, 146) = 2.58$, $p=0.04$], the mean score for elementary school CNP managers was ($M=4.6$, $SD=0.73$) compared to high school CNP managers at ($M=4.1$, $SD=1.01$) suggesting that elementary school CNP managers place higher importance on the student's acceptability of a recipe when choosing a recipe than high school CNP managers.

There was a significant difference between management school level on the importance of *Staff Acceptability of Recipe* at the $p<.05$ level for the three conditions [$F(3, 146) = 3.06$, $p=0.03$]. Post hoc comparisons using the Turkey HSD test indicated that the mean score for elementary school CNP managers ($M=4.51$, $SD=0.70$) was significantly different than attendance center CNP managers ($M=3.77$, $SD=1.30$) suggesting that elementary school CNP managers place higher importance on the student's acceptability of a recipe when choosing a recipe than attendance center CNP managers.

MRS Helpfulness

One section of the MRS Guide includes menu planning and cooking guidance consisting of an abbreviations key, measurement and conversion tables, guides for recipe customization, and information on portion control. The CNP managers' perceptions of the level of helpfulness of the 'Cooks' Tools' section is presented in Table 6. The most helpful feature was *Measurement Conversions* (M=3.82, SD=0.48) and the least helpful feature was *Recipe Abbreviations* (M=3.33, SD=0.78).

Independent t-test presented a significant difference in CNP managers' ratings of helpfulness (Table 6) of *Measurement Conversions* (M=3.82, SD=0.48) higher than CNP directors' of *Measurement Conversions* (M=3.52, SD=0.60) with conditions; $t(97)=3.06$, $p<.05$).

These findings provide indication to reject the claim, there is no significant difference between school-level managers' and district-level directors' evaluation of the usage, satisfaction, importance, and helpfulness of MRS guide features.

TABLE 1

CNP managers' qualitative feedback regarding their use of the MRS Guide

Question: Do you have any further comments about MRS?	
Yield	• Some of the recipes do not yield the servings the recipe says it does. • We have found some recipes that do not have the correct yield on them. • It would be great if the recipes were close to the serving amount when following the recipe. • There are some that do not yield the correct amount.
Pictures	• I think that all the MRS should have pictures a view of what you are preparing seen to turn out better when you see what you are doing as well as reading. • I would like to see more pictures. • I would like to have more pictures of the finished product on our *Nutrikids*™ website we use.
Measurements/Conversions	• I think the contributions on the recipe would be easier if they were adjusted to an even amount of product used. Ex. 1 #10 can, and 5/8? or 8lbs, and 2/3cup when using meat. or sauces, etc. • I feel like it would be very beneficial to food service managers if the recipes were in serving sizes for say 10 pounds of ground beef instead of use 12 lb 2 oz for 100 servings. I know people work very hard at creating recipes for our use and I can convert a recipe with out to much trouble. However, there are some that have to call because they are unsure of how to do that. Is there a way you could fix a program within the MRS site that you could put in how many servings you want to make that day and it would automatically convert all the ingredients for you? That would be a very beneficial feature to have as well. I really enjoy and am appreciative of the recipes being available online. Thank you.
Recipes	• I sure wish they would come up with some kid friendly recipes or something different! • I think more recipes should be added to MRS to accommodate all the USDA we get throughout the years so we don't have it sitting on hand as inventory.
Other	• I find all the tools needed to be very helpful.

TABLE 2

Means, standard deviations, and t-values of CNP managers' and CNP directors' satisfaction ratings for Mississippi Recipes for Success (MRS) Guide features

