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Culinary Competence: Skills and Knowledge Assessment for Dietetic Students

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Culinary Competence: Skills and Knowledge Assessment for Dietetic Students

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by

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Abstract

Graduates of didactic programs in dietetics are entering internships with little cooking experience. The Food and Culinary Professionals' Dietetic Practice Group (FCP DPG) has identified 11 core competencies that were developed as a recommendation to dietetic educators to include more culinary knowledge into existing programs. The purpose of this study was to determine if developing and incorporating experiential learning targeted to the competencies would increase dietetic students' culinary skills and knowledge at a southern land-grant university. Food and Culinary Professionals' DGP core competencies were used to guide the development of curriculum, experiential learning, and assessment in the Principles of Foods course for dietetics. Example experiences included identifying fruits and vegetables and culinary equipment, and performing culinary skills. The skills assessment, comprised of 50 testable components, was completed in the laboratory. The knowledge assessment was comprised of 50 short answer and fill in the blank questions, and was completed during class lecture time. Thirty-two students were assessed at the beginning of the course and after completing the course. Data were collected and analyzed by paired t-test using SPSS. There was a statistically significant increase in both assessments. There was a mean increase of 13.96± 1.1 points (p <0.001) in the skills assessment and an increase of 11.03± 1.0 points (p <0.001) in the knowledge assessment. Using Experiential learning theory as a teaching method and the FCP DPG core competencies as a guide, was an effective method for teaching students culinary skills and knowledge.

Acknowledgements

The work presented here would not be possible without the help and support of many. My committee: Ms. Mechelle Bailey, Dr. Betsy Garrison, Dr. Jill Rucker, and Dr. Sabrina Trudo. I thank each of you for your help and guidance. I imagine having a 50 year old graduate student who lacks necessary computer skills and has not written a research paper in 25+ years, could be an educator's nightmare. I appreciate your patience. I have learned so much from each of you. I also want to thank Dr. Kelly Way, Dr. Karen Compton, Dr. Rene Miller, Dylan Martinez, Lydia Perritt, Kara Kaiser, Lobat Siahmakoun, and Cindy Webb for revisions, corrections, computer skills interventions, friendship and support.

Dedication

I want to dedicate this paper to my husband, Dr. David Buckley, thank you for your love, support, encouragement, patience, financial assistance, mad dashes to HOEC to bring me what I had forgotten, and your new-found ability to unload the dishwasher, during my second college career. You are the best!

And to Mechelle Bailey, I would never have attempted this without you. You fought for me, threatened to quit for me, encouraged me, gave me support and guidance, and stayed with me to the end. I appreciate all that you have done for me, but mostly, I value your friendship. Thank you so much!

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CHAPTER I: INTRODUCTION

Three of the top five leading causes of potentially preventable death in the United States from 2008-2010, can be related to nutritional intake: heart disease, certain cancers, and strokes (Center for Disease Control and Prevention, n.d.). One study shows 47% of families' household food budget was spent on take-out food in 2010, an increase from 33% in 1970 (Reicks, Trofholz, Stang, & Laska, 2014). Consuming fast foods and take-out foods is associated with lower diet quality and greater obesity in adults (Fulkerson, Farbakhsh, Lytle, Hearst, Dengel, Pasch, Kubik, 2011). Having the skills to purchase food, follow a recipe, and prepare meals can greatly impact diet quality and food choices (Larson, Perry, Story, & Neumark-Sztainer, 2006). Young people who more often purchase and prepare food at home have improved their diet quality (Larson et al., 2006). Nutritional intake during young adulthood supports the maintenance of physical health, impacts risk for future disease, and plays a role in preventing excess weight gain (Brown, 2013). Fast foods, convenience foods, and modern lifestyles have brought about changes to people's abilities to cook. Many countries are experiencing cooking skills transitions, which involves the use of convenience and pre-packaged food, requiring fewer skills to provide meals for the family (Lang & Caraher, 2001). For one to take control of nutritional health, one must take control of daily food intake, quality, and quantity (Begley & Gallegos, 2010).

Dietitians prescribe diets. They distribute information on food and nutrition that is based on science. Dietitians advise people on the recommended nutritional requirements and instruct them that the best method to obtain these nutrients is through eating food. However, the chances of getting others to eat the recommended foods are greatly increased if the food tastes good (Canter, Moorachian, & Boyce, 2007). Cooking skills interventions have a positive effect on

fruit and vegetable consumption, as well as better overall nutritional quality (Larson et al., 2006). These interventions increase confidence in cooking abilities. Increasing confidence levels improves overall diet quality (Larson et al., 2006).

Many dietitians believe that anything related to improving dietary intakes and educating the public is their professional responsibility. Because of the education and training required to become a registered dietitian, one could assume they are a reasonable choice to lead these interventions (Krieger, 2014). However, studies show that a great number of registered dietitians have not been properly trained to deliver cooking skill interventions or demonstrations on healthy cooking techniques (Begley & Gallegos, 2010).

Problem Statement

Very little research has been published on dietetic practitioners' culinary skills and knowledge. A literature search on studies were dietitians' culinary skills were measured revealed no complete papers. However, three abstracts submitted to the American Dietetic Association, now known as the Academy of Nutrition and Dietetics, indicate dietitians lack the required food skills, and may not be able to answer questions related to cooking in practice (Long & Barrett, 1999; Solin & Dalton, 1997; Zwick-Hamilton & Braves-Fuller, 2001). Dietitians from around the world are expressing a concern that dietitians entering the profession lack skills in cooking and food preparation (Kasten, 2005). Dietitians in educator roles are saying:

> Today's students have little food knowledge or culinary skills due to the lack of food preparation experience at home while growing up. Therefore, many students enter the field of dietetics ill-equipped to handle career opportunities where extensive food knowledge is important (Canter, et al., 2007, p 318).

