

CHILD NUTRITION PROGRAM MANAGERS' EVALUATION OF A STATE MEAL PLANNING SYSTEM GUIDE

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ABSTRACT

PURPOSE/OBJECTIVES

The purpose of this study was to measure child nutrition program (CNP) managers' use, satisfaction, importance, and helpfulness of the features in a state meal planning guide, Mississippi Recipes for Success (MRS) Guide.

METHODS

A web-based survey platform was used to disseminate an online survey to CNP managers via email. A previously validated survey was used consisting of Likert-type scales, multiple choice, and an open-ended question. Descriptive statistics were used for each question, obtaining response numbers and percentages. Analysis of variance identified correlations between CNP managers' attributes and responses for satisfaction, importance, and helpfulness of MRS features. All data were analyzed using the statistical package SPSS (version 25).

RESULTS

CNP managers (n=148) responded to the survey with 74.3% (n=110) reporting using both online and printed formats of the MRS and 70.3% (n=104) using the nutrient analysis software that contains MRS recipes. CNP managers (n=108) reported using MRS features on a daily basis for training. The two features rated highest for level of satisfaction were *Organization of Food Categories* (n=89, 86.7%) and *Number of Meal Components in Recipes* (n=86, 86.6%). CNP managers reported low satisfaction for *Pictures of Recipe Preparation Steps* (n=68, 72.9%) and *Pictures of Recipe Finished Product* (n=65, 72.5%). When choosing a MRS recipe, *Food Safety-Critical Control Points (CCPs)* (n=141, 95.3%), *Food Safety-Recipe Hazard Analysis and Critical Control Point (HACCP) Process* (n=140, 94.6%), and *Easy-To-Follow Recipe Directions* (n=140, 94.6%) were the features rated most important. The features of the 'Cooks' Tools' section, which contains conversions charts, diagrams, abbreviations, and common measures, were reported as very helpful by the CNP managers.

APPLICATION TO CHILD NUTRITION PROFESSIONALS

The MRS guide is a meal planning database available for CNPs in Mississippi to assist in meeting federal school meal regulations. CNP managers reported using both printed and online versions of the MRS for employee training and were satisfied with the features used to assist with reimbursable meal compliance. The MRS can be customized to meet any CNP's needs, can be easily updated as meal regulations change, and can be a valuable resource nationwide.

KEYWORDS: Child Nutrition Programs, Mississippi Recipes for Success, School Meals, Menu Planning.

INTRODUCTION

In 2012, the National School Lunch Program (NSLP) and School Breakfast Program (SBP), aligned requirements for school meals with the Dietary Guidelines for Americans to address the vast need to improve the diets and overall health of America's children (Haack & Byker, 2014; McGuire, 2011; United States Department of Agriculture (USDA) Food and Nutrition Service (FNS), 2013a; USDA Health and Human Services (HHS), 2015). The USDA FNS (2013a) set new nutrition standards for all food sold and served in schools that increased amounts of fruits, vegetables, and whole grains while reducing saturated fat, trans fat, and sodium. The addition of vegetable subgroups (e.g. red/orange) increased variety offered and milk was to be low fat or fat free (USDA FNS, 2013a).

To address children's overall nutrient needs, weekly nutrient requirements, using five meal components, were developed based on age and grade level (USDA FNS, 2013a). While there are many advantages to the new standards, CNP directors are concerned with financial implications, student participation, menu development, and the timeline to correctly implement the changes (Yon et al., 2016).

Standardized recipes ensure nutrient requirements are met through consistent preparation methods (USDA FNS, 2013a). In studies evaluating the importance of using standardized recipes, it was found they were most important in managing yield, maintaining high quality, and consistent food products (Kim et al., 2010; Patil & Pol, 2014). Standardized recipes can also assist in ensuring safe meals for the millions of students participating in school meal programs by incorporating the HACCP system (Stinson et al., 2011). School Food Authorities (SFAs) participating in the NSLP and SBP are required to implement a food safety program based on the HACCP system which 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, 2013b). However, an evaluation of CNP directors' compliance with HACCP found that 35% had not classified their menu items into one of three processes. It was concluded there was a need for food safety education materials, training programs, and assurances that standardized recipes include HACCP processes (Stinson et al., 2011; USDA FNS, 2015).