Features	**t-value**	**n**	**Mean**	**SD**
Organization of Food Categories	2.0*			
Managers		138	3.63	0.57
Directors		98	3.43	0.61
Nutrient Analysis of Recipes	2.83*			
Managers		143	3.59	0.65
Directors		99	3.29	0.69
Number of Meal Components in Recipes	1.13			
Managers		148	3.56	0.63
Directors		99	3.45	0.56
Recipe Formatting and Layout	1.67			
Managers		145	3.51	0.62
Directors		99	3.34	0.63
Recipe Variety in Categories	2.78*			
Managers		144	3.47	0.69
Directors		99	3.15	0.81
Clarity of Recipe Directions	1.06			
Managers		149	3.42	0.67
Directors		99	3.30	0.72
Pictures of Recipe Preparation Steps	0.27			
Managers		137	3.30	0.08
Directors		99	3.28	0.73
Pictures of Recipe Finished Product	0.41			
Managers		137	3.30	0.83
Directors		99	3.25	0.79
ONLINE Features	**t-value**	**n**	**M**	**SD**
Organization of Website	3.08*			
Managers		112	3.61	0.56
Directors		77	3.26	0.62
Frequency of Website Updates	2.7*			
Managers		111	3.53	0.61
Directors		76	3.20	0.75
Printability and Resources on Website	1.76			
Managers		112	3.63	0.58
Directors		76	3.42	0.64
Search Options for Finding Recipes	2.47*			
Managers		112	3.51	0.67
Directors		76	3.20	0.75

* p=<0.05.

Means and standard deviations of managers were adjusted to 4-point scale using the formula: Y= 0.75 * X + 0.25; X= 5-point scale value and Y is the corresponding 4-point scale value.

Managers and directors who responded, "I do not use this feature" were not included in the n.

TABLE 3

Means, standard deviations, and t-values of CNP managers' and CNP directors' importance ratings for Mississippi Recipes for Success (MRS) Guide features

Features	t-value	n	Mean	SD
Easy-to-follow recipe directions	-0.32			
Managers		150	4.71	0.60
Directors		99	4.74	0.47
Accuracy of recipe yields	-2.47*			
Managers		150	4.37	1.05
Directors		99	4.65	0.58
Availability of equipment needed to prepare recipe	3.19*			
Managers		150	4.71	0.60
Directors		99	4.39	0.60
Adequate staffing needed to prepare recipe	0.57			
Managers		150	4.37	1.05
Directors		99	4.30	0.78
Skill level of staff needed to prepare recipe	3.05*			
Managers		150	4.59	0.65
Directors		99	4.25	0.80
Student acceptability of recipe	1.71			
Managers		150	4.44	0.88
Directors		99	4.24	0.77
Staff acceptability of recipe	-2.51*			
Managers		150	4.37	0.96
Directors		99	4.65	0.60
Number of meal components met by recipe	0.64			
Managers		150	4.54	0.81
Directors		99	4.47	0.64
Picture of recipe	2.59*			
Managers		150	4.54	0.81
Directors		99	4.24	0.80
Food Safety – Recipe HACCP Process	-7.21*			
Managers		150	4.09	0.09
Directors		99	4.64	0.52
Food Safety – Critical Control Points	1.25			
Managers		150	4.75	0.05
Directors		99	4.65	0.60

* p=<0.05.

TABLE 4

One-way analysis of variance (ANOVA) associations between CNP management school-level and importance of MRS feature.

Feature	n	M (SD)	df	F	P value
Accuracy of recipe yields			(3, 146)	2.98	0.03
Attendance Center	13	4.54[ab] (.78)			
Elementary School	77	4.55[a] (.82)			
High School	31	3.9[b] (1.25)			
Middle School	29	4.34[ab] (1.34)			
Adequate staffing needed to prepare recipe			(3, 146)	2.98	0.03
Attendance Center	13	4.54[ab] (.77)			
Elementary School	77	4.55[a] (.82)			
High School	31	3.9[b] (1.25)			
Middle School	29	4.34[ab] (1.34)			
Skill level of staff needed to prepare recipe			(3, 146)	2.87	0.04
Attendance Center	13	4.69[ab] (.63)			
Elementary School	77	4.65[a] (.58)			
High School	31	4.29[b] (.74)			
Middle School	29	4.69[ab] (.66)			
Staff acceptability of recipe			(3, 146)	3.06	0.03
Attendance Center	13	3.77[a] (1.3)			
Elementary School	77	4.51[b] (.70)			
High School	31	4.16[ab] (.97)			
Middle School	29	4.52[ab] (1.24)			
Food Safety – Recipe HACCP Process			(3, 146)	4.34	0.01
Attendance Center	13	3.31[a] (1.49)			
Elementary School	77	4.19[b] (.93)			
High School	31	3.87[abc] (1.09)			
Middle School	29	4.41[bc] (.87)			

Different superscripts (a-c) represent significantly different values ($\alpha = 0.05$).
Mean Ratings of Managers are based on a 5-point rating scale: 5=Very Important and 1=Not Important.

