

INCREASING THE USE OF FRESH, WHOLE FOODS IN K-12 SCHOOL
NUTRITION PROGRAMS THROUGH CULINARY TRAINING
FOR SCHOOL FOOD SERVICE PROFESSIONALS

by

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DEDICATION

This work is dedicated to my ever supportive husband, Jon Szajnuik. When I said, “Oh darling, let’s move to Montana and be adventurers,” he said, “Yes.”

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ABSTRACT

The purpose of this research is to develop and evaluate a hands-on culinary skills class for school food service professionals, the Montana Cook Fresh Workshop, aimed at increasing the use of whole, fresh foods in K-12 school nutrition programs. The literature indicates that scratch cooking with whole, fresh foods can help school nutrition programs meet USDA meal standards while creating healthier, more appealing meals for students. However, limited peer reviewed information exists regarding the best training approaches to provide school nutrition professionals with the necessary skills to integrate scratch cooking. To inform the development of the class, 103 Montana school food service managers and head cooks were surveyed and 12 key informants were interviewed. This formative research identified key skills and approaches necessary to integrate whole, fresh foods in school nutrition programs and specific areas to target with training. From this research, the Montana Cook Fresh Workshop was developed to address four main culinary concepts: knife skills, mise en place, use of herbs and spices, and appropriate equipment. Outcomes of the workshop were evaluated based on participant satisfaction and changes in participants' whole, fresh foods (a) cooking knowledge, (b) confidence, (c) attitude, and (d) intention to use. Participant satisfaction was evaluated with a Likert scale questionnaire and series of open-ended questions. Researchers used a pre-test/post-test design to assess participants' knowledge, confidence, attitudes, and intentions regarding whole, fresh food. For each statement assessing participant satisfaction, 96-100 percent of participants selected "agree" or "strongly agree," indicating high levels of participant satisfaction. From pre to post test, participants' knowledge, confidence, and intentions to use whole, fresh food increased significantly. Attitude did not change significantly. The success and appeal of the Montana Cook Fresh Workshop supports the use of hands-on classes to address training needs of school food service professionals and overcome barriers to using whole, fresh food. With the ability to use more whole foods, K-12 school food service programs have the opportunity to offer more appealing meals that meet USDA guidelines and promote healthy food choices.

CHAPTER 1

INTRODUCTION

History of Federally Funded School Nutrition Programs in the United States

Though the National School Lunch Program (NSLP) officially began in 1947, many years of child feeding programs and various levels of federal support preceded the official and permanent development of the program.^{1,2} Many school districts across the country independently instituted feeding programs as early as the turn of the century; however, severe need during the Depression era of the 1930's prompted many states to enact legislation to provide additional support for school nutrition programs. Hunger and excess farm products proliferated simultaneously as consumers were unable to afford food. In an effort to alleviate both issues, congress enacted legislation to purchase excess commodities and distribute them to school nutrition programs in 1936.² State level programs gained additional support from the Works Projects Administration (WPA). For example, WPA began putting unemployed women to work in school nutrition programs in 1935. Additionally, the WPA supported development of instructional materials including menus and recipes, specific to school nutrition programs.² With federal support through WPA, along with some amount of federal appropriations for food purchasing, the number of children fed through government programs continued to climb, growing from approximately 342,000 in 1937 to 7.1 million in 1947.¹

By 1947, Congress realized that the school nutrition program could not continue to grow without permanent funding to support food purchases, equipment, and operating

expenses.² The National School Lunch Act of 1946 established permanent funding for the program:

...as a measure of national security, to safeguard the health and well-being of the Nation's children and to encourage the domestic consumption of nutrition agricultural commodities and other food, by assisting the States, through grants in aid and other means, in providing an adequate supply of food and other facilities for the establishment, maintenance, and operation and expansion of nonprofit school lunch programs.³

This initial act established three different meal patterns and a reimbursement rate of approximately nine cents per meal.⁴ In the two decades following its inception, the School Lunch Act underwent various amendments including changes to reimbursement rates and special allotments for high needs schools.² The 1966 Child Nutrition Act brought significant changes including a Pilot Breakfast Program and increased financial support to school nutrition programs with specific assistance for equipment, administrative expenses, and nutrition education.⁴ Child nutrition programs enjoyed continued support and expansion into the 1970's with establishment of a permanent School Breakfast Program, Summer Food Service Program, Child Care Food Program, and Special Milk Program. Program funding was significantly cut in the 1980's, but the Healthy Meals for Healthy Americans Act of 1994 brought renewed attention to the nutritional value of meals served in school nutrition programs.^{4,5} The Child Nutrition Reauthorization of 2010, also known as the Healthy, Hunger Free Kids Act, brought significant change to school nutrition programs.⁶ These changes included new nutrient standards for meals and expanded support of the School Breakfast Program and After School Meal Program. School nutrition programs are currently funded and regulated under the Healthy, Hunger Free Kids Act of 2010 legislation.⁶

Past and Current Reach of USDA School Nutrition Programs

In 1947, NSLP served an average of 7.1 million children each day.¹ The program grew steadily for three decades and by 1979, 27 million children were receiving daily lunches.⁷ Participation declined moderately through the 1980's, but returned to pre 1980's levels by 1999 and continued to increase participation to peak levels by the 2011-2012 year. In that year, NSLP provided meals for an average of 31.8 million children in the U.S. each day, making it the largest child feeding program in the developed world.^{1,7,8} Though participation fell slightly since 2012, preliminary data from the 2014-2015 school year reports daily average participation at 30.4 million children.⁷ Children who participate in school nutrition programs may consume more than half of their daily calories at school and school lunches alone provide approximately one third of daily calorie requirements.^{9,10} These statistics underscore the potential influence of school nutrition programs on the health of American students and the importance of serving nutritious, balanced meals in school nutrition programs.

Nutrition Guidelines in School Nutrition Programs

The initial focus of the National School Lunch Act of 1946 was to address malnutrition and provide adequate calories to America's schoolchildren.³ The recommended meal pattern included milk, protein, fruit or vegetable, bread, and butter or margarine. This meal pattern was designed to provide one-third to one-half of the nutritional needs of a 12 year old child, with alternate meal pattern options for schools without the facilities to provide all components of the recommended pattern. The meal

pattern and emphasis on sufficient calories came into question in 1977 with a report by the Comptroller General to the United States Congress.¹¹ The report questioned the efficacy of the current meal pattern in meeting the nutritional needs of students, pointing out that the system may promote obesity and was not meeting children's iron needs, a nutrient of particular concern. The report recommended that the USDA assess and implement nutrient standards for school nutrition programs. Despite these recommendations, significant changes to meal guidelines and the introduction of optional Nutrient Standard Menu Planning (NSMP) did not come about until 1994's Healthy Meals for Healthy Americans Act.^{5,12} This legislation aimed to bring nutrient requirements of school lunches into alignment with the 1990 Dietary Guidelines for Americans and established standards for protein, vitamin A, vitamin C, iron, calcium, calories, saturated fat, and total calories from fat. Additionally, schools were encouraged to decrease sodium and cholesterol and increase fiber, though no specific targets or recommendations were established.¹²

Despite these efforts, in 2008, 17% of children ages 2-19 in the United States were obese.¹³ Overweight and obese children faced a plethora of health problems including high blood pressure, type 2 diabetes, fatty liver disease and breathing problems.¹⁴ As the epidemic of childhood obesity continued, school nutrition program requirements, specifically those introduced in the Healthy, Hunger Free Kids Act of 2010 attempted a new approach to addressing the issue. The Healthy, Hunger Free Kids Act eliminated the Nutrient Standard Menu Planning and returned to a food based planning approach and established new calorie and sodium limitations. The new meal patterns

emphasized increased amounts of fruits, vegetables, and whole grains as recommended by the 2010 Dietary Guidelines for Americans.

School Nutrition Program Challenges of the Past

Since the Comptroller's report of 1977, concerns regarding the nutritional value of school meals have been a prevailing issue. As noted, the Comptroller reported an imbalance of nutrients including insufficient minerals and overly abundant calories in the school meal pattern of the time.¹¹ The significant changes instituted by the Healthy Meals for Healthy Americans Act of 1994 were substantiated by the USDA's *School Nutrition Dietary Assessment*. The *Assessment* report indicated that school lunches exceeded Dietary Guideline for American recommendations for fat and saturated fat and children participating in the National School Lunch Program consumed significantly more calories from fat than children that did not eat school lunch.¹² Another study from the same period showed that the typical school lunch provided 40% of calories from fat, 17% from saturated fat, and contained higher sodium and lower fiber content than recommended by the Dietary Guidelines for Americans.¹⁵

Despite the modifications made in nutrient standards in the 1994 legislation, deficiencies in school lunches persisted. In the 2009 *School Nutrition Dietary Assessment*, researchers found that only 6% of assessed school lunches met all of the nutrient standards. The most frequent lack of adherence was observed in fat and sodium content. Eighty-one percent of school lunches assessed provided more than the recommended allowance of fat, 72% exceeded saturated fat standards, and almost all

exceeded sodium recommendations.¹⁶ Particularly concerning were indications that regular participation in NSLP may be correlated with higher body mass indices.¹⁷

New Regulations for School Nutrition Programs

In an effort to combat challenges to feeding children nutritious foods through school nutrition programs, the Healthy, Hunger Free Kids Act of 2010 mandated a number changes in school food service standards.⁶ In this Act, the USDA school meal guidelines more closely aligned with recommendations from the Institute of Medicine and the 2010 Dietary Guidelines for Americans.¹⁸ The new meal requirements defined nutrient standards for food group components and age groups.

Beginning in the 2012-2013 school year, school nutrition programs were required to offer $\frac{3}{4}$ to 1 cup of vegetables and $\frac{1}{2}$ to 1 cup of fruit per day. Previously, the requirement was $\frac{1}{2}$ to $\frac{3}{4}$ cup of fruit and vegetable combined. Starting with the 2014-2015 school year, schools were required to offer a full cup of fruits or vegetables at breakfast instead of the $\frac{1}{2}$ cup previously required. Furthermore, schools were required to serve minimum amounts of vegetable subgroups, including red/orange, dark green, legumes, starchy, and other, on a weekly basis.

Additionally, in 2013-2014 at least half of grains served were required to be whole grain rich, meaning grain based foods are made with at least 51% whole grains. Starting in the 2014-2015 school year, all grains served were required to be whole grain rich.¹⁰

Requirements also targeted sodium, calorie, and trans fat standards. While there were previously no limits set for sodium, the new standards set a progressively decreasing sodium allowance beginning in the 2014-2015 school year. The final target, ranging from 640 mg to 740 mg at lunch and 430 mg to 500 mg at breakfast, is set for implementation in the 2022-2023 school year. For calories, previous meal requirements set only minimum standards while new requirements set minimum and maximum calorie limits. Finally, a newly added limit on trans fat required all products to have zero grams per serving.¹⁰

The new nutrient standards under the Healthy, Hunger Free Kids Act of 2012 were received with contention. Some students complained of small portions and school food service staff voiced concern about food waste, cost of compliance, and lack of student acceptance.^{19,20} The School Nutrition Association, a national organization representing school nutrition professionals, initially supported the new measures, but later became vocal in urging Congress to relax the standards, particular the sodium restrictions and whole grain requirements.^{21,22} Despite this initial push back, by December of 2014, 95% of schools had been able to comply with the new standards.²³

Another relevant area that the Healthy Hunger Free Kids Act of 2010 addressed was professional training requirements for food service professionals. The final rule, implemented in the 2015-2016 school year, specifies minimum education and training requirements for all school food service professionals. Part time employees were required to have a minimum of four hours of continuing education each year and full time employees must have at least six. Managers and higher level professionals have

increasing minimum training requirements as well as minimum education standards based on school size.²⁴

Importance of School Food Service Staff Training

Well trained food managers and staff play an integral role in creating programs and meal plans that meet NSLP and SBP requirements.²⁵⁻²⁹ The current standard in most school kitchens is to “heat and serve” prepared meals, prepackaged, and processed foods, which contribute large amounts of sodium and saturated fats to school meals.^{16,30} Returning to scratch cooking and utilizing more whole, fresh foods in school food service may help schools meet new NSLP and SBP standards for sodium and calorie restrictions.^{10,28,31,32} However, a significant barrier to implementing scratch cooking is a lack of necessary skills and training.³³⁻³⁶ Appropriate school food service staff training may be influential in meeting meal standards and improving the nutritional quality of food produced in school nutrition programs. School food service programs with directors that have a nutrition related degree, have completed a food service training program, or work with nutrition education programs like Team Nutrition are more likely to serve healthier meals in general.³⁷ In addition, nutrition programs with certified food service program directors are more likely to adhere to nutrition policies.³⁸

Despite the noted importance, significant barriers exist to providing adequate and effective training for school food service professionals. Most prevalent are limited time and financial resources devoted specifically to training or continuing education.³⁹

Scope and Aims of Research

Effective and evidence based training for school food service professionals is vital to meeting new meal standards and efficiently meeting professional development standards. This research aims to add to the body of literature surrounding school food service training with three manuscripts. First, the systematic literature review provides thorough assessment of the current literature regarding school food service training programs. This review assesses evidence based best practices as supported by available peer reviewed literature and establishes the need for future research in this arena. The second manuscript describes research targeted to identify specific barriers, motivations, and training needs of Montana school food service professionals in utilizing whole, fresh food in school food service programs. Finally, the third manuscript reports the outcomes of the culinary training project developed from the formative research described in the second manuscript. This body of work provides background and support for further development of evidence based training for school food service professionals.