The USDA provides standardized recipes in the Child Nutrition Recipe Box (<https://theicn.org/cnr/b/>) as a resource for assisting with NSLP and SBP nutrition standards. However, depending on geographical location and how schools procure food, there is the concern that some of the ingredients found in those recipes may not be available or preferable to the CNPs' student population. In a study investigating the usage of USDA's recipes, Rushing and Johnson (2015) suggested the need for recipes to be more student friendly, trendy, culturally diverse, and region appropriate.

In 2000, the Mississippi Department of Education (MDE), Office of Child Nutrition (OCN) released its first comprehensive recipe database for Mississippi child nutrition programs. The data base, titled Mississippi Recipes for Success (MRS), is a menu planning system, in printed and online formats, created by CNP state administrators, district directors, school managers, and district support staff. There are five recipe manuals containing standardized recipes and a 'Cooks' Tools' reference manual that includes various menu matrixes for breakfast and lunch and training materials for meal planning and food safety. Each recipe encompasses an ingredient

list, yield, directions, meal component contribution, nutritional data, and sometimes pictures of preparation and presentation (MDE OCN, 2015).

MRS is accessible to the public through a weblink and contains all printed manuals that may be downloaded. The online database resource allows for continuous recipe updates to meet any new nutrition standards and/or cultural preferences of the Mississippi student population (MDE OCN, 2015) while providing nutrient updates of recipes through nutrient analysis software (e.g. Nutrikids®). Although the software must be purchased by the school district, the recipe imports for the software are managed by OCN at no cost to Mississippi school districts (<https://www.mdek12.org/OCN/OP/MRS>).

Since the release of MRS, contributors have inquired about usefulness of the menu-planning guide at meeting the needs of CNPs in Mississippi. A recent study conducted by Bell et al. (2017) evaluated the usefulness of MRS with CNP directors. While CNP directors' perceptions of MRS are very useful, a large portion of the systems' features were created to be utilized in the kitchen by CNP managers and staff for 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 and determine what percentage of CNP managers are using the various formats.

METHODS

Sample

The state directory for CNP directors was used to contact directors and request CNP managers' school emails. Out of 178 CNP directors contacted, 58 (33%) responded with a total of 336 CNP managers' emails. CNP managers (n=336) were sent an anonymous link, via email, requesting their participation in the study. As an incentive, CNP managers were given the option to enter a raffle to receive one of five twenty-dollar gift cards.

Instrument

A web-based survey, previously validated by Bell et al. (2017), was used to determine CNP managers' use, perceived satisfaction, importance, and helpfulness of the various features provided by the printed and online versions of MRS. Minor revisions were made, tailoring questions to CNP managers and their use of MRS. Questions were categorized into the following sections: Section 1) use (5=Daily to 1=Never) and accessibility of all formats, including nutrient analysis software, Section 2) level of satisfaction (5=Very satisfied to 1=Not satisfied) with MRS printed features such as recipe design and ease of online features, Section 3) importance of recipe features (5=Very important to 1=Not important) when choosing a recipe in MRS, such as student acceptability, skill level of staff, and equipment needed, Section 5) level of helpfulness (5=Very helpful to 1=Not helpful) with resources found in the 'Cooks' Tools' such as menu planning matrixes and measurement guides, and Section 6) how often (5=Daily to 1=Never) training features of MRS, such as food safety and recipe components, were used to train staff. Where appropriate, CNP managers also had the option to select "I do not use this feature." Lastly, CNP managers were asked how long they have worked in CNPs, the level of management in which they are currently working, and the daily average of students fed at their school site. The survey was evaluated for clarity, understanding, wording, and suitable length by CNP managers (n=39) in one local district that was excluded from participating in the final study.

