EVALUATION OF "ORIENTATION TO SCHOOL NUTRITION MANAGEMENT" TRAINING FROM THE INSTITUTE OF CHILD NUTRITION

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by

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ABSTRACT

This study was conducted to identify if the "Orientation to School Nutrition Management" training developed by the Institute of Child Nutrition (ICN) is effective in training school nutrition professionals. The training was evaluated utilizing three different instruments developed by the ICN: a 20 item multiple-choice pre-/post-training knowledge based quiz, a 14 item subjective training program evaluation on a Likert-scale with 4 open-ended questions, and a follow-up survey distributed at 6-months and 12-months post-training. Forty four training sessions were held from August 2012 to March 2018 and reached 1033 participants. These training sessions were held both on a central campus on-site or requested off-site at locations throughout the U.S. and U.S. territories. The participants were school nutrition professionals and professionals whose jobs are related to school nutrition programs. Job positions were collected with the training program evaluation.

A paired-sample t-test revealed that participants, regardless of training location or job position, significantly increased school nutrition management knowledge. Independent t-tests found that on-/off-site trainings provided consistent trainings. Independent t-tests also found that directors and school nutrition professionals perceived the training to be more valuable and relevant to their jobs than non-directors and non-school nutrition professionals. Participants highly rated the training program evaluation, with average scores of agreement (4) to strong agreement (5). The topics that participants found most useful were financial management and procurement/inventory management. The ICN's "Orientation to School Nutrition Management" training is an effective training program in increasing school nutrition management knowledge in

all participants, regardless of job position or location of training. Ensuring training activity and content relevancy to the participant is key to an effective training.

DEDICATION

This work is dedicated to my parents, George and Amy, who have been a constant source of support and encouragement.

LIST OF ABBREVIATIONS AND SYMBOLS

DoD	Department of Defense
HACCP	Hazard Analysis and Critical Control Points
HHFKA	Healthy Hunger-Free Kids Act
ICN	Institute of Child Nutrition
NCPM	The National Center of Program Management and Fiscal Operations
NSL	National School Lunch
NSLP	National School Lunch Program
OVS	Offer Versus Serve
SBP	School Breakfast Program
SND	School nutrition directors
SNP	School nutrition professionals
USDA	United States Department of Agriculture

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CHAPTER 1

INTRODUCTION

The National School Lunch Program has been amended several times since becoming federal law in 1946 with the biggest change due to the Healthy Hunger-Free Kids (HHFKA) of 2010. The HHKFA added nutrition regulations and program evaluation changes, such as those of school wellness policies. A challenge school nutrition directors (SNDs) and school nutrition professionals (SNPs) face is understanding and implementing policies that comply with changing and increasingly complex regulations.

The HHKFA included nutrition standards for all foods sold outside of the National School Lunch Program (NSLP) and School Breakfast Program (SBP) through the *Smart Snacks in School* standards. Existing nutrition guidelines for foods served in the NSLP and SBP were updated and were scheduled incrementally to be more restrictive through subsequent years while new meal patterns were established. Concerns regarding program changes were identified by SNDs with anticipated increases in food costs and uncertainty over student acceptance of change as a result of novel nutrition guidelines (Yon, Amin, Taylor, & Johnson, 2016).

Acknowledging the complexity of operating a federal school meal program, HHFKA incorporated continuing education requirements. As of July 1, 2015, all SNDs and SNPs are required to fulfill incrementally increasing professional standards requirements of continuing education and training hours (USDA-FNS, 2018a). SNDs are required to receive at least 12 hours of annual continuing education and training, school nutrition managers are required to receive at least 10 hours and all other SNPs are required to receive at least six hours.

SNDs have reported training needs for themselves and their staff in the areas of food safety, standardizing recipes, special needs, menu planning, cost effective use of USDA foods and compliance with nutrient guidelines (Bergman et al., 2015; Carmichael et al., 2016). USDA Foods are domestic agricultural products purchased by the USDA and can be used in all child nutrition programs. SNP training is critical since they play an important role in implementing and maintaining policies and procedures that follow federal regulations for feeding children (Stephens & Byker, 2015).

SNDs and SNPs can look to the Institute of Child Nutrition (ICN) (formerly known as the National Food Service Management Institute) for training support. Established by the Child Nutrition and WIC Reauthorization Act of 1989, the ICN is the only federally funded national center dedicated to providing education, training, and technical assistance to child nutrition and childcare professionals.

To support schools and SNPs, the ICN provides free trainings and materials in a 5-day in person training called "Orientation to School Nutrition Management" designed to provide an overview of basic school meal program components critical for successful food operations. Since 2012, 44 training sessions across the U.S. and U.S. territories have been held to reach 1033 participants. The activities throughout the training teach skills and provide participants an opportunity to create individualized goals to implement in their respective schools.

The purpose of this study was to evaluate secondary data collected by the ICN from August 2012 to March 2018 to assess "Orientation to School Nutrition Management" trainings offered by the ICN by evaluating participants' change in knowledge, perception of the training session and training information's usefulness, and changes in participants' operations as a result of the training.

CHAPTER 2

REVIEW OF LITERATURE

The management and operation of a United States Department of Agriculture (USDA) federally funded meal program is complex and challenging. As an example, school nutrition directors (SNDs) are required to know about nutrition standards, food allergies, food safety, special diets, Commodity Supplemental Food Programs, USDA Foods in Schools, and USDA Department of Defense (DoD) Fresh Fruit & Vegetable Program. This chapter will discuss the need for training of SNDs and all school nutrition professionals (SNPs), the USDA training requirements, general adult training methods, current methods for training and educating SNPs, and the purpose and role of the Institute of Child Nutrition (ICN).

Background of Child Nutrition Programs

Child nutrition programs in the U.S. have their beginnings in food assistance during the depression era. The Richard B. Russell National School Lunch (NSL) Act of 1946 created the National School Lunch Program (NSLP) to provide low-cost or free school lunch meals to qualified low-income students through subsidies to schools. The act outlined how the funding should be used, meal nutritional requirements, and reimbursement rates for free or reduced-price lunches. The NSL Act has been amended several times as the NSLP expanded, starting in 1962 to appropriate funding based upon a state's participation rate and assistance need rate. The Child

Nutrition Act of 1966 established the Special Milk Program, which provides milk to children in schools or child care institutions that do not participate in other federal child nutrition meal programs, and implemented The School Breakfast Program (SBP) as a pilot program, which was made permanent in 1975. The SBP is a federal assisted meal program that provides cash subsidies from the USDA to school districts and independent schools that choose to participate and serve breakfast that meets federal nutritional requirements.

The Child Nutrition and WIC Reauthorization Act provided further amendments in 2004. This act required schools to have a Hazard Analysis and Critical Control Points (HACCP) plan to ensure food safety. Schools must also have a Local School Wellness Policy (SWP). It was required that the SWP be a written document developed by each local education agency (LEA), or school district, that details a school district's and each individual school's policies to promote student health and wellbeing. The most notable and recent changes to federal child nutrition regulations came about with the passage of the Healthy, Hunger Free-Kids Act (HHFKA) of 2010.

Recent Policy Changes – Healthy Hunger Free Kids Act of 2010

The HHKFA took existing regulations and formed more restrictive guidelines and assessments to ensure compliance with the law, laying out four key provisions: *Smart Snacks in Schools*, Local School Wellness Policy, Community Eligibility and Administrative Review Procedures (USDA-FNS, 2016c).

Nutrition Guideline Changes. The HHFKA reauthorized funding for federal school meal programs (NSLP and SBP) and set specific nutrition guidelines for all foods sold to students

(Nutrition Standards, 2012). All lunch meals must provide all five food components: fruit, vegetables, meat/meat alternates, grains and milk. All breakfast meals must provide three food components: fruit or vegetable, grains and milk. Changes from the HHFKA include requiring schools to offer both fruit and vegetable components at lunch, limiting fluid milk to flavored or unflavored fat free milk or unflavored low fat milk, reduce sodium content, eliminate trans-fats, and introduce age/grade group specific calorie ranges.

Table 1 compares the previous and current NSLP meal patterns and introduces vegetable subgroups and meal component requirements for different grade ranges. Vegetable subgroups are dark green vegetables, red/orange vegetables, beans/peas, starchy vegetables and other vegetables as defined by the 2010 Dietary Guidelines. All subgroups must be offered weekly and starchy vegetables must be limited. Table 2 compares the previous and current SBP meal patterns, where meal component requirements for different grade ranges are introduced (USDA-FNS, 2012).

The current nutrient standards introduce incrementally restricting allowed sodium content with different requirements for breakfast, lunch and each grade group. Calorie requirements are now ranges instead of minimums and menu planning is used to incorporate required food components for breakfast and lunch. Saturated fat requirements remained unchanged while trans-fat requirements changed from no limit to 0g per serving. Table 3 shows the specific ranges for nutrient standards (USDA-FNS, 2012). Because of a collective concern voiced by SNPs regarding the formidable changes, a proclamation was issued on May 1, 2017 allowing schools to also serve 1% flavored milk instead of only fat free flavored milk, granting exemptions to allow only 50% of grains offered as whole grains and for now halting the targeted sodium reduction (USDA, 2017).

Table 1.

National School Lunch Program Meal Pattern.

Food Group	Previous Requirements (6/30/04)	K-12 Current Requirements K-12 (as of 7/1/12)
Fruit and Vegetables	½ - ¾ cup of fruit and vegetables combined per day	¾ - 1 cup of vegetables plus ½ -1 cup of fruit per day Note: Students are allowed to select ½ cup fruit or vegetable under OVS.
Vegetables	No specifications as to type of vegetable subgroup	Weekly requirement for: • dark green • red/orange • beans/peas (legumes) • starchy • other (as defined in 2010 Dietary Guidelines)
Meat/Meat Alternate	1.5 – 2 oz. eq. (daily minimum)	Daily minimum and weekly ranges: Grades K-5: 1 oz. eq. min. daily (8-10 oz. weekly) Grades 6-8 : 1 oz. eq. min. daily (9-10 oz. weekly) Grades 9-12 : 2 oz. eq. min. daily (10-12 oz. weekly)
Grains	8 servings per week (minimum of 1 serving per day)	Daily minimum and weekly ranges: Grades K-5: 1 oz. eq. min. daily (8-9 oz. weekly) Grades 6-8 : 1 oz. eq. min. daily (8-10 oz. weekly) Grades 9-12 : 2 oz. eq. min. daily (10-12 oz. weekly)
Whole Grains	Encouraged	At least half of the grains must be whole grain-rich beginning July 1, 2012. Beginning July 1, 2014, all grains must be whole grain rich.
Milk	1 cup Variety of fat contents allowed; flavor not restricted	1 cup Must be fat-free(unflavored/flavored) or 1% low fat (unflavored)

Table 2.

School Breakfast Program Meal Pattern

Food Group	Previous Requirements	K-12 Current Requirements K-12 (as of 7/1/12)
Fruit	½ cup per day (vegetable substitution allowed)	1 cup per day (vegetable substitution allowed) Note: Quantity required school year (SY) 2014-15. Students are allowed to select ½ cup of fruit under OVS.
Grains and Meat/Meat Alternate	2 grains, or 2 meat/meat alternates, or 1 of each per day	Daily minimum and weekly ranges: Grades K-5: 1 oz. eq. min. daily (7-10 oz. weekly) Grades 6-8 : 1 oz. eq. min. daily (8-10 oz. weekly) Grades 9-12 : 1 oz. eq. min. daily (9-10 oz. weekly) Note: Quantity required SY 2013-14. Schools may substitute the meat/meat alternate for grains after the minimum daily grains requirement is met.
Whole Grains	Encouraged	At least half of the grains must be whole grain-rich beginning July 1, 2013. Beginning July 1, 2014, all grains must be whole grain rich.
Milk	1 cup Variety of fat contents allowed; flavor not restricted	1 cup Must be fat-free(unflavored/flavored) or 1% low fat (unflavored)

Table 3.

Nutrient Standards for National School Lunch Program and School Breakfast Program (K-12)

Nutrient	Previous Standards	Current Standards (as of 7/1/12)		
Sodium	Reduce, no set targets	Target I: SY 2014-15 Lunch ≤1230mg (K-5); ≤1360mg (6-8); ≤1420mg (9-12) Breakfast ≤540mg (K-5); ≤600mg (6-8); ≤640mg (9-12)	Target 2: SY 2017-18 Lunch ≤935mg (K-5) ≤1035mg (6-8); ≤1080mg (9-12) Breakfast ≤485mg (K-5); ≤535mg (6-8); ≤570mg (9-12)	Final target: SY 2022-23 Lunch ≤640mg (K-5); ≤710mg (6-8); ≤740mg (9-12) Breakfast ≤430mg (K-5); ≤470mg (6-8); ≤500mg (9-12)
Calories	Minimums only *Traditional Menu Planning* Lunch: 633 (grades K-3) 785 (grades 4-12) 825 (optional grades 7-12) Breakfast: 554 (grades K-12) *Enhanced Menu Planning* Lunch: 664 (grades K-6) 825 (grades 7-12) 633 (optional grades K-3) Breakfast: 554 (grades K-12) 774 (optional grades 7-12) *Nutrient Based Menu Planning* Lunch: 664 (grades K-6) 825 (grades 7-12) 633 (optional grades K-3) Breakfast: 554 (grades K-12) 618 (optional grades 7-12)	Calorie Ranges *Only food-based menu planning allowed* Lunch: 550-650 (grades K-5) 600-700 (grades 6-8) 750-850 (grades 9-12) Breakfast: 350-500 (grades K-5) 400-550 (grades 6-8) 450-600 (grades 9-12)		
Sat. Fat	<10% of total calories	<10% of total calories		
Trans-fat	No limit	Zero grams per serving (nutrition label)		

SNDs can also plan meals with the concept of Offer Versus Serve (OVS) as a provision of the NSLP and SBP (Nutrition Standards, 2012). This menu planning method aims to reduce food waste by allowing students to decline foods offered in a reimbursable lunch or breakfast. OVS is optional at all grade levels for breakfast and required only for lunch at senior high school level schools (USDA-FNS, 2015). Schools must offer all five food components in the amounts found in Table 1. At lunch, students must take at least three of the five components offered and at least one selection must be a fruit or vegetable (USDA-FNS, 2015). At breakfast, students must take at least three of the four required food components and at least one selection must be a fruit or vegetable.