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CHAPTER TWO

K-12 SCHOOL FOOD SERVICE STAFF TRAINING
INTERVENTIONS: A REVIEW
OF THE LITERATURE

Contribution of Authors and Co-Authors

Manuscript in Chapter 2

Author: Lacy Stephens

Contributions: Developed research concept and design. Gathered and reviewed data. Wrote first draft of manuscript. Reviewed and finalized subsequent draft of manuscript.

Co-Author: Carmen Byker Shanks, PhD

Contributions: Assisted in development of research concept and design. Contributed expertise to research design and approach. Edited and reviewed manuscripts for submission.

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ABSTRACT

Background: School food service professionals are vital to implementing national nutrition standards in school meal programs. Appropriate and effective training for these professionals may be one key to producing healthful meals that students are excited to eat and also meet United States Department of Agriculture (USDA) nutrient guidelines. A systematic literature review was conducted to understand the scope of interventions conducted with food service staff.

Methods: PubMed, Web of Knowledge, and Science Direct databases were searched for articles detailing school food service training interventions in K-12 school settings within the United States.

Results: Of 2,341 articles retrieved, 17 articles describing 14 food service training interventions met the inclusion criteria. While food service staff training was an important component of many comprehensive school health and school meal interventions, there were few studies that specifically addressed school food service staff trainings. While some best practices can be concluded from the current literature, major gaps in knowledge about effective school food service training interventions and validated research tools remain.

Conclusions: As new professional standards are mandated by the USDA, a more thorough evaluation and understanding of best practices is vital to maximize the effectiveness of food service staff training.

Key Words: school meals, food service, continuing education, staff training

BACKGROUND

The National School Lunch Program (NSLP) and School Breakfast Program (SBP), authorized by the United States Department of Agriculture (USDA) Food and Nutrition Services (FNS), provide affordable meals for 31.6 million children in the U.S. each day.¹ Children who participate in the school breakfast and lunch programs consume more than half of their daily calories at school.² The USDA FNS sets forth guidelines for these meals, specifying the number of required servings in each food group and limiting the amount of sodium, fat, saturated fat, and calories for each meal.³ The vast majority of these meals do not meet all specified nutrient guidelines. In the 2009 School Nutrition Dietary Assessment Summary, researchers found that only 6% of assessed schools met all of the nutrient standards.⁴

School Food Authorities (SFAs) are responsible for operating school nutrition programs in compliance with USDA FNS meal guidelines.⁵ Food service professionals under each SFA are integral to the process of implementing USDA school meal guidelines. Appropriate and adequate training and education for school food service professionals may be one key to meeting USDA school meal guidelines and providing healthier meals overall.^{6,7} School food service programs with directors that have a nutrition related degree, have completed additional food service training, or work with nutrition education programs like Team Nutrition, are more likely to serve healthier meals in general.⁸ In addition, meal programs with certified food service program directors are more likely to adhere closely to nutrition policies in practice.⁹ Furthermore, new USDA minimum training requirements and professional standards for school food

service professionals will be implemented in the 2014-15 school year.¹⁰ In anticipation of these new requirements, developing the best practices for training and continued education for food service staff and managers becomes even more vital. Understanding the most effective implementations of staff training will allow strategic and productive use of training resources to improve the quality and nutrition of school meals.

To our knowledge, no comprehensive review of food service training interventions exists. To facilitate the development of effective future training models for school food service staff, a thorough literature review is necessary to answer the question, “What, if any, school food service staff training methods currently in practice have been thoroughly evaluated and how effective are these methods?” This systematic review of literature aims to synthesize existing research about school food service training interventions in order to answer this research question while identifying best practices and areas for future research.

METHODS

Researchers adhered to the systematic review protocol outlined in the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement. This peer reviewed statement, developed by a team of 29 research professionals outlines specific protocol for completing reviews and meta-analyses to enhance the strength and reliability of this type of reporting. The PRISMA Statement includes a 27 item checklist and flow diagram to be applied in the systematic review with the aim of eliminating bias and ensuring transparency in the review process.¹¹ In February 2014, the research

databases PubMed, Science Direct, and Web of Knowledge were searched for the following terms in various combination: school, food service, foodservice, food worker, nutrition program, training, and continuing education. Search results were combined and duplicated results eliminated. Titles and abstracts of the results were screened and inapplicable articles eliminated. The full text of all remaining articles eligible for inclusion were obtained and further evaluated for inclusion criteria.

Articles included in the final literature review were intervention based studies conducted in a U.S. K-12 school setting and published in peer reviewed journals between January 1990 and February 2014. Studies were excluded if they were: published prior to 1990, did not detail a school food service staff training, were not intervention based, were not original research, or did not take place in a U.S. K-12 setting (Figure 1).

Figure 1

The two authors extracted data based upon sample size, type of intervention, food service components of intervention, training methods, training areas addressed, and outcomes. The extracted data was evaluated to identify trends in current practices and evaluation of intervention as well as effective intervention approaches. The quality of the articles was assessed by evaluating methodology and outcomes, as they related to school food service interventions.

RESULTS

A total of 2341 unique articles were identified for possible inclusion in initial database searches (Figure 1). After evaluation of titles and abstracts, 93 articles were selected for full text evaluation. From those 93 articles, 74 articles did not meet inclusion criteria and were excluded. Reasons for exclusion included study location outside of the U.S. (N=1), settings other than a K-12 school (N=12), not intervention based (N=28), not detailing staff training (N=15), not having a staff training component (N=15), not original research (N=1), and being published prior to 1990 (N=4). A total of 17 articles describing 14 interventions were included in the final literature review (Table 1). The majority of articles (N=9) described comprehensive school health interventions with a specific food service component that included food service staff training as an important part of the overall intervention.¹²⁻²⁰ Six studies assessed school food service interventions or school food environment interventions that included a component of staff training²¹⁻²⁶ and just 2 studies were specific to evaluating a school food service staff training program.^{27,28} In assessment of experimental methodology, none of the studies randomized participants.

Table 1

Comprehensive School Health Interventions

The 6 comprehensive school health programs described in the 9 articles involved various components, including physical activity interventions, classroom curriculum, and community and parent involvement, in addition to food service intervention.¹²⁻²⁰ The duration of the interventions ranged from 1 to 3 years and the sample sizes varied from 4

schools¹³ to 96 schools.^{15,16,17} The primary aim of the food service interventions were to bring menus into closer alignment with USDA guidelines (1 study),¹⁴ decrease fat content in meals (5 studies),¹²⁻¹⁹ decrease saturated fat (1 study),^{18,19} decrease sodium content of meals (1 study),¹⁵⁻¹⁷ increase variety and quality of fruits and vegetables offered (2 studies),^{12,20} limit calories from sweets and desserts (1 study),¹² and increase fiber content of meals (1 study).¹² Most staff training in these comprehensive interventions included initial training (2 to 6 hours) and follow up from the intervention team in the form of monthly or bi-yearly booster trainings or kitchen visits. Three of the studies utilized staff interviews to assess implementation and attitudes regarding the intervention,^{14,15,19} while 5 of the 6 studies included menu and recipe analysis to assess food service intervention outcomes.¹³⁻²⁰ One study did not specify assessment protocol or outcomes.¹² Results of staff interviews indicated that staff felt involved with and positive about the intervention¹⁴ and confident in their abilities to implement change.²⁰ Nutritional aims achieved included lowering fat and saturated fat content^{13,15-19} and increasing fruit and vegetable offerings.²⁰ However, there was mixed successes in decreasing sodium.^{15,17}

Food Service and Food Environment Interventions

Aims of the 6 school food service interventions were similar to aims of the food service components reviewed in the comprehensive school health interventions: decrease fat content (2 studies),^{21,25} decrease sodium content (3 studies),^{21,25,26} and increase overall healthfulness and adherence to USDA guidelines (2 studies).²²⁻²⁴ The sample sizes of the interventions ranged from 2 schools²² to one large school district encompassing 1700 schools.²⁴ These programs differed widely in their implementation of staff training.

Workshops ranged from 2 hours to 3 days in duration and 2 of the interventions included chefs training food service staff by working alongside them for an extended period of time. One intervention incorporated staff interviews as an evaluation measure,²³ 1 measured plate waste,²¹ and 5 of the 6 relied on menu analysis to assess intervention success.^{21–23,25,26} These interventions generally achieved their menu and dietary goals with the exception of sodium reduction, which again had mixed results.^{21–23,25,26}

School Food Service Staff Training

The aims of the 2 articles specific to food service staff training were more explicit in training outcomes than previously discussed interventions.^{27,28} The intervention detailed by Roth-Yousey, Barno, Caskey, Asche, and Reicks²⁸ included 211 participants and aimed to increase the knowledge, positive attitudes and intentions to use whole grain products in the school food service setting, while Oakley²⁷ describes an intervention with 42 participants targeted at increasing knowledge regarding special dietary restrictions. These were both one time class interventions with programs that integrated presentations and participatory activities, including problem solving exercises and menu planning practice. In addition, the whole grain class included hands on culinary activities and participant discussion. To assess impact of the whole grain education class, participants completed an identical pre and post workshop survey as well as a follow up survey three to six months following the class. According to these measures, knowledge increased immediately following the class, however, some attitudes regarding the ease of whole grain use actually diminished following the class. In the follow up assessment, researchers found that knowledge had been maintained, and the majority of respondents

had increased the use of whole grain items in their kitchen. Assessment in the Oakley study included pre and post workshop measures to evaluate knowledge and skills gained, a workshop experience survey to assess participants attitudes regarding the workshop itself, and a follow up survey to assess participants applications of the training.

Evaluation tools were obtained from the National School Food Service Management Institute (NFSMI), as the material taught was based on a NFSMI module. Based on these evaluations, participants had an overall positive view of the training, increased their knowledge on the topic, and felt that they were able to implement knowledge in their workplace.