Purpose of Study

The Food and Culinary Professionals dietetic practice group (FCP DPG) of the Academy of Nutrition and Dietetics, was founded in 1997— with the intent to develop and strengthen food expertise throughout the profession of dietetics. The group identified 11 core competencies and 70 topic areas within the competencies. These competencies are a list of recommended skills, methods, techniques, and core knowledge for food and nutrition professionals. They were originally developed as a recommendation to dietetic education programs for ways to include more food and culinary knowledge into existing programs (See Appendix A). The purpose of this study is to determine if developing and incorporating experiential learning targeted to the competencies would increase dietetic students' culinary skills and knowledge.

Methods used in this study connect the core competencies to the classroom and laboratory. Experiential learning theory will guide the methods used to teach these skills and knowledge in the Principles of Foods lab. Descriptive statistics will be displayed of the assessment data. Tests of significance will be employed to test hypotheses about relationships between the variables in the population of dietetic students.

Dietitians are in a unique position to deliver cooking skill interventions as part of their profession. Food is an integral part of nutrition and cannot be removed from the dietetic profession. "Despite their best intentions, dietitians' practical cooking experience can sometimes be weak, which can decrease their level of effectiveness" (Roof, B., 2010, p.8). Dietetic educators need to prepare students for all aspects of the profession (Schaeffer, Hudak, Weiner, & Miller, 2013). There is strong justification for the inclusion of culinary skills and knowledge in dietetic training (Begley & Gallegos, 2010).

Objectives

1. Develop instrumentation that assesses the culinary skills and knowledge levels of dietetic students by incorporating experiential learning targeted to the Food and Culinary Professionals Dietetic Practice Groups' core competencies.
2. Assess the base cooking skill levels and knowledge of the students enrolled in the Principles of Foods course and laboratory at the beginning of the semester and after completing the course.
3. Determine if the teaching methods used in the Principles of Foods course increase the students' culinary skills and knowledge based on the pre- and post-assessment scores.

Hypothesis 1: Experiential learning targeted to the FCP DPG's core competencies will increase students' skill levels in an undergraduate nutrition laboratory course.

Hypothesis 2: Experiential learning targeted to the FCP DPG's core competencies will increase students' knowledge levels in an undergraduate nutrition laboratory course.

CHAPTER II: REVIEW OF LITERATURE

In 1970, 14% of the U.S. population was considered obese; today 34.9% of adults are considered obese, and 17% of children between the ages of 2-19 are obese (Centers for Disease Control and Prevention, n.d.). Heart disease is the leading cause of deaths in the U.S. (Centers for Disease Control and Prevention, n.d.). About 610,000 people die of heart disease in the United States every year. That is one in every four deaths. There are 1.7 million new cases of Type 2 diabetes diagnosed every year. Eighty-six million people are pre-diabetic. The Centers for Disease Control and Prevention states if pre-diabetic individuals do not change their lifestyles to improve their health they will develop Type 2 diabetes within five years (Centers for Disease Control and Prevention, n.d.). Obesity increases chances of the leading causes of preventable death: heart disease, stroke, Type 2 diabetes and certain types of cancer. All of these diseases can be related to nutrition. The recommendations for prevention, delaying, and managing these diseases are to eat a healthy diet (Centers for Disease Control and Prevention, n.d.). Cooking skills interventions are a method of educating the public, and considering the health of our nation, the need is evident (Michaud, Condrasky, & Griffin, 2007). However, food courses in dietetic programs have decreased through the years, and a great number of registered dietitians have not been properly trained to deliver cooking skill interventions or demonstrations on healthy cooking techniques (Begley & Gallegos, 2010). In order for dietetic professionals to take the lead in conducting cooking skill interventions, they must possess the required skills (Begley & Gallegos, 2010).

In a speech delivered on dietary guidelines for sustainability, Joan Dye Gussow (1999) states that she partially blames nutrition educators for the abandonment of food preparation skills. She says, “there is an epidemic of culinary ineptness, and nutrition educators have bought

into the convenience food trend and neglected their responsibility to teach the joys of cooking from scratch." The dietetic profession evolved from Home Economics. In the early 1900s, dietitians mainly worked in hospitals teaching food preparation skills to nurses (Barber, 1959). In 1917, President Hoover proclaimed "Food will win the war!" and the United States asked all citizens to conserve food for our soldiers overseas (Stage, 1997, p. 137). At this time, they needed educators to teach the public how to maintain a healthy diet on limited supplies, and dietitians were employed. The science of nutrition continued to advance as an emerging field, and this created opportunities for dietitians outside of foodservice. By 1935, the dietetic profession started to separate from preparing food to delivering dietary prescriptions. Food quality was now based on nutritional content instead of taste and appearance (Canter, et al., 2007). At this time the American Dietetic Association established three branches of study—a hospital course, an administrative course, and a community course (Krieger, 2014). These are forerunners of what we have today—clinical, community, and foodservice management.
The 1960s, ushered in "prepackaged convenience foods, designed to liberate the housewife from the burden of cooking," and cooking seemed to fall out of fashion (Krieger, 2014, p.314). Traditionally, cooking skills were taught in the homes or as a part of secondary schools home economics courses (Bengley & Gallegos, 2010). Studies show that there is a decline and devaluing of cooking skills, and people are relying heavily on convenience foods (Lang & Caraher, 2001). This may be the result of more women in the work force or the demise of home economics in the public schools, but students are entering dietetic programs with little or no cooking experience (Canter et al., 2007).