Smart Snacks in School Standards. *The Smart Snacks in Schools* standards mandate nutrition guidelines for all foods sold in schools and outside school meal programs. Snacks must meet nutrition requirements for ingredients, ensuring the snacks are mostly whole grain, fruit, vegetable, dairy or protein, and meet nutrient standards for calories, sodium, sugar, and fats (USDA-FNS, 2017). The requirements for ingredients can be found in Table 4 and requirements of nutrients can be found in Table 5 (USDA-FNS, 2016a).

Table 4.

Smart Snacks in Schools standards for foods sold outside the National School Lunch and School Breakfast Programs

Smart Snacks in Schools Requirements			
Must meet at least one of these requirements	Be a grain product that contains 50 percent or more whole grains by weight (have a whole grain as the first ingredient	Have as the first ingredient a fruit, a vegetable, a dairy product, or a protein food	Be a combination food that contains at least ¼ cup of fruit and/or vegetable
Must meet this requirement	The food must meet the nutrient standards for calories, sodium, sugar, and fats (Found below)		

One response from manufacturers to these nutrition standards is reformulated snack products that meet the *Smart Snacks in Schools* standards. Research has found that many of these reformulated products are virtually indistinguishable from the less nutritious versions sold outside of schools (Harris, Hyary, & Schwartz, 2016). Furthermore, since the implementation of *Smart Snacks in Schools*, research has not seen changes in students' consumption of snack foods and beverages (Mann, Hosig, Zhang, Shen, & Serrano, 2017).

Table 5.

Smart Snacks in Schools Standards Nutrients

Nutrient	Snack	Entrée
Calories	200 calories or less	350 calories or less
Sodium	200 mg or less	480 mg or less
Total Fat	35% of calories or less	35% of calories or less
Saturated Fat	Less than 10% of calories	Less than 10% of calories
Trans-Fat	0 g	0 g
Sugar	35% by weight or less	35% by weight or less

[1] An entree item may be sold as a la carte on the same day or the next day.

Local School Wellness Policy. All school districts that participate in the NSLP have a written SWP to promote student health and wellbeing. The SWP includes; nutrition guidelines for all foods available on campus during the day which must be as, or more, restrictive than national standards; goals for nutrition education; physical activity and other school-based activities; and a designated person for oversight with a plan for measuring implementation (Local School Wellness Policy Implementation, 2016). SWPs are implemented at the local level and designed to be individualized and address the needs of each LEA.

The HHFKA added requirements to inform the public about the SWP and updates, conduct triennial assessments for compliance and progress towards goals, and include goals for nutrition promotion and marketing. The HHFKA promotes local community involvement in the

SWP, requiring LEAs to allow the public and school community, including parents, students, representatives of the school food authority, physical education teachers, school health professionals, the school board, and school administrators to participate in development and implementation of the school wellness policy.

SNDs have reported supporting SWPs and believing in the potential benefits to improve student health, nutrition education, and physical education (Conklin, Lambert, Brenner, & Cranage, 2009; Longley, & Sneed, 2009). Seo (2009) found that while some schools prohibited and reduced offering junk food after implementation of the SWP, there was no increase in offered fruits or vegetables and no improvement in food preparation practices. Little association was found when comparing written wellness policies to actual school nutrition practices, in part due to ambiguous language (Lucarelli et al., 2014).

Community Eligibility Provision. In an effort to reduce administrative burden and increase the efficiency of operating the NSLP and SBP, the Community Eligibility Provision was implemented (Eliminating Applications Through Community Eligibility, 2016). Community eligibility is a reimbursement option available to high poverty schools and LEAs to provide free breakfast and lunch to all children. A report evaluating the community eligibility provision found that community eligibility was successful and significantly increased student participation in the NSLP and SBP (Harkness, Logan, Shivji, Nisar, & Connor, 2015).

Administrative Review. In addition to the Community Eligibility Provision, the HHFKA also introduced changes to the administrative review process for NSLP and SBP. The three changes were that weekly meals complied with meal patterns and nutrition requirements, a triennial program assessment was implemented, and a unified reviewing process to ensure results of reviews are made public was incorporated (Administrative Reviews in the School Nutrition

Programs, 2015). The changes included new procedures for ensuring compliance with school nutrition program requirements with the goal of increasing efficiency and flexibility of state agency reviews and increasing transparency of the policies. The new reviewing procedures now allow state agencies to utilize off-site experts to review complex documentation, conduct follow-ups at their discretion, and streamline the reviewing process.

Nutrient Analysis Requirements. While food-based menu planning is used for incorporating required food components for breakfast and lunch, compliance must also be met for specific nutrients. Therefore, SNDs and school food authorities rely on nutrient analysis software to run nutrient analysis on menus. State agencies also use nutrient analysis programs to assess compliance. Nutrient analysis software allows SNDs to plan menus accordingly, introduce flexibility and variety in menus, measure compliance with nutrient standards, calculate weighted nutrient analysis of menus, and produce menu reports of served foods. There are 17 USDA approved nutrient analysis programs to be used in school meal management (USDA-FNS, n.d.).These programs often include point of sale software, free and reduced application processer, menu planning software, nutritional analysis software, and perpetual inventory software.

Food Safety. The Child Nutrition Act of 2004 required schools to have a Hazard Analysis and Critical Control Points (HACCP) plan to ensure safe food. HACCP is a systematic preventative process to reduce the risk of hazards in food production. The HHFKA (2010) further clarified that all locations, not just the cafeteria, where food is stored, prepared, or served must follow the food safety program requirements (USDA-FNS, 2014). Schools participating in the NSLP or the SBP are required to obtain food safety inspections conducted by a state or local

governmental agency twice a year. They must also publically post the most recent food safety inspection report and provide copies of the food safety inspection report upon request.

SNDs are also responsible for creating, updating, and maintaining strong food safety policies and for educating staff about the importance of food safety. Additionally, SNDs should be informed on local and state food safety regulations to ensure compliance of their operations. Food safety practices include maintaining proper time and temperature control in compliance with HACCP, preventing cross-contamination, proper cleaning and sanitizing practices, proper handwashing practices, appropriate food storage conditions, and proper serving procedures.

A barrier to effectively implementing change in food safety is ensuring SNPs understand the importance of the lack of proper food safety practices as a risk to student health. A suggestion is to teach awareness of proper food safety practices, and focus training on improper food safety practices and the critical reasons for practicing food safety. This is especially important since it has been reported that some SNPs perceive food safety as a low risk to student health to SNDs (Machado, Monego, & Hidalgo Campos, 2014). In order to raise the level of importance that should be placed on food safety by SNPs, innovative motivation strategies may be the most effective way to present training on common topics like hand-washing. (Kwon, Sauer, & Wen, 2014).

Even prior to the HHKFA mandate requiring a HACCP plan, raising the awareness of the importance of strong food safety practices has been critical for some time because many school meal programs did have an active HACCP program (Kwon, 2003). Implementation of food safety plans based on HACCP has been shown to lead to the production of safer foods (Rodrigues, Silva, & Aleixo, 2012). The biggest constraints to implementing HACCP plans have been identified as time and money constraints and not the lack of skills to implement the plans

(Barrett & Riggins, 2009). Stinson, Carr, Nettles, and Johnson (2011) also found time, cost, as well as negative perceptions of food safety programs based on HACCP to be barriers to implementation.

Food Allergies and Modified Diets

School nutrition programs should have standard operating procedures that complement their school districts' policies for food allergies or food intolerances. Children with food allergies or intolerances generally are not classified as having a disability and schools may, but are not required to, make food substitutions. However, if a licensed health professional determines that the food allergies would result in severe life-threatening reactions, the child's condition would be considered a disability and schools must make substitutions and accommodations per the health professional's instructions. Accommodations may include providing food substitutions and/or modifying foods for students with disabilities (USDA-FNS, 2001). Additionally, school food authorities must provide food substitutions and accommodations for students who have a special medical or dietary need based on recommendations by a recognized medical authority and these are considered on a case by case basis. Accommodations and substitutions to school meals must be made at no additional cost to a student if accompanied by documentation from a licensed health professional and these modified meals are allowed to be reimbursed by the USDA with the same documentation (USDA-FNS, 2001).

To address student disabilities, schools may include a nutrition section in students' individualized educational plans to serve as guidance in meal planning. However, in the case where meal service is not normally available to the general student body, schools are not

required to provide meals to students with disabilities unless it is required in the individualized educational plan. Texture modifications, such as mechanically soft meat, do not require a licensed health professional's prescription (USDA-FNS, 2001).

USDA Foods in Schools and USDA DoD Fresh Fruits & Vegetables Program

USDA supports school meals such as the NSLP and Summer Food Service Program, through cash reimbursements and through the USDA Foods in Schools Program (USDA Foods). USDA Foods are domestic agricultural products purchased by the USDA to support American agriculture and for schools to use to feed children. These foods can be used in all child nutrition programs (USDA-FNS, 2016b). Originally a pilot program in 1996, the USDA partnered with the DoD to purchase and deliver fresh produce to schools. The Agricultural Act of 2014 requires that at least $50 million is used each fiscal year to purchase fruits and vegetables for schools. The USDA DoD Fresh Fruit and Vegetable Program allows schools to have greater buying power, consistent deliveries, and a wider variety of high quality produce than would not be available through USDA Foods alone (USDA-FNS, 2018b).

Positions in School Foodservice

To produce meals for the school meal programs and provide administrative support for the operation, there are a wide variety of jobs that vary from each organization. Larger districts require more support in the form of school nutrition professionals and specialized administrative staff. For example, a school nutrition program may operate with a chief financial officer, food

service director, assistant director, executive chef, accountant, secretary, and kitchen staff. The kitchen staff may include chefs, cooks, food service assistants, dishwashers, custodians, maintenance, and drivers among others. Therefore, the HHKFA (2010) introduced minimum education standards based on school districts' sizes for new nutrition program directors (Table 6). Existing directors were grandfathered into their current positions where they are currently working.

Training Requirements

Feeding America's children through all the USDA school meal programs has become a daunting and challenging responsibility. The many regulations and requirements that SNPs have to comply with, create a need for continuous and ongoing training. As a key provision of the HHFKA (2010), minimum professional standards requirements for SNPs who manage and operate the NSLP and SBP were put into effect July 1, 2015 (USDA-FNS, 2018a). The number of training hours varies dependent on position within the program and school size. As of the school year 2016-2017, SNDs are required to receive at least 12 hours of annual continuing education and training in addition to required food safety training in the first year of employment. School nutrition managers are required to receive at least 10 hours of annual continuing education and training and all other SNPs are required to receive at least six hours of continuing education and training.

Need for Training for School Nutrition Professionals

Lack of training for SNPs has been problematic long before the HHFKA (2010) required continuing education. In 1997, SNPs reported lack of training, lack of time, poor student acceptance, and increased costs as barriers to meeting the nutrition guidelines of the USDA (Stang, Story, Kalina, & Snyder, 1997). Sullivan, Harper, and West (2002) found that site-level managers reported needing training in employee management. Jones et al. (2013) surveyed SNPs and found that respondents indicated a need for training in topics related to program management; the HHFKA; nutrition, health and wellness; planning, preparing and serving meals; and communication and marketing. More recently, SNDs have reported training needs for themselves and their staff in the areas of food safety, standardizing recipes, special needs, menu planning, cost-effective use of USDA foods, and compliance with nutrient guidelines (Bergman et al., 2015; Carmichael et al., 2016). As school meal programs continue to evolve through federal policy changes, SNPs are key players in properly implementing federal regulations (Stephens & Byker, 2015) and therefore responsible for understanding the regulations. The vast range of information with federal, state, and local regulations that SNDs and their supporting staff are required to be familiar with and to practice, supports the need for training, resources, and a supporting infrastructure for training. Providing SNDs and SNPs with training helps them better understand the purpose of the changes and better prepare them to face the challenges of implementing the changes.