DISCUSSION

From these interventions, a number of lessons regarding food service staff training can be understood. First, promoting a positive attitude regarding food service changes amongst the food service staff is key to successfully implementing and institutionalizing goal behaviors.^{20,25} Developing positive relationships between interventionists and staff, encouraging discussion and feedback, and maintaining long term support from administration and trainers all contribute to positive staff regard.^{12,19,23–}²⁵ Second, full implementation of behaviors may take an extended period of time, so prolonged interventions over several years are likely to result in a higher degree of adherence and compliance.^{17,20} Follow up trainings and continued contact and interaction with interventionist further promotes continued adaptation of behavior modifications. Third, training and messaging must comply with the current available infrastructure of the school food service program. Encouraging small changes utilizing current equipment

available or modifying purchasing practices if the facility is only equipped for “heat and serve” service is more effective than promoting drastic change that cannot be implemented with available resources.^{13,15} Finally, easing barriers to attendance by timing trainings during regular work hours or providing additional pay or compensation for attendance may increase participation and promote a more positive attitude regarding training.¹⁷ While it is clear that skills training is vital to implementing most modifications in school meals, effective training must address more than just specific food preparation practices. Appropriate staff training can provide food service staff insight into the important role that they play in creating a healthy school environment. The greater the degree of involvement and interconnectedness that the staff feels with the greater school health goals, the more likely they are to adhere to and contribute to a healthier school environment.¹⁴ In addition, training should provide resources and promote efficacy in overcoming environmental barriers with training and technical assistance aimed at procurement practices, budget control, and promoting staff support and buy in. Even with this type of promotion, more dramatic menu, meal, and production changes are likely when staff training is paired with infrastructure changes, like the purchasing of new equipment.^{13,15} The literature does support the efficacy of staff training in modifying menu composition and fat content of meals. However, the limited ability of interventions to reach sodium goals indicates that farther reaching systemic changes, including modification of vendor products, may be necessary. Significant decreases in sodium were found in training programs focused on increasing scratch cooking and involved increased staff culinary knowledge and modification of purchasing practices,^{21,26}

Based on the limited number of peer reviewed articles addressing the topic of school food service staff training, there is significant need and opportunity for future research. Just one study completed long term (5 years) follow up to assess the institutionalization of behavior change. Significant research is necessary to identify the best training techniques and approaches to promote long term change adherence in school food service programs. None of the studies included in the review adhered to experimental methodology, so future research could produce higher quality data by utilizing both control and experimental groups. Also, with the new USDA school meal guidelines recently introduced, food service staff training needs may have changed somewhat based on the changes in the guidelines. Further investigation regarding new training needs is necessary to best assist schools in meeting guidelines. In addition, future research should explore the most time efficient and cost effective training techniques and strategies as the USDA Proposed Professional Guidelines for School Food Service Professionals are implemented.¹⁰ Finally, the literature exhibits a lack of accessible and validated evaluation tools aimed at school food service trainings. While the NFSMI training evaluation tool may be appropriate for assessing overall training perceptions, tools specific to the knowledge and skills of food service staff are limited.

Limitations

There are several limitations to consider with this literature review. First, the search terms selected may not have retrieved all studies relevant to the topic. Second, the authors chose to exclude studies that did not provide explicit information regarding school food service staff training as part of the intervention. These studies could

potentially have provided relevant information, specifically regarding necessary dose of training, but sufficient information about training was not found in the published literature. Finally, the authors chose to include only peer-reviewed literature to increase research validity and reliability, so potentially relevant documents (i.e. grant reports, university extension programs, government reports) may have been excluded. This approach is justified in order to better understand future research needs.

Conclusion

With new nutritional guidelines, professional development standards, and a stronger interest and emphasis on providing healthy and appealing school lunches, effective training for school food service staff is more important than ever. While the current literature can provide some insight into practices that can promote increased participation and adherence to training, there is still a significant need for research on best training practices and training practices that will meet the needs of today's changing school food service. School food service staff are integral to providing healthy school meals and promoting healthier schools. A thorough understanding of the best way to provide them with the skills and training they need to do so is vital to continued improvement in school meals and children's health.

IMPLICATIONS FOR SCHOOL HEALTH

Improving the quality and nutritional value of school meals has broad implications for overall school health. Nutritional deficiencies and inappropriate intake

can have detrimental impacts on academic performance and ability to learn.²⁹ By focusing on improving overall quality of food, appropriate training for food service professionals may not only increase nutritional quality of meals served, but also palatability and acceptability to students. To capitalize on these benefits, schools should implement comprehensive and carefully structured training for their school food service staff. Training must address not just basic culinary skills and job duties, but empower school food service professionals with nutrition and policy knowledge to answer the “why” questions regarding school meal requirements. Training should be ongoing and provide significant follow up and reinforcement to better institutionalize learned practices. Schools have a unique opportunity at this time to take advantage of programing and grant funding to support food service staff training.³⁰ Appropriate training and maximization of available training resources could potentially lead to greater program participation, reduced food waste, and overall better nutrition for students.

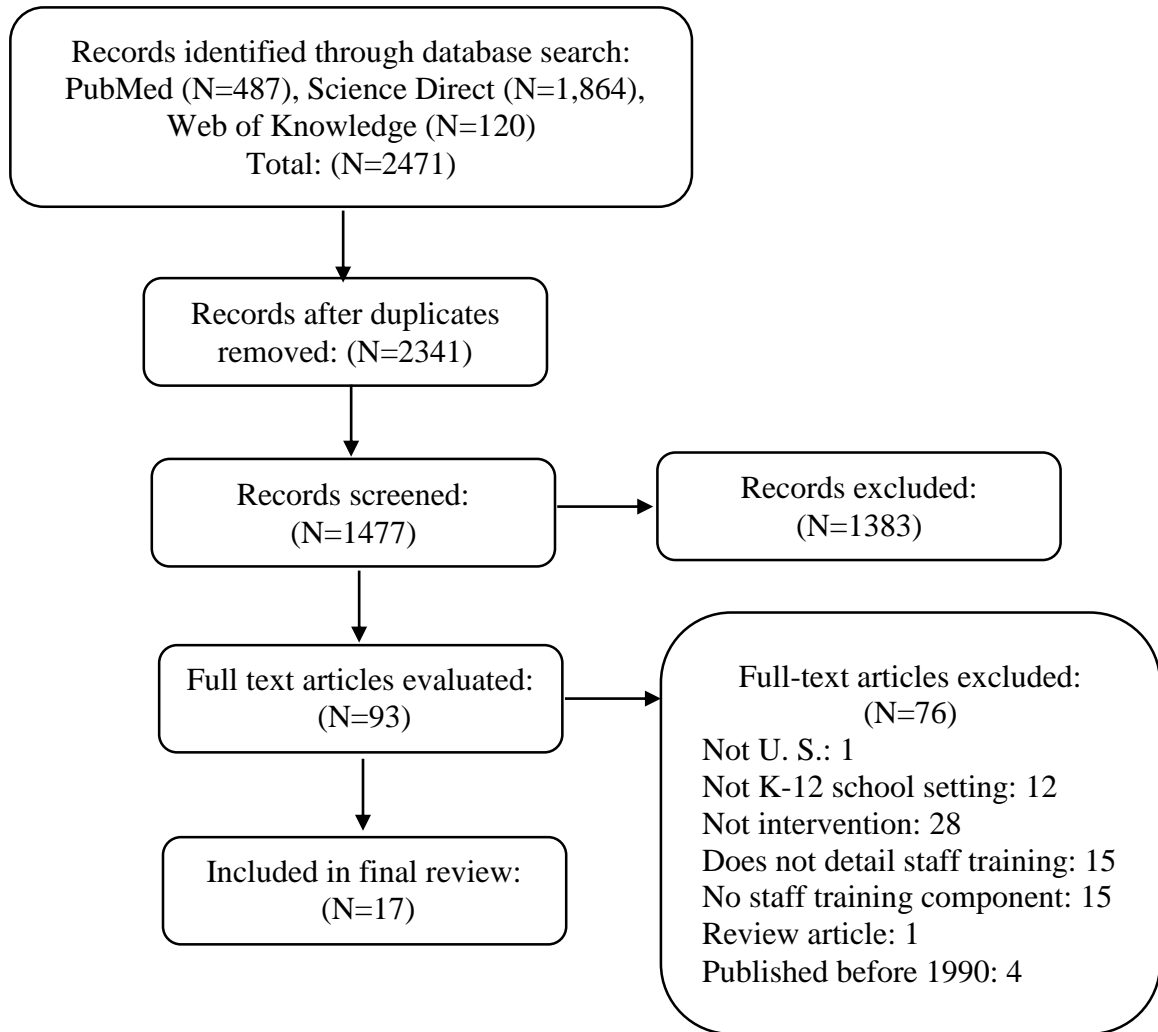
Figure 2.1**Flow Chart of Article Selection Process for K-12 School Food Service Staff Training**

Table 2.1. Overview of Interventions That Address Food Service Staff Training in K-12 Schools

First Author and Year	Intervention	Sample Size/Location	Intervention Components	Food Service Component Aims	Food Service Staff Training Methods	Training Areas Addressed	Outcomes
Comprehensive School Health Interventions							
Gillis B (2009) ¹²	HEALTHY Study	42 middle schools; 7 U.S. cities	School food environment, Physical activity, Classroom curriculum, Parent involvement	Decrease fat content, increase variety of F & V offered, limit portions and calories of snacks and deserts, increase high fiber offerings	Initial training session (length unspecified), twice yearly booster sessions, weekly follow up meetings	Risk factors for type 2 diabetes, overview of intervention, techniques to meet nutrition goals	Unspecified
Harris KJ (1997) ¹³	Kansas LEAN School Intervention Project	4 elementary schools; KS (urban and rural)	Food service changes, Physical activity, Classroom curriculum, Community partnership	Decrease fat content of lunches	Workshops (frequency and duration unspecified), one to one training and coaching	Food preparation techniques, identification of lower fat products from vendors	Fat content of school lunches decreased from baseline
Levine E (2002) ¹⁴	Team Nutrition	19 elementary schools; 7 U.S. districts	Food service changes, Classroom curriculum, Community partnerships	Modify meals to meet USDA guidelines	10 hours of training	Menu changes to adhere to USDA Dietary guidelines, cooking techniques (low-fat), public relations/marketing	Food service staff expressed positive feelings about the project and felt involved in implementation

Table 2.1 Continued

Nicklas TA (1992) ¹⁵ Osganian SK (1999) ¹⁶ Perry CL (1997) ¹⁷	CATCH (Child and Adolescent Trial for Cardiovascular Health) Eat Smart	96 elementary schools (223 food service staff members); 4 states (CA, LA, MN, TX)	Classroom curriculum, Food service changes, Physical education	Decrease fat (<30% of total energy), decrease saturated fat (<10% of total energy), decrease sodium (600-1000 mg per serving)	1 day (4-8 hour) initial training, monthly support visits, yearly 4-hour booster trainings	Program guidelines, menu planning, food purchasing and preparation, cafeteria program promotion	Significant decrease in fat, saturated fat, and cholesterol from baseline
Story M (2003) ¹⁸ Snyder P (1999) ¹⁹	Pathways	41 elementary schools; 7 American Indian Nations	Food service changes, Physical activity, Classroom curriculum, Parental involvement,	Decrease fat content of meals to <30% of total energy	2 2-hour training programs, 1 day/month working side by side w/ intervention staff	9 behavioral guidelines, hands-on skill training related to guidelines, taste tests of appropriate food choices, feedback/sharing of experiences	Significantly greater decrease in fat and saturated fat content of school lunches in intervention schools than control schools
Story M (2000) ²⁰	5-a-Day Power Plus	20 elementary schools; St. Paul, MN (urban)	Food service changes, Classroom curriculum, Parental involvement,	Increase promotion, attractiveness and variety of fruits and vegetables	2 hour initial training with, additional 2 hour training once each year	8 guidelines on offering F & V, 4 guidelines on F & V promotion	More fruit and vegetable variety and promotion at intervention schools. Staff reported increased confidence.
Food Service and Food Environment Interventions							
Cohen JF (2012) ²¹	Chef Initiative	4 middle schools; Boston, MA (urban)	Menu Changes, Staff training	Eliminate trans fats, reduce overall fat, added sugar, and sodium content of meals, increase whole grain offerings	Chef and food service staff work side by side 2-3 days/wk	Scratch cooking techniques, achieving nutritional goals	Intervention schools served more whole grains, more fresh or frozen fruits and vegetables, and meals contained less sodium than control schools