TABLE 5

One-way analysis of variance (ANOVA) associations between CNP management school-level and helpfulness of Cooks' Tool feature

Feature	n	M (SD)	df	F	P value
Recipe Abbreviations			(3, 146)	4.34	0.01
Attendance Center	13	3.31[a] (1.49)			
Elementary School	77	4.19[b] (.93)			
High School	31	3.87[abc] (1.09)			
Middle School	29	4.41[bc] (.87)			

Different superscripts (a-c) represent significantly different values ($\alpha = 0.05$).
Mean ratings of managers are based on a 5-point rating scale: 5=Most Helpful and 1=Not Helpful.

TABLE 6

Means, standard deviations, and t-values of CNP managers' and CNP directors' helpfulness ratings for Mississippi Recipes for Success (MRS) Guide features

Features	t-value	n	Mean	SD
Abbreviations and Common Measures	1.31			
Managers		150	3.65	0.61
Directors		98	3.52	0.60
Recipe Abbreviation	#			
Managers		150	3.33	.78
Directors		#	#	#
Measurement Conversions	3.06*			
Managers		150	3.82	0.48
Directors		98	3.52	0.60
Scoop, Ladle, Spoodle Portion Sizes	#			
Managers		150	3.81	0.40
Directors		#	#	#
Cutting Diagrams for Pan Portions	#			
Managers		144	3.61	0.58
Directors		#	#	#
Steamtable Pan Capacity Chart	#			
Managers		146	3.64	0.60
Directors		#	#	#
Common Can and Jar Sizes	#			
Managers		145	3.60	0.62
Directors		#	#	#
Purchasing Formula	1.40			
Managers		136	3.46	0.72
Directors		93	3.30	0.72
Customizing Recipes	1.53			
Managers		141	3.51	0.72
Directors		93	3.34	0.68
Crediting Grains	1.51			
Managers		137	3.53	0.62
Directors		94	3.37	0.66
Fresh/Frozen/Canned Vegetable Conversions	1.03			
Managers		141	3.51	0.73
Directors		96	3.40	0.62

* p=<0.05.
Means and standard deviations of managers were adjusted to 4-point scale using the formula: Y= 0.75 * X + 0.25; X= 5-point scale value and Y is the corresponding 4-point scale value.
Managers and directors who responded, "I do not use this feature" were not included in the n.
directors were not asked this question.

CHAPTER V

DISCUSSION

The purpose of this study was to investigate CNP managers' usage and satisfaction of the MRS Guide as well as the importance and helpfulness of the guide's features. A previous study by Bell et al. (2017) explored the usefulness of the MRS Guide with district-level CNP directors. The MRS Guide aims to be a diverse recipe database consisting of acceptable, compliant, nutrient analyzed recipes that meet the challenging USDA regulations as well features that assist in menu planning, preparation, food safety, and training. Because the recipes are prepared by CNP employees in the school kitchen and directly overseen by the CNP manager, the perceptions of the MRS Guide from school-level CNP managers will provide further discoveries that can be utilized in future updates by the Mississippi Department of Education (MDE) Office of Child Nutrition (OCN).

The MRS Guide is available in printed and online formats. The recipes are also available through Nutrikids™ software. CNP managers and directors are using both formats of MRS and reported adequate access to the online resource even though there are CNP managers who are not using MRS online. Due to their work environment, managers may not rely or seek out online resources. Also, resource availability could be a reason for the lack of access. Pratt, Bednar, and Kwon (2012) found a correlation between ADP and increased technology use. Because the number of meals served is the main revenue source for child nutrition programs, larger districts may have more revenue to furnish and support technology use for CNP managers. Larger

schools may also have technology departments which could facilitate a greater use of online resources among other departments. It is important for CNP directors to examine how resources are allocated in order to provide CNP managers with the proper technology to utilize the MRS Guide and other valuable resources.