There is a growing demand for a more culinary-focused approach to health. Dietitians must take a role as viable members in the food and culinary community as espoused by Canter et

al. (2007). “If we allow other food professionals without a nutrition background to fill the void, we will have abdicated our place as the true food and nutrition experts” (Canter et al., 2007, p. 319). In order for dietetic professionals to take the lead in conducting cooking skill interventions, they must possess the required skills (Begley & Gallegos, 2010).

Why Dietitians?

Founded in 1917, the Academy of Nutrition and Dietetics is the world’s largest organization of food and nutrition professionals. The Academy comprises more than 75,000 members which include: registered dietitian nutritionists; dietetic technicians, registered; students; and other dietetic professionals holding undergraduate and advanced degrees in nutrition and dietetics. They are committed to improving the nation’s health through research, education, and advocacy. Dietetic practitioners work as vital members of medical teams where they provide medical nutrition therapy to treat chronic conditions and illnesses, in communities where they provide health promotion, disease prevention, and wellness services, and as educators (www.eatrightpro.org, 2015). A study conducted by Reicks et al. (2014), compared 28 cooking skills intervention programs and found these interventions may result in favorable dietary outcomes, food choices, and other health related outcomes. Because registered dietitians are experts in nutrition, it is reasonable to assume they should lead the interventions ensuring correct information is given to the public. Cooking skills are more frequently being identified as a requirement for promoting good health (Lang & Caraher, 2001). However, food courses in dietetic programs have decreased through the years, and a great number of registered dietitians have not been properly trained to deliver cooking skill interventions or demonstrations on healthy cooking techniques (Begley & Gallegos, 2010). In order for dietetic professionals to take

the lead in conducting cooking skill interventions, they must possess the required skills (Begley & Gallegos, 2010).

The Accreditation Council for Education in Nutrition and Dietetics (ACEND), recognized by the United States Department of Education as the accrediting agency for the education programs that prepare dietetic professionals, conducted research to identify gaps in the competencies required in the current 2012 ACEND program accreditation standards. Food preparation and culinary skills and food preparation indicators are listed as a perceived gap in competencies (Accreditation Council for Education in Nutrition and Dietetics, 2015). Widespread chronic disease such as obesity, have made nutrition education and life-course interventions a high public priority (Rhea & Bettles, 2012).

The Food and Culinary Professionals Dietetic Practice Group of the Academy of Nutrition and Dietetics formed by petition in 1996 (M. A. Hess, personal communication, June 2, 2016). Over 700 American Dietetic Association members signed the documentation needed to form the group. They began with 200 members and now have over 2,700. An interview with two of the founding members, Mary Abbott Hess and Catharine Powers, revealed the history of the core competencies. In 1995, the Commission on Dietetic Registration conducted a dietetics practice audit. Phase 2 of this audit was designed to identify employer expectations of future performance by dietetics practitioners (Kane, Cohen, Smith, Lewis & Reidy, 1996). Fifty-six participants were interviewed in person and or in focus groups. Three sets of crucial competencies were identified: conceptual, interpersonal, and technical/clinical (Balch, 1996). The participants stated that the first two were important to all professions, but believed dietetics practitioners need to improve their skills in them. The technical/clinical competencies are unique to dietetics practice:

> Participants noted that the intersection of health and food is the unique core of dietetics. Although all commended the basic health science training of dietitians, several saw a need for greater attention to food. Food is what people eat, not nutrition (Balch, 1996, pp. 1304).

The study states that the "more skills and competencies the more valued the employee" (Balch, 1996, pp 1303). The core competencies were developed in response to a quarry from dietetic educators. Mary Abbott Hess explained, in the 1998 summer *NDEP-Line* newsletter, an article posed this question: "What do future dietitians need to know?" The founding members of the FCP DPG answered the challenge with a list of competencies. Mary Abbott Hess explained that she sat down and started making a list of what she believed dietitians needed to know regarding food and culinary practices (M. A. Hess, personal communication, June 2, 2016). The first list comprised of seven competencies. The list is updated annually and now comprises 11 core competencies and 70 topic areas (Academy of Nutrition and Dietetics, 2015). The competencies, as seen in Figure 1, serve as guidelines for educators and members of the Academy of Nutrition and Dietetics to include more food and culinary knowledge into existing programs. The competencies include: Sensory Perception and Evaluation, Basic Cooking Skills, Cooking Techniques, Menu and Meal Planning, Ingredient Selection, Recipe Development and Modification, Communicating about Food, Food Retailing, Food Safety, Sustainable Agriculture, and Food Trends. In addition to the 11 core competencies, 70 topic areas are included (See Appendix A). The topic areas provide detailed description of the competencies.