Data Collection

The survey was uploaded to Qualtrics®, an online survey service, and was accessible to CNP managers from February 19, 2019, until March 5, 2019, with CNP managers receiving weekly requests to participate. This study was approved by the University of Mississippi's Institutional Review Board for Human Subjects prior to survey distribution.

Data Analysis

All data were analyzed using the statistical package SPSS (version 25). Descriptive statistics were obtained for each survey question to obtain respondent percentages. Analysis of variance (ANOVA) identified correlations between CNP managers' attributes and responses for use, satisfaction, importance, and helpfulness of the MRS.

RESULTS AND DISCUSSION

MRS Usage

Of the 336 CNP managers sent the online survey, 162 (50%) responded with 148 (44%) being used for analysis. Thirty-five percent of district counties were represented by respondents and distributed throughout the state. Ninety-five CNP managers had over five years of experience in CNPs with 36 reporting more than 20 years of experience. There were 79 elementary school managers, 29 middle school managers, 29 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).

The majority of CNP managers reported using MRS for training on a daily (n=108) basis. The features used most often for training were *Serving Sizes and Utensils* (n=131, 83.4%) and *Recipe Components* (n=127, 80.9%). It is critical to provide the appropriate serving size in order to count the meal component as part of a reimbursable meal. The meal components provided by the recipes are shown in large colorful icons with the serving size, making it easier for CNP staff to recognize the components offered toward the reimbursable meal. The remaining features used to train staff were *Meal Component Contribution* (n=106, 68%), *Measurements and Conversions* (n=106, 68%), and *Food Safety-Recipe HACCP Process* (n=90, 57.7%).

Food Safety-CCPs (n=88, 56.1%) was reported as the feature used least often for training. Roberts et al. (2014) found most schools' HACCP principles had been operationalized, but few reports on compliance and plans of corrective actions could be found. With accessible food safety resources available through USDA and the Institute of Child Nutrition for free, CNP managers may be using other sources for training including the districts tailored HACCP manual, for training.

Satisfaction with the MRS features

CNP Managers were asked to indicate their level of satisfaction with features found in both printed and online formats of MRS (Table 1). *Number of Meal Components in Recipes* received satisfactory to most satisfactory from CNP managers (n=130, 87%). Many of the MRS recipes have multiple food components that may make it easier for menu planning but also assist in preparation time and serving by minimizing the number of items prepared, thus fewer items to place on the serving line and clean.

Table 1. *CNP Managers' Satisfaction with Guide Printed and Online Features*

| | N | Most 5 n (%) | 4 n (%) | 3 n (%) | 2 n (%) | Least 1 n (%) | Not used* 0 n |
|--|-----|--------------------|------------|------------|------------|---------------------|------------------------|
| Satisfaction with Printed Format Features | | | | | | | |
| Organization of Food Categories | 136 | 89 (65.4) | 29 (21.3) | 16 (11.8) | 2 (1.5) | 0 (0.0) | 12 |
| Number of Meal Components in Recipes | 145 | 86 (58.3) | 41 (28.3) | 13 (9.0) | 3 (2.1) | 2 (1.4) | 3 |
| Nutrient Analysis of Recipes | 141 | 88 (62.4) | 33 (23.4) | 14 (9.9) | 4 (2.8) | 2 (1.4) | 7 |
| Recipe Formatting and Layout | 143 | 79 (55.2) | 41 (28.7) | 20 (14.0) | 2 (1.4) | 1 (0.7) | 5 |
| Recipe Variety in Categories | 142 | 74 (52.1) | 45 (31.7) | 16 (11.3) | 4 (2.8) | 3 (2.1) | 6 |
| Clarity of Recipe Directions | 147 | 72 (49.0) | 46 (31.3) | 21 (14.3) | 8 (5.4) | 0 (0.0) | 1 |
| Pictures of Recipe Preparation Steps | 135 | 68 (50.4) | 29 (22.5) | 29 (21.5) | 3 (2.2) | 6 (4.4) | 13 |
| Pictures of Recipe Finished Product | 135 | 65 (48.1) | 33 (24.4) | 29 (21.5) | 2 (1.5) | 6 (4.4) | 13 |
| Satisfaction with Online Use | | | | | | | |
| Printability and Resources on Website | 110 | 69 (62.7) | 29 (26.4) | 10 (9.1) | 1 (0.9) | 1 (0.9) | 38 |
| Organization of Website | 110 | 66 (60.0) | 32 (29.1) | 11 (10.0) | 0 (0.0) | 1 (0.9) | 38 |
| Frequency of Website Updates | 109 | 60 (55.0) | 33 (30.3) | 14 (12.8) | 1 (0.9) | 1 (0.9) | 39 |
| Search Options for Finding Recipes | 110 | 61 (55.5) | 31 (28.2) | 13 (11.8) | 4 (3.6) | 1 (0.9) | 38 |

