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The Development of a School Lunch Observation Measure to Assess School District Lunch Menu Implementation

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CAPSTONE PROJECT ABSTRACT

**Background:** The most recent estimate of the prevalence of child and adolescent obesity in the United States is 17% (Ogden, Carroll, Lawman, & et, 2016). Based on evidence that the availability of healthy food at schools can significantly impact the nutrition behaviors of children, the Healthy and Hunger Free-Kids Act sets policy for the United States Department of Agriculture (USDA), which includes the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) (USDA, 2017a). School food authorities (SFAs) are responsible for administering school feeding programs (Byker, Pinard, Yaroch, & Serrano, 2013). In other words, local school authorities (school districts) design lunch menus that meet the USDA meal pattern and schools within the districts are expected to deliver the menu as intended. However, there is lack of information to determine if schools deliver the school district lunch menu as intended or if they adhere to the feeding program. Hence, the purpose of this study was to develop, and to establish content validity of an observation tool used to access and report the school district lunch menu implementation across three assessment period of the elementary school lunch time. (i.e., in the beginning, middle, and end of the lunchtime).

**Methods:** The development of this tool involved two phases: (1) Development phase and, (2) Content validity phase. For phase 1, the tool was developed based on existing tools from the literature and the USDA Lunch Meal Pattern. For phase 2, the content validity of the tool was established using research and practitioner raters, who were experts in nutrition and familiar with USDA policy on school meals.
Results: The results of this study were organized according to the two phases established in this study. For phase 1, there were three (3) items and four (4) sub-items generated and operationalized for the school lunch menu implementation outcome tool. These items included school menu implementation outcome, quantity, and quality of the meal. The four sub-items, (which were referred to as the four indicators of quality) included meal appearance, fresh/whole food item, transitioned food item, and highly processed food item. For phase 2, each item was rated by 5 expert raters. One of the sub-items “meal appearance” was eliminated, and the remaining items were retained based on a minimum value of 0.99. Also, more emphasis was placed on the sub-item “meal appearance” as being subjective if measured.

Discussion/Conclusions: The school lunch menu observation tool, based on a literature review, is the first tool developed to measure the implementation outcome of school district lunch menus. Data from the second phase demonstrated content validity. The items received perfect scores based on the rating metrics. This study findings suggest that public health researchers conduct further research to validate an instrument of school lunch implementation. A observation tool of this type may be useful for public health research and practice.

Keywords: Childhood Obesity, Content validity, School lunch program, Observation tool.
INTRODUCTION

Placement site

The service learning placement site was at Gretchen Swanson Center for Nutrition (GSCN) located in Omaha Nebraska. GSCN is an independent research institution that provides scientific expertise, partnership, and resources to improve diet and physical activity behaviors among youth and their families to help grow a healthier next generation. The role of school food environments in addressing children and adolescent's overweight/obesity has received increased policy attention (Schanzenbach, 2009). GSCN was responsible for evaluating activities conducted by LiveWell Colorado’s (LWC) School food initiative. The school food initiative program was designed to help school districts design and deliver menus that are of high nutrition quality which involved training school food personnel on how to use scratch cooking methods (i.e., using fresh/whole items). The evaluation activities conducted by GSCN were to determine the impact of the school food initiative program on a district’s ability to incorporate fresh/whole ingredients into the district menu cycle after one 18-month cycle in the program. Also, to examine current practices, what training/resources would be the most appropriate for LWC to provide to participating school districts. Furthermore, to examine the current percentage (baseline %) of fresh/whole ingredients in participating school districts’ menu cycles for the 2016-2017 school year. The observation tool developed for this project could help GSCN and LWC to measure meal consistency based on the nutrition quality of the meals served across the participating schools. This could inform any recommendation and training provided by the LWC’s school food initiative.
Childhood Obesity

The prevalence of overweight and obesity among children aged 2 to 19 years was 31.6% and 17.3% in 2007-2008 and 32.2% and 16.9% in 2011-2012 respectively (Borrell, Graham, & Joseph, 2016). The most recent estimate of the prevalence of child and adolescent obesity in the United States is 17% and is based on data for 2011-2014 (Ogden et al., 2016). Further, obese adolescents tend to remain obese as adults, making childhood the ideal time to prevent obesity (Kristensen et al., 2014).

School Food Environment

The school food environment has the potential to have a large impact on children's and adolescents' diets because they consume a substantial proportion (between 19 and 50 percent) of their total daily calories at school (Story, Nanney, & Schwartz, 2009). In 1995, after research showed that many school lunches failed to meet nutrition requirements, the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA) launched the School Meals Initiative for Healthy Children (SMI) with the long-term goal of improving the nutritional quality of meals provided through the National School Lunch Program (NSLP) and the School Breakfast Program (SBP) (Schanzenbach, 2009). The National School Lunch Program (NSLP) serves lunch to almost 30 million students, 60 percent of the total student population (Schanzenbach, 2009). Almost all public schools offer the NSLP, which annually provides $6.1 billion in total cash payments to local schools and an additional $4.7 billion in in-kind surplus food commodities such as fruit juices and peanut butter (Schanzenbach, 2009). Although a large
fraction of school lunch participants gets their lunch free (48 percent) or at a reduced price (9 percent), a substantial share (43 percent) is from nonpoor families (Schanzenbach, 2009).

PROBLEM STATEMENT

One factor that could contribute to childhood obesity prevention/reduction is the provision of healthy and nutritious meals to school children. School food authorities (SFAs) are responsible for administering school feeding programs (Byker et al., 2013). In other words, school districts create menus that are expected to meet the USDA meal policy (also known as the USDA meal pattern) while schools within districts are expected to adopt this menu and implement them as intended. However, the problem now is there isn’t an existing tool to observe the fidelity of the school district feeding program. When comparing schools in different geographic locations, there is a possibility of disparities in the ways meals are being prepared and served. Financial problems could be a major barrier to providing nutritious meals in schools. According to a study, a 5-day examination of the school lunch menus in two Mississippi school districts comparing them with the national guidelines revealed that regular school lunch meals from urban school cafeterias provided more energy than meals from the rural school district for kindergarten through grade 12 (mean=1,308 vs. 977 calories) (Addison, Jenkins, White, & Young, 2006; Nanney, Bohner, & Friedrichs, 2008). Both school districts had a majority of students who qualify for free and reduced-price lunches. With a measure of implementation outcome of the school district lunch menu, the pattern of variability among schools and the determinants of the variability can be identified.

In addition to the above problem, poor quantity and quality of meals served in schools and lack of meal consistency are issues in the school food environment that require thorough observation/investigation. However, one way to determine if the above-stated problems truly
exist was to develop and validate an observation tool that could be used to measure school implementation outcome of school district lunch menus across three lunchtime periods among elementary schools. This tool was designed to assess the quality and quantity of food served in elementary schools and was designed specifically for elementary schools participating in the NLSP. Few existing tools found in the literature have proven to be valid in measuring the nutrition quality of the meals served in schools. However, there are no tools to observe if the school district lunch menus are implemented as intended in elementary schools and if they meet the USDA lunch meal pattern.

This study was designed to answer the following research questions;

- Is the content of the tool valid to measure school implementation outcome of the school district lunch menus across three assessment periods of the school lunchtime?
- Is the content of the tool valid to measure the nutrition quality and quantity of the meals delivered in elementary schools?

The aim of this study was to develop and to establish content validity of an observation tool used to access and report the school implementation outcome of the school district lunch menus across three assessment periods of the school lunch time. (i.e., in the beginning, middle, and end of the lunchtime).

During the development of the Environment and Policy Assessment, and Observation as a Self-Report EPAO -SR instrument, an advisory committee and experts were identified and asked to comment on content coverage, and item relevance, format, and clarity of the instrument. Revisions were made based on the feedback from the reviewers (Ward, Mazzucca, McWilliams, & Hales, 2015). The development of the EPAO-SR instrument informed our process to establish validity for the tool developed for this project. To address the aim of this study, a thorough
review of the literature on existing tools was conducted. The USDA lunch meal pattern was reviewed to facilitate the tool development. A quantitative method was used to analyze the content validity of the tool.

HISTORICAL SIGNIFICANCE, RELEVANCE OF THE PROJECT TO PUBLIC-HEALTH, AND GAPS IN KNOWLEDGE

The National School Lunch Act in 1946 was “created as a measure of national security, to safeguard the health and well-being of the nation's children (Connor, Crepinsek, Gordon, & Nogales, 2007; Story et al., 2009).” Now, more than sixty years later, in the midst of a childhood obesity epidemic with one-third of U.S. children being overweight or obese, we are again faced with a major health crisis that could threaten “national security” in new ways (Connor et al., 2007; Story et al., 2009). With more than 30 million youth participating in the school lunch program every school day, the NSLP offers a potent policy tool to improve the diets of American children (Connor et al., 2007; Schanzenbach, 2009; Story et al., 2009). Furthermore, obesity and poor diet disproportionately affect low-income and minority children, and almost two-thirds (59 percent) of school lunches served are free or at a reduced price for students from low-income families (Connor et al., 2007; Story et al., 2009). Meals served in the NSLP, and SBP must meet federally defined nutrition standards for schools to be eligible for federal subsidies (cash reimbursements and commodity foods) (Connor et al., 2007; Story et al., 2009).

Schools participating in the NSLP and SBP are required by the USDA to meet certain nutrition criteria. Congress passed the Hunger-Free Kids Act in 2010 with bipartisan support to help ensure every American child had access to the nutrition they need to grow into healthy adults (USDA, 2014). One goal of the law was to help reduce America’s childhood obesity epidemic and reduce health risks for America’s children by helping schools across the country
produce balanced meals, so children had access to healthy foods during the school day (USDA, 2014).

USDA based the new school meal standards on independent, expert recommendations from the Institute of Medicine to ensure kids are being fed healthy food while they are at school (USDA, 2014). School food authorities (SFAs) are responsible for administering school feeding programs (Byker et al., 2013). In other words, local school authorities (school districts) design lunch menus that are expected to meet the USDA meal pattern and schools within the districts are expected to deliver the menu as intended to qualify for the NSLP. School food authorities must serve meals that offer 5 meal components daily, including fruits, vegetables, grains, meat/meat alternate, and milk. The serving sizes within the 5 meal components are planned based on kindergarten through 5, 6–8, and 9–12 age/grade groups (Byker et al., 2013).

However, there is lack of information to determine if schools deliver the school district lunch menu as intended and if they meet USDA lunch meal pattern. Studies lack school implementation outcome reports of the school district lunch menu, this report can be vital in improving the diet and health of children and reduce differences in the quality of the meals delivered to schools. Therefore, there is a need for a validated observation tool that can be used specifically for reporting of the school district lunch menu implementation in elementary schools. One instrument that does exist is the Environment and Policy Assessment, and Observation as a Self-Report (EPAO-SR) instrument used to assess the nutrition quality and physical environment of child care centers, which was developed based on an existing observation instrument called Environment and Policy Assessment, and Observation (EPAO) (Ward et al., 2015). Another instrument called the Smarter Lunchrooms Scorecard is the nation’s
premier tool to assess the use of evidence-based and best practices strategies in lunchrooms. Other existing tools identified in this study can be seen in the literature review section.

A gap in the literature exists such that these instruments are not designed to specifically measure if schools implement the school districts lunch menu as intended. Thus, the purpose of this project was to develop and validate an observation tool that could contribute to improving the diet of children and reduce childhood obesity at the elementary school level. This project is relevant to reducing the rate of childhood obesity and improving the diet of school children by making sure that the nutrition quality and quantity of meals delivered in elementary schools meet the federal nutrition standard. Poor quantity and quality of meals implemented in elementary schools and poor meal consistency and implementation are issues in the school food environment that require thorough observation/investigation. This project would provide public health researchers and policymakers with a valid tool used to determine if schools’ meals are implemented as intended based on school district menu and the USDA lunch meal pattern.
LITERATURE REVIEW

School Food Environment:

School cafeterias can play a significant role in providing healthy meals to children. The National School Lunch Program (NSLP) and School Breakfast Program (SBP) meal requirements require an increased focus on the skills and training that school nutrition professionals need to meet the dietary guidelines for Americans successfully. Improvements in the nutritional quality of all foods and beverages served and sold in schools have been recommended to protect the nutritional health of children, especially children who live in low-resource communities (Johnson, Podrabsky, Rocha, & Otten, 2016).