Years of experience may also contribute to lack of accessing any online resource. Twenty-three percent (n=38) of CNP managers reported having over 20 years of experience in child nutrition programs. CNP managers have been using standardized recipes in schools since the 1920's (USDA, 1925). Over the last decade, vast changes have occurred in child nutrition programs that have resulted in major changes to recipes and how they are accessed. Prior to the release of the MRS Guide, recipes and training materials, developed specifically for use with Mississippi child nutrition programs, were available in print form only. A study assessing the computer proficiency level of teachers revealed that a large percentage of those who had vast work experience were reluctant when it came to computers and other new technologies. It was stated that they did not see the value and felt no need for change (Kelty, 2002). Barriers such as age and attitude can be overcome through education and training. Explaining to staff the importance of technology and its benefit in addition to training can empower them to overcome those perceived barriers (Sneed & Henroid, 2007).

When CNP managers were asked to rate their level of satisfaction with MRS features, *Pictures of Illustrated Steps for Preparation of the Recipes* and *Pictures of the Recipe Finished Product* were the features in which they were least satisfied. CNP directors were also least satisfied with these two features. The importance of standardized recipes has been recognized in reducing food waste, increasing student satisfaction, and decreasing program costs (Kim, Kim, & Lee, 2010; Patil & Pol, 2014; USDA FNS, 2002; & National Food Service Management

Institute, 2002). An additional benefit of standardized recipes is the confidence boost it gives food service staff due to the recipes' consistent quality no matter who is preparing the recipe. Furthermore, participation may increase because customers know what to expect each time. Recipes that contain pictures of preparations steps and pictures of the final product increase that confidence and enjoyment of cooking. Visual step-by-step recipes assist in the learning process by showing the visual progression of preparation at each step in the cooking process. When observing cooks carry out different recipe formats, Buykx and Petrie (2011) identified that cooks wanted step by step recipes with pictures of each stage as well as video preparation techniques with ingredients and utensils. With a diverse workforce, pictures can also assist CNP staff who have communication barriers. A study that examined the effect of using pictures on job performance, task satisfaction, and job commitment found performance ratings to be higher for those that used pictures when preparing food than those who did not. Higher task satisfaction and commitment was also shown in this study (Madera, Dawson, Neal, & Busch, 2013). When comparing ratings of importance of MRS features, CNP managers placed a significantly higher importance on the recipe picture feature compared to CNP directors. CNP managers also referenced the need for more pictures in the qualitative feedback, associating a better end product and understanding of the recipe when pictures were provided (Table 6). These findings indicate the impact pictures have with employees directly responsible for recipe preparation. MDE, OCN should consider providing pictures of illustrated steps and finished products for all recipes in future MRS Guide updates.

The MRS Guide is divided into different binders by food category. The five food categories correlate with the MyPlate icon which was designed as part of the 2010 Dietary Guidelines for Americans to assist consumers in understanding how to carry out a healthy

lifestyle (USDA, 2019; MDE OCN, 2015). The recipes within the binders are divided into sections by meal type and main meal component contribution. In addition, recipes can be removed from the binders allowing users to bring the recipe to their production station (MDE OCN, 2015). The MRS Guide allows its users to easily access recipes which could explain why *Organization of Food Categories* received the highest satisfaction rating from both CNP managers and directors (Bell et al., 2017).