Note: * "I don't use this feature" responses were removed from analysis.

CNP Managers (n=118, 87%) reported satisfaction to most satisfaction with the *Organization of the Food Categories* feature. MRS is divided into different binders by food category, correlating with the MyPlate icons, which was designed as part of the 2010 Dietary Guidelines for Americans (USDA & HHS, 2015). The recipes within the binders are divided into sections by meal type and main meal component contribution. MRS allows its users to easily access recipes that could explain high satisfaction of this feature. The *Nutrient Analysis of Recipes* feature received 86% (n=121) of CNP managers responding they were satisfied or most satisfied. Having easy access to recipes' nutrient data allows CNP staff to meet special diet needs accurately such as carbohydrate counting for diabetic students.

Two features, *Pictures of the Recipe Finished Product* (n=98, 72.9%) and *Pictures of Illustrated Steps for Preparation of the Recipes* (n=97, 72.5%), had the lowest number of CNP managers reporting satisfied to most satisfied. Visual step-by-step recipes assist in the learning

process by showing the visual progression of the recipe at each step in the preparation process. A study that observed cooks using different recipe formats found that cooks wanted step by step recipes with pictures of each stage of preparation as well as video preparation techniques showing ingredients and utensils (Buykx & Petrie, 2011). When Surgenor et al. (2017) examined how video technology impacted learning new cooking skills, they found that a recipe preparation video promoted both confidence and application as well as allowed replication and flexibility because the video offered functions of continuous access, suspension, and playback control. With a diverse workforce, illustrated steps for preparation can also assist CNP staff who have communication barriers. In one study, researchers examined the effect of using pictures on job performance, task satisfaction, and job commitment when communication barriers exist in a food industry operation (e.g. recipe instructions). They found performance ratings for time, quality, and accuracy to be higher for those that used pictures when preparing a recipe than those who did not (Madera et al., 2012). CNP managers also referenced the need for more pictures in the qualitative feedback, associating a better-finished product and understanding of the recipe when pictures were provided. These findings suggest it may be worthwhile to investigate the needs of CNP managers when providing recipe preparation and finish product pictures. Increasing recipe production illustrations and moving towards video instructions as MRS continues to evolve and be updated may better meet the needs of CNP staff.

All features in the printed MRS are available as an online resource. A total of 126 (85%) CNP managers had school site access with 118 (80%) using the online resource at least monthly. Of the four online questions evaluating online use, CNP managers were most satisfied with the *Printability and Resources on Website* (n=98, 89.1%) and least satisfied with *Search Options for Finding Recipes* (n=92, 83.7%). MRS online contains over 600 recipes that are searchable by the MRS recipe number, recipe name, individual ingredients, or by MyPlate meal component icons. However, when conducting a recipe search, you must correctly key in the recipe name. If a 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. The website does provide a “Search Help” link under the search engine box, which leads to a page that assists users in carrying out searches correctly. However, users might be overlooking the small print link, leading to their dissatisfaction.