Barriers to Implementation of Changes

While SNDs have reported positive perceptions of the revised school meal standards and the potential impacts, and improved fruit and vegetable consumption due to the changes from the HHKFA (2010), they faced challenges in initial plate waste, dedicating enough time to in-service trainings, and complex and ongoing implementation (Asada, Ziemann, Zatz, & Chiriqui, 2017). Another concern of SNDs regarding changes from the HHFKA (2010) is increased food costs, compliance with food procurement changes, providing staff training, changes in student participation, and student acceptance of food (Yon, Amin, Taylor, & Johnson, 2016).

Training Provided to School Nutrition Professionals

Because of the many aspects of managing and operating a complex foodservice operation, there is the need to train SNPs in a wide range of areas. The USDA has provided guidance for training through the development of the Professional Standards Training Topics for SNPs that include learning objectives addressing four key training areas: Nutrition, Operations, Administration, and Communications and Marketing (USDA-FNS, 2018a). Table 7 shows the four key training areas of professional standards training topics and their subtopics. Outcomes of training programs for SNPs have shown positive impacts on increasing student consumption of fruits and vegetables, improving healthfulness of school meals, and SNPs' efficiency at running a foodservice operation. It is important to ensure that SNPs have a strong nutrition background because this knowledge leads to strategies for promoting healthy snacks and beverages and has been shown to improve nutrition policies and practices (Hollar et al., 2018). It is also important

Table 6.

Professional Standards for New School Nutrition Directors Hired On or After July 1, 2015

Minimum Requirements for Directors	Student Enrollment 2,499 or Less	Student Enrollment 2,500 – 9,999	Student Enrollment 10,000 or More
Minimum Education Standards (required - new directors only)	Bachelor's degree, or equivalent educational experience, with academic major or concentration in food and nutrition, food service management, dietetics, family and consumer sciences, nutrition education, culinary arts, business, or a related field; OR Bachelor's degree, or equivalent educational experience, with any academic major or area of concentration, and a State recognized certificate for school nutrition directors; OR Associate's degree, or equivalent educational experience, with academic major or concentration in food and nutrition, food service management, dietetics, family and consumer sciences, nutrition education,	Bachelor's degree, or equivalent educational experience, with academic major or concentration in food and nutrition, food service management, dietetics, family and consumer sciences, nutrition education, culinary arts, business, or a related field; OR Bachelor's degree, or equivalent educational experience, with any academic major or area of concentration, and a State recognized certificate for school nutrition directors; OR Bachelor's degree in any academic major and at least 2 years of relevant school nutrition programs experience; OR Associate's degree,	Bachelor's degree, or equivalent educational experience, with academic major or concentration in food and nutrition, food service management, dietetics, family and consumer sciences, nutrition education, culinary arts, business, or a related field; OR Bachelor's degree, or equivalent educational experience, with any academic major or area of concentration, and a State recognized certificate for school nutrition directors; OR Bachelor's degree in any major and at least 5 years experience in management of school nutrition programs.

	culinary arts, business, or a related field; and at least one year of relevant school nutrition programs experience; OR High school diploma (or GED) and 3 years of relevant experience in school nutrition programs.	or equivalent educational experience, with academic major or concentration in food and nutrition, food service management, dietetics, family and consumer sciences, nutrition education, culinary arts, business, or a related field; and at least 2 years of relevant school nutrition programs experience.	
Minimum Education Standards (preferred - new directors only)	Directors hired without an associate's degree are strongly encouraged to work toward attaining associate's degree upon hiring.	Directors hired without a bachelor's degree are strongly encouraged to work toward attaining bachelor's degree upon hiring.	Master's degree, or willingness to work toward master's degree, preferred. At least one year of management experience, preferably in school nutrition, strongly recommended. At least 3 credit hours at the university level in food service management plus at least 3 credit hours in nutritional sciences at time of hiring strongly preferred.
Minimum Prior Training Standards (required - new directors only)	At least 8 hours of food safety training is required either not more than 5 years prior to their starting date or completed within 30 calendar days of employee's start date.		

that SNPs have strong academic backgrounds because schools that require foodservice managers to be college educated or complete a foodservice training program reported using healthier food preparation methods and less unhealthy food offerings (Mincher, Symons, & Thompson, 2012; Thomson, Tussing-Humphreys, Martin, LeBlanc, & Onufrak, 2012). More research is needed on school nutrition professional training practices to develop effective school food service training interventions (Stephens & Byker, 2015).

Effective training for SNPs can result in healthy meals that comply with nutrient guidelines and are appealing to students. Increased student consumption of healthy choices such as fruits and vegetables and whole grains is positively correlated with school nutrition professional training. Taylor, Tibbett, Patel, & Bishop (2014) reported that SNPs trained in meal preparation practices and procurement strategies were able to produce healthier meals by reducing sodium in school meals. When SNPs are educated on the benefits of whole grains, whole grains are offered more often on the menu and result in increased student consumption of whole grains (Roth-Yousey, Barno, Caskey, Asche, & Reicks, 2009).

Successful outcomes from training programs for SNPs has been achieved in the various areas of school nutrition. School meal programs benefit in increased marketing and branding and increased staff motivation when SNDs are trained on healthy school environments, (Bergman et al., 2015). Providing culinary training for SNPs can improve student satisfaction, increase healthfulness of meals, and improve student experience by building a SNPs' confidence in how they manage their program and by increasing their understanding of the impact good nutrition has on academic performance (Till, Hildebrand, Brown, & Gates, 2017). Additionally, culinary trained SNPs have been shown to provide healthier meals; increase student selection and

Table 7.

Professional Standards Training Topics

Professional Standards Training Topics

1000 Nutrition
- **1100 Menu Planning**
  - 1110 USDA Nutrition Requirements
  - 1120 Cycle Menus
  - 1130 Local Foods -Farm to School
  - 1140 Standardized Recipes
  - 1150 Menu Analysis
  - 1160 Special Diets, Including Food Allergies
  - 1170 USDA Foods
- **1200 Nutrition Education**
  - 1210 Nutrition Activities
  - 1220 Classroom and Cafeteria Integration
  - 1230 School Gardens
- **1300 General Nutrition**
  - 1310 Dietary Guidelines for Americans, MyPlate, and School Nutrition
  - 1320 General Nutrition

2000 Operations
- **2100 Food Production**
  - 2110 Standardized Recipes
  - 2120 Food Production Records
  - 2130 Culinary Skills
  - 2140 Use and Care of Equipment
  - 2150 CN Labeling and Crediting
- **2200 Serving Food**
  - 2210 Portion Sizes/Special Diets
  - 2220 Offer Versus Serve
  - 2230 Maintaining Food Quality and Appearance
  - 2240 Serving Lines
- **2300 Cashier And Point Of Service (POS)**
  - 2310 Reimbursable Meals
  - 2320 POS Financial Responsibility
  - 2330 Free or Reduced Identification
- **2400 Purchasing/Procurement**
  - 2410 Product Specifications
  - 2420 Bid Solicitation and Evaluation
  - 2430 Purchase Food, Supplies, and Equipment
  - 2440 Food and Supplies Orders
  - 2450 Cooperative Purchasing Groups
  - 2460 Contracts with Food Service Management Company (FSMC)
- **2500 Receiving And Storage**
  - 2510 Inventory Management
  - 2520 Receiving and Storage
  - 2530 Hold and Recall
- **2600 Food Safety And HACCP**
  - 2610 HACCP
  - 2620 Food Safety-General
  - 2630 Federal, State, and Local Food Safety Regulations
  - 2640 Food Safety Culture

3000 Administration
- **3100 Free And Reduced Price Meal Benefits**
  - 3110 Eligibility
  - 3120 Direct Certification
  - 3130 Community Eligibility Provision (CEP)
- **3200 Program Management**
  - 3210 Staff Management
  - 3220 Standard Operating Procedures
  - 3230 Healthy School Environment
  - 3240 Emergency Plans
  - 3250 Water, Energy, and Waste Management
  - 3260 Administrative Review
- **3300 Financial Management**
  - 3310 Meal Counting, Claiming, and Managing Funds
  - 3320 Compliance with Regulations/Policies
  - 3330 Budgets
  - 3340 Financial Analysis
  - 3350 Pricing

3360 Communicate Financial Information

3400 Human Resources And Staff Training

3410 Human Resources Management

3420 Policies and Procedures

3430 Training Plans and Tracking

3440 Retention, Promotion, and Recognition

3450 Employee Health, Safety, and Wellness

3500 Facilities And Equipment Planning

3510 Facility and Equipment Planning

3520 Equipment Purchasing and Maintenance

4000 Communications And Marketing

4100 Communications And Marketing

4110 Strategic and Marketing Plans

4120 Program Promotion

4130 Customer Service

4140 Communication Skills

4150 School and Community Communication

4160 Smarter Lunchrooms Techniques

consumption of whole-grains and vegetables; and increase school meal participation (Cohen et al., 2012; Just, Wansink, & Hanks, 2014; Till et al., 2017). In one study, registered dietitians were utilized in a 10-year initiative to improve school food environments. They created menus that focused on food presentation and could be efficiently made with limited space and equipment, and used recipes that could be standardized. This study found that following the menus created by culinary and nutrition experts resulted in those schools having an increased availability of fruits and vegetables, whole grains, and low-fat dairy while having a decrease in availability of saturated fat, and added sugars (Perlman et al., 2012).Training SNPs to care for students with special needs is another important training topic and may be more challenging than meeting the nutrition needs of the general student population. Four-hour long trainings for SNDs on the special nutrition needs of students showed increases in knowledge of federal regulations and special needs conditions. Participants responded positively to the training and reported that they were able to apply the training information in the school setting (Oakley, Knight, Hobbs, Dodd, & Cole, 2011).

Workplace Training and Education

In order for training programs developed for school nutrition programs to be effective, there needs to be an understanding of best practices. In general, continuing education in the workplace is necessary and important to keep employees up to date and utilize best practices in carrying out job duties. Presenting information to adult audiences, such as SNPs, requires specific execution in order to be effective. The delivery style needs to be engaging in order to keep learners focused on the training (Smith, 2017). Adults are more prone to pay attention when they believe the training is relevant and valuable to them and their tasks (The National Center of Program Management and Fiscal Operations (NCPM), 2018). Additionally, the material must be presented respectfully and without patronizing learners. Adults have many life experiences to draw from and will feel more value from the training if the information can be related to those experiences. Information presented in this manner encourages memory retention and overall effectiveness of the training. Allowing the learner to participate in the training and apply skills and knowledge also increases the effectiveness of the training (Merli, 2011).

Effective workplace learning requires flexibility for information delivery and the ability to customize the content with each delivery. Trainings and training material are often repeated and reused in order to reach a large audience. However, training material needs to be modified to meet the needs of individual learners to show relevancy for maximum effectiveness on the learners (Duvernet & Whelan, 2017). The information also needs to accommodate changes in learners' expectations by identifying knowledge gaps and making information relevant to each training session.

Online learning is proving to be an effective training method and is becoming commonplace due to the cost-effectiveness of this method compared to the classroom setting (Zolkos, 2002). Depending upon the format, online training can allow learners to access information any time of day and at almost any location, while classroom instruction time and location have more limitations. Online learning has been shown to have the ability to provide immediate feedback and engage different levels of comprehension as effectively as in person classroom settings (Welsh, Wanberg, Brown, & Simmering, 2003). Just like in-person instruction, online learning can include simulations, videos, graphics, and animations to provide a variety of interactions and to keep the learner's attention. There are prepackaged online learning programs, which may be optimal in reducing information overload with the ability to split up training sessions and provide consistency. However, a disadvantage of prepackaged online training is that it can also be off-putting to adult learners if the information is not deemed relevant to their job tasks (Park & Choi, 2009). Another concern with prepackaged online trainings is that learners may not receive the amount of interaction they need with other learners or with trainers who can provide further information and explanations. It is imperative that online trainings provide opportunities for learners to apply skills and practice to increase memory retention (Pagano, Haddad, & Crosby, 2017).

Trainings offered in multiple locations also face consistency and distance related barriers. Trainings that are taught and created by two separate groups or people can have a disconnect between the original intended information and the actual delivered information (Tait, 2002). These inconsistencies between design and delivery can be further exacerbated by geographical distance from colleagues and distance from central campus (Beaumont, Stirling, & Percy, 2009).

The Institute of Child Nutrition

The Institute of Child Nutrition (ICN) is the only federally funded national center dedicated to providing education, training and technical assistance to child nutrition and childcare professionals. The ICN was established by the Child Nutrition and WIC Reauthorization Act of 1989 to promote the improvement of child nutrition programs. The duties of the ICN are outlined in section 21 of the Richard B. Russell National School Lunch Act and are provided through the four divisions of the ICN: Education and Training, Information Services, Administration, and Applied Research. The ICN is required to: 1) conduct training activities pertaining to technical assistance to those in child nutrition programs in regards to financial management, physical resources, procurement, sanitation and food safety, meal planning and culinary skills, 2) include activities and assistance in menu planning, 3) implementation and compliance of regulations 4) conducting relevant school nutrition based research, 5) develop training materials and informational materials and 6) assist state agencies to provide additional nutrition information.