Schools may use the dietary guidelines (2015-2020) information to implement the right quantity and quality of meals served as well as develop programs and policies for school children. These meal requirements aim to reduce calories, saturated fat, and sodium, nutrients associated with higher body mass indices (BMI) in children and increase intake of foods associated with healthy weight status, including fruits, vegetables, and whole grains (Cohen et al., 2012).

With 30.4 million students participating in NSLP each day and school lunch providing one-third of daily calorie requirements, the nutrient content of school meals may have a significant impact on overall nutritional status (Cohen et al., 2012). Although schools participating in the National School Lunch Program are required to meet the minimum program standards, advocates recommend that innovations be sought to enhance menu dietary quality (Cohen et al., 2012). Returning to scratch cooking and utilizing more whole, fresh foods may help schools meet new meal guidelines, especially for sodium and calorie restrictions (Cohen et al., 2012). Schools are
expected to use the recent dietary guidelines (2015-2020) information to develop programs and policies for school children.

**Reducing Childhood Obesity through NLSP:**

The prevalence of overweight and obesity among children aged 2 to 19 years was 31.6% and 17.3% in 2007-2008 and 32.2% and 16.9% in 2011-2012 respectively (Borrell et al., 2016). The most recent estimate of the prevalence of child and adolescent obesity in the United States is 17% and is based on data for 2011-2014 (Ogden et al., 2016). For these reasons, policymakers are interested in effective programs and policies to reduce childhood obesity.

Knowing that obesity and poor diet disproportionately affect low-income and minority children, a large fraction of school lunch participants get their lunch free (48 percent) or at a reduced price (9 percent), a substantial share (43 percent) is from nonpoor families and pay full price for lunch (Schanzenbach, 2009). Meals served in the NSLP, and SBP must meet federally defined nutrition standards for schools to be eligible for federal subsidies (cash reimbursements and commodity foods) (Connor et al., 2007; Story et al., 2009). Schools participating in the NSLP and SBP are required by the USDA to meet certain nutrition criteria.

The recent SNDA-III study showed that although the majority of U.S. schools offer breakfasts and lunches that meet the standards for key nutrients, such as protein, vitamins A and C, calcium, and iron, fewer than one-third of public schools meet the USDA standards for total fat and saturated fat (Connor et al., 2007; Story et al., 2009). Reducing fat in school meals to meet the Dietary Guidelines for Americans recommendations can help cut excess calories (Story et al., 2009). The USDA federal regulations also have nutrition standards for appropriate calorie levels for school meals averaged over a school week (Connor et al., 2007; Story et al., 2009).
Elementary (K through 6) lunches must have a minimum of 664 calories, and secondary (7 through 12) lunches, 825 calories (Connor et al., 2007; Story et al., 2009).

Congress passed the Hunger-Free Kids Act in 2010 with bipartisan support to help ensure every American child had access to the nutrition they need to grow into healthy adults (USDA, 2014). One goal of the law was to help reduce America's childhood obesity epidemic and reduce health risks for America's children by helping schools across the country produce balanced meals, so children had access to healthy foods during the school day (USDA, 2014).

Existing School Lunch Observation tools

There are five reasons for the measurement of food and nutrition environments (Institute of Medicine, Food and Nutrition Board, & Committee on Accelerating Progress in Obesity Prevention, 2012):

• Observation, or simply observing what is available and what people eat and why they eat the way they do in the different environments to which they are exposed.
• Explanation of the reasons for people’s choices
• Evaluation of the results of programs and strategies
• Support for advocacy or other actions
• Surveillance, or ongoing monitoring to identify trends and problems.

Existing tools used to observe the school nutrition environment includes the following;

• The first is the Environment and Policy Assessment, and Observation as a Self-Report (EPAO -SR) instrument used to assess the nutrition quality and physical environment of child care centers which was developed based on an existing observation instrument called EPAO (Ward et al., 2015). The result of the validity and reliability of the above
instrument have shown a positive effect. It provides researchers with valid, cost-effective method of measuring the child care nutrition quality.

- The Smarter Lunchrooms Scorecard is the nation’s premier tool to assess the use of evidence-based and best practices strategies in lunchrooms.

- An observation tool designed by New Havens Public Schools (NHPS). The NHPS observation tool is used to observe the nutrition and physical activity environment of public schools.

- The School Physical Activity and Nutrition Environment Tool (SPAN-ET) which was developed to assess school resources and readiness to improve nutrition and physical activity environments. The SPAN-ET was evaluated to be a reliable instrument for assessing the quality of elementary school physical activity and nutrition environments. SPAN-ET includes direct observation, interview, document review, and school wellness coalitions.

The EPAO-SR was used to guide the development of the tool for this study. The reason for selecting the EPAO was because the tool was designed to assess the nutrition quality of meals served at school which has shown evidence of the substantial validity of the items in the instruments. An advisory committee and experts were identified and asked to comment on content coverage, and item relevance, format, and clarity of the tool. Revisions were made based on the feedback from the reviewers (Ward et al., 2015). Other instruments listed above didn’t provide details of how the instruments were validated except the EPAO-SR instrument.

**Establishing a Content Validity:**

Validity has been defined as the degree to which an instrument measures what it purports to measure (Cottrell & McKenzie, 2010). Validity in Measurement addresses the degree to which
the concept or concepts under study are accurately represented by the particular items on your questionnaire, test, self-report form, or together measuring device (Cottrell & McKenzie, 2010).

If an instrument does not measure what it is supposed to, then it does not matter if it is reliable (Cottrell & McKenzie, 2010). There are three means of establishing validity which include: criterion-related validity, content and constructs validity. Criterion validity refers to a general category of evidence of the extent to which scores on a data-collection instrument are correlated with some measure of an individual’s behavior or performance (Cottrell & McKenzie, 2010). Construct validity is often used when trying to measure a theoretical construct (e.g., the locus of control, self-efficacy, or perceived barriers) for which a clear-cut behavioral equivalent does not exist (Cottrell & McKenzie, 2010). Lastly, content validity refers to the degree to which the items of the data collection instrument are a representative sample of the universe of content and/or behavior of the domain being addressed (Cottrell & McKenzie, 2010). Depending on the type of validity to be established, some methods are established via objective or quantitative means, whereas others are more subjective or qualitative in nature. However, content validity is based established by using both processes (Cottrell & McKenzie, 2010).

**Observing the School Nutrition Environment:**

Most of the work done to change nutrition environments in school settings has focused on the quality of school meals and reducing unhealthy competitive foods. Various studies have examined the types of food served in schools in the United States through self-report surveys, interviews, and direct observation. Population-based assessments of school environment characteristics in Australia, the United States of America and Canada have mostly relied on Principal or School Administrators completion of telephone or paper surveys. Despite the use of such measures, few have been validated (Nathan et al., 2013).
Very few studies used direct observation to look into the quality and quantity of food served in the school and if the meals served are consistent across schools. A study on low accuracy and low consistency of fourth-graders' school breakfast interviewed children using a multiple-pass protocol at school the morning after being observed eating school breakfast and school lunch (Baxter, Thompson, Litaker, Frye, & Guinn, 2002). This study reported that the accuracy of children's school breakfast and school lunch recalls obtained during 24-hour recalls was poor compared with observation. This raised concerns regarding the current uses of dietary recalls obtained from children to determine the accuracy and consistency of school breakfast and lunch (Baxter et al., 2002).

A cross-sectional observational study was conducted using a specially designed objective nutrition observation system to characterize and quantify the amount and source of other foods and beverages on school campuses. Significantly more unhealthy foods and beverages than healthy items were observed on all campuses (Caparosa et al., 2014). When focusing on the quality of food served in schools, data from the SNDA-III study, a cross-sectional study that included a national sample of public school districts, schools and children in the 2004–2005 school year, reported that more than two-thirds of schools in their study (70 percent) prepared meals on-site for consumption only on-site. 19 percent of schools received fully or partially prepared meals from a base or central kitchen, and 11 percent of schools prepared meals on-site for service on-site and shipment to other schools (Connor et al., 2007). About 20 percent of schools offered and served lunches that met the total fat standard, and about 30 percent offered and served lunches that met the saturated fat standard (Connor et al., 2007).
On average, school lunches both as offered and as served contained about 34 percent of energy from total fat and about 11 percent of energy from saturated fat. Thus, students’ choices did not affect the fat content of their meals (as a percentage of energy) (Connor et al., 2007). Essentially, no schools offered lunches that met the sodium benchmark; average sodium levels in school lunches were about twice the benchmark level (Connor et al., 2007). Other studies have found Americans of all ages consume much more sodium than recommended. Many school cafeterias also offer foods not currently regulated by the USDA. Products sold a la carte or in vending machines, in competition with the NSLP, generally lack comparable nutritional value (Hayne, Moran, & Ford, 2004). In a healthy communities nutrition study, three complementary instruments were designed to measure the school nutrition environment: The Lunch and Competitive Foods Observation Form (LCFO); the School Foodservice Questionnaire (SFSQ); and the nutrition-related aspects of the School Policies and Practices Questionnaire (SPPQ) (Ritchie et al., 2015). In Ritchie et al., (2015) study, the school nutrition assessment involved both direct observation and reported measures to obtain objective, valid measures of school food, with more comprehensive reports by school staff on factors that may influence children’s food consumption at school (Ritchie et al., 2015).
RESEARCH METHODS

The aim of this study was to develop and to establish content validity of an observation tool to access and report the school implementation outcome (i.e., school meal delivered) of the school district lunch menus across three assessment periods of the school lunch time. (i.e., in the beginning, middle, and end of the lunchtime).

This study was designed to answer the following research questions;

- Is the content of the tool valid to measure school implementation outcome of the school district lunch menus across three assessment periods of the school lunchtime?
- Is the content of the tool valid to measure the nutrition quality and quantity of the meals delivered in elementary schools?

Application of theories/theoretical models

A treatment implementation model applied at the individual level was created by Lichstein, Riedel, & Grieve (1994). However, in this study, the treatment implementation model was applied at the school level in the school menu context. The treatment implementation model is comprised of three stages; Delivery (i.e., Was the treatment delivered as intended?), Receipt (i.e., Did the patient receive the treatment?), and Enactment (i.e., Did the patient take the treatment?) (Lichstein, Riedel, & Grieve, 1994; Schlechter, Rosenkranz, Guagliano, & Dzewaltowski, 2016).

The application of the treatment implementation model at the school level in the context of the school menu helped us to understand the causal process of the school district lunch menu implementation leading to the implementation outcome (i.e., the school meal delivered). The instrument designed for this study is expected to measure the school menu implementation
outcome (that is the meal delivered) as well as the quality of the meal and the quantity based on the USDA lunch meal pattern.

**Figure 1** shows the causal process of the District lunch menu implementation at the school level with an application of the three stages of the treatment implementation model.

A causal process diagram will be used to explain the implementation model. This diagram was adopted from Schlechter et al., (2016) study on a systematic review of children's dietary interventions with parents as change agents. In this case, the diagram is presented at the school level in the context of the school district lunch menu.

**Figure 1. The causal process of the District lunch menu implementation at the school level.**

![Diagram of causal process]
Each of the stages in the implementation model is described below.