Table 2.1 Continued

Donnelly JE (2000) ²²	N/A	2 elementary schools; Hastings, NE	Menu changes, serving style changes	Modify meals to meet USDA guidelines	Unspecified	Menu planning, meal preparation/cooking modifications, nutrient analysis	Modified menus prepared with introduced cooking techniques met USDA guidelines
Goldberg J (2009) ²³	Shape Up Somerville: Eat Smart, Play Hard	1 school district; Somerville, MA (urban)	Menu changes, Staff training, Increased communication	Increase variety of fresh F & V options, increase nutritional quality of meals	Workshops (frequency and duration unspecified), monthly district wide food service manager meetings	Hands on techniques (ex. knife skills and F & V preparation), basic nutrition, encouraging and modeling healthy food choices	Increase in F & V offerings, food service staff has increased positive views of healthier meals
Perlman SE (2012) ²⁴	N/A	1 school district (1700 schools); New York, NY	Personnel changes, Modification of menu items, Change beverage offerings, New nutrition standards	Increase overall nutritional quality of meals	Extended partnership between chefs and school food service staff	Enhance visual appeal of food, increase staff efficiency, adherence to standardized recipes	Not specified
Snyder P (1992) ²⁵	LUNCHPOWER!	34 elementary schools (100 food service staff); MN (urban, suburban, and rural)	Recipe modifications, Purchasing changes, Meal preparation practices	Decrease fat content of lunches (<30% of calories), reduce sodium (<1000 mg per day)	2 hour training program	Intervention information, importance of intervention, altering menus and preparation techniques to reduce fat and sodium	Significant decrease in total fat and % calories from fat compared to baseline data. Not significant change in sodium

Table 2.1 Continued

Taylor S (2014) ²⁶	NA	5 high schools (11 food service staff); Shasta County, CA (rural)	Purchasing changes, Meal preparation practices	Decrease sodium content of school meals	1 short awareness promoting presentation, 3 day hands-on training, 1 procurement workshop	Dangers of high sodium diet, hands on training, skills for scratch cooking, procurement practices	Modest reduction in sodium in meals
School Food Service Staff Training							
Oakley C (2011) ²⁷	Eating Good and Moving Like We Should	42 school nutrition administrators and managers; MS	NA	Increase staff ability to meet special nutrition needs	4 hour sessions: lecture, problem solving activities	Addressing special dietary needs: federal regulations and addressing specific issues (diabetes, allergies, inborn errors of metabolism)	Increased participant knowledge, positive reaction of participants, participants able to apply knowledge in work setting
Roth-Yousey L (2009) ²⁸	NA	211 school food service managers and staff; MN	NA	Increase whole grain knowledge, attitude about serving whole grains, and intention to use whole grains in food service	3-hour program: participatory approach, activities, demonstrations, discussion	Whole grain basics: what is a whole grain, health benefits of whole grain, identifying whole grain; Whole grain preparation: improving acceptability, cost control, menu planning; Whole grain promotion	Increased whole grain knowledge and intention to increase whole grain use, decrease in positive attitude about use, increase in amount of whole-grains offered

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CHAPTER THREE

PERSPECTIVES AND FUTURE DIRECTIONS CONCERNING
FRESH, WHOLE FOODS IN MONTANA SCHOOL
NUTRITION PROGRAMS

Contribution of Authors and Co-Authors

Manuscript in Chapter 3

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Abstract

Purpose/Objectives: To meet new USDA school meal standards, school nutrition programs may need to transition from a “heat and serve” meal preparation approach to increased scratch cooking and use of fresh, whole foods. This study aims to assess the attitudes, motivations, and barriers for Montana school nutrition professionals and key stakeholders regarding the use of whole, fresh food in school nutrition programs.

Methods: The researchers conducted a survey of Montana school nutrition program staff (n=103) and semi-structured interviews with key stakeholders (n=12) including current and former school nutrition program staff (n=9), AmeriCorps FoodCorps service members (n=2), and a state level Farm to Cafeteria director (n=1). Survey responses were analyzed for statistically significant differences in responses between school nutrition programs based on size. Interviews were transcribed and coded to identify prevalent themes.

Results: Study participants identified numerous benefits to utilizing fresh, whole foods including increased ability to meet USDA standards. A number of barriers and challenges were also identified including lack of staff training, time limitations, food cost, and inadequate equipment.

Applications to Child Nutrition Professionals: Training and professional development specific to the needs of the school nutrition program may address some barriers to utilizing fresh, whole foods and increasing adherence to National School Lunch Program and School Breakfast Program standards. However, changes in institution, community,

and federal policies are necessary to facilitate broad adoption of scratch cooking and use of fresh, whole foods in school nutrition programs.

Keywords: whole foods, NSLP standards, school nutrition programs, food service perspective

Introduction

In 2012, the National School Lunch Program (NSLP) provided affordable meals for 31.6 million children in the United States each day (U.S. Department of Agriculture, Economic Research Service [USDA-ERS], 2013a). In the same year, 3.7 million students were served daily by the School Breakfast Program (SBP) (USDA-ERS, 2013b). The new NSLP and SBP standards, which are mandated by the Healthy Hunger Free Kids Act of 2010 (Healthy Hunger Free Kids Act, 2010), require an increased quantity of fruits and vegetables at both breakfast and lunch meals. They also specify servings of subgroups of vegetables, including dark green, red/orange, and legumes. Additionally, stricter limitations are added for fat, sodium, and calories. The USDA standards note that utilizing more fresh, whole foods in place of prepared items in meal preparation could help achieve these meal standards (U.S. Department of Agriculture, Food and Nutrition Service [USDA-FNS], 2012).

Prepackaged and processed foods utilized in the traditional “heat and serve” approach to meals, where nutrition program staff reheat prepared foods, may contribute large amounts of sodium and saturated fats to school meals (Gordon, Crepinsek, Briefel, Clark, & Fox, 2009). Returning to scratch cooking and utilizing more fresh, whole foods in school meal service may help schools meet new NSLP and SBP standards, especially for sodium and calorie restrictions (USDA-FNS, 2012).

Research completed under the former school meal standards identified a number of barriers to offering healthier meals and meeting USDA standards, as perceived by school nutrition professionals. Cited barriers include: students’ lack of acceptance of

healthy foods (Cho & Nadow, 2004; Lytle, Ward, Nader, Pedersen, & Williston, 2003; Slawson et al., 2013; Stang, Story, Kalina, & Snyder, 1997; Volpe et al., 2013); extra cost, labor, and time associated with modifying menus, recipes, and preparation of healthier food (Cho & Nadow, 2004; Lytle et al., 2003; Stang et al., 1997; Volpe et al., 2013); and lack of healthier options available through current vendors (Lytle et al., 2003; Volpe et al., 2013). Additional challenges identified include insufficient and outdated equipment (Economos et al., 2009; The PEW Charitable Trust & the Robert Wood Johnson Foundation, 2013), lack of support from administration or parents (Lytle et al., 2003; Slawson et al., 2013), and lack of necessary skills and training for staff (Cho & Nadow, 2004; Economos et al., 2009; Lytle et al., 2003; Stang et al., 1997).

Though the literature provides a broad review of potential barriers to utilizing healthier foods, a number of gaps in the research remain. First, further assessment of motivations for using fresh, whole foods in school nutrition programs can better inform effective interventions. Second, additional research regarding barriers specific to size of the school nutrition program is warranted. Third, few intervention evaluations have addressed the best practices to assist school nutrition professionals in overcoming challenges to implementing meals with more fresh, whole foods. Finally, it is an important time to evaluate the ability of school nutrition programs to meet the new NSLP and SBP standards and to identify how the use of fresh, whole foods can assist school nutrition programs in doing so.

A thorough understanding of training needs and best training practices for school nutrition program professionals is vital to successful implementation of the new

requirements. The change in meal preparation practices required by the new standards will increase the need for skilled labor and may contribute to increased labor costs (USDA-FNS, 2012). This research aimed to gain insight into these issues by assessing attitudes, motivations, and barriers for Montana school nutrition professionals and key stakeholders regarding the use of fresh, whole food in Montana school kitchens after implementation of the new NSLP and SBP standards.

Methodology

The current study utilized survey and semi-structured interview methods to assess school nutrition program managers, staff, and key stakeholder perspectives regarding the use of fresh, whole foods in the school nutrition program. The researchers defined stakeholders as individuals with direct experience in school nutrition programs or those in positions that influence or are influenced by school nutrition program practice and policy. The authors utilized the survey tool to gain a general picture of perspectives, while the semi-structured interviews allowed collection of in-depth information. Fresh, whole foods were defined for participants as foods that have no added ingredients or preservatives, including fresh, whole fruits and vegetables that have not been cooked, frozen, or canned and meats that have not been cooked (but may be frozen).

Subjects

Montana School Nutrition Program Staff Survey. Potential survey subjects were identified from a complete list of Montana school food service authorities obtained from the Montana Office of Public Instruction. All nutrition program managers or head cooks identified on the list (n= 254) were sent an email with explanation of the project

and a link to the online survey. Non-respondents were sent two subsequent emails over the course of the next month with requests for participation. As an incentive, participants who completed the survey were entered into a random drawing to win a set of kitchen knives for their school nutrition program.

Key Informant Interviews. Interview subjects were identified by Montana Team Nutrition and Office of Public Instruction employees as stakeholders based on the subject's use and knowledge of fresh, whole foods in school nutrition programs. Stakeholders were sampled according to their position in school nutrition programs, including school nutrition program professionals, individuals whose positions directly support food service, or individuals whose positions influence policy in nutrition programs. A total of 19 potential subjects were initially contacted by email requesting an interview. One follow up email was sent to non-respondents approximately two weeks after the initial email.

Instruments

Montana School Nutrition Program Staff Survey. Survey questions were adapted from the Survey of K-12 Food Service Providers in Michigan and the K-12 Food Service Directors Needs Assessment (Joshi & Azuma, 2009) with additional input from Montana Team Nutrition staff. Survey questions assessed both current practices and future nutrition program needs involving the use of fresh, whole foods including barriers, additional equipment needs, and training needs.

Key Informant Interview Questions. Interview questions were developed by the researchers based upon review of literature and input from school nutrition program

managers. To ensure face, construct, and content validity, both survey and interview questions were reviewed by a panel of five professionals comprised of nutrition researchers, Montana Team Nutrition staff, and Montana school nutrition program managers. Adjustments were made based on panel feedback. Table 1 identifies the final semi-structured interview questions. Participants were asked to identify barriers to using fresh, whole foods, ways to overcome barriers, motivations and benefits to using fresh, whole foods, training approaches, and equipment and training needs.

Table 1

Procedure

Survey participants completed the online survey from their computers at their convenience. Prior to beginning the survey, participants were asked to review an informed consent statement. Completion of the survey was considered consent to participate in the study.

The lead author scheduled times and dates for telephone interviews with interview subjects via email. Interview participants were asked to sign consent forms prior to the scheduled interview. The lead author telephoned interview participants at the scheduled time and obtained verbal consent to audio record the interviews. Survey instruments, interview questions, and subject protocol were reviewed and approved by the Montana State University Institutional Review Board.

Data analysis

Survey data was analyzed using Statistical Package for Social Sciences (version 22.0, 2013 SPSS Inc. Chicago, IL). Descriptive statistics summarized survey responses.

Analysis of Variance (ANOVA) was used to determine significant differences between the numbers of items selected for barriers, training needs, and equipment needs among participants from different size nutrition programs, as determined by the reported average number of lunches served each day. Statistical significance was set at a two-sided alpha level of $p < 0.05$.

To ensure anonymity of interview participants, each interview was de-identified by replacing the participant's name with a code number. Interview recordings were transcribed verbatim using Microsoft Word and Excel (Microsoft Corporation, 2008). Interview data were separated into meaning units, or distinct fragments that represent a single idea. The two lead authors independently coded the data, working from an inductive approach (Creswell, 2014). The authors discussed and resolved any discrepancies in coding. Approximately 33% of coded data required resolving for reasons including discrepancies in the organization of categories and differing levels of specificity. For example, the differing codes of "training needs" and "skills" were collapsed into a general theme of "training" with appropriate subthemes, including "skills."

Results and Discussion

Survey Findings

A total of 103 subjects completed the survey for a response rate of 41%. The average number of reported lunches served per day ranged from 1 to 4,000 with a mean of 316 lunches. While two respondents did not provide data on number of lunches served, six respondents reported serving 10 or fewer lunches per day, 28 reported serving

between 11 and 100, 26 served between 101 and 200, 20 served 200 to 399, 11 served 400 to 599, 4 served 600 to 799, 3 served 800 to 999, and 5 respondents reported serving more than 1000 lunches per day. The high number of responses in the lower range is indicative of the high percentage of very small school nutrition programs in Montana.