While CNP mangers were highly satisfied with the four MRS online features, *Search Options for Findings Recipes* was the feature rated the lowest. CNP directors also found the search capabilities dissatisfying (Bell et al., 2017). MRS online contains over 600 recipes that are searchable by MRS number, recipe name, individual ingredients, or by MyPlate meal component icons. The results of the search can also be numerically or alphabetically sorted. However, when conducting a recipe search, you must spell out the entire word in the recipe correctly. If the word is misspelled or shortened without using the "*" symbol at the end, no results will appear. This may be frustrating for users who are unaware of how the search engine works. MRS does provide a link under the search engine box to a "Search Help" page that assist users in carrying out searches correctly, but users might be overlooking the small print link which, may be leading to their dissatisfaction (MDE OCN, 2015).

'Cooks' Tools' is a resource within the MRS Guide that contains information about weights and measures, serving utensils, portion control, food safety, and customizing recipes. The feature in 'Cooks' Tools' that were most helpful to CNP managers were *Measurement Conversions*. All the features had a mean score of 3.33 or higher. However, this section had the highest number of managers and directors who stated they did not use the features in 'Cooks' Tools' (Bell et. al, 2017). 'Cooks' Tools' were added to the MRS Guide to assist CNP managers

and staff as they prepare recipes. Lack of use by CNP directors is not a surprising finding considering they are not the ones preparing the recipes each day. CNP managers' lack of use could be explained by the location of the features. This section of the MRS Guide is in a binder separate from the MRS recipes. Better explanation and training on the MRS Guide by CNP directors to managers and staff may maximize the full helpfulness of the 'Cooks' Tools' resource.

When choosing a recipe, there are different features that can increase or decrease a recipes' usage such as acceptability and equipment needs. Two of the eleven features evaluated for importance were food safety features, *Critical Control Points* and *Recipe HACCP Process*. A critical control point (CCP) is any cooking, cooling, re-heating, or holding step that a control measure can be taken to reduce, eliminate, or prevent the growth of microorganisms that lead to foodborne illnesses. The CCP determines the time and/or temperatures that must be reached or maintained to control a food safety hazard. USDA requires SFAs participating in the NSLP and SBP to implement this food safety procedure to ensure safe meals are being served (USDA FNS, 2009). MRS recipes highlight the CCP in each recipe to amplify the importance of taking temperatures at the right step in the recipe. CNP managers may associate CCP with taking temperatures and the format of the MRS recipe which could explain why *Food Safety-Critical Control Points* was rated higher than all other features for importance when choosing a recipe.

Each MRS recipe is classified into one of the three HACCP processes. The complexity of the processes differs depending on the number of times the ingredients transition through the temperature danger zone. The recipe HACCP process is indicated at the top of the recipe under the *Meal Component Contribution* and *Number of Portions*. However, the HACCP process does not stand out like the CCP when viewing the recipe. In a study that surveyed school foodservice

personnel on their beliefs and perception about complying with the HACCP process, respondents recognized the importance of the program for maintaining a safe food environment, and also indicated that resources, time, and training were available to improve food safety programs (Barrett & Riggins, 2011). When determining the impact educational interventions had on food safety programs in schools, Sneed and Henroid (2007) discovered that managers who had a food safety certification such as ServSafe®, had higher knowledge scores than those that were not certified. MDE, OCN requires all managers to have a ServSafe® certification. CNP managers' low importance rating of *Food Safety-HACCP Process* may indicate their understanding of the process as a whole and they do not base their recipe choices on the HACCP process.

There were several significant findings between management school-level and importance of MRS features (Table 3). *Accuracy of Recipe Yield* was rated higher for level of importance when choosing a recipe by elementary school CNP managers than high school CNP managers. Recipe yield is extremely important when it comes to foodservice. While standardized recipes are recognized for predictable yields (USDA FNS, & National Food Service Management Institute, 2002), outside factors such as product shrinkage can result in a shortage of servings. This can play a significant role in participation. In a study that identified issues affecting high school participation, food access was one of the six identified and refers to the accuracy of serving portions and the availability of food throughout the serving period. Inadequate food amounts, followed by running out of food, were ranked among the top food access reasons (Asperin, Nettles, and Carr, 2010). In order to meet high school nutrient requirements, menu planners must offer multiple menu options (USDA FNS, 2013). High school CNP managers may not feel yield is as important because students have more options they can select at the high school level if one item is no longer available. It is important for the MDE,

OCN to ensure accurate yielding for all recipes. Continuously having a shortage of food could be detrimental on participation and reduce student satisfaction.