**Delivery.** The U.S school districts are expected to meet the federal nutrition standards for meals delivered in schools to be eligible for NLSP. The USDA updated the meal patterns and nutrition standards for the National School Lunch and School Breakfast Programs to align them with the Dietary Guidelines for Americans (Food and Nutrition Service (FNS), USDA, 2012). This rule requires most schools to increase the availability of fruits, vegetables, whole grains, and fat-free and low-fat fluid milk in school meals; reduce the levels of sodium, saturated fat and trans fat in meals; and meet the nutrition needs of school children within their calorie requirements (Food and Nutrition Service (FNS), USDA, 2012). These improvements to the school meal programs, largely based on recommendations made by the Institute of Medicine of the National Academies, are expected to enhance the diet and health of school children and help mitigate the childhood obesity trend (Food and Nutrition Service (FNS), USDA, 2012).

The intent of the proposed rule was to provide nutrient-dense meals (high in nutrients and low in calories) that better meet the dietary needs of school children and protect their health (Food and Nutrition Service (FNS), USDA, 2012). The proposed rule was first developed in alignment with the 2005 dietary guidelines, however, due to changes in the guideline, the USDA modified the final rule to reflect the 2010 Dietary Guidelines. According to Food and Nutrition Service (FNS), USDA (2012) identified the key differences between current meal pattern requirements and the final rule includes:

- The number of fruit and vegetable servings offered to students over the course of a week would double at breakfast and would rise substantially at lunch.
• Schools would no longer be permitted to substitute between fruits and vegetables; each has its own requirement, ensuring that students are offered both fruits and vegetables every day.

• A minimum number of vegetable servings would be required from each of 5 vegetable subgroups. The proposed rule included tomatoes in the ‘‘other’’ vegetable category, consistent with the 2005 Dietary Guidelines. The 2010 Dietary Guidelines and this final rule create a new ‘‘red/orange’’ group that combines tomatoes with all of the vegetables in the previous ‘‘orange’’ category.

• Initially, half of the grains offered to students would have to be whole grain rich. Two years after implementation, all grain products offered would have to be whole grain rich.

• Schools would be required to substitute low-fat and fat-free milk for higher fat content milk. This is a separate requirement of the Healthy Hunger-Free Kids Act of 2010 (HHFKA).

• The 2010 Dietary Guidelines recommends fat-free or low-fat milk (1 percent milk fat) for children ages 2 and older.

Based on the USDA final rule, all schools must develop and follow standardized recipes. A standardized recipe is a recipe that was tested to provide an established yield and quantity using the same ingredients for both measurement and preparation methods (USDA, 2017b). These recipes provide Child Nutrition Program operators with delicious new dishes that meet meal pattern requirements developed by the USDA (USDA, 2017b).

Receipt. Do schools receive and review the standard menu provided by the school district? Meals served in the NSLP must meet federally defined nutrition standards (USDA meal pattern).
However, menus designed by the school districts should meet the USDA meal pattern and provide to schools within the same district. See (Appendix A) for the USDA final rule nutrition standards

**Enactment.** Are schools implementing the district lunch menu as intended? Do schools enact on the district lunch menu as intended? In order to determine if schools are enacting on the district menu as intended, an observation tool is needed. This tool could be used to inform policymakers, researchers, and practitioners with useful information about schools that do not implement the school district menu as intended, schools that do not meet the USDA menu policy, and schools that do not provide high-quality meals.

**Study Design**

The development of the observation tool involved two phases;

**Development Phase**

An observation tool called the School Lunch Menu Implementation Outcome Tool was developed based on existing tools from the literature and the USDA lunch meal pattern as shown in Table 1. This tool was designed basically for elementary schools. Following the literature review, the content domain of the tool was identified and defined. Some of the contents identified were obtained from GSCN pre-developed recipe rubric (see Appendix B). This process included 3 senior researchers who have substantial experience in nutrition research.

**Operationalization of items on the instrument:**

Three items and four sub-items were generated and operationalized for this tool, each of the items would be used as a measurement for the tool. The items are operationalized in Table 1 below.
Table 1. Operationalization of Items on the Instrument:

<table>
<thead>
<tr>
<th>Items</th>
<th>Operationalization</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Menu Implementation Outcome</td>
<td>This variable will measure whether schools deliver the District lunch menu as intended and if they follow the USDA lunch meal pattern. Measurement of the implementation outcome variable (i.e., the meal delivered) would be carried out over three lunch periods (i.e., beginning, middle and end) to determine consistency across time. Note: Implementation outcome in this context is defined as the meal delivered or meals displayed as intended.</td>
<td>• The entrée on the menu should correspond with the entrée displayed on the observation day.</td>
</tr>
<tr>
<td>2. Quantity</td>
<td>This item would measure the portion of each food item delivered based on the minimum amount per day (i.e., the minimum amount per day according to the USDA meal pattern).</td>
<td>• Vegetables: Minimum per day for Grade K-5 is three-quarter (3/4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fruit: Minimum per day for Grade K-5 is half (1/2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Grains (oz. eq) (any type of grains): Grade K-5 (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Meats/Meat Alternates: Grade K-5 (1 oz. eq)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fluid milk (cups): Grade K-5 (1)</td>
</tr>
<tr>
<td>3. Quality</td>
<td>The quality of the meals implemented/delivered in elementary schools can be measured using four indicators of quality: the first three indicators are: fresh/whole, transitional and highly processed. Then the fourth indicator is the meal appearance. To measure quality using the first three indicators, the observer would require the recipe used for the meal on the observation day and code each ingredient on the recipe as either fresh/whole, transitional or highly processed item. To measure the fourth indicator, the observer will visually observe the meal served to determine the rate of attractiveness.</td>
<td>• Fresh/whole item, transitional item, highly processed item and meal appearance determine the quality of the meal displayed. A recipe is required to measure the quality of the meal.</td>
</tr>
<tr>
<td>a. Fresh/whole (quality)</td>
<td>This indicator would categorize meal ingredients as fresh/whole. Ingredients that are raw/uncooked with the only processing being skinned, cut and/or frozen.</td>
<td>• Raw meat and poultry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ground raw meat (include raw preformed patties)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Raw fruits/vegetables</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Raw whole-grains cooked in-house (ex. brown rice, quinoa, oatmeal, barley)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Homemade bread and bread products (ex. muffins, pizza crust, etc.) (51% or more whole grains).</td>
</tr>
</tbody>
</table>
b. **Transitional (quality)**

This indicator of quality would categorize meal ingredients that are minimally processed, often precooked and flash frozen with no fillers and no preservatives added.

- Precooked meat, no fillers, no preservatives: Beef, pork, lamb (ex. crumbles, meatballs, roast, steaks, and performed cooked hamburger patties).
- Frozen fruit/vegetables

---

c. **Highly Processed (quality)**

This indicator of quality would categorize ingredients that have been processed and are mostly a heat and serve items; cured/preserved items; has fillers, preservatives, or other ingredients.

- Commercially prepared vegetable-based sauces (ex. canned or jarred salsa, marinara sauce)
- Canned vegetables with additives
- Fruit juice from concentrate.
- Eat & serve meat: Beef (ex. Hamburgers, crumbles, and meatballs) with fillers; hot dogs, bacon.

---

d. **Meal appearance (quality)**

Meal appearance could be a key factor that some school children consider before choosing to eat any meal. This item would measure the level of attractiveness of the food displayed in the cafeteria.

- Meal appearance should be measured as attractive/not attractive/somewhat attractive.

---

**Content Validity Phase**

An establishment of the content validity of the tool was conducted using a quantitative content validity method. This included a panel of experts in nutrition to validate the instrument.

This process is described in Table 2 below. A panel of expert raters was selected based on the following criteria; 1) research expert in nutrition, nutrition educator and/or nutrition practitioner (chef); 2) be willing to serve as an expert rater; 3) be willing to complete the task in the time frame provided by the researcher. A sample of the letter of request and cover letter sent to the expert raters can be seen in (Appendix D).

Eight (8) nutrition experts were approached to be included as an expert rater for this project. The expert raters were requested once to judge on the content validity ratio; open-ended questions were used to collect additional comments/recommendations from them which included an opportunity for revision and add/delete items.
A content validity package was presented which included the project objectives; a content validity survey which included a scoring method for each item, open-ended questions, and important instructions for responding; a draft of the tool; a cover letter; and a sample of each of the forms in the tool was also included (See Appendix E). In case no reply was received within a week, an email reminder was required.

Following the rating process, a content validity ratio (CVR) was calculated to determine the content validity of each item on the tool.

**Table 2: The procedure to establish content validity**

1. **Establish a panel of experts.**
   
   A. Create criteria for selection
   
   B. Identify potential experts
   
   C. Select experts
   
   D. Create directions for the work of the experts.

2. **Quantitative review of instrument components**
   
   A. Appropriateness of instrument title
   
   B. Content validity Ratio of each item
      
      I. Essential
      
      II. Useful but not essential
      
      III. Not necessary
   
   C. Opportunity for revision of items
   
   D. Opportunity to recommend deleting an item
   
   E. Opportunity to add additional items to the instrument
   
   F. Opportunity for additional comments/recommendations.
Study Population/study sample

This study was preparatory to research which involved the development and content validity of school lunch observation tool for elementary schools. However, a study population/sample was not needed for this project.

Sample size, power to answer the research question, if appropriate

A sample size was not needed for this project.

Data source(s)

The data source for the development of the tool was collected from existing literature review (peer-reviewed journals). The expert raters provided the result of the rated tool via email.

Data collection methods

Quantitative data on the content validity of each item on the tool was collected from the expert raters via email.

Statistical and analytical methods

Content validity was ascertained using a number of experts to review the tool during its development. A quantitative method was used to confirm the content validity of the tool. In this study, the tool was judged once by the expert raters using the Content Validity Ratio (CVR) scale.

To calculate the Content Validity Ratio (CVR), the experts were requested to specify whether an item is necessary for operating a construct in a set of items or not. They were instructed to score each item from 1 to 3 with a three-degree range of “not necessary, useful but not essential, essential” respectively. The higher scores indicate further agreement of members of the panel on the necessity of an item in an instrument (Zamanzadeh et al., 2015). The formula for content validity ratio is $\text{CVR} = \frac{(Ne - N/2)}{(N/2)}$ (Lawshe, 1975; Zamanzadeh et al., 2015).
In this study, Ne was assigned the number of panelists indicating "essential" and “useful” and N is the total number of panelists. The numeric value of content validity ratio for this tool was determined by Lawshe (1975) table shown in Table 3. Eight (8) nutrition experts were approached, and only five (5) of the experts accepted the request to be an expert rater for this project. Since we had 5 panelists, the items were retained/deleted based on the minimum value for 5 panelists which is 0.99.
RESULTS

The results of this study were organized according to the two phases established in this study.

Development Phase

There were three (3) items and four (4) sub-items that were generated and operationalized for the school lunch menu implementation outcome tool, these include; the school menu implementation outcome, quantity of the meal, and quality of the meal. The four sub-items which were referred to as four indicators of quality includes the meal appearance; fresh/whole food item; transitioned food item and highly processed food item. Each item was designed to be measured under 3 forms which are Form A, Form B and Form C. (See Appendix C). Operationalization of each item was defined by the primary author, the three research experts in nutrition and the committee preceptor during discussions. Meetings with the research experts were conducted thrice until a final consensus was made on the tool. Prior to the second phase, the observation tool was called the School Lunch Menu Implementation Outcome Tool. However, the title of the tool was modified at the end of the second phase.