Importance of MRS features

Table 2 provides CNP managers’ rating of importance of features when selecting a recipe from the MRS. The highest percentage of CNP managers (n=141, 95.3%) reported that *Food Safety-CCP* was important to most important. A 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 temperatures that must be reached or maintained to control a food safety hazard. USDA requires schools participating in the NSLP and SBP to implement this food safety procedure to ensure safe meals are being served (USDA FNS, 2010). MRS recipes highlight the CCP, amplifying the importance of taking temperatures at the right step in the recipe. This result may show that CNP managers are aware of the importance placed on taking temperatures and are referring to the recipe for guidance.

The *Food Safety-HACCP* processes feature was also perceived as important to most important by 94.6% (n=140) of CNP managers. 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 shown at the top of each recipe. OCN requires all CNP managers to have a ServSafe® certification, reinforcing the importance of the HACCP process. One study found that CNP managers who had a food safety certification, such as ServSafe®, had higher knowledge scores on food safety issues than those who were not certified (Sneed & Henroid, 2007).

Helpfulness of the MRS features

The CNP managers' perceptions of the level of helpfulness of the 'Cooks' Tools' manual is presented in Table 2. 'Cooks' Tools' is a resource that contains information about menu planning, weights and measures, serving utensils, portion control, food safety, and customizing recipes. The highest percentage of CNP managers (93%) identified *Scoop, Ladle, Spoodle, and Portion Sizes* as helpful to most helpful. Understanding portion sizes is critical in managing yield and maintaining consistent food products when using standardized recipes. Additionally, inaccurate portions can be costly and jeopardize meeting nutrition standards (USDA FNS, NSFMI, 2002). The *Purchasing Formula* feature received the lowest percentage of helpful to most helpful by CNP managers (79.1%). *Purchasing Formula* and *Crediting Grains* are resources in this section that are more useful to the menu planner, which is usually performed by the CNP director, more so than CNP manager.

Perceptions based on CNP managers' attributes

One-way analysis of variance (ANOVA) was used to identify associations between CNP managers' management school level, years of experience, ADP, and their perceptions of the MRS features. There was only a significant difference between management school level on the importance of *Accuracy of Recipe Yield* 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 managers' placement of importance ($M=4.55, SD=0.82$) was significantly higher than high school managers ($M=3.90, SD=1.25$). These findings suggest that high school managers do not find the recipe yield accuracy to be as important when choosing a recipe as do elementary school managers. Inadequate food amounts, followed by running out of food, were ranked among the top reasons for dissatisfaction with NSLP (Asperin et al., 2010). In order to meet high school nutrient requirements, menu planners must offer multiple menu options (USDA FNS, 2013a). High school managers may not feel yield is as important because students in this age group have more options from which to select their meal components.

Table 2. *CNP Managers' Perceptions of Importance and Helpfulness of Guide Features*