Although not statistically significant, another interesting finding related to management school-level and recipe feature importance was *Student Acceptability of Recipe.* Elementary CNP managers found this feature to be more important when choosing a recipe than high school CNP managers. The recipes in the MRS Guide consist of USDA recipes and recipes developed by schools and the MRS task force. However, there was no formal testing completed with students on acceptability. Several studies have implicated the importance of acceptability on participation (Rushing & Johnson, 2015; Asperin, Nettles, and Carr, 2010). Participation at the high school level has consistently been declining over the years compared to the elementary and middle school level which is concerning for child nutrition programs (Asperin, Nettles, and Carr, 2010). A study examining neighborhood food environment on participation found high school participation declined when fast food restaurants were near the school. (Mirtcheva and Powell, 2009). Other barriers include the availability of foods competing with the NSLP such as competitive foods and a` la carte snacks as well as the stigma that may be associated with eating school lunch (Bhatia, Jones & Reicker, 2011). Elementary students do not have these barriers to participation so elementary school CNP managers may place more value on acceptability than high school CNP managers.

Elementary CNP managers found the feature *Staff Acceptability of Recipe* to be more important than attendance center CNP managers. CNP managers and staff have an opportunity to significantly influence the choices students make when eating school breakfast and lunch. However, a large percentage do not believe they have any influential impact when it comes to the choices the students make and it was observed that staff rarely make suggestions to students

regarding food choices (Fulkerson, French, Story, Snyder & Paddock, 2002). Staff acceptability should be considered an important training need along with how to positively influence student food choices. When CNP staff taste test food, they are more comfortable recommending the menu item to the students. Considering attendance centers can have students ranging from kindergarten to twelfth grade, attendance center CNP managers may not feel their encouragement is as influential on student choice as elementary school CNP managers which may have contributed to the lower importance rating. CNP directors recognize *Staff Acceptability of Recipe* as a very important feature when choosing a recipe. This importance and value must be communicated to CNP managers and staff so they understand the impact their satisfaction has on the student population they serve (Stephens & Shanks, 2015).

Limitations

A web-based survey platform was used and sent electronically through an email link. One limitation to this survey platform is the response rate. Fan and Yan (2010) reported response rates of a web-based survey to be 10% less than surveys conducted through the mail or telephone. Secondly, not all CNP managers in Mississippi had a school email. Emails had to be retrieved by contacting CNP directors through a MDE, OCN directory.

Conclusions

The Mississippi Recipes for Success (MRS) Guide is the newest recipe database available for child nutrition programs in Mississippi in printed and online formats. The menu planning tools and recipes were originally developed by MDE, OCN to assist CNP directors in implementing and adhering to the changes that occurred through the Healthy Hunger-Free Kids

Act 2010 (HHKFA). Since its debut, the database has been continuously updated to meet the evolving USDA regulations and student trends. The MRS Guide is a useful resource that is being utilized by both CNP managers and directors (Bell et. al, 2017). While some features are used differently by CNP directors and managers, their evaluation revealed high satisfaction, importance, and helpfulness of the guide.

While the MRS Guide features some visual preparation steps, twenty percent of the feedback received from the CNP managers pertained to recipe picture features, revealing a need for improvement. Another consideration for future updates would be for the online format of MRS to have videos pertaining to recipe preparation. Buykx and Petrie (2011) found food service staff favored recipe formats that contained recipe preparation videos and pictures. While CNP managers did report the importance of pictures, the addition of preparation videos would provide another feature to assist CNP staff across the state.

Updating the printed version of MRS could be costly and delay updates due to printing and distribution. MRS online allows for the frequent changes in recipes, addition of new recipes, updates to pictures, and the possible addition of videos that are immediately available to users. It would be important for MDE, OCN to assess whether the benefit outweighs the cost of updating the printed format when both CNP directors and managers reported having adequate access to the online database.