Content Validity Phase

A Content validity ratio (CVR) was calculated to determine the content validity of each item on the tool. Table 3 shows the minimum value for the number of panelists. Since we calculated the scores of only 5 expert raters, the minimum value for 5 raters on each item was 0.99. This determined if the item should be retained or deleted (if less than 0.99). Table 4 shows the result for calculating the CVR for the instrument items. Each of the items was evaluated by the 5 expert raters. One of the sub-items “meal appearance” was eliminated, and the remaining items were retained. These retained items had content validity ratio of 0.99 while the eliminated item had content validity ratio less than 0.99
Table 5 shows the result of the comments/recommendations received by the expert raters from the open-ended questions in the content validity survey. More emphasis was placed on the sub-item under quality “meal appearance” as being subjective if measured. As mentioned earlier, this item was eliminated from the tool because it scored lower than 0.99. The final tool known as the School Lunch Menu Observation Tool was developed based on the result of the CVR and the recommendations provided by the expert raters. The final tool will be provided upon request.

Table 3. Minimum Values of CVR.

<table>
<thead>
<tr>
<th>No. of Panelists</th>
<th>Min. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>.99</td>
</tr>
<tr>
<td>6</td>
<td>.99</td>
</tr>
<tr>
<td>7</td>
<td>.99</td>
</tr>
<tr>
<td>8</td>
<td>.75</td>
</tr>
<tr>
<td>9</td>
<td>.78</td>
</tr>
<tr>
<td>10</td>
<td>.62</td>
</tr>
<tr>
<td>11</td>
<td>.59</td>
</tr>
<tr>
<td>12</td>
<td>.56</td>
</tr>
<tr>
<td>13</td>
<td>.54</td>
</tr>
<tr>
<td>14</td>
<td>.51</td>
</tr>
<tr>
<td>15</td>
<td>.49</td>
</tr>
<tr>
<td>20</td>
<td>.42</td>
</tr>
<tr>
<td>25</td>
<td>.37</td>
</tr>
<tr>
<td>30</td>
<td>.33</td>
</tr>
<tr>
<td>35</td>
<td>.31</td>
</tr>
<tr>
<td>40</td>
<td>.29</td>
</tr>
</tbody>
</table>
**Table 4. Calculation of CVR for the instrument items.**

<table>
<thead>
<tr>
<th>Items</th>
<th>*Ne</th>
<th>**CVR</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Menu Implementation</td>
<td>5</td>
<td>1.0</td>
<td>Retained</td>
</tr>
<tr>
<td>Outcome</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Quality</td>
<td>5</td>
<td>1.0</td>
<td>Retained</td>
</tr>
<tr>
<td>a. Fresh/Whole item</td>
<td>5</td>
<td>1.0</td>
<td>Retained</td>
</tr>
<tr>
<td>b. Transitional item</td>
<td>5</td>
<td>1.0</td>
<td>Retained</td>
</tr>
<tr>
<td>c. Highly Processed item</td>
<td>5</td>
<td>1.0</td>
<td>Retained</td>
</tr>
<tr>
<td>d. Meal Appearance</td>
<td>4</td>
<td>0.6</td>
<td><strong>Eliminated</strong></td>
</tr>
<tr>
<td>3. Quantity</td>
<td>5</td>
<td>1.0</td>
<td>Retained</td>
</tr>
</tbody>
</table>

**NOTE:** * Number of experts rated the item essential or useful, **CVR or Content Validity Ratio = (Ne-N/2)/(N/2) with 5 persons at the expert panel (N=5), the items with the CVR >=0.99 were retained at the instrument and the rest eliminated.
Table 5. Summary of comments made by the expert raters based on the open-ended questions.

<table>
<thead>
<tr>
<th>Open-ended questions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is the title of the tool appropriate?</td>
<td>Majority of the expert raters stated that the title of the tool “school lunch menu implementation outcome tool” is a bit “cumbersome, confusing and needs to be shortened.”</td>
</tr>
<tr>
<td></td>
<td>A proposed title recommended by most of the raters was “School Lunch Menu Observation Tool.”</td>
</tr>
<tr>
<td>2. Is the tool (Form A to C) appropriate to measure the school lunch menu</td>
<td>Most of the expert raters suggested that all the forms were appropriate to measure each item.</td>
</tr>
<tr>
<td>implementation outcome, the quality, and quantity of the school meal delivered?</td>
<td>However, two of the raters stated that the quantity item might be difficult to measure without measuring food tray.</td>
</tr>
<tr>
<td>3. Does the tool include anything that shouldn’t be there?</td>
<td>An expert rater advised that Form A to C should be merged into one page to make it easier to complete.</td>
</tr>
<tr>
<td></td>
<td>Also, three out of five of the raters emphasized on the meal appearance. Rating the meal appearance seems like the most subjective aspect of the tool. “The meal appearance seems to be inherently subjective”.</td>
</tr>
<tr>
<td>4. Do you have any additional item/s to be included?</td>
<td>Two expert raters emphasized on the meal appearance, requested that additional items such as the color, shape and the temperature of the food can be measured by the meal appearance.</td>
</tr>
<tr>
<td>5. Is the tool concise and comprehensive?</td>
<td>Most of the expert raters commented that the tool is concise and highly comprehensive. But one rater stated that the tool is not concise.</td>
</tr>
<tr>
<td>6. Additional comments/recommendation?</td>
<td>Some of the raters provided additional resources that could be used to revise the tool.</td>
</tr>
</tbody>
</table>
DISCUSSION

The aim of this paper was to develop and to establish content validity of a school lunch menu observation tool. According to the Institute of Medicine, Food and Nutrition Board, and Committee on Accelerating Progress in Obesity Prevention (2012), there are five reasons for the measurement of food and nutrition environments. This include; Observation, or simply observing what is available and what people eat and why they eat the way they do in the different environments to which they are exposed; Explanation of the reasons for people’s choices; Evaluation of the results of programs and strategies; Support for advocacy or other actions; Surveillance, or ongoing monitoring to identify trends and problems. Based on the five reasons, the school lunch menu observation tool was developed to support for advocacy or other actions related to school lunch program, to monitor and identify trends and problems in the school lunch, and to evaluate the results of school lunch programs (such as NLSP).

For schools to be eligible for the NLSP in the United States, participating schools must serve lunches that meet NLSP meal pattern requirements and offer lunches at a free or reduced price to eligible children. School districts and independent schools participating in the NLSP receive cash subsidies and USDA foods for each reimbursable meal they serve (USDA, 2017a). Thus, local school authorities (school districts) design lunch menus that are expected to meet the USDA meal pattern and schools within the districts are expected to deliver the menu as intended. USDA has a Certification of Compliance Worksheets used by school food authorities to document the meals served that meet the USDA meal pattern for reimbursement purpose. However, a literature search revealed that there is a need for a school menu implementation observation school. The school lunch menu observation tool is the first tool developed to directly observe school districts lunch menu implementation.
This tool was guided by the USDA nutrition standards. Although there are tools to measure food environments at schools, such as the Smarter Lunchrooms Scorecard, the purpose of these existing tools are different from the purpose of the school lunch menu observation tool.

Data from the second phase demonstrated the content validity evidence for the items contained in the tool. The content validity of the tool was supported by the viewpoints provided by the expert raters using the open-ended questions. The items received perfect scores based on the rating metrics in calculating the Content Validity Ratio (CVR). The result of the CVR shows that most of the raters scored the three items and three of the four sub-items as essential or useful items. However, more emphasis was placed on the quantity item and the fourth indicator of quality which is the meal appearance. Raters suggested that measuring the meal appearance can be inherently subjective. Each item on the tool was revised based on the recommendations provided by the expert raters (See Appendix F).

With a measure of implementation outcome of the school district lunch menu, the pattern of variability among schools and the determinants of the variability can be identified. Past studies have identified differences in meals delivered across school districts participating in NLSP with the use of surveys (Addison et al., 2006; Nanney et al., 2008), thus this tool could be vital in directly observing variability across elementary schools in the United States. The tool could also create an avenue for actions to reduce any observed variability in the meals served in schools. The school lunch menu observation tool could be valuable in helping to develop research questions on the factors contributing to the differences in the school district lunch menu implementation across three assessment periods of the school lunchtime.
The findings of this study suggest that public health researchers use this tool for further research in school nutrition. Also, after further validation policymakers and practitioners could use the tool to assess the implementation of the NLSP and to develop and promote policies and strategies that reduce childhood obesity in the United States.

One strength that was observed in this study was that the content domain of the instrument was well defined by research experts in nutrition. Also, the content validity result was supported by the view points of the expert raters who are familiar with the USDA school lunch policy. This is tool would be the first tool used to observe the school district lunch menu implementation. This study has limitations. First, we were unable to conduct a reliability test on the instrument, which goes beyond the scope of the project due to cost. Lack of pilot testing is another limitation that was observed in this study. Pilot testing the tool would have boosted the content validity result and reduce the bias received from the subjective feedback by the expert raters.

CONCLUSION

The school lunch menu observation tool was developed based on the USDA lunch meal pattern and existing tools from the literature. The tool was content validated by experts in nutrition who are familiar with the USDA policy on school lunch meals. Providing initial content validation of the tool was a first step needed to determine if the contents of the tools are valid to measure the school lunch as intended. The future research should conduct more in-depth investigations to revise the tool, establish reliability, and pilot test the tool.
REFERENCES


Food and Nutrition Service (FNS), USDA. (2012). Nutrition standards in the national school lunch and school breakfast programs; final rule. 77(17), 4088-4167.


SERVICE LEARNING/CAPSTONE EXPERIENCE REFLECTION

Gretchen Swanson Center for Nutrition (GSCN) is an independent non-profit research organization that provides expertise in measurement and evaluation of: childhood obesity prevention, food insecurity, and local food systems. GSCN also provides scientific expertise, partnership, and resources to improve diet and physical activity behaviors among youth and their families to help grow a healthier next generation. They offer process and outcome program evaluation, including the development and implementation of mixed-methods approaches. They offer evaluation planning; design a comprehensive project plan that includes a scope of work, timeline, task responsibilities, deliverables, budget and communication strategies. They identify the current state of affairs through a literature review of published work, technical reports and informal documents, secondary data analysis, and primary data analysis prior to determining an intervention and/or action steps. They also collect and analyze data using the right measurement tool and data collection method. GSCN develops and/or modifies survey items and testing for validity and reliability. They develop and modify techniques specific to diet and physical activity assessment. They conduct quantitative menu analysis and evaluate policy advocacy campaigns. They measure early care and education obesity prevention efforts, including Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) and Environmental and Policy Assessment and Observation (EPAO) data analyses. GSCN operates this way to provide evidence that support, enhance and empower efforts to improve diet and physical activity behaviors among youth and their families to help grow a healthier next generation.

One thing that was different than what I expected when I started the project was the school menu data management. I was hoping to work on data management which includes data entry, analyses, and evaluation of existing programs that are focusing on the human subject.
However, they had a different program evaluation they were working on when I started my project. The program evaluation plan focused on quantitative menu analysis which included school menu data entry and analysis at the recipe level. Recipe items were quantitatively analyzed to determine the quality of meals delivered in schools.

The project I worked on during my service learning at GSCN focused on quantitative menu analysis of school menu across districts in Denver, Colorado. GSCN was responsible for evaluating activities conducted by LiveWell Colorado’s (LWC) School food initiative. The school food initiative program was designed to help school districts design and deliver menus that are of high nutrition quality which involved training school food personnel on how to use scratch cooking methods (i.e., using fresh/whole items). I was involved in the evaluation activities conducted by GSCN to determine the impact of the school food initiative on a district’s ability to incorporate fresh/whole ingredients into the district menu cycle after one 18-month cycle in the program. Also, I contributed to the activities required to examine the current percentage (baseline percent) of fresh/whole ingredients in participating school districts’ menu cycles for the 2016-2017 school year. All service learning activities took place in the month of June to July 2017. The following were the service learning activities that took place at GSCN; I cleaned, entered and analyzed the baseline school menu data for the 2016 and 2017 cohort; Investigated potential tools used to collect and measure ongoing feedback from students on their satisfaction with the current meals for the LiveWell Colorado’s School Food Initiative; Conducted a literature review on minimally processed food and existing surveys used to collect student feedback on school meals; Attended meetings with the preceptor and training on how to code school menus at the ingredient level.
Also, I inputted some school districts menu data on an excel sheet. I coded each food item using the United States Department of Agriculture food coding scheme. I listened to a recorded interview conducted by the preceptor with the food service director to determine the right menu recipe that should be coded. I was responsible for the school menu data management. Lastly, the project focused on two phases; first was to develop a school lunch menu observation tool based on the United States Department of Agriculture (USDA) lunch meal pattern; the second phase was to content validate the tool by involving research experts in nutrition to review and rate the tool. The tool was modified based on the feedback and the rating scores provided by the experts.