The ICN provides free online and face-to-face trainings and training resources for child nutrition and child care professionals. The face-to-face trainings are offered on-site at the ICN building on the University of Mississippi campus and off-site at requested locations in all 50 states and U.S. territories. The ICN assists professionals in managing child nutrition programs including school lunch, school breakfast, summer food service, and child and adult care food programs. In 2017, the ICN reached over 14,000 professionals in over 400 on-site trainings in 44 states and Guam. The ICN also conducts conference sessions and presentations at national and state nutrition association meetings (ICN, 2017).

The ICN offers a multitude of programs, which can be found and requested through their website (https://theicn.org/training/#). One well established program that the ICN offers as a 5-day face-to-face training, both on- and off-site, is called "Orientation to School Nutrition Management" and is targeted to new and aspiring SNDs who have five years or less experience (Institute of Child Nutrition, n.d.). This training is the most comprehensive training of school nutrition management the ICN offers in one training session. The topics covered are: 1) Program Accountability, Integrity, and Role of Director, 2) Food Production and Operation Management, 3) USDA Foods, 4) Meal Pattern/Healthier U.S. School Challenge, 5) Special Needs, 6) Customer Service, Merchandising & Food Presentation, 7) Federal Regulations, 8) Farm to School, 9) Financial Management, 10) Procurement and Inventory Management, 11) Human Resource Management, 12) Marketing, 13) Food Safety Basics, 14) Workplace Safety and Emergency Preparedness. These topics have been guided by the USDA's Professional Standards Training Topics. Activities offered throughout the 5-day training provide the skills for participants to create individualized goals and the ability to implement them at their respective schools.

The on-site trainings are offered three times a year, typically during January, March, and June. The off-site trainings are offered upon request throughout the U.S. and U.S. territories. Off-site trainings must be requested at least 8-10 weeks before the training date and a minimum of 25 participants is required for the ICN to provide the training. By design, trainings are kept small, usually accommodating 25-45 participants. The ICN provided 46 trainings between August 2012 and March 2018 reaching 1033 participants across the U.S. and U.S. territories during that time frame.

Statement of Purpose

The constantly changing regulations and many job responsibilities of SNDs substantiate the need for training and resources to support them. The ICN provides both trainings and resource materials to SNDs and other child nutrition professionals. The purpose of the study was to evaluate the effectiveness the ICN's "Orientation to School Nutrition Management" by evaluating participants' change in knowledge, the perception of the training session and training information's usefulness, and implementation of changes in participants' operations. This 5-day (30.5 hour) face-to-face training is directed towards new and aspiring SNDs.

Research Questions

Question 1: Do participants gain knowledge from this training?

Question 2: Do participants perceive the ICN's Orientation to School Nutrition Management as an effective training program?

Question 3: Did participants make changes to their operation as a result of the training at 6 months after the training and at 12 months after the training?

CHAPTER 3

METHODOLOGY

Participants

The training "Orientation to School Nutrition Management" is offered on-site at the Institute of Child Nutrition (ICN) building on the University of Mississippi campus. The ICN on-site trainings are offered three times a year, typically during January, March, and June. Off-site trainings are offered upon request throughout the U.S. and U.S. territories. The ICN provided 44 trainings between August 2012 and March 2018 reaching 1033 participants across the U.S. and U.S. territories as of July 2018. Of the 955 returned evaluations, there were 371 (39.3%) on-site participants and 584 (61.8%) off-site participants. Regarding job positions, of the 955 returned evaluations there were 318 (34.7%) directors and 637 (67.4%) non-directors. Of those 955 responses, 615 (65.1%) were school nutrition professionals and 340 (35.9%) were non-school nutrition professionals.

Instruments

To evaluate the training program, the ICN utilized three different instruments: a pre-training/post-training knowledge based quiz, a subjective training program evaluation, and a follow-up application survey at six months and 12 months post-training. These surveys were developed by the ICN's Applied Research Division. All training and evaluation data was

collected by the ICN and is, therefore, secondary data. This study was approved by the Institutional Review Board at the University of Mississippi (#18x-062).

Pre-Training/Post-Training Knowledge Based Quiz. Prior to beginning the training program, the trainer distributed a 20-item, multiple-choice knowledge based quiz (Appendix A). The ICN's Applied Research Division found that 20 questions was an optimal number to provide participants without overwhelming them before and after the training. Key concepts for school nutrition included questions regarding program accountability, food production, meal patterns, special needs, customer service, procurement and inventory management, marketing, food safety basics, workplace safety, and emergency preparedness.

Upon completion of the pre-training quiz, participants were asked to place and remember a unique identifier or symbol at the top right of their quiz. An identical post-training quiz was distributed at the end of the training program. Once the participant had completed the post-training quiz they placed the same identifier on the top right corner that they used for their pre-training quiz. The pre-training and post-training quiz were later matched by the symbols and graded out of 100 possible points. All incomplete or unmatchable quizzes were discarded. There were 663 completed and matched pre-training/post-training knowledge based quizzes. Of those, 587 quizzes were also matched up with a training location.

Training Program Evaluation. The training program (referred to as "session" in the evaluation questions) evaluation was also completed by participants immediately completion of the training to determine participants' perceptions of and experiences with the program (Appendix B). The evaluation consisted of a multiple-choice selection for a job position, 14 multiple-choice questions on perception of (i.e. The session objectives were clearly presented.) and experience with (i.e. I can apply what I learned in this session to my job.) the training

session and two open-ended questions. The 14 multiple-choice questions were measured on a 5-point Likert scale (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; and 5=strongly agree). The two open-ended questions were included to determine what information participants found most useful and any additional comments. Evaluations utilized after June 2017 included two additional open-ended questions to determine what additional training topics participants felt would be beneficial and what method of training participants preferred. There were 955 completed training evaluations.

Follow-Up Application Surveys. The follow-up survey was distributed at six months post-training and 12 months post-training via SurveyMonkey and delivered via email. The survey consisted of four yes/no questions regarding the applicability of ICN training information to participants' jobs and three open-ended questions to determine what information was used in their operation, if any (Appendix C). Participants selected from a multiple-choice selection list to identify their job position. There were 30, 6-month post-training surveys completed and 13, 12-month post-training surveys completed.

Statistical Analyses

All data were analyzed using the statistical package Version 24 of SPSS. An alpha level of .05 was used for all statistical tests.

Pre-Training/Post-Training Knowledge Based Quiz. Paired sample t-tests were used to determine if there were statistically significant changes in participants' knowledge from the pre- to post-training. Independent t-tests were run to identify if there were differences in knowledge change based on training site. Correlations between participants' pre-training scores and their

own post-training scores were used to determine patterns in participant baseline and resultant knowledge.

Training Program Evaluation. Job positions were manually grouped in two different variations for analysis: 1) director or non-director and 2) school nutrition professional or non-school nutrition professional categories. Participants self-selected a job position from the following list: district director, state agency staff, educator, major city director, site-level manager, "other", private consultant/trainer, and foodservice assistant. The "other" category allowed participants to write in another job position, such as an accountant or assistant director. The director category included district directors, major city directors, and other relevant director positions from the "other" category. The school nutrition professional category included district directors, major city directors, site-level managers, foodservice assistant and school nutrition professional relevant positions from the "other" category. The non-school nutrition professional included all additional job positions provided.

Descriptive statistics for individual question means, standard deviations, and percentages were obtained for each of the 14 questions in the participant training evaluation. Cronbach alpha was conducted and determined the acceptable internal reliability of the 14 questions (14 items; $\alpha = 0.928$).

Independent t-tests were used to identify associations between participants' perception of the training for on-site and off-site, and associations between participants' perception of training depending on their job position (director vs non-director, school nutrition professional vs non-school nutrition professional).

Evaluation questions one through twelve were grouped into three factors [training accomplishing training session goals (session goals), training elements, and the applicability of

the training to their jobs (applicability)]. These groups were arranged by placing together questions with similar subjects. Session goals included questions 1-3, training elements included questions 4-6,8 and 9, and applicability included questions 7, and 10-12 (Appendix B).

Multiple linear regressions were used to identify which factors affected recommendation scores (evaluation question 13) for participants who attended on-site training and for those who attended off-site. Multiple linear regressions were also used to identify which factors affected participant training session expectations (question 14) for participants who trained on-site and for participants who trained off-site. The Durbin-Watson test was used to detect the presence of autocorrelation among the dependent and independent variables. All four Durbin-Watson scores were between 1.5 and 2.5, which is acceptable and therefore the data was not autocorrelated.

Additional multiple linear regressions were also used to identify which factors affected recommendation scores (evaluation question 13) for school nutrition professionals and non-school nutrition professionals. Multiple linear regressions were also used to identify which factors affected expectations scores (evaluation question 14) for school nutrition professionals and non-school nutrition professionals. The Durbin-Watson test was used to detect the presence of autocorrelation among the dependent and independent variables. All four Durbin-Watson scores were between 1.5 and 2.5, which is acceptable and therefore the data was also not autocorrelated.

Thematic analysis was used on open-ended questions allowing participants to identify which topics they found most useful. Additional themes from the open-ended question allowing participants to identify which training methods were preferred were also determined using qualitative analyses. Responses to the open-ended questions were compiled and separated by each training session. Researchers manually tallied up topics that participants entered and

assigned a point to each named topic. Some participants (N = 173) responded that “all topics were useful”. Since these responses did not identify a specific topic, they were not used in the analysis.

Follow-Up Application Surveys. Themes for the topics participants implemented in their operations were determined through qualitative analyses. Responses to the open-ended questions were compiled from the 6 and 12-month follow-up surveys. Researchers manually tallied up topics that participants entered and assigned a point to each named topic.

CHAPTER 4

RESULTS

Participants

A total of 1033 participants across the U. S. and U.S. territories attended the "Orientation to School Nutrition Management" training from August 2012 to March 2018. A total of 663 participants completed the pre-training/post-training knowledge based quiz, 955 completed the training evaluation, 30 completed the 6-month follow-up survey, and 13 completed the 12-month follow-up survey. Participants who completed the training evaluation are categorized by job position and found in Table 8.

Table 8.

Descriptives of Job Position and Training Location

Job Position	*N* = 955 (%)	On-site (*n* = 371)	Off-site (*n* = 584)
Director	318 (33.30%)	123 (33.13%)	195 (33.39%)
Non-Director	637 (66.70%)	248 (66.85%)	389 (66.61%)
School Nutrition Professional	615 (64.40%)	208 (56.07%)	407 (69.69%)
Non-School Nutrition Professional	340 (35.60%)	163 (43.94%)	177 (30.31%)

Pre-/Post-Training Knowledge Based Quiz

There were 663 completed pre-training/post-training knowledge based quizzes with 587 completed quizzes matched up with a training location. Scores were based on a 100 point maximum. The pre-training/post-training knowledge based quiz scores for all participants (N = 663) showed a significant increase from pre-training scores (M = 60.73, SD = 13.38) to post-training scores (M = 71.82, SD = 13.61), $t(662) = -20.95$, $p < .001$ (Table 9).

The knowledge based quiz scores for **on-site participants** (N = 245) showed a significant increase from pre-training scores (M = 61.43, SD = 12.79) to post-training scores (M = 72.71, SD = 13.07), $t(245) = -13.47$, $p < .001$.

Table 9.

Quiz Scores For All Participants

	Pre-training score (N = 663)		Post-training score (N = 663)		
	Mean	SD	Mean	SD	T-test
All participants	60.73	13.38	71.82	13.61	-20.95***

****p<.001*

The knowledge based survey scores for **off-site participants** (N = 342) survey scores also showed a significant increase from pre-training scores (M = 59.82, SD = 13.43) to post-training scores (M = 71.58, SD = 14.01), $t(341) = -15.51$, $p < .001$ (Table 10).

Table 10.

Quiz Scores with Training Locations

	On-site participants (N = 245)		Off-site participants (N = 342)		
	Mean	SD	Mean	SD	T-test
Pre-training score	61.43	12.79	59.82	13.43	-13.47***
Post-training score	72.71	13.07	71.58	14.04	-15.51***

****p<.001*

A correlation test was conducted to examine the relationship between the pre-training and post-training participant scores. For **all participants**, the pre-training and post-training scores were moderately positive correlated ($r(663) = 0.49$, $p < .001$) with participants testing 11.09 points higher after the trainings (95% CI [10.05, 12.13]). This reflects that participants who tested higher in pre-training tended to test higher post-training and participants who tested lower in pre-training tended to test lower post-training.

A correlation test was conducted to examine the relationship between the pre-training and post-training participant scores for on-site training and off-site training. Results showed a moderately positive correlation between pre-training and post-training scores for **on-site** ($r(245) = .486$, $p < .001$) and **off-site** ($r(342) = .479$, $p < .001$) with on-site testing 11.29 points higher after trainings (95% CI [9.64, 12.94]) and off-site testing 11.75 points higher after trainings (95% CI [10.26, 13.25]).

Independent t-tests were conducted to examine the relationship between starting knowledge (pre-training scores) and location of training, and between resulting knowledge (post-training scores) and location of training. The **on-site** pre-training scores ($M = 61.43$, $SD = 12.79$) did not show a significant difference from **off-site** pre-training scores ($M = 59.82$, $SD = 13.43$), $t(585) = 1.46$, $p = .15$. The **on-site** post-training scores ($M = 72.71$, $SD = 13.07$) also did not show a significant difference from **off-site** post-training scores ($M = 71.58$, $SD = 14.01$), $t(585) = 1.00$, $p = .32$.