Another feature that could be added to MRS online is a way to convert recipe serving sizes. Several comments left by respondents referenced a way to size recipes for the exact servings needed. This would also be a free source for child nutrition programs. Sizing and prep reports comes at an additional cost through the *Nutrikids*™ software.

CNP managers level of management may change the level of importance of some MRS features. Most differences were seen between elementary school and high school CNP managers. These differences might be due to age-based nutrient requirements and high school participation barriers such as neighborhood food environment, competitive foods, and participation stigma.

Survey comparisons revealed that CNP managers and directors may give priority to different features when choosing a recipe. Reasoning behind these differences could be explained by how the MRS Guide is used at the district-level and school-level. CNP directors may view features such as recipe yield, food safety, and staff acceptability as important when menu planning. However, when recipes are carried out at the school-level, other features such as availability of equipment, skill level of staff, and recipe pictures reveal a higher importance to CNP managers.

The MRS Guide is a highly rated recipe database that other child nutrition programs could use to develop their own state recipe database or adapt the current guide to their district. Future studies could evaluate the use of the guide outside child nutrition programs in Mississippi.

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LIST OF APPENDICES

APPENDIX 1: EMAIL RECRUITMENT SCRIPT

Subject line: Your valuable input is needed for Mississippi Recipes for Success.

As a Child Nutrition Manager, you have been selected to participate in this survey. This survey was developed by the University of Mississippi researchers in collaboration with the developers of the Mississippi Recipes for Success (MRS) resource and the Office of Child Nutrition. The survey evaluates YOUR perceptions of the helpfulness and importance, as well as, satisfaction with the MRS. Your responses will greatly contribute to future updates of the MRS. The survey takes approximately 5-8 minutes to complete and your responses will remain anonymous. Although we encourage you to take the survey promptly, you will have access to this survey until March 5, 2019.

After completion of the survey, you will be redirected to a separate browser window where you can enter your contact information for a chance to win one of five available $20 Wal-Mart cards.

Thank you for your participation and feedback!

APPENDIX 2: SURVEY INSTRUMENT

1. **Are you at least 18 years old?**
   ☐ YES

   ☐ NO

2. **Are you familiar with Mississippi Recipes for Success (MRS), a guide for Child Nutrition Programs (CNP)?**
   ☐ YES

   ☐ NO

3. **As a school food service manager, please indicate how often you and/or your staff use the following formats of MRS. Check all used.**

	Daily	Weekly	Monthly	Less than Monthly	Never
Printed Binders	5	4	3	2	1
Online	5	4	3	2	1
Software (such as *Nutrikids*™, Mosaic, Horizon)	5	4	3	2	1

4. **Are the MRS <u>PRINTED BINDERS</u> available at your school site?**
   ☐ YES

   ☐ NO

5. **Do you have access to the <u>ONLINE</u> version of MRS at your school site?**
   ☐ YES

   ☐ NO

6. As a school food service manager, please select how often you used the following features of MRS to train employees?

Features	Daily	Weekly	Monthly	Less than Monthly	Never
Food Safety – Critical Control Points	5	4	3	2	1
Food Safety – Recipe HACCP Process	5	4	3	2	1
Meal Component Contribution	5	4	3	2	1
Measurements and Conversions	5	4	3	2	1
Serving Sizes and Utensils	5	4	3	2	1
Recipe Components	5	4	3	2	1

7. Please rate your level of satisfaction with the following features of MRS on a scale of 0-5, where 5 is most satisfied, 1 is least satisfied, and 0 is I do not use this feature.