| | N | Most | | | | Least | Not used* |
|---|-----|------------|------------|------------|------------|------------|-----------|
| | | 5 n (%) | 4 n (%) | 3 n (%) | 2 n (%) | 1 n (%) | 0 |
| Importance of Recipe Features | | | | | | | |
| Food Safety – Critical Control Points | 148 | 116 (78.4) | 25 (16.9) | 7 (4.7) | 0 (0.0) | 0 (0.0) | n/a |
| Food Safety-Recipe HACCP process | 148 | 114 (77.0) | 26 (17.6) | 8 (5.4) | 0 (0.0) | 0 (0.0) | n/a |
| Easy-to-follow recipe directions | 148 | 114 (77.0) | 26 (17.6) | 8 (5.0) | 0 (0.0) | 0 (0.0) | n/a |
| Accuracy of recipe yields | 148 | 117 (79.1) | 20 (13.5) | 11 (7.4) | 0 (0.0) | 0 (0.0) | n/a |
| Availability of equipment to prepare recipe | 148 | 101 (68.2) | 35 (23.6) | 12 (8.1) | 0 (0.0) | 0 (0.0) | n/a |
| Number of meal components met by recipe | 148 | 102 (68.9) | 28 (18.9) | 15 (10.1) | 1 (0.7) | 2 (1.4) | n/a |
| Skill level of staff needed to prepare recipe | 148 | 79 (53.4) | 49(33.1) | 12 (8.1) | 6 (4.1) | 2 (1.4) | n/a |
| Adequate staffing needed to prepare recipe | 148 | 90 (60.8) | 38 (25.7) | 14 (9.5) | 3 (2.0) | 3 (2.0) | n/a |
| Staff acceptability of recipe | 148 | 83 (56.1) | 41 (27.7) | 17 (11.5) | 5 (3.4) | 2 (1.4) | n/a |
| Student acceptability of recipe | 148 | 85 (57.4) | 34 (23.0) | 21 (14.2) | 7 (4.7) | 1 (0.7) | n/a |
| Picture of recipe | 148 | 69 (46.6) | 39 (26.4) | 27 (18.2) | 10 (6.8) | 3 (2.0) | n/a |
| Helpfulness of Cooks' Tools Features | | | | | | | |
| Scoop, Ladle, Spoodle Portion Sizes | 144 | 104 (72.2) | 30 (20.8) | 7 (4.9) | 3 (2.1) | 0 (0.0) | 4 |
| Abbreviations and Common Measures | 139 | 87 (62.6) | 39 (28.1) | 10 (7.2) | 2 (1.4) | 1 (0.7) | 8 |
| Recipe Abbreviation | 141 | 82 (58.2) | 44 (31.2) | 14 (9.9) | 1(0.7) | 0 (0.0) | 7 |
| Steamtable Pan Capacity Chart | 144 | 95 (66.0) | 32 (22.2) | 13 (9.0) | 3 (2.1) | 1 (0.7) | 4 |
| Common Can and Jar Sizes | 143 | 89 (62.2) | 37 (25.9) | 13 (9.1) | 2 (1.4) | 2 (1.4) | 5 |
| Cutting Diagrams for Pan Portions | 142 | 89 (62.7) | 34 (23.9) | 16 (11.3) | 3 (2.1) | 0 (0.0) | 6 |
| Crediting Grains | 135 | 74 (54.8) | 42 (31.1) | 15 (11.1) | 3 (2.2) | 1 (0.7) | 13 |
| Measurement Conversions | 143 | 92 (64.3) | 29 (20.3) | 15 (10.5) | 4 (2.8) | 3 (2.1) | 5 |
| Fresh/Frozen/Canned Vegetable Conversions | 139 | 83 (59.7) | 33 (23.7) | 16 (11.5) | 3(2.2) | 4 (2.9) | 9 |
| Customizing Recipes | 139 | 83 (59.7) | 32 (23.0) | 16 (11.5) | 5 (3.6) | 3 (2.2) | 9 |
| Purchasing Formula | 134 | 74 (55.2) | 32 (23.9) | 21 (15.7) | 5(3.7) | 2 (1.5) | 14 |

Note: * "I don't use this feature" responses were removed from analysis.

There was a significant difference between management school level on the importance of *Staff Acceptability of Recipe* 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 managers ($M=4.51, SD=0.70$) was significantly higher than attendance center managers ($M =3.77, SD=1.30$) suggesting that elementary school managers place higher importance on the staff's acceptability of a recipe when choosing a recipe than attendance center managers. CNP Managers and staff have an opportunity to influence significantly the choices students make when eating school breakfast and lunch (Alcaraz & Cullen, 2014; Schwartz, 2007). CNP staff's acceptability could positively influence student food choices. When CNP staff taste test food, they are more comfortable recommending the menu item to the students (Alcaraz & Cullen, 2014). Considering attendance centers can have students ranging from kindergarten to twelfth grade, attendance center managers may not feel their encouragement is as influential on student choice as elementary school managers which may have contributed to the lower importance rating.