Table 2 further details survey findings. The most frequently cited barriers to utilizing more fresh, whole food included cost of food (n=66), inconsistent availability (n=46), and not enough preparation time (n=40). In total, 19 respondents reported no barriers to utilizing fresh, whole foods. In response to the question “What equipment are you currently utilizing to prepare and serve fresh, whole foods?” the most frequently reported response was cutting boards (n=100) followed by salad bar (n=75), convection oven (n=74), peeler (n=65), and high quality knives (n=63). Respondents expressed the greatest interest in utilizing cherries (n=42), green beans (n=27), and winter squash/pumpkins (n=26).

While 22 respondents said that they would require no new equipment to prepare and serve more fresh, whole foods, 37 identified high quality knives, 26 steamer, 22 food processor, and 22 salad spinner. The most frequently cited training needs were use of herbs and spices (n=48), efficient planning and preparation (n=36), and creating and standardizing recipes (n=33).

Table 2

To compare responses based on nutrition program size, as determined by average number of lunches served, respondents were grouped in to three size categories, with one third of respondents in each category (Groups 1, 2, and 3). The average number of meals

served by group 1 was 57 meals, group 2, 170 meals, and group 3, 717 meals. As shown in Table 3, there were no significant differences amongst the groups in the number of training needs cited or the number of equipment needs cited. There was a significant difference between the smallest (group 1) and the largest (group 3) groups in the number of barriers to serving fresh, whole foods, with group 1 citing significantly fewer barriers than group 3.

Table 3

Interview findings

One on one semi-structured interviews were conducted with 12 key informants by the lead author. These participants included current and former school nutrition program managers (n=9), AmeriCorps FoodCorps service members (n=2), and a state level Farm to Cafeteria program coordinator (n=1). Seven of the 19 individuals initially contacted did not respond to interview requests. In total, 421 meaning units were identified across 12 interviews.

Seven primary themes emerged from analysis of the transcribed interview data: whole foods, training, local foods, equipment, procurement, NSLP standards, and successful implementation. Within the themes of whole foods, training, and local foods, several distinct subthemes emerged. Meaning units within the themes of equipment, procurement, NSLP standards, and successful implementation were more homogenous in subject matter and subthemes did not emerge within these themes. Table 4 details the themes and subthemes (where applicable). The table also notes the number of participants

mentioning the theme/subtheme, number of meaning units in which the theme/subtheme appeared, and examples of each theme/subtheme.

Table 4

Whole Foods

Motivation. According to interview participants, the primary motivation for using fresh, whole foods was to provide healthier, more appealing meals for students.

Respondents believed that using fresh, whole foods was healthier because the food was fresher and cooks had more control over ingredients. Additionally, multiple respondents noted pressure or encouragement from administration and parents as motivation for using fresh, whole foods.

Integration. Several participants integrated fresh, whole foods into schools through the Fresh Fruit and Vegetable Snack Program (USDA-FNS, 2013). Respondents also frequently noted using the salad bar to feature fresh foods and integrating fresh vegetables into side dishes.

Barriers. Barriers to utilizing whole foods included cost, limited skilled staff, and lack of storage space. One participant who works with several school districts described a disconnect between clerks who handle the budget and nutrition program managers, which limited the nutrition program manager's ability to make changes to ordering or production practices. In addition, two managers from smaller programs noted that they did not meet the minimum required order from some distribution companies, thus reducing their sourcing options.

Benefits. A wide variety of benefits to using whole foods were cited by 9 of the 12 participants. Improved taste, visual appeal, and variety in meals were the most frequently noted benefits, followed by increased meal participation, decreased food waste, and positive staff feedback.

Child perspective. Of the 12 participants, 8 discussed the use of fresh, whole foods from the child perspective. Participants noted that in using fresh, whole foods on the salad bar, children were able to make their own choices and were more likely to eat the foods that they picked. Students were more accepting of new fruits and vegetables when they were in a form that they could recognize.

Training

Skills. Specific culinary skill needs noted by participants included knife skills, safe and efficient handling of fresh produce, and following a standardized recipe. Beyond culinary skills, inventory and budget management needs were commonly cited as well as time management and efficient planning. Several participants mentioned the need to educate staff on the benefits of using fresh, whole food in order to increase their willingness to integrate fresh, whole foods into the school nutrition program.

Professional Development. Some respondents actively participated in professional development offerings while others stated that they had received no additional professional development. Managers interviewed who participated in continuing education opportunities did so at state conferences (Montana School Nutrition Association) and online (National Food Service Management Institute).

Approaches. Most respondents did not have specific designated training times, but rather trained as needed and “learned as we go.” Several managers used experienced and better skilled staff as leaders and peer teachers in the kitchen. Other managers expressed a desire to bring in an outside teacher, a chef or extension agent, to teach or work alongside the staff to enhance skills and be a “positive example.”

Challenges. The most frequently cited challenge to implementing training was limited time in the workday. One respondent commented that there were only two staff members in the kitchen, making it impossible for anyone to take a day away for training. A respondent from a larger district cited the staff’s restrictive contract that did not allow for extra time outside of required staff workdays.

Local Foods

Motivation. Supporting local farmers and putting money back into the local economy were the most frequently mentioned motivation for utilizing local foods, followed by increased freshness, quality, and taste.

Procurement. Several participants noted that time and effort to develop relationships with farmers as a significant barrier to local procurement, although having an AmeriCorps FoodCorps service member decreased this barrier. Multiple participants expressed a desire to procure more local products, but felt inhibited by their remote location and limited access to distribution channels. Also frequently mentioned was the limited growing season in Montana.

Integration. Participants integrated local foods in to school nutrition program through the Fresh Fruit and Vegetable Snack program (USDA-FNS, 2013) as well as

modifying recipes to utilize locally available products. One participant was able to integrate more local products into meals by focusing on local products that are available all year round, like beef and lentils.

Equipment

Nearly all respondents expressed a desire for additional or updated equipment. Many expressed a sense of “making do” with their current equipment. The equipment most frequently noted as especially useful in processing fresh, whole foods included food processors, industrial chopper/dicer, slicers, peelers, and commercial freezers and refrigerators.

Procurement

Procurement sources ranged from large scale distributors to local farmers, and in two cases, school and nutrition program staff gardens. Several respondents noted their remote location as a limiting factor to fresh food access. One respondent recruited any member of the town traveling to a larger city to pick up fresh produce for the school.

National School Lunch Program Standards

Several participants noted that utilizing more fresh, whole food and scratch cooking helped them meet USDA School Meal standards (USDA-FNS, 2012). Respondents reported that utilizing salad bars to feature a variety of fruits, vegetables, and legumes helped meet requirements for the number of servings and provided abundant food for fewer calories which assisted in meeting calorie restrictions. One respondent used lentils in place of ground beef to not only assist in meeting legume serving requirements, but also help decrease fat and saturated fat content of meals.

Successful Implementation

A prevalent theme associated with successful implementation was managing staff members appropriately. One manager noted shifting staff responsibilities to maximize staff skills and decrease the effect of staff members who were unwilling to change to more scratch cooking. In overcoming cost, multiple participants underscored the importance of creative thinking and innovative solutions. “But, it’s kind of a balancing act,” commented one participant, “like getting the fresh fruits and vegetables but also making sure you meet the costs with the canned.”

Conclusion and Applications

Findings from both the survey and interviews build on previous research and point to opportunity to increase the use of fresh, whole foods in school nutrition programs through improved and targeted training and appropriate policy changes. Though previous research indicates limited staff skills and training as barriers to producing healthier meals or using local products (Cho & Nadow, 2004; Economos et al., 2009; Lytle et al., 2003; Stang et al., 1997), few studies address specific training needed to effectively utilize fresh, whole foods. Our findings support previous work indicating the need and desire for training in recipe and menu standardization, food safety, and using local food (Smith, Wleklinski, Roth, & Tragoudas, 2013; Stang et al., 1997; Sullivan, Harper, & West, 2002). Additionally, the findings of the current study identify the specific skills and training needed to best utilize fresh, whole food and meet NSLP and SBP standards.

No previous research assesses the differing needs of various sizes of school nutrition programs, beyond the one previous study evaluating the influence of school size

on interest in utilizing local foods (Smith et al., 2013). The wide range of program participant numbers reported by survey respondents emphasizes the widely varying challenges of Montana schools. Appropriate training should be customized to nutrition program size and serving styles. Schools that do not have fully equipped kitchens may benefit from introducing fresh, whole foods through the Fresh Fruit and Vegetable Snack program, whereas schools with full kitchens could benefit from culinary trainings to incorporate fresh, whole foods into meals (USDA-FNS, 2013).

School nutrition program managers must also have opportunities to learn budgeting and staff management techniques to facilitate the use of fresh, whole foods. The researchers' findings corroborate previous work pointing to the need for enhanced managerial skills to promote teamwork and staff motivation (Sullivan et al., 2002). Strong leadership and management abilities are vital to encouraging staff support of food service changes. Continuing education and professional development opportunities should be made available to all levels of school nutrition program staff in a manner that accommodates limited travel time and geographic barriers. Consistent online training may be one option to reach rural nutrition program staff (Rasor-Greenhalgh, Taylor, & Roberts, 1995). Another effective option may be to embed trainers within the school nutrition program to allow them to work alongside staff for an extended period of time (Cohen et al., 2012; Perlman et al., 2012).

Internal school and district level policies may require changes to better support continued training. Providing adequate time and compensation in contracts to allow for continuing education will be necessary to allow nutrition program staff to meet new

proposed professional standards for all school nutrition employees (USDA-FNS, 2014). Facilitating communication between budget planners and meal planners is vital to promoting flexibility in ordering and increasing the use of fresh, whole foods. Contrary to previous studies indicating lack of administrative and parental support as a barrier to serving healthier meals (Lytle et al., 2003; Slawson et al., 2013), the current research points to pressure from administrators and parents as motivation to produce healthier meals. This may indicate changing priorities for both institutions and parents and an increased preference for healthful school lunches.

At a community level, promoting interorganizational communication and connections between school districts, growers' cooperatives, and local food organizations may help facilitate increased access to fresh, whole foods. While previous research has shown limited distribution and availability to be a barrier in utilizing local foods (Izumi, Rostant, Moss, & Hamm, 2006; Pinard et al., 2013), the current findings indicate that these issues also limit access to fresh, whole foods in general. In Montana in particular, developing appropriate infrastructure to support distribution of fresh, whole foods to remote areas will be key to promoting increased use of whole foods statewide. Individuals and organizations, like FoodCorps, dedicated to enabling such connections may increase the use of fresh, whole foods and promote healthier meals overall (FoodCorps, Inc., 2013).

Changes at a national policy level may also be necessary to support a transition to scratch cooking and the use of fresh, whole foods. The current research confirms previous studies citing insufficient equipment as a barrier to healthier food preparation

(Economos et al., 2009; The Kids Safe and Healthful Food Project, 2013; Wagner, Senauer, & Runge, 2007). Allotting funds specifically for updated equipment would take significant pressure off nutrition program managers. Funding is also necessary to enable school districts to meet the proposed training standards (Wagner et al., 2007). Additional monies to pay staff for time and travel to training would ease the burden of the new USDA professional standard requirements. With recent backlash against the new standards and required changes in school nutrition programs, it is important that school nutrition programs are maximally supported for successful implementation (Lubrano, 2014).

While this research provides valuable insights into Montana school nutrition programs, there are some limitations. The validity of the survey may be threatened by selection bias. That is to say participation was optional and those who chose to participate may have had a more vested interest in using whole, fresh foods than non-respondents. The survey did not directly assess respondents' interest or desire to increase their use of fresh, whole foods or their current food service model. This information may have clarified the limitations and barriers cited by respondents. Additionally, the results may not generalize to a national population, particularly due to the limited sample size of the study and the remote nature of many Montana schools.