Over the past, I have had hands-on experience in behavioral science data entry and analysis; this skill helped me accomplish the service learning activities on data management at GSCN. My research skills also helped to boost the design and development of the observation tool developed for the capstone project. The service learning products include the current percentage of fresh/whole ingredients in the school menu cycle using the quantitative menu analysis technique. Also, a presentation on the evaluation of the school menu baseline data was designed and presented at a workshop for participating school district food personnel at Denver, Colorado.

My greatest accomplishment was an improved knowledge and skills on school menu data management which includes cleaning, entering and analyzing school menu data at the recipe/ingredient level (quantitative menu analysis). Some of the strengths I brought into the project were data management, communication, and research skills. The greatest challenge faced during the service learning/capstone experience were; lack of training on how to establish content validity and quantitative analysis of the tool using content validity ratio. Also, it was
quite hard to conduct research without the use of human subjects. To overcome these challenges, I conducted a thorough review of the literature of past studies on how to content validate an instrument as well as how to conduct research on tool design and development.

In addition, my views on public health practice improved during my SL/CE. There are different ways to improve the population health which can be done directly (i.e., working with human subjects) or indirectly (i.e., working on non-human subjects such as making changes to health policies or developing an instrument to observe and improve the population health). Working indirectly to improve the population health influenced the way I view public health practice. Thus, as public health professionals, we don’t have to work directly with the community to make a significant impact on their health, we can create/design resources needed to improve the community’s health. Lastly, I didn’t encounter any ethical issue during my SL/CE project because human subjects were not included in the study.
ACKNOWLEDGEMENTS

I want to give special thanks to Almighty God for the success of this project. Special thanks to my committee members: Leah Carpenter, M.P.H, Lynette M. Smith, Ph.D., Jennie L. Hill, Ph.D., and David A. Dzewaltowski, Ph.D for being academically supportive. Then I want to acknowledge my husband (Timi Adeyeba, ESQ), my father (John Taiwo), my mother (Aderemi Taiwo) and my little brother not little at all (Damilare Taiwo) for their support, love and care. Lastly, I want to thank the College of Public Health, University of Nebraska Medical Center for all the resources provided for the success of this project. And I want to acknowledge the three senior researchers that contributed to the development of the tool and the expert raters.
## APPENDIX A


### Breakfast Meal Pattern

<table>
<thead>
<tr>
<th>Meal Pattern</th>
<th>Grades K-5&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Grades 6-8&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Grades 9-12&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Lunch Meal Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits (cups)&lt;sup&gt;c,d&lt;/sup&gt;</td>
<td>5 (1)</td>
<td>5 (1)</td>
<td>5 (1)</td>
<td></td>
</tr>
<tr>
<td>Vegetables (cups)&lt;sup&gt;c,d&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Dark green&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Red/Orange&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Beans/Peas (Legumes)&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Starchy&lt;sup&gt;f&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Other&lt;sup&gt;e,g&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Additional Veg to Reach Total&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Grains (oz eq)&lt;sup&gt;i&lt;/sup&gt;</td>
<td>7-10 (1)</td>
<td>8-10 (1)</td>
<td>9-10 (1)</td>
<td></td>
</tr>
<tr>
<td>Meats/Meat Alternates (oz eq)</td>
<td>0&lt;sup&gt;k&lt;/sup&gt;</td>
<td>0&lt;sup&gt;k&lt;/sup&gt;</td>
<td>0&lt;sup&gt;k&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Fluid milk (cups)&lt;sup&gt;j&lt;/sup&gt;</td>
<td>5 (1)</td>
<td>5 (1)</td>
<td>5 (1)</td>
<td></td>
</tr>
</tbody>
</table>

### Lunch Meal Pattern

<table>
<thead>
<tr>
<th>Min-max calories (kcal)&lt;sup&gt;m,n,o&lt;/sup&gt;</th>
<th>350-500</th>
<th>400-550</th>
<th>450-600</th>
<th>550-650</th>
<th>600-700</th>
<th>750-850</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturated fat (% of total calories)&lt;sup&gt;n,o&lt;/sup&gt;</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Sodium (mg)&lt;sup&gt;n,p&lt;/sup&gt;</td>
<td>≤ 430</td>
<td>≤ 470</td>
<td>≤ 500</td>
<td>≤ 640</td>
<td>≤ 710</td>
<td>≤ 740</td>
</tr>
<tr>
<td>Trans fat&lt;sup&gt;n,o&lt;/sup&gt;</td>
<td>Nutrition label or manufacturer specifications must indicate zero grams of trans fat per serving.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

<sup>a</sup> In the SBP, the above age-grade groups are required beginning July 1, 2013 (SY 2013-14). In SY 2012-2013 only, schools may continue to use the meal pattern for grades K-12 (see § 220.23).

<sup>b</sup> Food items included in each food group and subgroup and amount equivalents. Minimum creditable serving is ⅛ cup.
c One quarter-cup of dried fruit counts as ½ cup of fruit; 1 cup of leafy greens counts as ½ cup of vegetables. No more than half of the fruit or vegetable offerings may be in the form of juice. All juice must be 100% full-strength. d For breakfast, vegetables may be substituted for fruits, but the first two cups per week of any such substitution must be from the dark green, red/orange, beans and peas (legumes) or “Other vegetables” subgroups as defined in §210.10(c)(2)(iii).

e The fruit quantity requirement for the SBP (5 cups/week and a minimum of 1 cup/day) is effective July 1, 2014 (SY 2014-2015).

f Larger amounts of these vegetables may be served.

g This category consists of “Other vegetables” as defined in §210.10(c)(2)(iii)(E). For the purposes of the NSLP, “Other vegetables” requirement may be met with any additional amounts from the dark green, red/orange, and beans/peas (legumes) vegetable subgroups as defined in §210.10(c)(2)(iii).

h Any vegetable subgroup may be offered to meet the total weekly vegetable requirement.

i At least half of the grains offered must be whole grain-rich in the NSLP beginning July 1, 2012 (SY 2012-2013), and in the SBP beginning July 1, 2013 (SY 2013-2014). All grains must be whole grain-rich in both the NSLP and the SBP beginning July 1, 2014 (SY 2014-15).

j In the SBP, the grain ranges must be offered beginning July 1, 2013 (SY 2013-2014).

k There is no separate meat/meat alternate component in the SBP. Beginning July 1, 2013 (SY 2013-2014), schools may substitute 1 oz. eq. of meat/meat alternate for 1 oz. eq. of grains after the minimum daily grains requirement is met.

l Fluid milk must be low-fat (1 percent milk fat or less, unflavored) or fat-free (unflavored or flavored).

m The average daily amount of calories for a 5-day school week must be within the range (at least the minimum and no more than the maximum values).

n Discretionary sources of calories (solid fats and added sugars) may be added to the meal pattern if within the specifications for calories, saturated fat, trans fat, and sodium. Foods of minimal nutritional value and fluid milk with fat content greater than 1 percent milk fat are not allowed.

o
In the SBP, calories and trans fat specifications take effect beginning July 1, 2013 (SY 2013-2014). Final sodium specifications are to be reached by SY 2022-2023 or July 1, 2022. Intermediate sodium specifications are established for SY 2014-2015 and 2017-2018. See required intermediate specifications in § 210.10(f)(3) for lunches and § 220.8(f)(3) for breakfast.
## APPENDIX B