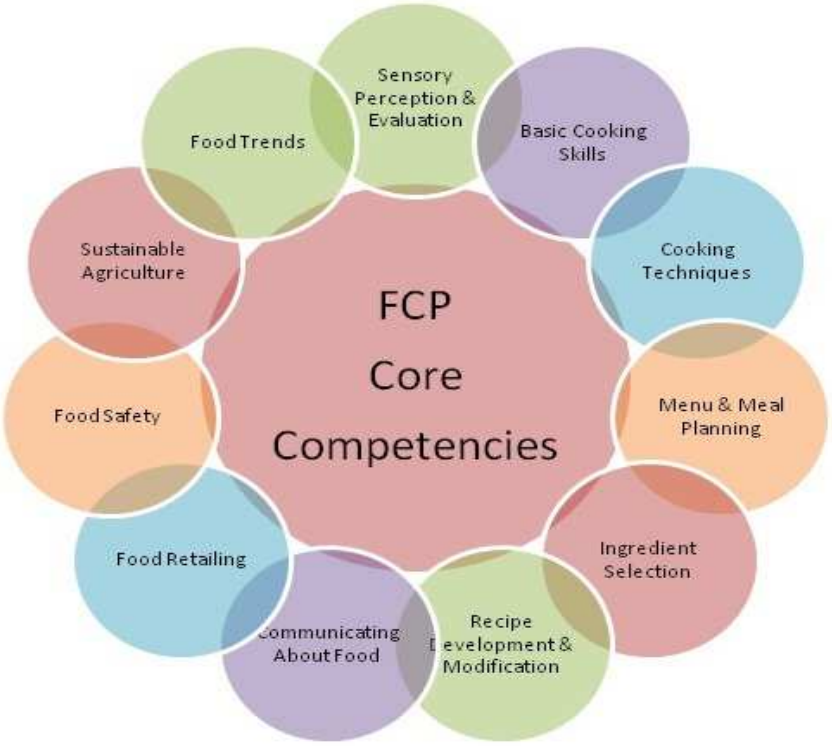

Figure 1: FCP Core Competencies (Academy of Nutrition and Dietetics, 2015)

Theoretical Framework

Constructivist learning theory recognizes learning as both a social and reflective process (Halpern, 2015). Constructivist educators facilitate learning through experiential strategies such as, case studies or creating problems for the learners to work through. They believe that knowledge occurs through activities and experiences, and that incorporating self-reflection the learner gains the new knowledge into their worldview. Andragogy and experiential learning are two theories based on constructivism, and could be used for this study.

Malcolm Knowles popularized the concept of andragogy, or adult learning, in the 1980s. Four principles of Andragogy are that instruction: be highly relevant to assignments; be problem-based to encourage critical thinking and reflective learning; acknowledge prior work and life

experience; and be self-paced (Halpern, 2015). The majority of students enrolled in dietetic education programs in the United States are considered traditional students and enrolled in college soon after completing their high school education. Since Andragogy is based on instruction that acknowledges prior work and life experiences, the researchers eliminated this theory based on the age of the majority of the students.

Experiential learning theory is a method of instruction where instructors offer students the opportunity to learn through experience without acknowledging prior work and life experiences. It can be broadly defined as "the process by which a learner creates meaning from direct experience" (Bohn & Schmidt, 2008). Kolb introduced his theory on experiential learning in 1984. He uses research by Dewey, Lewin, and Piaget to identify common characteristics that define the nature of experiential learning (Kolb, 1984). His experiential learning model includes the following steps:

- Concrete Experience- *Doing*
- Reflective Observation- *What Happened?*
- Active Conceptualization- *Why is this Important?*
- Active Experimentation- *How does it apply to real life?*

Kolb suggests that optimal learning takes place when learners have a balance of these four stages. Learning through experience is common in laboratory instruction, and is highly effective when individual questions and problems can be addressed that may benefit the group (Harrington & Ogbeide, 2010). Experiential learning involves hands-on experience, collaboration, and reflection, which helps students fully understand new skills and knowledge (Barr, Walters, & Hagan, 2007). Project-based learning and active learning are two teaching approaches that intentionally promote experiential learning (Wurdinger & Carlson, 2010.) This

theory is applicable to sciences courses. In one study, incorporating experiential activities in an introductory food science course improved students' grades by 8.6% (Reitmeier, 2002). Barak and Dori (2005) conducted a research study on chemistry students and discovered that the project-based experimental group outperformed the control group who were exposed to traditional textbook chemistry problems, not only on the posttest but also on the course final exam (Barak & Dori, 2005).

In the Principles of Foods lab, students are given instructions about the lab and a recipe to follow. They use the skills and knowledge they possess to create their product. They are allowed to ask questions and for assistance in order to complete the assignment. After the recipes are completed, the students evaluate their food item as well as their peers' food items, and discuss the results amongst the group. Experts in experiential learning theory assert that students will be more motivated to learn when they have a personal stake in the subject (Wurdinger & Carlson, 2010). At the conclusion of lab, the instructors guide a collaborative session on the techniques and principles taught with application to daily life.

The majority of students enrolled in dietetic education programs in the United States are considered millennials. The millennial generation, born 1981-2001, was raised during a time of exceptional wealth in the U.S. (Nicholas, 2008). Millennials are thought to feel entitled, empowered, and extremely social. They have been raised on computers and cell phones. Social networking is a method of group collaboration, which is important to this generation (Lancaster & Stillman, 2002). Millennial students have different expectations of college than previous generations (Monaco & Martin, 2007). They are accustomed to *helicopter* parenting styles and want to be hand-held through the educational process (Nicholas, 2008). Studies focusing on this generation suggest learning-centered environments with assistance in developing independent

thinking and decision making skills (Monaco & Martin, 2007). They find success in group dynamics, enjoy structure, but want to assist in creating their own knowledge. The curriculum for this study was designed to instruct millennial students enrolled in the Principles of Foods class, through experiential learning, targeted to the FCP DPG core competencies.