Features	Most Satisfied				Least Satisfied	I Do Not Use this Feature
Organization of food categories found in the binders	5	4	3	2	1	0
Variety of recipes found in each category	5	4	3	2	1	0
Formatting or layout of recipes	5	4	3	2	1	0
Clarity of recipe directions	5	4	3	2	1	0
Pictures of 'Illustrated Steps for Preparation' of the recipes	5	4	3	2	1	0
Pictures of the recipe finished product	5	4	3	2	1	0
Nutrient analyses of recipes	5	4	3	2	1	0
Number of meal components found on recipe	5	4	3	2	1	0

8. Please rate the level of importance of the following features when choosing a recipe in MRS.

Features	Very Important				Not Important
Easy-to-follow recipe directions	5	4	3	2	1
Accuracy of recipe yields	5	4	3	2	1
Availability of equipment needed to prepare recipe	5	4	3	2	1
Adequate staffing needed to prepare recipe	5	4	3	2	1
Skill level of staff needed to prepare recipe	5	4	3	2	1
Student acceptability of recipe	5	4	3	2	1
Staff acceptability of recipe	5	4	3	2	1
Number of meal components met by recipe	5	4	3	2	1
Picture of recipe	5	4	3	2	1
Food Safety – Recipe HACCP Process	5	4	3	2	1
Food Safety – Critical Control Points	5	4	3	2	1

9. Please rate the level of helpfulness of the 'Cook's Tools' section of MRS on a scale of 0-5, where 5 is most satisfied, 1 is least satisfied, and 0 is I do not use this feature.

Features	Very Helpful				Not Helpful	I Do Not Use this Feature
Abbreviations and Common Measures	5	4	3	2	1	0
Recipe Abbreviations	5	4	3	2	1	0
Measurement Conversions	5	4	3	2	1	0
Scoop, Ladle, Spoodle Portion Sizes	5	4	3	2	1	0
Cutting Diagrams for Pan Portions	5	4	3	2	1	0
Steamtable Pan Capacity Chart	5	4	3	2	1	0
Common Can and Jar Sizes	5	4	3	2	1	0
Purchasing Formula	5	4	3	2	1	0
Customizing Recipes	5	4	3	2	1	0
Crediting Grains	5	4	3	2	1	0
Fresh/Frozen/Canned Vegetable Conversions	5	4	3	2	1	0

10. For the <u>ONLINE</u> version of MRS, please rate your level of satisfaction with the following features on a scale of 0-5, where 5 is most satisfied, 1 is least satisfied, and 0 is I do not use this feature.

Features	Most Satisfied				Least Satisfied	I Do Not Use this Feature
Organization of website	5	4	3	2	1	0
Frequency of website updates	5	4	3	2	1	0
Printability and resources on website	5	4	3	2	1	0
Search options for finding recipes	5	4	3	2	1	0

The last three questions of this survey ask you about yourself. Only the researchers from the University of Mississippi will use this information in the data analysis. As with the other questions in this survey, confidentiality will be maintained.

11. How many years have you worked in child nutrition programs?

☐ Less than 1 year ☐ 1-5 years ☐ 6-10 years
☐ 11-15 years ☐ 16-20 years ☐ More than 20 years

12. At which level of management are you currently working?

☐ Elementary School ☐ Middle School ☐ High School ☐ Attendance Center

13. How many students do you and your staff feed on average daily?

☐ Less than 200 ☐ 201-400 ☐ 401-600 ☐ 601-800 ☐ More than 800

14. Do you have any further comments about MRS?

_____

_____

_____

APPENDIX 3: PARTICIPATION RAFFLE ENTRY INSTRUMENT

1. **Would you like to be entered into a raffle to win one of five $20 Walmart Cards?**
   ☐ YES

   ☐ NO

2. **Would you like to be contacted through email or text if you are selected as one of the five winners for the $20 Walmart Card?**
   ☐ Email

   ☐ Text

3. **Please enter the email you would like to be contacted through.**
   _____

4. **Please enter the number you would like to receive a text through.**
   (_ _ _) _ _ _ - _ _ _ _

VITA

ALEX HALLMARK

EDUCATION

Bachelor of Science (December 2009) in Dietetics and Nutrition, University of Mississippi, Oxford, Mississippi.

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ACADEMIC EMPLOYMENT

Graduate Assistant, Department of Nutrition and Hospitality Management, August 2014 – May 2015. Responsibilities included providing meals and supplement to college athletes.

PROFESSIONAL MEMBERSHIP

Mississippi School Nutrition Association, July 2015-present

School Nutrition Association, July 2015-present