Areas for future research include assessment of current available training for school nutrition program professionals and further evaluation of best training practices. The ability of schools and districts to meet the USDA's proposed professional standards for school nutrition employees should be evaluated before and after implementation

deadlines. The impacts of those standards should also be explored to determine effectiveness, costs, student acceptance, and nutritional implications.

Study participants noted numerous benefits to utilizing fresh, whole foods in school nutrition programs and also identified significant barriers. While training and professional development aimed at increasing culinary skills and promoting productive management practices may address some of these barriers, change in institution, community, and federal policy are necessary to facilitate broad adoption of scratch cooking and use of fresh, whole foods in school nutrition programs. It is vital that school nutrition program staff are provided resources and knowledge to effectively integrate fresh, whole foods to not only meet NSLP and SBP standards, but also produce appetizing and enticing school meals.

Table 3.1.

Key Informant Interview Questions about Fresh, Whole Foods

<u>Topic</u>	<u>Question and Select Probes</u>
Use of fresh, whole foods	How do you or the foodservice that you work with utilize fresh, whole foods in your meal preparation? Probe: Incorporated into recipes? Served as side dishes? Have you or the foodservice that you work with increased your use of fresh, whole foods in recent years? Probe: How? (new recipes, new vendors, new menus, etc.)?
Motivations	What are your or the food service that you work with motivations for utilizing fresh, whole foods?
Skills and training	What additional skills or training did you or the food service staff that you work with need to prepare fresh, whole foods? Probe: How was this training accomplished? Is there additional training still required? How is training implemented?
USDA meal standards	What new foods or menu items have you added to help meet new USDA school lunch guidelines? Probe: Was extra staff training required for production of these items?
Professional development	Where do you or the foodservice managers that you work with get your professional development and additional training?

Table 3.1 Continued

Equipment	<p>What equipment has been useful in preparing fresh, whole foods for you or the foodservice that you work with?</p> <p>Did you or the foodservice that you work with require new equipment to meet new USDA school lunch requirements? Probe: What equipment has been most beneficial? Has the way you use equipment changed?</p>
Barriers	<p>What other barriers did you or the foodservice that you work with have to overcome to incorporate fresh, whole foods?</p>
Benefits	<p>What benefits have you or the foodservice that you work with seen in utilizing more fresh, whole foods?</p>

Table 3.2.

Responses of Montana School Nutrition Staff Regarding Fresh, Whole Foods (N=103)

<u>Question Topic</u>	<u>Response</u>	<u>n</u>
Barriers that prevent using more fresh, whole foods	Cost of Food	66
	Inconsistent availability	46
	Not enough preparation time	40
	Limited storage/refrigerator space	35
	Lack of necessary equipment	20
	There are no barriers for me to utilize fresh, whole foods	19
	Insufficient staffing levels	16
	Lack of recipes	13
Equipment currently utilized to prepare and serve fresh, whole foods	Other	11
	Cutting Boards	100
	Salad Bar	75
	Convection Oven	74
	Peeler	65
	High Quality Knives	63
	Slicer	43

Table 3.2 Continued

<u>Question Topic</u>		<u>Response</u>	<u>n</u>
Equipment	Food Processor		40
currently utilized	Wedger		32
to prepare and	Tilt skillet		29
serve fresh, whole	Blender		27
foods (cont.)	Steamer		20
	Salad spinner		17
	Steam jacket kettle		16
Fresh, whole	Cherries		42
foods to use in the	Green Beans		27
future (not	Winter squash/pumpkins		26
currently used)	Sweet Corn		25
	Kale		22
	Mushrooms		22
	Berries		22
	Summer squash		21
	Sweet potatoes		15
	Pears		14
	Lentils/Dried Beans		13
	Melons		12
	Meat and Poultry		11

Table 3.2 Continued

<u>Question Topic</u>	<u>Response</u>	<u>n</u>
Fresh, whole	Fish	11
foods (cont.)	Not interested in any additional foods	11
Additional	High Quality Knives	37
equipment needed	Steamer	26
to prepare and	No new equipment necessary	22
serve more fresh,	Food Processor	22
whole foods	Salad Spinner	22
	Wedger	21
	Slicer	18
	Blender	17
	Peeler	17
	Tilt skillet	14
	Steam jacket kettle	13
	Other (ex. Cooler/storage space, more labor)	13
	Salad bar	12
Additional skills	Use of herbs and spice	48
training required	Efficient planning and preparation	36
by staff to	Creating/Standardizing recipes	33
incorporate more	Using local foods	33
fresh, whole food	Reducing food waste	33

Table 3.2 Continued

<u>Question Topic</u>	<u>Response</u>	<u>n</u>
Additional skills	Batch Cooking	23
training required	Knife Skills	23
by staff to	Reducing sodium in preparation	22
incorporate more	Low fat/low sodium vegetable preparation	22
fresh, whole	Appropriate storage and handling of fresh produce	20
foods (cont.)	No additional skills training required	15
	Food safety	13

Table 3.3

Comparison of Barriers, Training Needs, and Equipment Needs Based on School Lunch Program Size (N=103)

	Small School	Medium School	Large School
	Lunch Program¹	Lunch Program¹	Lunch Program¹
	(n=34)	(n=33)	(n=34)
	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>
Barriers	2.2 ± 1.7 ^a	2.5 ± 1.6	3.4 ± 1.9 ^b
Training Needs	3.0 ± 2.7	3.1 ± 2.7	4.1 ± 3.3
Equipment	2.1 ± 1.9	2.7 ± 2.9	3.0 ± 2.2
Needs			

¹School size was determined by reported average number of lunches served each day.

Small schools were defined as 1 – 100 lunches served, medium schools were defined as 101 - 245, large schools were defined as 246 - 4000.

^{ab}Means with different superscripts across rows are significantly different ($p < 0.05$)

based on $p < .05$ level using Tukey Post Hoc Test for One Way ANOVA

Table 3.4.

Emergent Major Themes and Subthemes of Key Informant Interviews Related to Fresh, Whole Foods in School Meals (N=12)

<u>Theme</u>	<u>Subtheme</u>	<u>P^a</u>	<u>MU^b</u>	<u>Example MU</u>
Whole Foods	Motivation	8	33	They're easy to serve. There's a little more labor involved in the prep work, but fresh produce is a lot easier.
	Integration	12	51	So, we're including a lot of fresh and local whenever possible, even in our existing USDA recipes.
	Barriers	9	16	I think another big reason that schools use us is that they are, they don't have time to do all the chopping on their own. The time or the equipment.
	Benefits	9	19	So, I think actually just trying to eliminate processed food actually really helps your budget.

Table 3.4 Continued

<u>Theme</u>	<u>Subtheme</u>	<u>Pa</u>	<u>MU^b</u>	<u>Example MU</u>
Whole Foods (cont.)	Child perspective	8	28	By offering choices at the salad bar and some more choices at the elementary level, they're really starting to see those fresh fruits and vegetables and by having the choices they're really able to choose what they want.
Training	Skills	12	50	<p>One is things like knife skills and the ability to just quickly chop and process, clean items.</p> <p>I think organizing your day and organizing your time and just time management is a skill that's completely undervalued.</p> <p>I would say even more training on budgeting, and learning how to incorporate fresh fruit and vegetables more efficiently without going over budget.</p>

Table 3.4 Continued

<u>Theme</u>	<u>Subtheme</u>	<u>Pa</u>	<u>MU^b</u>	<u>Example MU</u>
Training (cont.)	Professional Development	9	18	There's a couple of trainings that happen every year with OPI [<i>Office of Public Instruction</i>] that are decent, but there's not like a core set of professional development that we participate in, so it's mainly paying attention to what your neighbors are doing, finding out what works, what's good, talking to kids, seeing what works, and then trying to implement that.
	Approaches	10	21	I think to work with a chef or an extension agent would be great. They can only, they hear so much stuff from me, that I think it's a little bit more exciting when it comes from somebody else.

Table 3.4 Continued

<u>Theme</u>	<u>Subtheme</u>	<u>Pa</u>	<u>MU^b</u>	<u>Example MU</u>
Training (cont.)	Challenges	3	4	Training is just hard that way when you get a lot of people together. Some people seem to benefit and others don't.
Local Foods	Motivation	5	11	There's starting to be an increased buzz around farm to school and all the benefits that it holds.
	Procurement	6	19	We've increased our local sourcing...for the fresh fruits and vegetable program, I was able to get local produce in through that way.
	Integration	2	6	Another would be just regular integration into the school lunch program and that has been really successful with Montana food products that are available year round... things like lentils, ground beef that is raw.

Table 3.4 Continued

<u>Theme</u>	<u>Subtheme</u>	<u>Pa</u>	<u>MU^b</u>	<u>Example MU</u>
Equipment		12	43	<p>I would say the one other huge piece of equipment that is super helpful is our peeler.</p> <p>I did have to buy commercial refrigerator.</p> <p>I think the most important thing we purchased last year was a heavy duty food processor that can shred or puree.</p>
Procurement		10	21	<p>Yeah, the one that always comes up is distribution. And that is just part of living in Montana.</p>
National School Lunch Program (NSLP) Standards		9	24	<p>I think, you know, switching to scratch helped us meet those guidelines.</p> <p>We try to incorporate more kale and more lentils, squash, you know, which all then help us meet the red, green needs and the legumes.</p>

Table 3.4 Continued

<u>Theme</u>	<u>Subtheme</u>	<u>P^a</u>	<u>MU^b</u>	<u>Example MU</u>
Successful Implementati on		10	57	<p>In general, the whole, basic ingredients are affordable and, as long as you're managing inventory well, I don't find it to be an issue.</p> <p>Definitely if you're buying in season, that's good. It will be a little bit cheaper.</p> <p>So sometimes it's just about having the mind set and thinking creatively and thinking about how we can get this done instead of why we can't do it.</p>

^a P = Number of participant interviews in which theme was present

^b MU = Number of meaning units in which theme was present

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CHAPTER FOUR

MONTANA COOK FRESH WORKSHOP: A K-12 SCHOOL FOOD
SERVICE PROFESSIONAL TRAINING TO INCORPORATE
WHOLE FOODS IN SCHOOL MEALS

Contribution of Authors and Co-Authors

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ABSTRACT

Background: To meet new school meal guidelines and create meals that appeal to students and promote positive food choices and a healthy weight, school food service programs are increasingly moving towards scratch cooking. This research aims to evaluate the outcomes of the Montana Cook Fresh Workshop, a culinary skills class for K-12 school food service professionals to promote the use of whole foods in school food service programs. Outcomes of the workshop are evaluated based on participant satisfaction and participants' whole, fresh foods (a) cooking knowledge, (b) confidence, (c) attitude, and (d) intention to use.

Methods: Participant satisfaction was evaluated with a Likert scale questionnaire and series of open-ended questions. Researchers used a pre-test/post-test design to assess participants' knowledge, confidence, attitudes, and intentions regarding whole, fresh food. Descriptive, t-test, and ANOVA were used to analyze data.

Results: For each statement assessing participant satisfaction, 96-100 percent of participants selected "agree" or "strongly agree," indicating high levels of participant satisfaction. From pre to post test, participants' knowledge, confidence, and intentions to use whole, fresh food increased significantly.

Conclusions: The success and appeal of the Montana Cook Fresh Workshop supports the use of hands-on classes to address the changing training needs of school food service professionals. With the ability to use more whole foods, K-12 school food service programs have the opportunity to offer more appealing meals that meet USDA guidelines and promote healthy food choices. (Word Count: 234)

Key Words: food services, training programs, school meals

INTRODUCTION

With the recent implementation of new National School Lunch Program (NSLP) and School Breakfast Program (SBP) meal requirements, increased attention has focused on the skills and training that school food service professionals require to successfully meet these guidelines.¹ These new meal requirements aim to reduce calories, saturated fat, and sodium, nutrients associated with higher body mass indices (BMI) in children, and increase intake of foods associated with healthy weight status, including fruits, vegetables, and whole grains.²⁻⁴ With 30.4 million students participating in NSLP each day and school lunch providing one third of daily calorie requirements, the nutrient content of school meals may have significant impact on overall nutritional status.^{1,5,6}

Returning to scratch cooking and utilizing more whole, fresh foods may help schools meet new meal guidelines, especially for sodium and calorie restrictions.⁷⁻⁹ However, more skilled labor will be needed in school food service kitchens to transition to scratch cooking.¹ Along with the new school lunch standards, The Healthy Hunger Free Kids Act also requires the development of professional standards for school food service which specify hiring and training standards for all school food service positions.^{10,11}

Training of food service staff has been identified as an important component in several notable Coordinated School Health Programs.^{9,12-14} However, few reports target interventions and evaluations directly at school food service staff training.^{15,16} The authors identified only two interventions that utilize staff education to target nutrient content in school meals.^{17,18} Significant gaps in the peer-reviewed literature remain. Few interventions detail specific approaches to training or assess efficacy. Additionally, there

are few reliable and valid instruments to assess culinary training for school food service professionals.