CHAPTER III: METHODOLOGY

The purpose of this study was to determine if the methods used in teaching a food laboratory course are effective. The FCP DPG has identified 11 core competency areas and 70 competency topics that served as a guide for the knowledge and skills included in the assessment and curriculum. Experiential learning theory guided the methods used to teach these skills and knowledge in the Principles of Foods lab. This theory was chosen based on studies that showed it an effective method in laboratory learning environments and for teaching the millennial generation (Nicholas, 2008). This study was conducted in a real-life situation where the variables were not manipulated and a control group was not used. The policies of the University of Arkansas, as well as federal regulations, require all research studies involving human subjects be reviewed and approved before investigators can begin their research. In compliance with this policy, this study received the proper surveillance and was granted permission to proceed. This research was assigned the following research project number: 15-06-777. A copy of the IRB approval form is presented as Appendix E. Tests of significance were employed to assess knowledge and skill acquisition in the nutrition students (Vogt, 1999).

Research Objectives

The core competencies outlined by the FCP DPG, which is associated with the Academy of Nutrition and Dietetics, guided this research study. The study aims to determine the effectiveness of teaching methods of a food lab course that includes dietetic students, it is only meant to generalize to that population.

The research objectives include:

1. Develop instrumentation to assess the culinary skills and knowledge levels of dietetic students by incorporating experiential learning targeted to the Food and Culinary Professionals Dietetic Practice group's core competencies.
2. Assess the base cooking skill levels and knowledge of the students enrolled in the Principles of Foods course and laboratory at the beginning of the semester and after completing the course.
3. Determine if the teaching methods used in the Principles of Foods course increase the students' culinary skills and knowledge.

Sample

The sample used in the study is a sample of convenience. The participants were students enrolled in the Principles of Foods course at the University of Arkansas and are pursuing a major or minor degree in Human Nutrition and Hospitality Innovations, with an emphasis in dietetics. All students were asked to participate in the assessments. It included students classified as freshmen (5), sophomores (12), juniors (10), and seniors (5), for a total of 32 students. All students who participated in the study, with the exception of one student, are considered millennials, people born between the years 1981- 2001. Out of the original 32 who signed consent forms, two students dropped the course; one student had already taken the lab component of the course so only data from the knowledge assessment are included; one student didn't complete the post-skills assessment due to an injury; and one student signed up for the course after the knowledge assessment had been given. Twenty-nine students completed the pre- and post-knowledge assessment, and twenty-eight students completed the pre- and post-skills assessment.

Instrumentation and Data Collection

The researchers began to develop an instrument of assessment by perusing the FCP DGPs' core competencies and topic areas and deciding on which topic areas could be taught experientially in the Principles of Foods laboratory. They then chose topics from each competency area and discussed how the topic should be assessed. The instrument was piloted on the students enrolled in the Principles of Foods course and laboratory during the spring semester of 2015. Adjustments were made to questions when the majority of students missed it or were confused by it. The assessment used in the study is attached as Appendix B and C. A variety of textbooks and dictionaries validate the instrument. *On Cooking: A Textbook of Culinary Fundamentals,* fifth edition, and *Understanding Food: Principles and Preparation*, fifth edition, validate assessment questions on sensory perception, basic cooking skills, cooking techniques, menu and meal planning, ingredient selection, recipe development and modification, and food retailing. Terminology was validated using *The New Food Lover's Companion*, fourth edition. The *ServSafe Coursebook*, was validation for assessing food safety and sanitation. *Grow Vegetables* was used to validate the identification of fruits, vegetables, and herbs. One of the researchers had completed the Master Gardener's course and serves as an expert on identification of fruits, vegetables, and herbs.

Once the assessment was finalized, the researchers used the curriculum from previous semesters to locate opportunities for including the competencies. Appendix D shows the core competency, how the competency was assessed and the lab that the competency was taught. Several competencies overlapped in the lab instruction. All core competency areas, with the exception of *Food Trends*, were included in the assessment; however, not all topics areas were assessed.

Prior to the assessment, the students were informed of the study and consent forms were signed. Each participant was assigned a number to protect identities. The assessment included a written component and a skills component. The written component composed of 50 short answer and fill in the blank questions, worth 1 point each, assessed current knowledge. The written assessment was given on the first day of class lecture. The two researchers scored the knowledge assessment separately and compared results. During the first week of classes, the students were asked to sign up for the skills assessment for the following week. Fifty testable components composed the skills assessment. The skills assessment took place in the laboratory classroom. Each student was allotted a 30 minute time slot. The assessment began by introducing the students to the lab—pointing out the location of the dry goods, the refrigerator, and the freezer designated for the class. The students were first asked to demonstrate proper hand washing procedures. The assessment was videotaped using a Go Pro camera and a Sony Cyber-shot camera and audio-taped using a recorder. It included basic cooking skills, identification of tools and equipment, identification of fruits, vegetables, herbs and other ingredients, and communicating and defining basic cooking terminology. The principal researcher and an assistant conducted the assessments. The principle researcher scored the skill assessments while conducted, and a second researcher scored the assessment based on video and audio recordings. After scoring the assessments the researchers compared the scores and discussed differences. The textbooks that validated the instrument were used to settle differences. This established inter-rater reliability.

Upon completion of the study, researchers analyzed the pre- and post-assessment knowledge and skills values. The principal researcher entered the data into SPSS Statistic 22

software package to ascertain if there were significant differences in the pretest and posttest scores. A paired t-test illustrated the differences.