Training Program Evaluation

There were 955 completed training program evaluations. Of the completed evaluations, 371 (39.3%) were on-site and 584 (61.8%) were off-site. Regarding director level positions, there were 318 (34.7%) directors and 637 (67.4%) non-directors. Regarding school nutrition professionals (SNPs), there were 615 (65.1%) SNPs and 340 (35.9%) non-school nutrition professionals (non-SNPs).

Table 8 shows the job positions for the participants who completed the training evaluation (N = 955). The majority of participants were non-directors (N = 637) and SNPs (N = 615). On-site trainings and off-site trainings had the similar proportions of directors (33.15% and 33.39%, respectively) compared to non-directors (66.85% and 66.61%, respectively). However, when grouped by school nutrition professional, there was a lower percentage of school nutritional professionals attending on-site training (56%) compared to off-site training (69%).

An independent t-test was conducted to compare participants' perception of training effectiveness measures based on training location. Of the 14 training evaluation questions (Table 11), there was a significant difference in participants' perception that the content was organized (question 4) with **off-site participants** (M = 4.61, SD = 0.63) evaluating organization significantly higher than **on-site participants** (M = 4.50, SD = 0.72), $t(950) = -2.362$, $p < 0.05$. There was also a significant difference in participants' perception that training activities helped them understand the content (question 9) with **off-site participants** (M = 4.62, SD = 0.57) evaluating training activities significantly higher than **on-site participants** (M = 4.53, SD = 0.63), $t(952) = -2.19$, $p < 0.05$.

Independent t-tests were conducted to compare the results of participants' perception of training effectiveness measures based on their job position, director or non-director. Overall, directors evaluated all 14 questions higher than non-directors with 7 of the 14 questions being evaluated significantly higher (Table 12). As an example; there was a significant difference in perception that the training session provided participants the opportunity to actively participate (question 3) between directors (M = 4.87, SD = 0.35) and non-directors (M = 4.78, SD = 0.49), $t(952) = 2.88$, $p < 0.001$. There was also a significant difference in whether or not a participant would recommend the training session to others (question 13) between directors (M = 4.84, SD = 0.39) and non-directors (M = 4.74, SD = 0.51), $t(950) = 2.99$, $p < 0.001$. Directors seem to believe there is more value in the ICN training program than non-directors.

Overall, SNPs evaluated all 14 questions higher than non-SNPs with 10 of the 14 questions being evaluated significantly higher (Table 13). SNPs felt that they can apply what they have learned in the training session to their jobs (M = 4.78, SD = 0.45) more than non-SNPs (M = 4.57, SD = 0.64), $t(953) = 5.84$, $p < .001$ (question 7). SNPs also felt that the training sessions increased their skill on the topic (M = 4.65, SD = 0.56) more than non-SNPs M = 4.51, SD = 0.68), $t(950) = 3.59$, $p < .001$ (question 13). SNPs also felt that the training met or exceeded expectations (M = 4.73, SD = 0.53) more than non-SNPs (M = 4.57, SD = 0.63), $t(948) = 4.36$, $p < .001$ (question 14). These results are similar to the comparison between directors and non-directors suggesting that SNPs perceived the trainings to be more valuable and relevant compared to non-SNPs.

A multiple linear regression was conducted using the three factors [training accomplishing training session goals (session goals), training elements, and the applicability of the training to their jobs (applicability)] to predict the effect of participants' training location and

recommendation of the training to others (question 13). The results of the regression for **on-site participants** indicated that two factors explained 57% of variance (R^2 = .57, F(3,367) = 162.33, p < .001). It was found that session goals (β = .24, p < .001) and applicability (β = .56, p < .001) significantly predicted participants recommending the training.

The results of the regression to predict **off-site participants' recommendation** of the training to others (question 13) indicated that two factors explained 56.1% of variance (R^2 = .56, F(3,577) = 246.09, p < 0.001). It was found that training elements (β = .28, p < .001) and applicability (β = .63, p < .001) significantly predicted participants recommending the training.

The results of the regression to predict **on-site participants' predicted expectations** being met with the training session (question 14) indicated that three factors explained 63.5% of variance (R^2 = .64, F(3,366) = 212.58, p < 0.001). It was found that session goals (β = .34, p < .001)

The results of the regression to predict **off-site participants' predicted expectations** being met with the training session (question 14) indicated that three factors explained 59.1% of variance (R^2 = .59, F(3,576) = 277.77, p < 0.001). It was found that session goals (β = .20, p < .001) training elements (β = .43, p < .001) and applicability (β = .46, p < .001) significantly predicted participants' expectations being met with the training.

The results of the regression to predict **SNPs' recommendation** of the training to others (question 13) indicated that two factors explained 58.3% of variance (R^2 = .58, F(3,608) = 283.67, p < 0.001). It was found that training elements (β = .20, p < .001) and applicability (β = .65, p < .001) significantly predicted SNPs recommending the training.

Table 11.

Results from Training Program Evaluation: Relationship between participant perception of training and training location (On-site vs Off-site)

Survey Questions	Training Location	Mean	Std. Deviation	T-Test
1. The session objectives were clearly presented.	On site	4.71	.54	-0.59
	Off site	4.73	.47	-0.57
2. The session objectives were achieved.	On site	4.58	.60	-0.24
	Off site	4.59	.56	-0.24
3. The session provided me with an opportunity to actively participate.	On site	4.83	.44	0.86
	Off site	4.80	.46	0.86
4. The content was organized.	On site	4.50	.72	-2.36***
	Off site	4.61	.63	-2.29***
5. The activities supported learning.	On site	4.65	.58	-0.99
	Off site	4.69	.54	-0.97
6. The activities held my attention.	On site	4.42	.73	-1.13
	Off site	4.47	.68	-1.11
7. I can apply what I learned in this session to my job.	On site	4.67	.58	-1.52
	Off site	4.73	.50	-1.47
8. The trainer[s] answered questions adequately.	On site	4.67	.56	-1.73
	Off site	4.73	.51	-1.70
9. The training activities helped me to understand the content.	On site	4.53	.63	-2.19***
	Off site	4.62	.58	-2.14
10. The handouts provided will be useful reference materials.	On site	4.78	.46	-1.70
	Off site	4.82	.39	-1.64
11. Attending the session increased my knowledge on the topic.	On site	4.73	.51	-0.99
	Off site	4.76	.47	-0.97
12. Attending the session increased my skill on the topic.	On site	4.62	.63	0.73
	Off site	4.59	.60	0.72
13. I would recommend this session to others.	On site	4.77	.49	-0.14
	Off site	4.78	.47	-0.14
14. Overall- the training session met or exceeded my expectations.	On site	4.63	.62	-1.78
	Off site	4.70	.54	-1.73

****p* < .001. Means rating based on a 5-point rating scale: 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree

Table 12.

Results from Training Program Evaluation: Relationship between participant perception of training and participant job position (Director vs Non-Director)

Survey Questions	Job Position	Mean	Std. Deviation	T-Test
1. The session objectives were clearly presented.	Director	4.75	0.47	1.24
	Non-Director	4.71	0.51	1.27
2. The session objectives were achieved.	Director	4.59	0.58	0.38
	Non-Director	4.58	0.58	0.38
3. The session provided me with an opportunity to actively participate.	Director	4.87	0.35	2.88***
	Non-Director	4.78	0.49	3.23***
4. The content was organized.	Director	4.58	0.62	0.43
	Non-Director	4.56	0.70	0.45
5. The activities supported learning.	Director	4.73	0.48	2.16***
	Non-Director	4.65	0.58	2.31***
6. The activities held my attention.	Director	4.52	0.63	2.12***
	Non-Director	4.42	0.73	2.23***
7. I can apply what I learned in this session to my job.	Director	4.84	0.38	5.52***
	Non-Director	4.64	0.59	6.35***
8. The trainer[s] answered questions adequately.	Director	4.73	0.49	0.88
	Non-Director	4.70	0.55	0.91
9. The training activities helped me to understand the content.	Director	4.62	0.54	1.49
	Non-Director	4.56	0.63	1.57
10. The handouts provided will be useful reference materials.	Director	4.84	0.37	1.95
	Non-Director	4.79	0.44	2.05
11. Attending the session increased my knowledge on the topic.	Director	4.78	0.44	1.49
	Non-Director	4.73	0.51	1.55
12. Attending the session increased my skill on the topic.	Director	4.67	0.54	2.52***
	Non-Director	4.57	0.64	2.66***
13. I would recommend this session to others.	Director	4.84	0.39	2.99***
	Non-Director	4.74	0.51	3.27***
14. Overall- the training session met or exceeded my expectations.	Director	4.75	0.49	2.73***
	Non-Director	4.64	0.60	2.92***

****p* < .001. Means rating based on a 5-point rating scale: 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree

Table 13.

Results from Training Program Evaluation: Relationship between participant perception of training and participant job position (SNP vs Non-SNP)

Survey Questions	Job Position	Mean	Std. Deviation	T-Test
1. The session objectives were clearly presented.	SNP	4.73	.50	0.79
	Non-SNP	4.70	.50	0.79
2. The session objectives were achieved.	SNP	4.60	.57	1.08
	Non-SNP	4.56	.58	1.08
3. The session provided me with an opportunity to actively participate.	SNP	4.84	.43	2.23***
	Non-SNP	4.77	.48	2.16***
4. The content was organized.	SNP	4.59	.66	1.34
	Non-SNP	4.53	.69	1.33
5. The activities supported learning.	SNP	4.71	.52	2.61***
	Non-SNP	4.61	.60	2.50***
6. The activities held my attention.	SNP	4.49	.69	2.11***
	Non-SNP	4.39	.72	2.09***
7. I can apply what I learned in this session to my job.	SNP	4.78	.45	5.83***
	Non-SNP	4.57	.64	5.30***
8. The trainer[s] answered questions adequately.	SNP	4.73	.50	1.85
	Non-SNP	4.67	.58	1.78
9. The training activities helped me to understand the content.	SNP	4.61	.56	1.99***
	Non-SNP	4.53	.65	1.90***
10. The handouts provided will be useful reference materials.	SNP	4.84	.38	3.05***
	Non-SNP	4.75	.47	2.88***
11. Attending the session increased my knowledge on the topic.	SNP	4.78	.46	2.51***
	Non-SNP	4.70	.53	2.41***
12. Attending the session increased my skill on the topic.	SNP	4.65	.56	3.59***
	Non-SNP	4.51	.68	3.40***
13. I would recommend this session to others.	SNP	4.81	.45	3.12***
	Non-SNP	4.71	.52	2.99***
14. Overall- the training session met or exceeded my expectations.	SNP	4.73	.53	4.36***
	Non-SNP	4.57	.63	4.15***

****p* < .001. Means rating based on a 5-point rating scale: 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree

The results of the regression to predict **non-SNPs' recommendation** of the training to others (question 13) indicated that two factors explained 51.8% of variance (R^2 = .52, F(3,336) = 120.61, p < 0.001). It was found that training elements (β = .21, p < .001) and applicability (β = .56, p < .001) significantly predicted non-SNPs recommending the training.

The results of the regression to predict **SNPs' predicted expectations** being met with the training session (question 14) indicated that three factors explained 64.5% of variance (R^2 = .65, F(3,335) = 202.70, p < 0.001). It was found that session goals (β = .32, p < .001), training elements (β = .42, p < .001) and applicability (β = .46, p < .001) significantly predicted SNPs' expectations with the training.

The results of the regression to predict **non-SNPs' predicted expectations** being met with the training session (question 14) indicated that three factors explained 57.8% of variance (R^2 = .58, F(3,607) = 276.98, p < 0.001). It was found that session goals (β = .21, p < .001), training elements (β = .39, p < .001) and applicability (β = .48, p < .001) significantly predicted non-SNPs' expectations with the training.

training elements (β = .33, p < .001) and applicability (β = .53, p < .001) significantly predicted participants' expectations being met with the training.

Regardless of the location of training or job position, how well the training accomplished training session goals, the content of training elements, and the applicability of the training to participants' jobs, all contributed to participants being willing to recommend the training to others and their overall expectations being met.

There were four open-ended questions on the training evaluation tool. The participants answered the first open-ended question asking them to identify the training topic areas that they felt were most useful (Table 14). The top five topics identified as most useful are as follows:

Financial Management (37.4%), Procurement and Inventory Management (14.9%), Meal Pattern/Healthier U.S. School Challenge (8.8%), Human Resource Management (7.9%), and Marketing (7.0%). The lowest percentage of participants found the topics of special needs (1.3%), USDA Foods/DoD Foods (1.4%), and Customer Service, Merchandising, and Food Presentation (1.5%) as most useful.

Additionally, of the 167 participants that responded to the open-ended question regarding preferred method of receiving training (open-ended question 4), the majority of on-site [*n* = 55(55%)] and off-site [*n* = 47(70.15%)] participants reported preferring face to face/in-person trainings over online/webinar trainings [*n* = 28(28%), *n* = 17(25.37%), respectively]. The second and third open-ended questions from the training program evaluation were not analyzed. Responses to the prompt for "additional comments" did not result in actionable items; most responses were expressing gratitude. Responses prompted by "additional beneficial training topics" were primarily topics that were already in the training.