The Montana Cook Fresh Workshop (MCFW) is targeted at providing Montana K-12 food service professionals with skills to use whole, fresh foods in school food service. The primary research objective is to evaluate the influence of MCFW pilot intervention on participants' (a) culinary knowledge, (b) confidence in using whole, fresh foods, (c) attitudes regarding the use of whole, fresh foods, and (d) intention to use whole, fresh foods in school food service. Results of this pilot research are an integral step to improving MCFW and developing appropriate and cost effective training for school food service professionals.

METHODS

Development of Intervention

The primary objective of MCFW, a project of Montana Team Nutrition, was to provide school food service professionals with basic culinary skills to increase scratch cooking and the use of whole, fresh foods into school food service. A team of three trained professionals, which included a trained chef, a school food service professional, and a Montana Team Nutrition staff member, taught each four-hour workshop. Specific skills to be addressed in the workshop were determined by formative surveys and interviews with Montana school food service professionals and stakeholders.¹⁹ Based on this research, the workshop focused on: knife skills, mise en place, herbs and spices, and

equipment. The workshop culminated in a group cooking experience in which participants utilized the learned skills to cook recipes including whole, fresh foods.

Participants

Workshops were offered in four locations around the state of Montana and were open to all school food service employees. Classes were publicized at school nutrition conferences and via relevant email listservs. School food service managers were notified via email or phone call about workshops. There was no cost to participants. Participants were offered a certificate of completion and continuing education credits.

Evaluation Instrument Development

As the constructs of the Theory of Planned Behavior (TPB) have been empirically shown to explain and predict food and nutrition related behaviors, the intervention evaluation is categorized around the TBP constructs of attitude, perceived control, and intention, with the measurements of knowledge and confidence relating to perceived control.²⁰⁻²⁸

Workshop outcomes (knowledge, confidence, attitude, and intent) were assessed with pre and post evaluations. The pre workshop assessment included collection of baseline data about participant professional position, years in school food service, and size of food service.

Knowledge, confidence, attitude, and intent questions about using whole, fresh foods were identical in pre and post evaluations. Knowledge assessment consisted of five multiple choice questions specific to information taught in the workshop and were adapted from the Food Preparation Knowledge Questionnaire.^{29,30} Assessment of

confidence, attitude, and intent were conducted with a questionnaire consisting of 21 statements, with 5 statements assessing confidence, 8 assessing attitude, and 8 assessing intent. Statements were set on a 5-point Likert scale (“not at all confident” to “extremely confident,” “strongly agree” to “strongly disagree,” or “not very likely” to “very likely”) and were adapted from surveys utilized in culinary or food service education programs.^{18,29,31}

To assess participant satisfaction with the workshop, researchers used a training evaluation instrument developed by The National Food Service Management Institute (NFSMI).¹¹ The 5-point Likert scale evaluation (“strongly agree” to “strongly disagree”) included 13 statements such as, “I can apply what I learned in this session in my job,” and “Attending the session increased my knowledge on the topic.” Participants were also asked open-ended questions about what they found most and least valuable about the workshops.

Steps were taken to ensure evaluation validity and reliability, following methods outlined and tested in previous evaluation research.³² All evaluation materials were reviewed and revised by nutrition and food service content experts. The Likert scale statements regarding attitude were reverse coded in an effort to improve reliability. Researchers used factor analysis to ensure validity of the instrument. The authors used a threshold of 0.5 as a cutoff point for factor loadings and inclusion in the data.³³ Chronbach’s alpha was calculated for each portion of the assessment to further evaluate reliability.

Based on factor analysis, two statements assessing “attitude” were omitted. All other statements met the 0.5 threshold criteria.³³ Survey statements and factor loading

outcomes are detailed in Table 1. The two “attitude” statements that did not meet the inclusion threshold were not stated in a manner that allowed reverse coding, which may have caused confusion for participants. Additionally, the statements may not have appropriately assessed participants’ personal attitudes regarding whole, fresh food but forced them to speculate about others attitudes (students) and the financial aspects of the school food service program. Cronbach’s alpha for each construct are as follows: confidence (Cronbach $\alpha = .88$), attitude (Cronbach $\alpha = .71$), intention (Cronbach $\alpha = .88$). Cronbach’s alpha was not calculated for knowledge as the knowledge score was based on a single value determined by correct number of responses to the multiple choice knowledge assessment.

Table 1

All evaluation materials and participant protocols were reviewed and approved by [Blinded] Institutional Review Board.

Data Analysis

Pre and post workshop survey data was analyzed using Statistical Package for Social Sciences (version 22.0, 2013 SPSS Inc. Chicago, IL). Descriptive statistics were used to evaluate participant satisfaction and demographics.

Knowledge score was determined by calculating descriptive statistics for the number of correct answers. Participant scores for overall confidence, attitude, and intent constructs were determined by finding the mean value of all question responses within that

construct. To determine significant change in constructs from pre to post evaluation, means of each construct were compared using paired t-test.¹⁸

Two separate analysis of variance (ANOVA) tests were conducted to assess significant differences between changes in construct scores between pre and post and participants' years of food service experience and size of school food service. The decision to separate participants into three equal groups for each ANOVA was based on preceding school foods research methods detailed elsewhere.³⁴

Additionally, to determine differences in pre to post score construct changes by participants' professional position, participants were grouped into positions with more authority (manager, supervisor, head cook) and positions with less authority (cook, assistant cook). An independent t-test was used to compare mean pre to post score construct change by professional position grouping. Other food service research using similar methodology shows that professional position may impact study outcomes.³⁵

As baseline knowledge may impact nutrition education results, participants were further categorized by three equal groups (low, medium, high) based on pretest scores within each construct (knowledge, confidence, attitude, and intent). Participant were divided based on pre test scores as researchers were interested in exploring which baseline groups were most influenced by the intervention. For each construct, an ANOVA test was used to compare mean score change by baseline construct score grouping.

Statistical significance was set at a two-sided alpha level of $p < 0.05$

RESULTS

Participant Demographics

A total of 53 participants attended the workshops. Participants were drawn from a pool of 258 school food authorities operating food service programs in 821 schools at the time of the study.³⁶ Of participants, 50 were employed by a Montana school food service, one was employed by a state Extension agency, and two did not disclose their employer and position. Twenty-six participants identified as a food service director, manager, supervisor, and/or head cook. Twenty-four identified as a cook or assistant cook.

Participants represented school food service programs of various sizes. One participant reported serving fewer than 10 meals per day, 11 serving between 11 and 99 meals, 24 serving between 100 and 299, 10 serving between 300 and 499, three serving between 500 and 999, and two serving between 1000 and 1500. Five participants had one year or less of experience. Thirteen reported two to five years, six reported six to 10 years, 17 reported 11 to 19 years, and 11 reported greater than 20 years of experience.

Transformation of relevant demographic data into tertile groups for further analysis is detailed in Table 2.

Table 2

Workshop Evaluation

Based on the workshop evaluation, participants were very satisfied with the workshop. For each of the 13 statements, 96 to 100 percent of participants selected “agree” or “strongly agree.” Participants found practicing knife skills and having instructors and

peers to answer questions particularly valuable. For follow up support, participants requested more recipes, particularly with lentils and vegetable/herb combinations, and training opportunities.

Evaluation of Change in Knowledge, Confidence, Attitudes, and Intention

From pre to post, participants' knowledge ($p = .00$), confidence ($p = .00$), and intentions to use whole, fresh food ($p = .00$) changed significantly (See Table 3). Participants' attitudes regarding whole, fresh food did not change significantly.

Table 3

There was no significant difference found in mean change of pre to post construct scores when compared by number of years of food service experience or size of school food service.

When grouped by professional position, significant difference was found in the mean change in confidence scores ($p = .03$). Participants in positions of greater authority ($n = 26$) had a significantly higher level of change in confidence score (0.8 ± 0.7) than those in lower authority positions ($n = 24$, 0.4 ± 0.5). There was not a significant difference in mean score change between the two groups in knowledge, attitude, or intentions.

Based upon low, medium, and high groups equally divided by pretest construct scores, significant differences were found in the change in knowledge and confidence construct scores amongst all three groups (Table 4). Participants with the lowest pretest scores increased scores the most and participants with the highest baseline increased the least. In

the constructs of attitude and intention, there was significant difference between the groups with the lowest pretest scores and the groups with the highest pretest scores.

Table 4

DISCUSSION

Results of this study parallel previous evaluations of educational interventions on staff knowledge, attitudes, and intentions. Similarly to the MCFW results, in the Roth-Yousey whole grain education intervention, participants showed improvements in knowledge and intention but saw a decrease in attitudes towards the use of whole grains.¹⁸ In this comparable study, participants indicated in a follow up survey that their use of whole grains did increase, suggesting that increases in knowledge and intentions are sufficient to influence behavior change.¹⁸ The tenants of TBP support these assumptions as in the theory the constructs of attitude and perceived control (self-efficacy) are predictors of intention, which is the strongest predictor of behavior change.²⁰

As MCFW results indicate, the hands-on approach begins to meet school food service training needs. Inadequately skilled staff has been cited as a barrier to providing healthier meals and meeting USDA standards.³⁷⁻⁴⁰ The Workshop parallels efforts of the USDA in partnership with NFSMI to offer appropriate training programs with the Team Up for School Nutrition Success Training.⁴¹ However, there is still a great need for training opportunities at the state and local level. High participant satisfaction from MCFW points to the hands-on approach as broadly appealing. While this approach may be appealing and effective, it is also time and labor intensive, with significant supply and personal

costs. As supported in previous literature, additional financial support to provide training opportunities will be vital to providing school food service professionals with these types of trainings.^{19,42}

Training and education needs to be tailored for the skillset and job duties of the school food service worker. In this research, participants in positions of authority had significantly greater score increases in the confidence construct. This may be because they saw opportunity to apply the new skills and recipes presented in the class.

Participants with less authority and control may see less opportunity to institute changes in menus and cooking approaches in their workplace. Participants in positions of more authority may benefit from additional training to help promote buy-in provide their staff with motivation to integrate the techniques learned in the workshop.⁴³

For this training model, participants did not require a particular baseline level of knowledge, confidence, attitudes, or intentions regarding whole, fresh foods to benefit from the training intervention. Further, as demonstrated by the significantly greater change in scores from participants with lower pretest scores, basic culinary education may have an even greater impact on participants at a lower baseline. However, participants with a higher baseline may gain from more advanced training.

Limitations to this study exist. Selection bias threatens internal validity as participants voluntarily attended the workshop. Study results may not be generalizable to populations not interested in learning about how to use whole, fresh foods. The sample size and the fact that all participants work in or with Montana school food service may threaten external validity for generalizing results to other populations.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The framework for MCFW may be modifiable for other school food service settings. Additional research is needed to assess the long-term impacts of culinary education in school food service. Determining how participants implement culinary skills, share knowledge with coworkers, and modify meals to meet USDA guidelines post training will be important in future research. Further research is needed to determine the influence of training on the nutritional content of school meals and how those nutritional modifications impact BMI and nutritional status of students.

As the use of whole, fresh foods has significant potential to impact nutrient content and student appeal of school meals it also may further the reach and influence of school nutrition programs by increasing participation, further promoting student nutrition knowledge and healthy food choices. As interest and demand for healthy, appetizing school meals increases, the need for well-trained school food service professionals will continue to accelerate. Providing school food service professionals with the skills needed to meet USDA standards and student expectations will continue to be an important focus. With increased attention, the school food service professional is finally being recognized as an important link to promoting the health and well-being of American children.