CHAPTER IV: RESULTS

The purpose of this study was to determine if using FCP DPGs' core competencies as a guide for course content and experiential learning as a method of teaching the Principles of Foods laboratory would increase the students' knowledge and skill levels. The participants were students enrolled in the Principles of Foods course at the University of Arkansas and pursuing a major or minor degree in Human Nutrition and Hospitality Innovations, with an emphasis in dietetics. All students were asked to participate in the assessments. It included students classified as freshmen (5), sophomores (12), juniors (10), and seniors (5), for a total of 32 students. Twenty-nine students completed the knowledge assessments and 28 students completed the skills assessments.

Table 1 displays descriptive statistics of data collected. Only data from participants that completed the pre- and post-assessment are used. The knowledge assessment reveals that the average participant (n= 29) score on the pre-assessment (17.38 ± 5.0) dramatically increased on the post-assessment (28.41 ± 5.6). The knowledge post-assessment elicited a mean increase of 11.03 points. Comparing the average growth score to 0 (no growth), a dramatic increase in knowledge was revealed. The average participant (n= 28) score on the skills pre-assessment (25.07 ± 6.3) significantly increased on the post-assessment (39.03 ± 4.0). The skills post-assessment elicited a mean increase of 13.96.

Table 1
Assessment Data Analyzed

Assessments	n	M	SD
Pre- Knowledge	29	17.38	5.0
Post- Knowledge	29	28.41	5.6
Pre- Skills	28	25.07	6.3
Post- Skills	28	39.03	4.0

Table 2 shows the distribution of data according to student classification, and includes data from participants (n=28) that completed pre- and post-assessments. Five seniors enrolled in the course, one student signed up for the course after the knowledge assessment was given and only completed the skills assessment, and one senior student had previously taken the lab and did not participate in the post assessments. All 10 participants classified as juniors, completed the assessment. Of the 12 sophomores enrolled in the course, ten completed all of the assessment; one student dropped the course and one was injured and could not complete the post skills assessment. Five freshmen enrolled in the course, one student dropped the course, so four completed all components of the assessment.

Table 2
Mean Scores of Data Analyzed by Student Classification

Assessment	Senior (n=4)	Junior (n=10)	Sophomore(n=10)	Freshmen (n=4)
Pre-Knowledge	21.30	14.60	18.18	17.25
Post Knowledge	35.50	27.20	27.90	28.25
Pre-Skills	26.00	24.10	26.09	22.00
Post Skills	42.75	37.10	39.50	39.00

A bar chart in Figure 2 pictorially displays the data for comparison by student classification. The senior students had the highest mean scores on pre-knowledge assessment and the junior students had the lowest. The junior students had the greatest increase from pre-knowledge to post knowledge on the assessment. The sophomore class had the lowest increase in mean scores on the knowledge assessment, but the highest on the pre-skills assessment. The sophomore class had students with the highest overall scores in the pre-knowledge, pre-skills, and post-skills assessments. The freshmen class saw the greatest increase in skills. They had a mean increase of 17.0 points. The senior class showed the greatest improvement overall with a 14.85 point mean increase. They were followed by the freshmen (M=14.0), the juniors (M=12.8), and the sophomores (M=11.57).

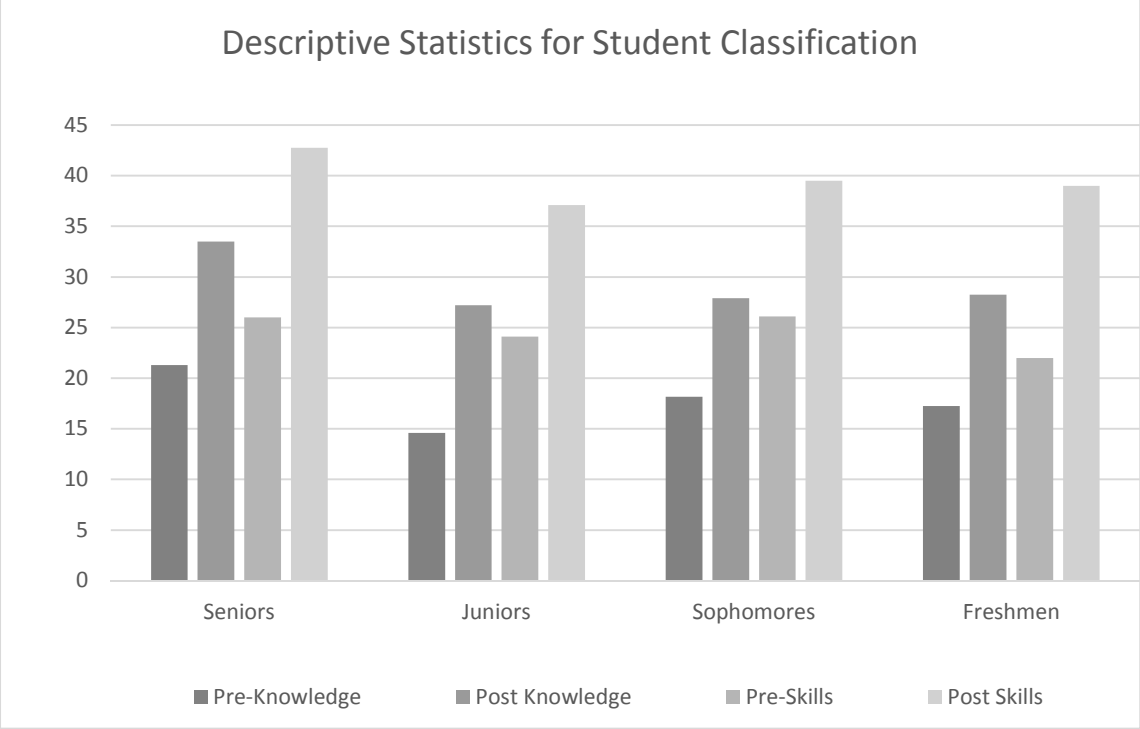

Figure 2.