Follow-up Application Survey

Participants answered an open-ended question regarding which topics they implemented and made changes to their operation. Of the 30 completed surveys, 20 responded to the open-ended question from the 6-month follow-up surveys. Six participants made changes in food production and operation management, three participants made changes in procurement and inventory management, and four participants made changes in meal pattern/Healthier U.S. School Challenge and seven provided various other responses (Table 15). Of 13 completed surveys, 5 responded to the open-ended question from the 12-month follow-up surveys. Three

participants made changes in food production and operation management, one participant made changes in meal pattern/Healthier U.S. School Challenge and one participant made changes regarding federal regulations (Table 15).

Table 14.

Results from Training Program Evaluation: Most Useful Topics

Topic (Hours Provided)	Off-site	On-site	Total	Percentage
Financial Management (4 hours)	182	183	365	37.4%
Procurement and Inventory Management (3 ½ hours)	69	77	146	14.9%
Meal Pattern/Healthier U.S. School Challenge (2 ¼ hours)	57	29	86	8.8%
Human Resource Management (1 ¾ hours)	35	42	77	7.9%
Marketing (2 hours)	36	32	68	7.0%
Workplace Safety and Emergency Preparedness (1 ¼ hours)	33	12	45	4.6%
Federal Regulations (2 ¾ hours)	19	20	39	4.0%
Program Accountability, Integrity, and Role of Director (2 hours)	19	14	33	3.4%
Food Safety Basics (1 ½ hours)	17	11	28	2.9%
Food Production and Operation Management (2 ¼ hours)	16	11	27	2.8%
Farm to School (1 hours)	8	13	21	2.1%
Customer Service, Merchandising & Food Presentation (1 ¼ hours)	6	9	15	1.5%
USDA Foods/DoD Foods (1 ¼ hours)	7	7	14	1.4%
Special Needs (50 minutes)	7	6	13	1.3%
All	95	78	173	-

Participants answered four yes/no questions regarding if they applied the training to their jobs. Of the 30 responses from the 6-month follow-up survey, all 30 participants reported sharing information from the training with a colleague, 26 conducted a presentation or training on the training content, 20 implemented changes to their operation and 25 planned to conduct a presentation or training in the next 6 months (Table 16). Of the 13 responses from the 12-month

follow-up survey, 12 participants reported sharing information from the training with a colleague, 13 conducted a presentation of training on the training content, 7 implemented changes to their operation and 9 planned to conduct a presentation or training in the next 6 months.

There were no identifiers in the follow-up surveys so responses from the 6-month and 12-month surveys could not be matched with job position or any demographics.

Table 15.

Results from Follow-Up Application Survey: Topics Implemented in Operations

Topics	6 Month	12 Month
Food Production and Operation Management	6	3
Meal Pattern/Healthier U.S. School Challenge	4	1
Food Safety Basics	3	0
Procurement and Inventory Management	3	0
Financial Management	2	0
Customer Service, Merchandising & Food Presentation	1	0
Marketing	1	0
Federal Regulations	0	1

Table 16.

Results from Follow-Up Application Survey: Application to Job

Question	Response	6 Month	12 Month
Have you shared any information you gained through the ICN training with a colleague?	Yes	30	12
	No	0	1
Have you conducted a presentation or training on the content you received through the ICN training?	Yes	26	13
	No	4	0
Based on the knowledge or skills gained by participating in the ICN training session, have you implemented any changes to your operation?	Yes	20	7
	No	10	6
Do you plan to conduct a presentation or training in the next 6 months?	Yes	25	9
	No	4	4

CHAPTER 5

DISCUSSION

The purpose of this study was to assess the effectiveness of the training "Orientation to School Nutrition Management" by evaluating participants' change in knowledge, the perception of the training session and training information's usefulness, and implementation of changes in participants' operations.

Participants

The participant job positions (Table 8) showed that both on-site and off-site trainings had more non-directors than directors and more SNPs than non-SNPs. This larger percentage of SNPs in off-site trainings could be attributed to these trainings requiring at least 25-30 participants for the ICN to send a trainer to the school site. Because of the lower financial burden to the school district by not having to cover travel expenses of attending training off-site, schools would most likely encourage the participation of all kitchen staff and other SNPs.

While the training is targeted towards new and aspiring directors, other SNPs and non-SNPs are permitted to attend the training as they may also benefit. A non-SNP, such as a school accountant, may be in charge of the financial aspect of the school nutrition program and may gain a better overall understanding of school nutrition programs. Additionally, by allowing non-SNPs to attend trainings, the ICN can be viewed as fulfilling its mission to provide information and services to promote improvement of child nutrition programs (Institute of Child Nutrition,

n.d.). This is reflected in a quote from a participant who works at a state agency "I am always on the lookout for new ways to communicate and train on various school nutrition program topics and requirements. This course was a nice look at the various requirements within the school nutrition program."

Pre-/Post-Training Knowledge Based Quiz

Providing trainings on-site and off-site can deliver two different learning experiences (Beaumont, Stirling, & Percy, 2009; Tait, 2002). These differences can be a result of inconsistencies in the delivery style of the trainer, presentation of materials, or planned activities. Additionally, the participant make-up of the trainings on-site and off-site may differ and contribute to the learning outcomes. The quiz scores reflected that the ICN training was equally effective in increasing school nutrition management knowledge on both on-site and off-site. The gained knowledge may result in changes to participants' operations as previous research has found that training school nutrition professionals (SNPs) increases school nutrition knowledge and increases their efficiency in running a school foodservice operation (Bergman et al., 2015; Hollar et al., 2018; Perlman et al., 2012). Hollar et al. (2018) found that providing training and technical assistance to childcare professionals improved nutrition policies and practices. Training SNPs has also been found to improve healthfulness of menus and increase consumption of fruits and vegetables (Cohen et al., 2012; Hollar et al., 2018; Just, Wansink, & Hanks, 2014; Taylor, Tibbett, Patel, & Bishop, 2014; Till et al., 2017).

Both on-site and off-site participants had significant increases in knowledge. When quiz scores were compared between on-site and off-site participants, their pre-training knowledge and

post-training knowledge had no significant differences. Only total final scores for the knowledge based quizzes were provided for analysis so no specific training areas could be identified as areas of strengths or weaknesses among the participants.

Regardless of training location or pre-test score measure, all participants' school nutrition management knowledge significantly increases. This suggests that regardless of starting level of school nutrition management knowledge, all participants benefitted from the training.

Training Program Evaluation

Participant perception of training. Regardless of job position and training location, participants evaluated the training session highest in: providing opportunities to actively participate (question 3), perceiving the handouts to be useful reference materials (question 10) and recommending the training to others (question 13). Regardless of job position and training location, participants evaluated two questions the lowest; the organization of the content (question 4) and how well the activities held their attention (question 6). It is important to note that even the lowest evaluation measures still reflected measures of agreement to strong agreement, reflecting positive evaluations. It is interesting to note that participants evaluated the training highest in providing opportunities to actively participate and lowest in the activities hold their attention. Ensuring that activities are relevant to participants is a key principle to effective adult learning (Duvernet, & Whelan, 2017; NCPM, 2018; Park, & Choi, 2009). It has been shown that to promote participant attention to activities, relevancy to the job needs to be increased (Duvernet, & Whelan, 2017; NCPM, 2018; Park, & Choi, 2009). Changing the training delivery style may also need to occur to promote participant interest (Smith, 2017). These are

always challenges in developing training programs. The ICN should continue providing opportunities to actively participate in the trainings since this has been shown to be an effective way in providing training (Merli, 2011).

Participant perception of training in on-site vs off-site training. Since on-site trainings are housed in the ICN building, it may be assumed that the overall trainings would be better organized and more effectively implemented due to repeated events at the same location and the ease of arranging the training logistics. However, the off-site trainings' evaluation for the content being organized (question 4) and the training activities helping understand the content (question 9) were significantly different with off-site trainings receiving higher evaluations in both (Table 11). Differences could be due in part to the higher percentage of SNPs attending off-site trainings who may bring with them different perceptions regarding training organization and activities than non-SNPs. However, 12 of the 14 evaluation questions were not significantly different which supports that the ICN has done well to prepare their trainers to deliver consistent trainings. Previous research has shown difficulties in consistency in information delivery when different individuals provide training, which is further exacerbated by geographical distance from the central campus (Beaumont, Stirling & Percy, 2009; Tait, 2002).

Participant perception of training in different job positions. Compared to non-directors (Table 12) and non-SNPs (Table 13), directors and SNPs found the training to be more applicable to their jobs, hold their attention better, and found the trainer more helpful in answering questions. This could be attributed to the training topics being more relevant to SNPs especially since the training has been developed for directors. Future trainings could be formatted to increase the appeal to non-SNPs by combining areas of training to provide material in a summary or overview fashion which may meet the needs of non-SNPs, but still provide

adequate information to familiarize them with school nutrition management. Directors and other SNPs also reported significantly higher agreement than non-SNPs for taking the initiative in recommending the training and with the training meeting their expectations. Adult learners have been found to learn better when information is relevant to their job positions (Duvernet, & Whelan, 2017; NCPM, 2018; Park, & Choi, 2009). However, non-SNPs can benefit from training which may lend a better understanding of future decisions and future implementation of policies in school nutrition programs even if the some material is not directly related to their particular roles.

The more strongly off-site, SNP and non-SNP participants agreed that the training elements were well received; and the training was applicable to their job; the stronger they agreed to recommend the training. However, to meet the participants' expectations how well the program accomplished training session goals; the training elements were well received; and the training was applicable to their job, contributed to their evaluation of the training. How the training applies to participants' jobs is most likely different and depends on one's role in the school nutrition program. For non-directors it is assumed that their role in the management of the school nutrition program is limited. If ICN continues to embrace and welcome non-SNPs to their trainings, as reflected in their mission, the training needs for non-SNPs could be explored to better meet these participants' needs.

Most useful topics. Participants identified Financial Management, Procurement and Inventory Management, and Meal Pattern/Healthier U.S. School Challenge as some of the most useful areas of the ICN training. The fewest number of participants identified Customer Service, USDA Foods, and Special Needs as the most useful topics. This may not be surprising as there may be a connection between time spent on a topic during the training and the number of

participants who found the topic most useful. The three topics that the most participants found most useful were also allocated the most time for training and the three topics that the least number of participants found most useful were allocated the least time for training (Table 14).

The USDA has provided the Professional Standards Training topics database to assist in developing training programs (Table 7). However, there are no guidelines for how much time should be allocated to each topic. Therefore, the ICN established the time that they believe should be allocated to the trainings that they developed based on their interactions with participants.

Importance and appropriateness of the topics included in the ICN training can be linked to previous research showing the need for training in financial management, meal patterns, menu planning, marketing, food safety, special needs and federal regulations, healthy school environment, increasing fresh fruit and vegetable use and promotion and farm to school programs (Bergman et al., 2015; Jones et al., 2013; Stephens & Byker, 2015; Yon, Amin, Taylor, & Johnson, 2016). This reflects that there is a wide variety of topics that directors need to know and participants in this training come from all backgrounds so they find different topics most valuable.

Although special needs can be a complex topic area, only 13 (1.3%) participants noted this topic as most useful relative to other topics. When addressing students with special needs, all school nutrition programs must have policies and procedures in place (USDA-FNS, 2001). These policies are usually developed in coordination with the administration and other personnel. SNPs may not see that supporting students with special needs plays as large of a role in the day-to-day operations as perhaps the other training topics. Customer service and USDA foods may also be viewed similarly. The topics that participants showed the least interest in could be further

developed and re-evaluated for content and relevancy. The school wellness policy is an important topic that is not addressed in this training and could be explored for interest and relevance to participants.

Although the training provides a basic overview of many topics, more time is dedicated in the training to topics considered more complex, such as financial management and procurement and inventory management. In providing training materials, each topic has an introduction, identifies the functional area(s) and competencies along with the lesson objectives and lesson plan. All the information that is reviewed in the training and all activities that are designed to teach the material, make-up the largest section of the training manual. Included in the appendices are key terms, website, references, and power points. Even the topics that are not allotted as much training time during the training are given equal consideration in preparation.

While ICN provides "Orientation to School Nutrition Management" which is designed to be broad in topics covered, it also provides separate trainings on many topics such as "Financial Management for Managers" which is directed at school nutrition managers. This training, in particular, is offered online, on-site, and may be requested for off-site training. Participants who find certain topics more useful and want more information have a variety of options that can be found at ICN's website and through various ICN contact venues.

Preferred methods of training. The ICN offers a wide variety of trainings online through their website and in person with a trainer. In this study, when participants were asked about preferred methods of receiving training, they responded that they preferred face to face trainings or in person trainings over an online or webinar based course. The complexity and breadth of this training is best suited for an interactive setting where participants can ask multifaceted questions and receive a tailored response from the trainer or other participants. This is reflected in previous

research that finds that online trainings may not provide participants the level of interaction with other learners or further explanations from trainers that they need (Park & Choi, 2009).