Table 4.1. Principal Component Analysis of Likert Scale Statements Assessing Confidence, Attitudes, and Intentions Regarding the Use of Whole, Fresh Foods in School Food Service

Construct	Statement	Factor Loading
Confidence ^a	Using knife skills in the school kitchen.	.784
	Preparing fresh vegetables.	.856
	Preparing fresh fruit.	.576
	Preparing legumes and dried beans/peas.	.783
	Using herbs and spices (eg. Basil, thyme, cumin).	.783
Attitude ^a	It is too expensive to increase the use of fresh, whole fruits, vegetables, and legumes in our school. ^b	.536
	Using fresh, whole foods is cost effective for our school.	.250 ^c
	If we served more fresh, whole fruits, vegetables, and legumes, it would result in more plate waste. ^b	.686
	Students would be accepting of meals made with more fresh, whole fruits, vegetables, and legumes.	.222 ^c
	Using fresh, whole fruits, vegetables, and legumes helps us serve menus that meet the U.S. Dietary Guidelines.	.573
	We can meet U.S. Dietary Guidelines without using fresh, whole fruits, vegetables, and legumes. ^b	.657

Table 4.1 Continued

Attitude ^a	Serving fresh, whole fruits, vegetables and legumes in school meals improves the health of students.	.532
(cont.)	Our student's health is not changed by serving fresh, whole fruits, vegetables, and legumes in school meals. ^b	.772
Intention ^a	Use fresh, whole fruits, vegetables or legumes in place of canned or frozen.	.542
	Use a new recipe that includes fresh, whole fruit or vegetables.	.714
	Use a new recipe that includes fresh or dried legumes.	.588
	Obtain training or seek out more knowledge about how to prepare fresh, whole fruits or vegetables.	.711
	Obtain training or seek out more knowledge about how to prepare legumes.	.769
	Purchase kitchen equipment to prepare fresh, whole fruits, vegetables, or legumes.	.788
	Buy fresh, whole fruits or vegetables for school meals.	.788
	Buy fresh or dried legumes for school meals.	.803

^aPossible Likert scores for Confidence, Attitude, and Intention constructs range 1 to 5, "not at all confident" to "extremely confident," "strongly agree" to "strongly disagree," or "not very likely" to "very likely."

^bStatements reverse coded to enhance reliability.

^cStatements omitted from analysis based on inclusion threshold of 0.5.

Table 4.2. Montana Cook Fresh Workshop Participant Demographics Groups**Based on Tertile Division (n=52)**

Foodservice	Small^a (n= 16)		Medium^a (n=18)		Large^a (n=17)	
size based on	Mean ±	Range	Mean ±	Range	Mean ±	Range
average daily	SD		SD		SD	
lunches	80.0 ±	2 to 125	207.2 ±	135 to	504.9 ±	263 to
served^c	31.3		44.4	260	327.0	1500
Years of	Low^b (n=17)		Medium^b (n=18)		High^b (n=17)	
school	Mean ±	Range	Mean ±	Range	Mean ±	Range
foodservice	SD		SD		SD	
experience	2.3 ± 1.2	.5 to 4	10.8 ±	5 to 14	22.8 ±	15 to 32
			3.0		6.0	

^aGroups equally divided by participant reported average number of lunches served^bGroups equally divided by years of school foodservice experience^cSum of n for small, medium, and large groups does not equal 52 based on nonresponse of one participant to particular question

Table 4.3. Mean Pre and Post Test Scores for Knowledge, Confidence, Attitude, and Intention Constructs in the Montana Cook Fresh Workshop (n=49)*

Construct	Pre-Test	Post-Test
Knowledge	3.1 ± 1.3 ^a	4.5 ± 0.8 ^b
Confidence	3.5 ± 0.8 ^a	4.1 ± 0.5 ^b
Attitude	3.7 ± 0.6	3.8 ± 0.6
Intention	3.9 ± 0.7 ^a	4.2 ± 0.6 ^b

* All data reported as Mean ± SD; Means with different superscripts across rows are significantly different ($p < 0.05$) based on paired t-tests, denoting changes in construct scores

Table 4.4. Mean Changes in Knowledge, Confidence, Attitude, and Intention Construct Scores by Pretest Score Groups in the Montana Cook Fresh Workshop (n=49)

Construct ^a	Low Group ^b			Medium Group ^b			High Group ^b			Significantly Different Group Pairs ^c
	n	Mean ± SD	Range	n	Mean ± SD	Range	n	Mean ± SD	Range	
Knowledge	17	2.7 ± 1.2	0 to 4	11	1.5 ± 0.8	0 to 2	21	0.2 ± 0.7	-1 to 1	A, B, C
Confidence	15	1.3 ± 0.5	0.6 to 2.6	19	0.5 ± 0.5	-0.2 to 1.6	15	0.1 ± 0.3	-0.4 to 0.6	A, B, C
Attitude	14	0.4 ± 0.5	-0.7 to 1.2	18	0.2 ± 0.5	-0.8 to 1.0	17	-0.2 ± 0.5	-1.3 to 0.3	B
Intention	16	0.6 ± 0.4	-0.4 to 1.3	17	0.4 ± 0.4	-0.6 to 1.0	16	0.0 ± 0.3	-0.5 to 0.8	B

^aPossible scores for Knowledge construct range from 1 to 5, based on correct number of responses to a 5 question multiple choice assessment. Possible Likert scores for Confidence, Attitude, and Intention constructs range 1 to 5, “not at all confident” to “extremely confident,” “strongly agree” to “strongly disagree,” or “not very likely” to “very likely.”

^bGroups equally divided by mean pretest scores.

^cSignificantly different Group pairs at $P < .05$ level per ANOVA. Group pairs are as follows: A = Low and Medium; B = Low and High; C = Medium and High

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CHAPTER 5

CONCLUSION

As schools continue to work towards meeting USDA school meal guidelines and new school food service professional development standards, the demand for effective and evidence based training programs will continue to increase.^{1,2} As evident in the literature review, there is great need for peer-reviewed research evaluating food service staff training programs to comply with new school meal policy changes. While the literature supports food service staff training as a vital element in improving the nutritional quality of school meals and enhancing the food environment of schools, little attention is devoted to detailing or evaluating the staff training itself. Additionally, few reliable and validated tools are available to assess such training interventions.³

Increased scratch cooking and use of whole, fresh foods is one potential way to meet meal guidelines and increase the nutritional quality and appeal of school meals.^{1,4-7} However, lack of culinary skills has been consistently cited as a barrier to doing so.⁸⁻¹² Thus, basic cooking skill trainings and interventions are potential areas to make an impact in the school meal program. The plethora of information regarding barriers and motivations in using whole, fresh foods identified in the formative research detailed in Chapter 3 provides a strong basis for training development.¹²

The recommendations and outcomes from the formative research of Chapter 3 are strengthened by the varying perspectives taken into account. For example, views of both the food service professionals who had successfully integrated whole, fresh foods and

those who had found significant enough barriers to prevent them from doing so were included in the formative research. While many emergent themes parallel previous literature on the topic of barriers to scratch cooking, like the need for increased training and equipment, some of the findings may be specific to the small, rural school nutrition program that is predominant in Montana.⁸⁻¹⁴ It is interesting to note that while smaller schools perceived fewer barriers to utilizing whole, fresh foods, the extremely limiting factor of insufficient access to distribution channels was often too great to overcome.¹² This finding points to the need for policy change at the local and national level to support the development of infrastructure to increase access to whole, fresh foods, especially in remote or rural locations.

Interventions, such as skills training, to increase the use of whole, fresh foods, as well as policy changes to increase institutional access to whole, fresh foods, have the potential to strengthen not just the nutritional value and appeal of school meals, but also the local and regional food based economy. Barriers to using local foods parallel those of using whole, fresh foods. Therefore, by addressing barriers such as lack of staff training and limited distribution channels, school nutrition programs increase their opportunity to integrate local foods.^{11,15,16} Creating new outlets for local growers and contributing to the development of a local food system may contribute to increased community food security and economic viability.¹⁷⁻¹⁹

The formative research in Chapter 3 allowed developers of the Montana Cook Fresh Workshop, highlighted in Chapter 4, to target key areas of culinary training need as well as skills and topics identified as vital to increasing scratch cooking in the school

food service kitchen.¹² Evaluation of the intervention was also a key component of the research in order to identify outcomes and areas for improvement associated with the workshop. The tools for evaluation were developed and tested for reliability and validity. Participants in the workshop reported high levels of satisfaction and provided positive feedback. Participants particularly liked the hands-on approach to the workshop as well as getting feedback from instructors and peers. Based on the pre and post workshop evaluations, participants demonstrated significant increases in culinary knowledge, confidence in using whole, fresh foods, and intentions to use whole, fresh foods. This indicates that the Montana Cook Fresh Workshop successfully achieved program objectives. Additional evaluation suggested that participants in positions of authority and those with a lower baseline scores in all the constructs evaluated made the most gains and should perhaps be the groups that the workshop should be targeted to.

Even with the demonstrated success of the Montana Cook Fresh Workshop, several barriers may inhibit the long term sustainability of the project. First, there is significant labor, time, and cost associated with the preparation and execution of the workshop. Second, the logistics of the workshop, including finding an appropriate space and a time that is convenient for a large group of school food service workers, is challenging. Finally, food service professionals in remote locations, often those most in need of technical assistance, are least likely to be able to travel long distances to congregate locations for training.

However, with these barriers come opportunities to make modifications to the approach to broaden the reach and strengthen the impacts of the program. One potential

future manifestation of the program would be to work with one school nutrition program at a time and bring the class directly into that program's kitchen. Working with a single food service program would allow customization of skills and recipes taught as well as promoting team building amongst the staff, another cited need.¹⁶ Practicing skills in the actual workplace and utilizing available equipment may also promote increased integration of new skills into the daily work, as seen in some longer term training interventions.^{20,21} With a modified and individualized approach, the size of the training team and time allotted could be further modified to best utilize available resources and cater most efficiently to the trainees.

Additionally, the Montana Cook Fresh Workshop provides an optimal platform for promoting the use of local foods in the school food service. As previously noted, documented barriers to using local food include a lack of scratch cooking skills, the exact issue that the workshop addresses.^{11,15} While the Workshop did utilize some Montana products, slight modifications to recipe choices and participant handouts would allow for an even greater emphasis on the use and benefits of local foods.

While the Montana Cook Fresh Workshop is one effective approach to training, research should continue to evaluate and identify other impactful methods of training. Though this research focused primarily on culinary skills, other training areas, targeted to specific food service positions require evaluation of best training practices as well. Trainings may include skills like staff management and menu development, focused primarily at food service managers and directors. Future research should also evaluate the long term impacts of training interventions on the nutritional quality of meals served. A

long term evaluation would help identify which areas of training and type of interventions best help programs meet USDA school meal guidelines. Partnerships with state agencies that collect and evaluate production records would be beneficial for long term evaluative research to reduce any additional reporting burden to school nutrition programs. A final area of potential future research is the thorough evaluation of nutrient changes, specifically sodium and fat, in school meals associated with using whole, fresh foods in place of “heat and “serve” processed meals. Detailed data iterating the different nutrient content may provide additional support for the transition to using whole, fresh foods and reinforce the need for training and support of skilled staff to implement scratch cooking. The information would also allow researchers to further explore possible connections between school meal nutrition and overall health and disease status. An expanding body of research supporting the impact of school food service staff training will likely help promote much needed funding measures to alleviate the financial burden of training programs.

The role of the school food service professional is only beginning to receive the recognition and attention it deserves. Specialists in school food are a vital link to providing nutritious and appetizing meals to students and promoting a healthy school food environment. Empowering school food service professionals with skills and training allows them to create a cafeteria that is a place of nourishment and learning. The school lunchroom has the potential to be a classroom and nutrition laboratory where children can learn about healthy choices and culinary appreciation. With confidence in their abilities

and pride in their work, school food service professionals can guide even the youngest eaters onto a lifelong path of enthusiasm and excitement for nutritious and delicious food.

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