CHAPTER V: DISCUSSION AND CONCLUSIONS

The FCP DPG of the Academy of Nutrition and Dietetics, identified 11 core competencies and 70 topic areas within the competencies. These competencies are a list of recommended skills, methods, techniques, and core knowledge for food and nutrition professionals. They were originally developed as a recommendation to dietetic education programs for ways to include more food and culinary knowledge into existing programs. The purpose of this study is to determine if developing and incorporating experiential learning targeted to the competencies would increase dietetic students' culinary skills and knowledge.

Discussion

The results reveal that the teaching methods used in this study did increase the students' culinary knowledge and skill levels. Data analysis indicated that experiential learning as the method used to teach the students was an effective method to use in a laboratory learning environment. Not new, experiential learning has been a component of dietetics education programs since 1927 (Barr, et al., 2002). The millennial generation prefers to learn with hands on experience, so this theory was a good fit for this study (Nikirk, 2012) and the overall results were not unexpected.

When the data were analyzed by student classification by using data from complete sets, the results were surprising. The senior students had the highest mean scores on pre-knowledge assessment which is not surprising, since they have taken more nutrition courses. However, the junior students had the lowest. This can be explained, in part, by the junior class having five out of ten students that English is their second language. The junior class also had the greatest number of non-dietetic majors, four out of ten students were nutrition minors. Not surprisingly, the juniors had the greatest increase from pre-knowledge to post knowledge on the assessment.

The sophomore class had the lowest increase in mean scores on the knowledge assessment, but the highest on the pre-skills assessment. The sophomore class had students with the highest overall scores in the pre-knowledge, pre-skills, and post-skills assessments. The freshmen class saw the greatest increase in skills. They had a mean increase of 17.0 points. This may be explained as the freshman mostly live in residence halls and do not have access to a kitchen, therefore; they enrolled in the course with little or no previous culinary experience. They had the lowest mean score on the pre-skills assessment.

Limitations are defined as an aspect of a study that the researcher knows may negatively affect the results or generalizability of the results, but over which the researcher has no control (Gay & Airasian, 2003). There were a few limitations to this study. The study was comprised of a small sample. A literature review showed little research has been conducted on the culinary skills and knowledge levels of dietetic students, therefore, instrumentation to measure the skills and knowledge has not been developed or published. The core competencies used to guide the assessment and curriculum does not give specific details on the recommendations; an interview with founding member Catharine Powers explains this as each educator has the opportunity to consider the core competencies and apply them to their individual setting. Educators in food service will interpret them differently than educators working in home kitchens (C. H. Powers, personal communication, June 2, 2016). Another limitation is the amount of information included in the competencies to cover in a one hour laboratory course that meets once a week. A study conducted by Engler-Stringer (2010), stated that "when cooking skills have been evaluated in a research context, often no clear definitions of terms are included. This leaves them open to interpretation and puts research results into question" (Engler-Stringer, 2010, p.144). Some of the students are from other countries. After completing the study the researchers realized that

some of the assessment questions could be considered culturally biased. Students from Panama, India, or Africa may not know what month fruits and vegetables are in season in Arkansas. These students may not know the English word for the fruits, vegetables, and herbs used during assessment. A personal interview with a colleague who lived in Iran and Germany before moving to the United States explained that when her family cooks, nothing is ever measured, one knows how much to make by the number of people being served; the amount of seasoning added is based on experience. Sometimes during baking, cups and spoons are used, but they are the kind you eat and drink with, not standardized measuring cups and spoons (L. Siahmakoun, personal communication, June 2, 2016). Some of the students may have learned to cook this way and not know that standardized measuring tools are commonly used in the United States. In dietetics, it is important to assess nutrient quantity in diets and standardized recipes are necessary for accurate measurements. Dietetic educators may need to address this issue with their students.

The Principles of Foods course at the University of Arkansas, is the only dietetic course that students are taught cooking skills. The ability to identify fresh fruits and vegetables, and culinary equipment, is knowledge that many students of the millennial generation do not possess. One assessment question asked the students to identify a scallion; 19 out of 30 students did not know the answer on the pre-assessment. One student thought a butternut squash was a scallion. Also on the pre-assessment, the students were asked to identify three items that would be considered a seasonal fruit or vegetable for August in Arkansas, 22 out of 28 students did not know the answer. The majority chose an orange as being seasonal in Arkansas during the month of August. One student said "jalapeños are in season," and held up a container of okra. The majority of students confused beets and turnips, summer and winter squash, very few could identify herbs. Many could not distinguish between a cucumber and a zucchini. The students

were allowed to hold the items for inspection and pinch off leaves to smell. Fruits, vegetables, and herbs were not the only area where the students' knowledge was subpar. The students were asked to identify a sauce pan, the majority chose a skillet. Identification of a skillet was the next question, having realized the mistake, many asked to change their answers. The students were not familiar with a lot of cooking terms. When asked to give an example of a *folding* technique, one student stated "it's when you do the laundry after cooking, like the kitchen towels."