Follow-up Application Survey

The follow-up surveys are distributed via participants' emails which include a link to an online survey software program SurveyMonkey. The surveys have received a very low response rate (2.90%). Research has shown that web-based data collection tends to have lower response rates than other data collection methods (Blumenberg, & Barros, 2018; Guo, Kopec, Cibere, & Goldsmith, 2016; Sax, Gilmartin, & Bryant, 2003). Guo, Kopec, Cibere, & Goldsmith (2016) found that giving respondents a paper survey or providing monetary incentives can lead to higher response rates. The ICN may be more successful in increasing participant response rates if they incorporate several different methods for survey distribution, such as offering an incentive or including paper surveys with an option to respond online with a provided web link. One study showed that when school nutrition directors were surveyed 6 months after completing a training program, they reported it was too soon to provide a follow-up assessment in that they had not had time yet to implement planned changes (Bergman, 2015).

Of the participants that did respond, 20 of 30 responses to the 6-month survey and 7 of the 13 responses to the 12-month survey identified that they did make a change to their operations. In the 6-month survey, three participants reported making changes in procurement and inventory management and four reported making changes to meal patterns/Healthier U.S. School Challenge and in the 12-month survey, one participant also reported making changes to meal patterns/Healthier U.S. School Challenge (Table 15). Those two topics were among the

three highest ranked most useful topics (Table 14). It is difficult to provide any sound conclusions because of the low response rate, so improvements to the data collection method should be investigated as to how to increase response rates.

Of the respondents to the follow-up training, most participants reported sharing information from the training with a colleague, conducting or planning to conduct a presentation or training on the training content, and implementing changes to their operation (Table 16). If survey responses increase, the long-term value of the training could be better understood.

Limitations

To maintain anonymity, participants were requested to only place a unique identifier on their quiz to match pre-training and post-training quizzes. No job positions were provided with the knowledge based quiz responses. It would have been useful to have participants also identify their job position to allow researchers to further investigate differences between pre-training and post-training knowledge, and knowledge change in relation to job position. Having the 20 individual question scores would have allowed for a more in-depth investigation into what topics participants were least familiar with prior to training and what topics, if any, showed little or no improvement after training. If knowledge gaps were able to be identified, the trainings could be adjusted accordingly to each participant group and the information would be more relevant.

It would have been beneficial to correlate pre-training and post-training knowledge based survey responses with job position and also demographics, and experience in school nutrition. Having this information would allow ICN to identify if changes in training procedures to better meet specific groups' needs. Additionally, there were 1033 total participants, but only 663 (64.18%) completed knowledge quizzes could be matched, with only 587 (56.83%) that could be

matched to an on-site or off-site training location. A robust matching system for participants may increase the number of knowledge quizzes that can be matched. The number of quizzes that could not be matched was not available, which would have allowed the researcher to identify the overall response rate.

Training evaluation comments from participants were compiled and could not be linked to a specific job position. Having this information may have led to a more in depth understanding of relevance to each job positions and which topics each job position found most beneficial.

The limited responses from follow-up application surveys hindered the analyses of the 6-month and 12-month impact of the training. Introducing additional methods to contact participants, such as paper surveys with web-based response options, may increase response rates.

Conclusion

The new federal regulations in the HHFKA require annual continuing education and training for directors and other SNPs. To help meet these requirements, the ICN provides education, training, and technical assistance to child nutrition and childcare professionals. One of the offered trainings is the "Orientation to School Nutrition Management." With this training, the ICN has reached 1033 professionals in 44 training sessions across the U.S. and U.S. territories in the last 6 years. The training has been shown to be effective in increasing school nutrition management knowledge in all participants, regardless of job position or location of training. Future surveys should include job position and individual question knowledge scores in data collection to improve understanding of the training impact by identifying specific topic

weaknesses in knowledge and by identifying application outcomes for SNPs and non-SNPs. Non-SNPs may find available topic specific online modules or in-person trainings more helpful due to being more targeted to their jobs and role in school nutrition programs. Improved efforts through different contact methods to collect 6-month and 12-month follow-up surveys have the potential to provide valuable data for future development of training programs

LIST OF REFERENCES

Administrative Reviews in the School Nutrition Programs. 80 Fed. Reg. 26846 (May 11, 2015) (to be codified at 7 CFR 210, 215, 220, & 235).

Agricultural Act of 2014. Pub L. No. 113-79. 128 Stat. 649. (2014).

Asada, Y., Ziemann, M., Zatz, L., & Chriqui, J. (2017). Successes and challenges in school meal reform: Qualitative insights from food service directors. Journal of School Health, 87(8), 608-615. doi:10.1111/josh.12534

Barrett, E. B., & Riggins, L. (2009). Beliefs and Perceptions of School Foodservice Personnel About HACCP Implementation. *Journal of the American Dietetic Association*, *109*(9, Supplement), A46. https://doi.org/10.1016/j.jada.2009.06.132

Beaumont, R., Stirling, J., & Percy, A. (2009). Tutors' forum: Engaging distributed communities of practice. Open Learning: The Journal of Open, Distance and e-Learning, 24(2), 141-154. doi:10.1080/02680510902879478

Bergman, J. J., Briggs, M. M., Beall, D. L., Curwood, S., Gray, P., Soiseth, S, & Zidenberg-Cherr, S. (2015). Stepping Up to the Challenge: The Development, Implementation, and Assessment of a Statewide, Regional, Leadership Program for School Nutrition Directors. *Health Promotion Practice*, *16*(1), 122–131. https://doi.org/10.1177/1524839914530399

Blumenberg, C., & Barros, A. J. D. (2018). Response rate differences between web and alternative data collection methods for public health research: A systematic review of the literature. International Journal of Public Health, 63(6), 765-773. doi:10.1007/s00038-018-1108-4

Carmichael, C., Allen, R., Zhang, D., Stracener, J., Campbell, M., Dupre, J., & Champagne, C. (2016). Improving Child Nutrition in Louisiana: Barriers and Training Needs Drive

Innovative Approaches for Change. *Journal of the Academy of Nutrition and Dietetics*, *116*(9, Supplement), A22. https://doi.org/10.1016/j.jand.2016.06.068

Child Nutrition and WIC Reauthorization Act of 1989. 62 Fed. Reg. 23613. (May 1, 1997) (to be codified at 7 CFR pts. 226).

Child Nutrition and WIC Reauthorization Act of 2004. Pub. L. No. 108-265. 118. Stat. 729. (2004).

Cohen, J. F. W., Smit, L. A., Parker, E., Austin, S. B., Frazier, A. L., Economos, C. D., & Rimm, E. B. (2012). Long-Term Impact of a Chef on School Lunch Consumption: Findings from a 2-Year Pilot Study in Boston Middle Schools. *Journal of the Academy of Nutrition and Dietetics*, *112*(6), 927–933. https://doi.org/10.1016/j.jand.2012.01.015

Conklin, M. T., Lambert, C. U., Brenner, M., & Cranage, D. A. (2009). Relationship of directors' beliefs of perceived organizational support and affective commitment to point in time of development of school wellness policies. Journal of Foodservice Business Research, 12(2), 110-119. doi:10.1080/15378020902910249

Duvernet, A., & Whelan, T. (2017). Trends in Workplace Training. *Society for Industrial and Organizational Psychology*. Retrieved from http://www.siop.org.umiss.idm.oclc.org/tip/april17/ll.aspx

Eliminating Applications Through Community Eligibility as Required by the Healthy, Hunger-Free Kids Act of 2010, 81 Fed. Reg. 50194 (June 29, 2016) (to be codified at 7 CFR 245).

Guo, Y., Kopec, J. A., Cibere, J., Li, L. C., & Goldsmith, C. H. (2016). Population survey features and response rates: A randomized experiment. American Journal of Public Health, 106(8), 1422-1426. doi:10.2105/AJPH.2016.303198

Harkness, J., Logan, C. W., Shivji, A., Nisar, H., Connor, P., Abt Associates, Inc. Food and Nutrition Service (USDA). (2015). Community eligibility provision evaluation: *Year 3 addendum. nutrition assistance program report*.US Department of Agriculture.

Harris, J. L., Hyary, M., & Schwartz, M. B. (2016). Effects of offering look-alike products as smart snacks in schools. Childhood Obesity, 12(6), 432-439. doi:10.1089/chi.2016.0080

Healthy, Hunger-Free Kids Act of 2010, Pub. L. No. 111-296, 124 Stat. 3184 (2010).

Hollar, T. L., Cook, N., Natale, R., Quinn, D., Phillips, T., & DeLucca, M. (2018). Training early childcare providers in evidence-based nutrition strategies can help improve nutrition policies and practices of early childcare centres serving racially and ethnically diverse children from low-income families. *Public Health Nutrition*, *21*(7), 1212–1221. https://doi.org/10.1017/S1368980017003573

IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Institute of Child Nutrition. Training. (n.d.) Retrieved from https://theicn.org/training/#

Institute of Child Nutrition. Face-to-Face Training Update. (2017, October 17). *Institute of Child Nutrition*. Retrieved from https://news.theicn.org/face-to-face-training-update/

Institute of Child Nutrition. Orientation to School Nutrition Management. (n.d). Retrieved from https://theicn.org/icn-resources-a-z/orientation-to-school-nutrition-management/

Jones, A. M., Punia, M., Young, S., Huegli, C. C., & Zidenberg-Cherr, S. (2013). Training Needs of Personnel Employed in Programs Participating in the National School Lunch Program in California. *Journal of Child Nutrition & Management*, 37(1).

Just, D. R., Wansink, B., & Hanks, A. S. (2014). Chefs move to schools. A pilot examination of how chef-created dishes can increase school lunch participation and fruit and vegetable intake. *Appetite*, *83*, 242–247. https://doi.org/10.1016/j.appet.2014.08.033

Kwon, J. (2003). Overview of Food Safety Issues in School Foodservice Operations in the United States. *J Community Nutrition*. 5. 239-245.

Kwon, J., Sauer, K., & Wen, H. (2014). Priorities and Strategies for Training School Foodservice Employees about Fresh Produce Safety. *Journal of the Academy of Nutrition and Dietetics*, *114*(9, Supplement), A58. https://doi.org/10.1016/j.jand.2014.06.187

Local School Wellness Policy Implementation Under the Healthy, Hunger-Free Kids Act of 2010. 81 Fed. Reg. 50151 (July 29,2016) (to be codified at 7 CFR 210 & 220).

Longley, C., & Sneed, J. (2009). Attitudes of school foodservice directors about the potential benefits of school wellness policies. Journal of Child Nutrition & Management, 33(1)

Lucarelli, J. F., Alaimo, K., Belansky, E. S., Mang, E., Miles, R., Kelleher, D. K., . . . Liu, H. (2015). Little association between wellness policies and school-reported nutrition practices. Health Promotion Practice, 16(2), 193-201. doi:10.1177/1524839914550245

Machado, M. G., Monego, E. T., & Hidalgo Campos, M. R. (2014). Risk Perception of Food Safety by School Food-handlers. *Journal of Health, Population & Nutrition*, *32*(1), 19–27.

Mann, G., Hosig, K., Zhang, A., Shen, S., & Serrano, E. (2017). Smart snacks in school legislation does not change self-reported snack food and beverage intake of middle school students in rural appalachian region. Journal of Nutrition Education and Behavior, 49(7), 599-604.e1. doi:10.1016/j.jneb.2017.05.338

Merli, C. M. (2011). Effective Training for Adult Learners. *Professional Safety*, *56*(7), 49–51.

Mincher, J. L., Symons, C. W., & Thompson, A. (2012). A Comparison of Food Policy and Practice Reporting between Credentialed and Noncredentialed Ohio School Foodservice Directors. *Journal of the Academy of Nutrition and Dietetics*, *112*(12), 2035–2041. https://doi.org/10.1016/j.jand.2012.06.366

Nutrition Standards in the National School Lunch and School Breakfast Programs. 77 Fed. Reg. 4087 (Jan. 12, 2012) (to be codified at 7 C.F.R. pts. 210, & 220)

Oakley, C. B., Knight, K., Hobbs, M., Dodd, L. M., & Cole, J. (2011). Delivery and Evaluation of Training for School Nutrition Administrators and Managers on Meeting Special Food and Nutrition Needs of Students in the School Setting. *Journal of Child Nutrition & Management*, *35*(1).

Pagano, K., Haddad, A., & Crosby, T. (2017). Virtual Reality-Making Good On the Promise of Immersive Learning: The effectiveness of in-person training, with the logistical and cost-effective benefits of computer-based systems. *IEEE Consumer Electronics Magazine*, *6*(1), 45–47. https://doi.org/10.1109/MCE.2016.2614413

Park, J.-H., & Hee Jun Choi. (2009). Factors Influencing Adult Learners' Decision to Drop Out or Persist in Online Learning. *Journal of Educational Technology & Society*, *12*(4), 207–217.

Perlman, S. E., Nonas, C., Lindstrom, L. L., Choe-Castillo, J., McKie, H., & Alberti, P. M. (2012). A menu for health: changes to New York City school food, 2001 to 2011. *The Journal of School Health*, *82*(10), 484–491. https://doi.org/10.1111/j.1746-1561.2012.00726.x

Richard B. Russell National School Lunch Act, Pub. L. No. 79-396, 60 Stat. 239 (1946).

Richard B. Russell National School Lunch Act, Pub. L. No. 79-396, 60 Stat. 239 (1946), codified as amended at 42 U.S.C. §§ 1751.