### Recipe Rubric

<table>
<thead>
<tr>
<th>Animal-based Protein</th>
<th>Fresh/whole = 0</th>
<th>Transitional =1</th>
<th>Highly Processed = 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and meat alternatives delivered raw/uncooked with the only processing being skinned, cut and/or frozen:</td>
<td>Meat and meat alternatives that are minimally processed, often precooked and flash frozen with no fillers and no preservatives added (100% meat):</td>
<td>Meat and meat alternatives that have been commercially prepared, i.e., heat &amp; serve items; cured/preserved items; has fillers, preservatives, or other ingredients:</td>
<td></td>
</tr>
<tr>
<td>- Raw meat: beef, pork, lamb</td>
<td>- Precooked meat, no fillers, no preservatives: Beef, pork, lamb (ex. ground cooked hamburger patties)</td>
<td>- Heat &amp; serve meat: Beef (ex. Hamburgers, crumbles, and meatballs) with fillers; Hotdogs; Bacon</td>
<td></td>
</tr>
<tr>
<td>- Raw poultry: chicken, turkey, duck</td>
<td>- Precooked poultry, no fillers, no preservatives: Chicken, turkey, duck (ex. Fajita strips, unbreaded chicken breast, turkey crumble with no fillers)</td>
<td>- Heat and Serve poultry: Chicken (ex. nuggets, strips and patties); turkey crumble with fillers</td>
<td></td>
</tr>
<tr>
<td>- Ground raw meat (include raw preformed patties)</td>
<td>- Liquid Eggs</td>
<td>- Deli meat (ex. turkey, roast beef, ham, salami, pepperoni)</td>
<td></td>
</tr>
<tr>
<td>- Ground raw poultry (include raw preformed patties)</td>
<td>- Canned Tuna (fish and water or oil, no preservatives)</td>
<td>- Powdered eggs</td>
<td></td>
</tr>
<tr>
<td>- Shelled Eggs</td>
<td>- Frozen unbreaded precooked fish, shrimp</td>
<td>- Canned Tuna (fish and water or oil, has fillers, preservatives, or other ingredients)</td>
<td></td>
</tr>
<tr>
<td>- Raw fish, shrimp</td>
<td></td>
<td>- Frozen breaded precooked fish, shrimp</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plant-based Protein</th>
<th>Minimally processed beans, legumes, nuts and seeds consisting primarily of dried and fresh varieties:</th>
<th>Canned/frozen beans, legumes, nuts and seeds with no added ingredients:</th>
<th>Canned beans, legumes, nuts and seeds with added flavoring, salt, and additional ingredients:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dried beans and legumes (ex. kidney, garbanzo, pinto, black, lentils)</td>
<td>- Plain canned/frozen beans and legumes (ex. Kidney, garbanzo, pinto, black, lentils)</td>
<td>- Chili beans</td>
<td></td>
</tr>
<tr>
<td>- Nuts and seeds, either whole or ground with no additives (ex. almond, sunflower or peanut butter)</td>
<td>- Plain/unflavored soft or firm tofu</td>
<td>- Baked beans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Nut and seed butter with added salt</td>
<td>- Refried Beans (canned or dried)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dairy</th>
<th>Minimally processed dairy products:</th>
<th>Moderately processed dairy products:</th>
<th>Highly processed cheese and dairy products:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Plain/unflavored milk or milk alternatives (soy, almond, rice, etc.)</td>
<td>- Plain cream cheese</td>
<td>- American cheese and other cheese-products (ex. cheese wiz, cheese sauce)</td>
<td></td>
</tr>
<tr>
<td>- Plain, unsweetened yogurt</td>
<td>- Natural shredded cheese or cheese blends</td>
<td>- Flavored milk or milk alternatives (ex. vanilla, chocolate, strawberry)</td>
<td></td>
</tr>
<tr>
<td>- Natural cheese without coloring in block form (ex. cheddar, mozzarella, swiss, jack)</td>
<td>- Cottage cheese</td>
<td>- Flavored, sweetened yogurt</td>
<td></td>
</tr>
<tr>
<td>- Unsalted butter</td>
<td>- Ricotta cheese</td>
<td>- Dry/powdered milk/whey</td>
<td></td>
</tr>
<tr>
<td>- Buttermilk</td>
<td>- Sour cream</td>
<td>- Sweetened condensed milk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Salted butter</td>
<td>- Margarine/butter substitute</td>
<td></td>
</tr>
<tr>
<td><strong>Fruit</strong></td>
<td><strong>Fresh/whole = 0</strong></td>
<td><strong>Transitional =1</strong></td>
<td><strong>Highly Processed = 2</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Fresh fruit with no added ingredients:</td>
<td>Minimally processed products made with 100% fruit and no added ingredients:</td>
<td>Products made with fruit and added ingredients, specifically sugar:</td>
<td></td>
</tr>
<tr>
<td>• Fresh fruit</td>
<td>• Frozen fruit</td>
<td>• Canned fruit in syrup or light syrup</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 100% fruit juice (squeezed in-house or not from concentrate)</td>
<td>• Fruit juice from concentrate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Canned fruit in own juice</td>
<td>• Canned applesauce with added ingredients</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plain fruit sauce (ex. Applesauce)</td>
<td>• Dried fruit with added sugar</td>
<td></td>
</tr>
<tr>
<td>Dried fruit without added sugar or preservatives</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Vegetable</strong></th>
<th><strong>Fresh vegetables:</strong></th>
<th>Minimally processed, canned or frozen vegetable products:</th>
<th>Canned vegetables with added ingredients:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Raw vegetables</td>
<td>• Frozen vegetables without added ingredients</td>
<td>• Commercially prepared vegetable-based sauces (ex. canned or jarred salsa, marinara sauce)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Canned vegetables without added ingredients (ex. Peas, peppers, tomatoes, tomato paste)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Canned vegetables with additives</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Processed, pre-cooked vegetables with added seasoning (ex. fries, tots)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Grains</strong></th>
<th><strong>Whole or ground grains with the bran and germ:</strong></th>
<th>Items that contain a mixture of whole and commercially prepared/processed grains:</th>
<th>Grains that have been commercially processed through milling and bleaching, removing the bran and germ:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Raw whole-grains cooked in house (ex. brown rice, quinoa, oatmeal, barley)</td>
<td>• Unsweetened instant/quick cook grains (ex. brown rice, quinoa, oatmeal, barley)</td>
<td>• Commercially prepared bread/bread products containing less than 51% whole grains</td>
</tr>
<tr>
<td></td>
<td>• Homemade bread and bread products (ex. muffins, pizza crust, etc.) (51% or more whole grains)</td>
<td>• Frozen or Par-baked bread (51% or more whole grain)</td>
<td>• Pre-made tortillas (less than 51% wheat flour)</td>
</tr>
<tr>
<td></td>
<td>• Wheat Flour (51% or more whole grains or wheat alternative)</td>
<td>• Granola/bars with whole oats and no added sugar</td>
<td>• White rice, pasta and flour</td>
</tr>
<tr>
<td></td>
<td>• Dry pasta (51% or more whole grains or wheat alternative ex. brown rice, pasta)</td>
<td>• Breading on frozen products (51% or more whole grain)</td>
<td>• Packaged snacks (ex. tortilla chips, pretzels or granola bars)</td>
</tr>
<tr>
<td></td>
<td>Pre-made tortillas (51% or more wheat flour or 100% corn)</td>
<td>• Commercially prepared bread/bread products containing more than 51% whole grains</td>
<td>• Flavored grains (ex. sweetened instant oatmeal, savory rice mixes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Flour (less than 51% whole grains)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Sauces, Condiments and Misc.</strong></th>
<th><strong>Sauces that are made from scratch using a combination of fresh and minimally processed ingredients:</strong></th>
<th>Minimally processed sauces that contain a small number of fresh and clean label ingredients:</th>
<th>Commercially processed and packaged sauces that are ready to heat and serve, typically containing a long list of ingredients:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Oils (ex. vegetable, canola oil)</td>
<td>• Canned broths without added ingredients</td>
<td>• Canned/powdered gravy</td>
</tr>
<tr>
<td></td>
<td>• Vinegars (ex. balsamic, red wine)</td>
<td>• Canned olives</td>
<td>• Cream soups (ex. mushroom, chicken, onion, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Natural raw cane sugar</td>
<td>• Commercially processed sauces and condiments made with minimal ingredients</td>
<td>• Bottled or powdered salad dressing</td>
</tr>
<tr>
<td></td>
<td>• 100% maple syrup, molasses, honey, agave</td>
<td>• Refined sugar (ex. white granulated sugar, powdered sugar, brown sugar)</td>
<td>• Highly processed, commercially prepared sauces and condiments made with multiple ingredients</td>
</tr>
<tr>
<td></td>
<td>• Unsweetened cocoa powder</td>
<td>• Semi-sweet or dark chocolate chips</td>
<td>• High fructose corn syrup</td>
</tr>
<tr>
<td></td>
<td>• Yeast</td>
<td>Unsweetened baking chocolate</td>
<td>• Corn syrup (dark or light)</td>
</tr>
<tr>
<td></td>
<td>• Salt</td>
<td></td>
<td>• Jelly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Breakfast syrup (not 100%) (ex. Aunt Jemima, Mrs. Butterworth)</td>
</tr>
</tbody>
</table>
| Herbs and Spices | Herbs and spices in their purest form that are made from scratch using a combination of fresh and minimally processed ingredients:  
- Fresh herbs (ex. Oregano, basil, cilantro)  
- Dried herbs  
Spices (ex. Paprika, cinnamon, onion powder, pepper, etc.) | Sugar substitutes  
Sweetened cocoa powder or chocolate syrup  
Cake mix  
  
Seasoning packet (ex. Taco seasoning, ranch packet)  
Beef Base/bullion  
Imitation Vanilla |

Adopted from Gretchen Swanson Center for Nutrition.
**APPENDIX C**

**FORM A**

<table>
<thead>
<tr>
<th>Date: ______________</th>
<th>School District: _____________</th>
<th>School Name: __________</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Circle the appropriate score.</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Quality: Fresh/whole item*; Transitional item*; Highly processed item**

<table>
<thead>
<tr>
<th>List Items from the Actual Recipe Under Each of the Food Group.</th>
<th>Fresh/whole</th>
<th>Transitional</th>
<th>Highly processed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entrée 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Entrée 2:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Side 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Side 2:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Fruit:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Vegetable:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
## LUNCH OBSERVATION PERIOD

**Menu Implementation Outcome**

<table>
<thead>
<tr>
<th>Actual School Menu for The Day</th>
<th>Menu Implementation Outcome</th>
<th>Quality: Meal Appearance*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Entrée 1:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Entrée 2:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Side 1:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Side 2:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fruits 1:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fruits 2:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fruits 3:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vegetable 1:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vegetable 2:</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vegetable 3:</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Quantity**

<table>
<thead>
<tr>
<th>Quantity*</th>
<th>Quantity Met</th>
<th>Quantity Not Met</th>
<th>Not Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetable</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fruits</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grains (any type)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Meat/Meat Alternatives</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fluid milk (cups)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
### FORM C

**Circle/shade the appropriate score.**

<table>
<thead>
<tr>
<th>Quality: Fresh/whole item*; Transitional item*; Highly processed item*</th>
<th>Quality: Meal Appearance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>List items that can be seen but didn’t meet the actual district menu/recipe.</td>
<td>Fresh/whole</td>
</tr>
<tr>
<td>Entrée 1:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
</tr>
<tr>
<td>Entrée 2:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
</tr>
<tr>
<td>Side 1:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td></td>
</tr>
<tr>
<td>Side 2:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td></td>
</tr>
<tr>
<td>Fruit:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td></td>
</tr>
<tr>
<td>Vegetable:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td></td>
</tr>
</tbody>
</table>

**Why was the recipe modified? Please do indicate in this box by describing the reason for the recipe modification.** For instance, a beef burger might be replaced with a chicken burger because they don’t have grounded beef. Therefore the recipe was modified.
APPENDIX D

LETTER OF REQUEST

08/28/2017

(Name of expert rater)
(Address).

Dear ….:

I am writing to request your assistance as a panel of expert in validating an instrument I am developing for my capstone experience on School Lunch Menu Implementation Outcome. This tool would be useful for school districts and public health professionals to determine if schools deliver the school district lunch menu as intended and if the meals delivered met the United States Department of Agriculture (USDA) lunch meal pattern. The tool would also be used to determine the quality of the meals delivered, and the quantity of the food served based on the minimum amount per day according to the USDA lunch meal pattern.

I am inviting you to participate in this process because of your work, knowledge, and interest in nutrition. Participation in this process will include a quantitative review of my draft instrument with some open-ended questions. I would estimate that the review would take you approximately 30-60 minutes to complete. Should you accept my invitation to serve as a panel of expert, in the next few weeks, you will receive a packet of materials via email including a copy of the draft instrument and instructions for completing the reviews.

Thank you for considering this request. Please contact me via e-mail or telephone by September 4th, 2017 to let me know of your decision. I look forward to hearing from you soon.

Sincerely,

Mariam Taiwo
MPH student
Research Assistant
College of Public Health (COPH)
Department of Health Promotion, Social & Behavioral Health
COVER LETTER

09/01/2017

(Name of expert rater)
(Address).

Dear …:

Thank you for agreeing to serve on the panel of experts for the development of the observation tool on School Lunch Menu Implementation Outcome. Your input and feedback are very important to establish the validity of the instrument. As noted in earlier correspondence, I estimate that the review of this three-item instrument will take approximately 30-60 minutes.

Enclosed you will find a copy of the draft instrument to be reviewed, a content validity survey which contains specific directions and questions while completing your review, and samples of the completed instrument. Please feel free to add additional space for comments on the survey. Return the instrument and the survey via email. I would be glad if you send the instrument and survey by September 11, 2017. If you have any questions, please feel free to contact me.

Please accept my thanks in advance for your help and advice in the development of the tool.

Sincerely,

Mariam Taiwo
MPH student
Research Assistant
College of Public Health (COPH)
Department of Health Promotion, Social & Behavioral Health
APPENDIX E

SCHOOL LUNCH MENU IMPLEMENTATION OUTCOME TOOL

(CONTENT VALIDITY SURVEY)

Instructions:

1. This process could take approximately 30 – 60 minutes.
2. There are a table and open-ended questions to be completed below.
3. Please make sure you have the tool close by because questions in this survey are directed to the tool.
4. As an expert rater for this project, please score each item on the tool from 1 to 3 with a three-degree range of “not necessary, useful but not essential, essential” respectively. Each item can be scored in the table below.
   - 1 = not necessary
   - 2 = useful but not essential
   - 3 = essential.
5. Please read the operationalized items on the tool (on page 3-4) to better understand the content of each of the item displayed in the table below.
6. Please review each of the items on Form A to C (i.e., items with the asterisk symbol) before you start the validation process. You can also review a sample of each Form in the package sent to you.
7. Please add additional space if needed.

Note: As mentioned in the cover letter, this tool would be useful for school districts and public health professionals to determine if schools deliver the school district lunch menu as intended and if the meals delivered met the United States Department of Agriculture (USDA) lunch meal pattern. The tool would also be used to determine the quality of the meals delivered, and the quantity of the food served based on the minimum amount per day according to the USDA lunch meal pattern.
Table 1: Item Rating

<table>
<thead>
<tr>
<th>Items</th>
<th>Not necessary</th>
<th>Useful but not essential</th>
<th>Essential</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Menu Implementation Outcome</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Quality</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>a. Fresh/Whole item</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. Transitional item</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. Highly Processed item</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. Meal Appearance</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3. Quantity</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Please answer the following open-ended questions for additional comments/recommendation after scoring each item. The tool should be close by when answering the questions. (Please add additional space if needed).