CONCLUSIONS AND APPLICATIONS

MRS is the current recipe database available for Mississippi CNPs. The menu planning tools and recipes were originally developed by OCN as part of the School Meals Initiative for Healthy Children (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 (MDE OCN, 2000). Since the debut of the Healthy Hunger-Free Kids Act 2010 (HHKFA), the database has been continuously updated to meet the evolving USDA regulations (USDA FNS, 2018) and student trends (<https://mrs.mdek12.org/>).

While MRS features some visual illustrations of steps for recipe preparation, 20% 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. It has been found that foodservice staff favor formats that contain recipe preparation videos and pictures (Buykx & Petrie, 2011, Surgenor et al., 2017). 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 can be costly and delay in updates due to printing and distribution. The online availability allows for the frequent changes or adjustments in recipes, addition of new recipes, updates to pictures, and the possible addition of videos. It would be important for OCN to assess whether the benefit outweighs the cost and efforts of updating the printed format for CNP managers. Another benefit with having access to the MRS website is a continuous quality check of menus that can be easily and quickly changed to address any inaccuracy or inefficiencies found with the prepared product. However, because 15% of CNP managers reported not having access to MRS online, the print form is still needed for accessibility. Understanding reasons why there is limited access to MRS online may be helpful for any deliberation on the future of the printed format.

Another feature that could be added to the MRS website is a recipe conversion function. Several comments provided by CNP managers referenced the need to size recipes for the exact servings needed. While nutrient analysis software containing MRS recipes can provide recipe sizing and

preparation reports, it comes at an additional cost. Some CNP programs do not have the financial capacity for the added expense.

Researchers of this study have concluded that MRS is meeting its goal of providing a menu planning system and online recipe resource that CNP managers perceive to be helpful in assisting them with menu compliance. Additionally, the features provided by MRS are overall satisfactory to CNP managers who also believe the features provided to be important. While USDA provides standardized recipes for CNPs, MRS provides recipes that are region specific, representing their culture. Plus, the recipes' ingredients are listed with the procurement number associated with the *Mississippi Child Nutrition Statewide Purchasing Program* to assist CNP management in ordering items.

This menu planning system and database could be used as a template that other CNPs could use to develop their own recipe databases or adapt the MRS to their school districts' needs. MRS is more than a recipe database; it has also been identified as a useful training resource. CNP managers identified important features such as recipe component icons and CCPs included in the recipes that also aid in training staff on food safety measures and offer versus serve to ensure the distribution of safe reimbursable meals. Because the food industry employs a diverse workforce, communication barriers may occur. These features not only assist in regulation compliance but can also serve as a communication tool to those with limited English proficiency.

LIMITATIONS AND FUTURE RESEARCH

Limitations

Limitations of this study could be that a web-based survey platform was used and sent electronically through an email link. Not all CNP managers in Mississippi had a school email. Emails had to be retrieved by contacting CNP directors through the OCN directory. Another limitation is not all schools have access to nutrient analysis software due to the licensing costs. Therefore, there is no way at this time to know the actual number of CNP managers that would use MRS recipes through a software if it were available.

Future research

Future research in using MRS could look beyond satisfaction features and evaluate the proper use of MRS components such as following recipes and properly preparing and serving accurate portion sizes. As mentioned previously, accurate portion sizes are critical in managing yield, maintaining consistent food products, reducing cost, and meeting nutritional standards. For a more in-depth understanding, OCN could conduct focus groups discussions with CNP managers providing rich qualitative data. Future studies could also evaluate the applicability of the MRS to CNPs in other states to see if similar results of use, satisfaction, importance, and helpfulness are found.

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