Rodrigues, K. L., Silva, J. A., & Aleixo, J. A. G. (2012). Effect of the implementation of the Hazard Analysis Critical Control Point (HACCP) prerequisite program in an institutional foodservice unit in Southern Brazil. *Food Science and Technology*, *32*(1), 196–200.

Roth-Yousey, L., Barno, T., Caskey, M., Asche, K., & Reicks, M. (2009). Whole-grain Continuing Education for School Foodservice Personnel: Keeping Kids from Falling Short. *Journal of Nutrition Education and Behavior*, *41*(6), 429–435. https://doi.org/10.1016/j.jneb.2008.07.002

Sax, L. J., Gilmartin, S. K., & Bryant, A. N. (2003). Assessing response rates and nonresponse bias in web and paper surveys. Research in Higher Education, 44(4), 409-432. doi:10.1023/A:1024232915870

Seo, D. (2009). Comparison of school food policies and food preparation practices before and after the local wellness policy among indiana high schools. American Journal of Health Education, 40(3), 165-173. doi:10.1080/19325037.2009.10599091

Smith, S. P. (2017). Adult Learners: Effective Training Methods. *Professional Safety*, *62*(12), 22–25.

Stang, Story, Kalina, & Snyder. (1997). Meeting the U.S. Dietary Guidelines in School Meals: Current Practices, Perceived Barriers, and Future Training Needs. *Journal of Nutrition Education*, *29*(3), 152–158. https://doi.org/10.1016/S0022-3182(97)70180-8

Stephens, L., & Byker Shanks, C. (2015). K-12 School Food Service Staff Training Interventions: A Review of the Literature. *Journal of School Health*, *85*(12), 825–832. https://doi.org/10.1111/josh.12338

Stinson, W. B., Carr, D., Nettles, M. F., & Johnson, J. T. (2011). Food Safety Programs Based on HACCP Principles in School Nutrition Programs: Implementation Status and Factors Related to Implementation. *Journal of Child Nutrition & Management*, *35*(1).

Sullivan, K. Harper, M., & West. (2002). Training Needs of School Foodservice Site Managers *Journal of Child Nutrition & Management*, 26(2).

Tait, J. (2002). 'from competence to excellence': A systems view of staff development for part-time tutors at-a-distance. Open Learning: The Journal of Open, Distance and e-Learning, 17(2), 153-166. doi:10.1080/02680510220146913

Taylor, S., Tibbett, T., Patel, D., & Bishop, E. (2014). Use of environmental change strategies to facilitate sodium reduction: a case study in a rural California school district. *Journal of Public Health Management and Practice : JPHMP*, *20*(1 Suppl 1), S38.

The National Center on Program Management and Fiscal Operations. (2018) Adult Learning Principles.

Thomson, J. L., Tussing-Humphreys, L. M., Martin, C. K., LeBlanc, M. M., & Onufrak, S. J. (2012). Associations among School Characteristics and Foodservice Practices in a Nationally Representative Sample of United States Schools. *Journal of Nutrition Education and Behavior*, *44*(5), 423–431. https://doi.org/10.1016/j.jneb.2012.01.009

Till, J., Hildebrand, D., Brown, B., & Gates, G. (2017). Cooking for Kids: Culinary Training for School Nutrition Professionals Positively Affects School Nutrition Professionals' Culinary Practices and Beliefs. *Journal of Nutrition Education and Behavior*, *49*(7, Supplement 1), S106. https://doi.org/10.1016/j.jneb.2017.05.127

USDA. (2017). USDA Commitment to School Meals. Retrieved July 12, 2018, from https://www.usda.gov/sites/default/files/documents/secretary-perdue-child-nutrition-proclamation.pdf

USDA-FNS. (n.d.). Nutrient Analysis Software Approved by USDA for Nutrient Analysis | Healthy Meals Resource System. Retrieved June 14, 2018, from https://healthymeals.fns.usda.gov/menu-planning/nutrient-analysis-software-approved-usda/nutrient-analysis-software-approved-usda

USDA-FNS. (2001). Accommodating Children with Special Dietary Needs in the School Nutrition Programs. Retrieved from https://fns-prod.azureedge.net/sites/default/files/special_dietary_needs.pdf

USDA-FNS. (2012) Comparison of Previous and New Regulatory Requirements under Final Rule "Nutrition Standards in the National School Lunch and School Breakfast Programs". Retrieved from https://fns-prod.azureedge.net/sites/default/files/cn/comparison.pdf.

USDA-FNS. (2014). Food-Safe Schools Action Guide - A food safety resource for School Nutrition Directors. Retrieved from https://fns-prod.azureedge.net/sites/default/files/Food-Safe-Schools-Action-Guide.pdf.

USDA-FNS. (2015). Updated Offer versus Serve Guidance for the National School Lunch Program and School Breakfast Program Effective Beginning School Year 2015-2016. Retrieved from https://fns-prod.azureedge.net/sites/default/files/cn/SP41_2015os.pdf.

USDA-FNS. (2016a). A Guide to Smart Snacks in School. USDA. Retrieved from https://fns-prod.azureedge.net/sites/default/files/tn/USDASmartSnacks.pdf

USDA-FNS. (2016b). Schools/Child Nutrition USDA Foods Programs. Retrieved from https://fns-prod.azureedge.net/sites/default/files/nslp/programFactSheet-schcnp.pdf

USDA-FNS. (2016c). USDA Announces Additional Efforts to Make School Environments Healthier. USDA. Retrieved from https://www.usda.gov/media/press-releases/2016/07/21/usda-announces-additional-efforts-make-school-environments

USDA-FNS. (2017). Smart Snacks in School. Retrieved May 29, 2018, from https://www.fns.usda.gov/school-meals/smart-snacks-school-0

USDA-FNS. (2018a). Professional Standards. Retrieved May 29, 2018, from https://www.fns.usda.gov/school-meals/professional-standards

USDA-FNS. (2018b). USDA Foods in Schools. Retrieved May 30, 2018, from https://www.fns.usda.gov/fdd/schoolscn-usda-foods-programs

Welsh, E. T., Wanberg, C. R., Brown, K. G., & Simmering, M. J. (2003). E-learning: emerging uses, empirical results and future directions. *International Journal of Training & Development*, *7*(4), 245–258. https://doi.org/10.1046/j.1360-3736.2003.00184.x

Yon, B. A., Amin, S. A., Taylor, J. C., & Johnson, R. K. (2016). School Nutrition Directors' Perspectives on Preparing for and Implementing USDA's New School Meal Regulations. *Journal of Child Nutrition & Management*, *40*(1).

Zolkos, R. (2002). Online education getting good marks; E-learning seen as more cost-effective, efficient than classroom approach. Business Insurance, 36, 14.

APPENDIX

APPENDIX A: KNOWLEDGE BASED QUIZ

Orientation to School Nutrition Management

1. Which of the following is NOT required in food production records?
a. Age group of students
b. Raw food cost per serving
c. Portion or serving size
d. Amount of food used

2. Nutrition accountability deals with
a. Meeting the USDA nutrition requirements that are based on the Dietary Guidelines and the RDA
b. Providing accurate information on meals to support reimbursement from USDA
c. Ensuring every household has the opportunity to apply for reduced or free meals
d. Providing information on goal for nutrition education

3. Characteristics of food that are acceptable to consumers are referred to as
a. Food Quality Standards
b. Culinary Techniques
c. Food Presentation Principles
d. Nutrient Standards

4. Which of the following is a false statement about factors that influence student eating habits?
a. Adolescent customers have strong social needs and are often influenced by their peers.
b. The age of a child has no influence on their food likes and dislikes.
c. The beliefs of parents about food customs influence student eating patterns.
d. The environment of the dining room can have an effect on a student's desire to participate in the school nutrition program.

5. Schools can serve
a. Commercially prepared tofu and soy product as part of a reimbursable meal
b. More fruit and vegetable servings than the weekly requirement
c. More grain servings than the weekly ranges
d. All of the above

6. Which of the following is NOT a common menu modification?
a. Texture
b. Sodium content
c. Calories
d. Consistency of liquids

7. Which of the following is NOT a recommended action for a child with a disability?
a. Offering foods as a reward
b. Longer than normal eating time
c. Assistance with grasping and releasing eating utensils
d. Placing children who are easily distracted behind a screen

8. Which of the following statements about leadership and the role of the School Nutrition Director is false?
a. The superintendent is the leader of the school district, but leadership for the school nutrition program is assigned to the School Nutrition Director.
b. The state school nutrition office is accountable for the district school nutrition program.
c. School Nutrition Directors cooperate and work with the state office.
d. Leadership encompasses both accountability and responsibility.

9. Most school nutrition programs have the goal of marketing healthy food choices, quality diet/nutritious food, and more nutrient dense foods to meet nutrient standards. These are examples of which principle of the marketing campaign?
a. Product
b. Price
c. Policy
d. Promotion

10. Which is NOT a benefit of a marketing campaign for school nutrition programs?
a. It helps administrators and faculty see the value of child nutrition programs.
b. It helps achieve nutrition-related education.
c. It helps curtail disciplinary issues.
d. It helps resolve issues some children face such as obesity and diabetes.

11. Which of the following is NOT a key step for effective inventory management?
a. Knowing where and how much food you have on hand
b. Controlling waste, loss and theft
c. Maintaining only as much food as you need
d. Utilizing Offer versus Serve

12. All of the following must be identified in RFP's EXCEPT
a. All parties being solicited
b. Goods, products, and/or services needed
c. Evaluation Factors
d. How the needs will be met

13. All of the following key information should be included in product description specifications EXCEPT
a. Case Pack/weight
b. Minimum and Maximum Size and Pieces
c. Quality Indicators
d. Price

14. Material Safety Data Sheets (MSDS) must contain all of the following EXCEPT
a. How to handle an accident using a chemical or toxic substance
b. Ingredients in the chemical or toxic substance
c. Possible side effects of exposure
d. Emergency contact information

15. Offer versus Serve is
a. Intended to reduce food waste
b. Mandatory for senior high schools in the National School Lunch Program
c. Mandatory for the School Breakfast Program and for the National School Lunch program at lower grades
d. A and B

16. The conditions that favor the growth of most foodborne microorganisms (excluding viruses) are
a. Food, acidity, temperature, time, oxygen, and moisture
b. Food, time, and temperature
c. Food, temperature, and moisture
d. Food, acidity, and time

17. Which of the foods listed below would NOT be considered a potentially hazardous food?
a. Lemon
b. Sliced Melon
c. Baked potato
d. Cooked rice

18. When cooling a hot food from 135°F down to 41°F, it must be reheated immediately to 165°F for 15 seconds if it has not reached 70°F within
a. 1 hours
b. 2 hours
c. 3 hours
d. 4 hours

19. Which of the following describes food biosecurity?
a. Limits cross contamination
b. Limits presence of naturally occurring food contaminants
c. Prevents grown of organisms caused by time/temperature abuse
d. Prevents product tampering

20. It is imperative in an emergency situation that the director
a. Understands the chain of command
b. Establishes and communicates plans and procedures
c. Monitors the inventory of food, equipment and supplies
d. All of the above

APPENDIX B: TRAINING PROGRAM EVALUATION

What is your job position?

a. District director
b. State agency staff
c. Educator
d. Major city director
e. Site-level manager
d. Other (please list)
f. Private consultant/trainer
g. Foodservice assistant

Please indicate your agreement with the set of statements below pertaining to the Orientation to School Nutrition Management by shading the number that best fit your opinion on a scale of 1-5 (1-strongly disagree; 2-disagree; 3-neutral; 4-agree; and 5-strongly agree).

Q1: The session objectives were clearly presented.

Q2: The session objectives were achieved.

Q3: The session provided me with an opportunity to actively participate.

Q4: The content was organized.

Q5: The activities supported learning.

Q6: The activities held my attention.

.Q7: I can apply what I learned in this session to my job.

Q8: The trainer(s) answered questions adequately

Q9: The training activities helped me to understand the content.

Q10: The handouts provided will be useful reference materials.

Q11: Attending the session increased my knowledge on the topic.

Q12: Attending the session increased my skill on the topic.

Q13: I would recommend this session to others.

Q14: Overall, the training session met or exceeded my expectations.

The following are open-ended questions:

1. The information I found most useful was:

2. Please share any additional comments:

3. What additional face-to-face/or online training topics would be beneficial to your program?

4. What is your preferred method for receiving training?

APPENDIX C: FOLLOW-UP APPLICATION SURVEY

1. Have you shared any information you gained through the ICN training with a colleague? (Yes/No)

2. Have you conducted a presentation or training on the content you received through the ICN training? (Yes/No)

If yes, what training topic?

3. Based on the knowledge or skills gained by participating in the ICN training session, have you implemented any changes to your operation? (Yes/No)

If yes, please describe.

If you no, what changes to the respective training would you suggest to increase your likelihood to make changes in your operation?

4. Do you plan to conduct a presentation or training in the next 6 months? (Yes/No)

5. Which of the following best describes your role?

a. District director
b. State agency staff
c. Educator
d. Major city director
e. Site-level manager
d. Other (please specify)
f. Private consultant/trainer
g. Foodservice assistant.

VITA

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