1. Is the title of the tool appropriate?

2. Is the tool (Form A to C) appropriate to measure the school menu implementation outcome, the quality, and quantity of the school meal delivered?

3. Does the tool include anything that shouldn’t be there?

4. Do you have any additional item/s to be included?

5. Is the tool concise and comprehensive?

6. Additional comments/recommendation?

Thanks for your time!
SCHOOL LUNCH MENU
OBSERVATION TOOL

<table>
<thead>
<tr>
<th>AN OBSERVATION TOOL</th>
<th>ELEMENTARY SCHOOLS (GRADE K TO 5)</th>
</tr>
</thead>
</table>

58
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>60</td>
</tr>
<tr>
<td>Operationalization of items on the instrument</td>
<td>60</td>
</tr>
<tr>
<td>Lunch Observation Protocol</td>
<td>62</td>
</tr>
<tr>
<td>Form A</td>
<td>68</td>
</tr>
<tr>
<td>Form B</td>
<td>69</td>
</tr>
<tr>
<td>Form C</td>
<td>70</td>
</tr>
</tbody>
</table>
INTRODUCTION

The School Lunch Menu Observation Tool contains three (3) items and four (4) sub-items used to observe the school lunch meal delivered at elementary schools. The three items include the school lunch menu implementation outcome, the quantity of the meals served on the students’ tray, and the quality of the meal. The four sub items fall under the quality item, this include categorizing the recipe as fresh/whole food item; transitional food item, and highly processed food item as well as rating the meal appearance. Each item is operationalized below.

Operationalization of Items on the Instrument:

<table>
<thead>
<tr>
<th>Items</th>
<th>Operationalization</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Menu Implementation Outcome</td>
<td>This variable will measure whether or not schools deliver the District lunch menu as intended and if they follow the USDA lunch meal pattern. Measurement of the implementation outcome variable (i.e., the meal delivered) would be carried out over three lunch periods (i.e., beginning, middle and end) to determine consistency across time. Note: Implementation outcome in this context is defined as the meal delivered or meals displayed as intended.</td>
<td>• The entrée on the menu should correspond with the entrée displayed on the observation day.</td>
</tr>
<tr>
<td>5. Quality</td>
<td>The quality of the meals implemented/delivered in elementary schools can be measured using four indicators of quality: the first three indicators are; fresh/whole, transitional and highly processed. Then the fourth indicator is the meal appearance. To measure quality using the first three indicators, the observer would require the recipe used for the meal on the observation day and code each ingredient on the recipe as either fresh/whole, transitional or highly processed item. To measure the fourth indicator, the observer will visually observe the meal served to determine the rate of attractiveness by looking at the color and shape of the food displayed.</td>
<td>• Fresh/whole item, transitional item, highly processed item and meal appearance determine the quality of the meal displayed. A recipe is required to measure the quality of the meal.</td>
</tr>
<tr>
<td>e. Fresh/whole (quality)</td>
<td>This indicator would categorize meal ingredients as fresh/whole. Ingredients that are raw/uncooked with the only processing being skinned, cut and/or frozen.</td>
<td>• Raw meat and poultry&lt;br&gt;• Ground raw meat (include raw preformed patties)&lt;br&gt;• Raw fruits/vegetables</td>
</tr>
</tbody>
</table>
### f. Transitional (quality)
- This indicator of quality would categorize meal ingredients that are minimally processed, often precooked and flash frozen with no fillers and no preservatives added.
- Precooked meat, no fillers, no preservatives: Beef, pork, lamb (ex. crumbles, meatballs, roast, steaks, and preformed cooked hamburger patties).
- Frozen fruit/vegetables

### g. Highly Processed (quality)
- This indicator of quality would categorize ingredients that have been processed and are mostly a heat and serve items; cured/preserved items; has fillers, preservatives, or other ingredients.
- Commercially prepared vegetable based sauces (ex. canned or jarred salsa, marinara sauce)
- Canned vegetables with additives
- Fruit juice from concentrate.
- eat & serve meat: Beef (ex. Hamburgers, crumbles, and meatballs) with fillers; hot dogs, bacon.

### h. Meal appearance (quality)
- Meal appearance could be a key factor that some school children consider before choosing to eat any meal. This item would measure the level of attractiveness of the food displayed in the cafeteria by observing the color and shape of the meal.
- Meal appearance should be measured as attractive/not attractive/somewhat attractive.

### 6. Quantity
- This item would measure the portion of each food item delivered based on the minimum amount per day (i.e., the minimum amount per day according to the USDA meal pattern).
- Vegetables: Minimum per day for Grade K-5 is three-quarter (3/4)
- Fruit: Minimum per day for Grade K-5 is half (1/2)
- Grains (oz. eq) (any type of grains): Grade K-5 (1)
- Meats/Meat Alternates : Grade K-5 (1 o.z. eq)
- Fluid milk (cups): Grade K-5 (1)
Lunch Observation Protocol

1. Meet with the food service staff present on the observation day and collect the actual school district menu, recipe and ingredient labels.
2. Review the menu, recipe, and ingredient labels before you start the observation process and complete Form A.
3. Lunch observation should be conducted across three lunch periods in order to determine the meal consistency across time. Make sure the meals displayed are observed periodically (i.e., at the beginning, middle and end of the lunch period).
4. This means you need to note the time lunch starts and when it ends. To calculate the three periods, divide the total number of minutes allocated for lunch by three which should result in three periods.
5. Form B should be used three times during observation. Note the start and end time for each observation period on Form B. Shade the lunch observation period on Form B based on the start time.
6. Form C should only be used if the meal delivered (observed) is different from the actual district menu. That is if the actual district menu was modified or replaced.
7. Read thoroughly the operationalized items on page 3-5 to better understand the content of each item to be measured during observation.
8. Add additional row in all tables if needed.
9. Lunch observation should be conducted the same day to determine variability across three lunch periods (i.e., in the beginning, middle and end of the lunch period).

FORM A

1. The Form A is expected to measure the first three indicators of Quality which includes: FRESH/WHOLE ITEM, TRANSITIONAL ITEM, HIGHLY PROCESSED ITEM. An observation of the meal delivered is not required at this stage.
2. Indicate the date, school name and district on this form.
3. The first three quality items are coded on the table in Form A as 0,1,2 respectively.
4. The observer should ask for the menu, recipe, and ingredient labels from the food service staff using the open-ended questions on page 8 to complete the table on this form.
5. Use the recipe and the ingredient labels to fill out the table by listing all ingredients used in each food section. A copy of the recipe and ingredient labels should be provided for reference.
6. It is important to review the quality items that have been operationalized on page 3-5.
7. When coding the ingredients, review the ingredient labels then code each item using the first three quality items (i.e., fresh/whole = 0, transitional = 1, and highly processed items = 2), please review the recipe rubric table on page 8 to better understand how to code the ingredients. For example; if the entrée is a beef burger, the recipe should contain a list of ingredients for a beef burger. If one ingredient is ground beef (which is an animal-based protein), from the rubric below, grounded beef can be seen under the Fresh/whole column. Please code ground beef as 0 by circling 0 on the table.

8. Please add an additional row if needed.

**FORM B**

1. This form is expected to measure implementation outcome and the fourth indicator for quality. Observation of the meals delivered is required at this stage.

2. **Form B** should be used three times by indicating on the form the start and end time at the beginning, middle and end of the lunch observation period. Which means there should be three Form B required to complete this stage. Each lunch observation period should be shaded on the form for clarity.

3. **Implementation Outcome**
   i. The first segment on the table is to measure implementation outcome. The observer is required to Review the school district menu assigned on the observation day and list what is on the menu by filling the first column.
   ii. Observe the meal displayed and complete the second column by comparing the actual menu and the meal displayed. If the actual school menu doesn’t/does correspond with the meal observed, please indicate in the table (second column) by shading Yes or No. For example: if the first entrée is a beef burger on the menu and you can visually see beef burger displayed in the cafeteria then Yes on the table as delivered.

4. **Quality: Meal Appearance**
   iii. The next segment is Meal appearance which is a measure of quality. To measure the meal appearance please observe each of the meal displayed thoroughly, then circle the level of attractiveness of the meal by looking at the color and shape of the meal. Shade on the table one of the following; All items displayed/observed are not attractive; All items displayed/observed are somewhat attractive; All items displayed/observed are attractive.
v. Only meals that meet the actual menu should be scored for quality on Form B. Meals delivered (observed) that don’t meet the actual district menu should be measured on Form C.

5. **Quantity**

   vi. This item should measure the portion of each food item delivered on the tray based on the minimum amount per day (i.e., the minimum amount per day based on the USDA meal pattern). Based on the USDA lunch meal pattern (final rule), schools would no longer be permitted to substitute between fruits and vegetables; each has its own requirement, ensuring that students are offered both fruits and vegetables every day.

   vii. The following criteria should be used to observe the minimum amount of each food group per day (i.e., Quantity)

   **Vegetables (cups):** Minimum per day for Grade K-5 is three-quarter (3/4)

   **Fruit:** Minimum per day for Grade K-5 is half (1/2)

   **Grains (any type of grains):** Grade K-5 (1 oz. eq)

   **Meats/Meat Alternates:** Grade K-5 (1 oz. eq)

   **Fluid milk (cups):** Grade K-5 (1)

   viii. At least a total of ten (10) Students’ tray should be observed to determine if the quantity is met.

   ix. Please tick the box in Session C, F, I, to determine if each food item displayed on the tray met the minimum quantity per day as stated above. If an item isn’t present during observation, please tick “not present.”

6. Please add an additional row if needed.

**FORM C**

1. This form is only met for meals that don’t meet the actual district menu. This can be determined after filling out Form B (the implementation outcome segment).

2. This form would only measure the quality of the meals that don’t meet the actual school district menu and recipe. All quality indicators will be measured on this form, this includes;

   FRESH/WHOLE ITEM, TRANSITIONAL ITEM, HIGHLY PROCESSED ITEM, and MEAL APPEARANCE.

3. Please follow the same procedure for scoring the four indicators of quality.

4. Information about the reason for recipe modification should be included in Form C.

5. Please add an additional row if needed.
The following open-ended questions should be conducted during the observation on Form A. These questions should be answered by the food service staff present on the observation day.

a) Do you have the original recipe for the meal cooked today? If yes, list all ingredients from the recipe and code each item on Form A. A copy of the recipe should be provided for reference.

b) If there is no recipe available, ask the food service staff to provide a list of all ingredients used for the meal and code each item on Form A.

c) If the original recipe was modified at any point please complete Form C.

Recipe Rubric

<table>
<thead>
<tr>
<th>Animal-based Protein</th>
<th>Fresh/whole = 0</th>
<th>Transitional =1</th>
<th>Highly Processed = 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and meat alternatives delivered raw/uncooked with the only processing being skinned, cut and/or frozen:</td>
<td>Meat and meat alternatives that are minimally processed, often precooked and flash frozen with no fillers and no preservatives added (100% meat):</td>
<td>Meat and meat alternatives that have been commercially prepared, i.e. heat &amp; serve items; cured/preserved items; has fillers, preservatives, or other ingredients:</td>
<td></td>
</tr>
<tr>
<td>• Raw meat: beef, pork, lamb</td>
<td>• Precooked meat, no fillers, no preservatives: Beef, pork, lamb (ex. crumbles, meatballs, roast, steaks, and preformed cooked hamburger patties)</td>
<td>• Heat &amp; serve meat: Beef (ex. Hamburgers, crumbles, and meatballs) with fillers); Hotdogs; Bacon</td>
<td></td>
</tr>
<tr>
<td>• Raw poultry: chicken, turkey, duck</td>
<td>• Precooked poultry, no fillers, no preservatives: Chicken, turkey, duck (ex. Fajita strips, unbreaded chicken breast, turkey crumble with no fillers)</td>
<td>• Heat and Serve poultry: Chicken (ex. nuggets, strips and patties); turkey crumble with fillers</td>
<td></td>
</tr>
<tr>
<td>• Ground raw meat (include raw preformed patties)</td>
<td>• Liquid Eggs</td>
<td>• Deli meat (ex. turkey, roast beef, ham, salami, pepperoni)</td>
<td></td>
</tr>
<tr>
<td>• Ground raw poultry (include raw preformed patties)</td>
<td>• Canned Tuna (fish and water or oil, no preservatives)</td>
<td>• Powdered eggs</td>
<td></td>
</tr>
<tr>
<td>• Shelled Eggs</td>
<td>• Frozen unbreaded precooked fish, shrimp</td>
<td>• Canned Tuna (fish and water or oil, has fillers, preservatives, or other ingredients)</td>
<td></td>
</tr>
<tr>
<td>• Raw fish, shrimp</td>
<td></td>
<td>• Frozen breaded precooked fish, shrimp</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plant-based Protein</th>
<th>Minimally processed beans, legumes, nuts and seeds consisting primarily of dried and fresh varieties:</th>
<th>Canned/frozen beans, legumes, nuts and seeds with no added ingredients:</th>
<th>Canned beans, legumes, nuts and seeds with added flavoring, salt, and additional ingredients:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dried beans and legumes (ex. kidney, garbanzo, pinto, black, lentils)</td>
<td>• Plain canned/frozen beans and legumes (ex. Kidney, garbanzo, pinto, black, lentils)</td>
<td>• Chili beans</td>
<td></td>
</tr>
<tr>
<td>• Nuts and seeds, either whole or ground with no additives (ex. almond, sunflower or peanut butter)</td>
<td>• Plain/unflavored soft or firm tofu</td>
<td>• Baked beans</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Nut and seed butter with added salt</td>
<td>• Refried Beans (canned or dried)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Soy-based meat alternatives</td>
</tr>
<tr>
<td>Dairy</td>
<td>Minimally processed dairy products:</td>
<td>Moderately processed dairy products:</td>
<td>Highly processed cheese and dairy products:</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>• Plain/unflavored milk or milk alternatives (soy, almond, rice, etc.)</td>
<td>• Plain cream cheese</td>
<td>• American cheese and other cheese-products (ex. cheese wiz, cheese sauce)</td>
<td></td>
</tr>
<tr>
<td>• Plain, unsweetened yogurt</td>
<td>• Natural shredded cheese or cheese blends</td>
<td>• Flavored milk or milk alternatives (ex. vanilla, chocolate, strawberry)</td>
<td></td>
</tr>
<tr>
<td>• Natural cheese without coloring in block form (ex. cheddar, mozzarella, swiss, jack)</td>
<td>• Cottage cheese</td>
<td>• Flavored, sweetened yogurt</td>
<td></td>
</tr>
<tr>
<td>• Unsalted butter</td>
<td>• Ricotta cheese</td>
<td>• Dry/powdered milk/whey</td>
<td></td>
</tr>
<tr>
<td>• Buttermilk</td>
<td>• Sour cream</td>
<td>• Sweetened condensed milk</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Salted butter</td>
<td>• Margarine/butter substitute</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Fresh/whole = 0</td>
<td>Transitional = 1</td>
<td>Highly Processed = 2</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| Fruit            | Fresh fruit with no added ingredients:  
|                  | • Fresh fruit  | Minimally processed products made with 100% fruit and no added ingredients:  
|                  |                | • Frozen fruit  
|                  |                | • 100% fruit juice (squeezed in house or not from concentrate)  
|                  |                | • Canned fruit in own juice  
|                  |                | • Plain fruit sauce (ex. Applesauce)  
|                  |                | Dried fruit without added sugar or preservatives  
|                  |                | Products made with fruit and added ingredients, specifically sugar:  
|                  |                | • Canned fruit in syrup or light syrup  
|                  |                | • Fruit juice from concentrate  
|                  |                | • Canned applesauce with added ingredients  
|                  |                | • Dried fruit with added sugar  
| Vegetable        | Fresh vegetables:  
|                  | • Raw vegetables  | Minimally processed, canned or frozen vegetable products:  
|                  |                | • Frozen vegetables without added ingredients  
|                  |                | • Canned vegetables without added ingredients (ex. Peas, peppers, tomatoes, tomato paste)  
|                  |                | Canned vegetables with added ingredients:  
|                  |                | • Commercially prepared vegetable based sauces (ex. canned or jarred salsa, marinara sauce)  
|                  |                | • Canned vegetables with additives  
|                  |                | • Canned vegetable-based soups (ex. tomato and vegetable soup)  
|                  |                | • Instant potatoes  
|                  |                | • Processed, pre-cooked vegetables with added seasoning (ex. fries, tots)  
| Grains           | Whole or ground grains with the bran and germ:  
|                  | • Raw whole-grains cooked in house (ex. brown rice, quinoa, oatmeal, barley)  
|                  | • Homemade bread and bread products (ex. muffins, pizza crust, etc.) (51% or more whole grains)  
|                  | • Wheat Flour (51% or more whole grains or wheat alternative)  
|                  | • Dry pasta (51% or more whole grains or wheat alternative ex. brown rice, pasta)  
|                  | Pre-made tortillas (51% or more wheat flour or 100% corn)  | Items that contain a mixture of whole and commercially prepared/processed grains:  
|                  |                | • Unsweetened instant/quick cook grains (ex. brown rice, quinoa, oatmeal, barley)  
|                  |                | • Frozen or Par-baked bread (51% or more whole grain)  
|                  |                | • Granola/bars with whole oats and no added sugar  
|                  |                | • Breading on frozen products (51% or more whole grain)  
|                  |                | • Commercially prepared bread/bread products containing more than 51% whole grains  
|                  |                | Grains that have been commercially processed through milling and bleaching, removing the bran and germ:  
|                  |                | • Commercially prepared bread/bread products containing less than 51% whole grains  
|                  |                | • Pre-made tortillas (less than 51% wheat flour)  
|                  |                | • White rice, pasta and flour  
|                  |                | • Packaged snacks (ex. tortilla chips, pretzels or granola bars)  
|                  |                | • Flavored grains (ex. sweetened instant oatmeal, savory rice mixes)  
|                  |                | • Flour (less than 51% whole grains)  
| Sauces, Condiments and Misc. | Sauces that are made from scratch using a combination of fresh and minimally processed ingredients:  
|                  | • Oils (ex. vegetable, canola oil)  
|                  | • Vinegars (ex. balsamic, red wine)  
|                  | • Natural raw cane sugar  
|                  | • 100% maple syrup, molasses, honey, agave  
|                  | • Unsweetened cocoa powder  
|                  | • Yeast  
|                  | • Salt  | Minimally processed sauces that contain a small number of fresh and clean label ingredients:  
|                  |                | • Canned broths without added ingredients  
|                  |                | • Canned olives  
|                  |                | • Commercially processed sauces and condiments made with minimal ingredients  
|                  |                | • Refined sugar (ex. white granulated sugar, powdered sugar, brown sugar)  
|                  |                | • Semi-sweet or dark chocolate chips  
|                  |                | Unsweetened baking chocolate  
|                  |                | Commercially processed and packaged sauces that are ready to heat and serve, typically containing a long list of ingredients:  
|                  |                | • Canned/powdered gravy  
|                  |                | • Cream soups (ex. mushroom, chicken, onion, etc.)  
|                  |                | • Bottled or powdered salad dressing  
|                  |                | • Highly processed, commercially prepared sauces and condiments made with multiple ingredients  
|                  |                | • High fructose corn syrup  
|                  |                | • Corn syrup (dark or light)  
|                  |                | • Jelly  
<p>|                  |                | • Breakfast syrup (not 100%) (ex. Aunt Jemima, Mrs. Butterworth)  |</p>
<table>
<thead>
<tr>
<th>Herbs and Spices</th>
<th>Herbs and spices in their purest form that are made from scratch using a combination of fresh and minimally processed ingredients:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Fresh herbs (ex. Oregano, basil, cilantro)</td>
</tr>
<tr>
<td></td>
<td>- Dried herbs</td>
</tr>
<tr>
<td></td>
<td>Spices (ex. Paprika, cinnamon, onion powder, pepper, etc.)</td>
</tr>
<tr>
<td></td>
<td>- Seasoning packet (ex. Taco seasoning, ranch packet)</td>
</tr>
<tr>
<td></td>
<td>- Beef Base/bullion</td>
</tr>
<tr>
<td></td>
<td>- Imitation Vanilla</td>
</tr>
</tbody>
</table>

Adopted from Gretchen Swanson Center for Nutrition.
### Form A

**Date:** ______________  **School District:** _____________  **School Name:** __________

**Start Time:** ______________  **End Time:** ______________

*Circle the appropriate score.*

**Quality:** Fresh/whole item*; Transitional item*; Highly processed item*

<table>
<thead>
<tr>
<th>List Items from the Actual Recipe Under Each of the Food Group.</th>
<th>Fresh/ whole</th>
<th>Transitional</th>
<th>Highly processed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entrée 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Entrée 2:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>d.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>e.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Side 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Side 2:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Fruit:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Vegetable:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
FORM B

Start Time: ______________  End Time: ___________

**LUNCH OBSERVATION PERIOD**

<table>
<thead>
<tr>
<th>Menu Implementation Outcome*</th>
<th>Quality: Meal Appearance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual School Menu for The Day</td>
<td>All Items Displayed Are Not Attractive based on color and shape</td>
</tr>
</tbody>
</table>

**Menu Implementation Outcome**

- **Yes**
- **No**

| Entrée 1: | 0 | 0 | 0 | 0 | 0 |
| Entrée 2: | 0 | 0 | 0 | 0 | 0 |
| Side 1: | 0 | 0 | 0 | 0 | 0 |
| Side 2: | 0 | 0 | 0 | 0 | 0 |
| Fruits 1: | 0 | 0 | 0 | 0 | 0 |
| Fruits 2: | 0 | 0 | 0 | 0 | 0 |
| Fruits 3: | 0 | 0 | 0 | 0 | 0 |
| Vegetable 1: | 0 | 0 | 0 | 0 | 0 |
| Vegetable 2: | 0 | 0 | 0 | 0 | 0 |
| Vegetable 3: | 0 | 0 | 0 | 0 | 0 |

**Quantity* Shade the appropriate score**

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Quantity Met</th>
<th>Quantity Not Met</th>
<th>Not Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetable</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fruits</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grains (any type)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Meat/Meat Alternatives</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fluid milk (cups)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Start Time: ______________

End Time: ______________

Circle/shade the appropriate score.

<table>
<thead>
<tr>
<th>Quality: Fresh/whole item*; Transitional item*; Highly processed item*</th>
<th>Quality: Meal Appearance*</th>
</tr>
</thead>
<tbody>
<tr>
<td>List items that can be seen but didn’t meet the actual district menu/recipe.</td>
<td>Fresh/whole</td>
</tr>
<tr>
<td>Entrée 1:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
</tr>
<tr>
<td>Entrée 2:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
</tr>
<tr>
<td>b.</td>
<td>0</td>
</tr>
<tr>
<td>c.</td>
<td>0</td>
</tr>
<tr>
<td>Side 1:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
</tr>
<tr>
<td>Side 2:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
</tr>
<tr>
<td>Fruit:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
</tr>
<tr>
<td>Vegetable:</td>
<td>0</td>
</tr>
<tr>
<td>a.</td>
<td>0</td>
</tr>
</tbody>
</table>

Why was the recipe modified? Please do indicate in this box by describing the reason for the recipe modification. *For instance, a beef burger might be replaced with a chicken burger because they don’t have ground beef, therefore the recipe was modified.*