Conclusions

This study was conducted to determine if developing and incorporating experiential learning targeted to the FCP DPG core competencies would increase the students, culinary skills and knowledge. Graduates of didactic programs in dietetics are entering internships with little cooking experience.

The research was conducted in the fall of 2015. An in depth literature review along with the FCP DPG core competencies and the objectives of this study were used to guide the development of the assessment and curriculum used for teaching the course. Experiential learning guided the method of instruction.

The sample of this study included 32 students, mainly millennials, attending a four-year southern land-grant university, all were enrolled in the Principles of Foods course. The students were assessed at the beginning of the semester and after completing the course. Knowledge was assessed during the classroom lecture and skills were assessed in the laboratory. Twenty-nine students completed the pre- and post- knowledge assessment and 28 completed both skills assessments. Copies of the instruments used to measure skills and knowledge can be found in Appendices B and C.

The results of the study show that using experiential learning theory as a teaching method and the FCP DPG core competencies as a guide, was an effective method for teaching students culinary skills and knowledge.

Implications. Dietitians are in a unique position to deliver nutritional information to their clients. They are the bridge between food science research and getting recommendations from that research onto peoples' plates (M. Bailey, personal communication, April 11, 2016). Many studies are currently being funded for prevention of diseases like cancer, heart disease, and obesity; however, if the public cannot translate that information into practical skills, the research is useless in preventing these diseases. This is where dietitians step in. Culinary skill interventions have shown positive effects on consumption of fruits and vegetables and improved overall diet quality. If dietitians are able to teach the public quick, easy, and healthy ways to get dinner on the table, maybe more people would consider less fast-food, and take-out meals in favor of eating at home. As dietetic educators, we need to prepare our students for these roles. The FCP DPG has listed core competencies to include in existing programs, but maybe dietetic education programs should increase culinary courses that focus on healthy food preparation.

The Academy of Nutrition and Dietetics has listed culinary skills and knowledge as gaps in the education of dietetic students (ACEND, 2015). Our goal, in conducting this research, is fill this gap by teaching future dietitians the skills and knowledge needed to be competent in educating the public on nutritional recommendations backed by research. If dietitians are expected to communicate to patients on food preparation techniques and food substitutions, and encourage people to consume more fruits and vegetables, it stands to reason that they should have knowledge of basic cooking techniques and be able to identify the fruits and vegetables they are suggesting. Culinary skills and knowledge should be required competencies in dietetics,

and dietetic educators need to address this culinary illiteracy (Schaeffer, et al., 2013). Educating future dietitians on culinary skills and knowledge provides them with additional tools to increase their opportunities in the dietetic profession.

Recommendations for Future Research. Future assessments are needed to test the instrumentation used in the study. The FCP DPG core competencies are broad, and educators may interpret them in a variety of ways. For example, *Culinary Terminology* is listed under the competency- *Basic Cooking Skills*. Dictionaries have been written on culinary terminology, so narrowing the topic to what terminology is sufficient for dietetics would be helpful in developing the assessment and planning curriculum. Additional research could include testing the sample at end of their nutrition education and comparing those scores to the post scores of Study 1. Another inclusion in future research would be to determine if there was a significance difference in culinary skills and knowledge of students of the same generation, not majoring or minoring in human nutrition. Future studies could address cultural differences in culinary knowledge to prevent bias.

Food for Thought. Cooking shows have become popular, but when a study published in *Topics in Clinical Nutrition*, compared recipes from two cooking shows against the 2005 Dietary Guidelines for Americans, the study revealed the recipes on the cooking shows are higher in calories, sodium, total fat, and saturated fats. They conclude that "eating foods with these characteristics would lead to poor eating habits and excessive intake of caloric requirements (Silva, di Bonaventura, Byrnes, Herbold, 2010). While reviewing literature for this thesis, several articles suggested returning home economic courses, generally referred to as family and consumer sciences, to the secondary curriculum. One article published in the *Journal of the American Medical Association,* states:

> This idea now seems quaint, but in the midst of a pediatric obesity epidemic and concerns about the poor diet quality of adolescence in the United States, instruction in basic food preparation and meal planning skills needs to be part of any long-term solution (Lichtenstein & Ludwig, 2010).

As stated by Michaud et al. (2007), "for diet-related behavior changes to occur, one must have knowledge about nutrition, analytical skills for planning nutritionally sound meals and evaluating when foods are prepared correctly, and technical knowledge and cooking skills" (Michaud, et al., p. 344, 2007).

Research shows that there are many obstacles to home cooking (Jones, Walter, Soliah & Phifer, 2014). And we as dietitians, should explore those obstacles and create solutions. When one prepares their own food, they have the opportunity to customize it in a way that pleases them. In her acceptance speech for the 2012 Ryley-Jeffs Memorial Award, Mary Sue Waisman says that she believes that she was chosen for the award not because she stepped out as a pioneer, but because she had the "courage, vision, and foresight to step back, to just stand still and breathe and not lose those methods, knowledge and activities that are at the root of our profession" (Waismen, 2012). Waisman, after practicing what she refers to as mainstream dietetics, decided at age 46, to attend culinary school. In her speech, she states "one incredibly important concept that came through loud and clear in culinary school was that food is meant to provide pleasure to people."

Cooking is a life skill. It is also a way to improve the quality of life. Whether it is cooked in thirty minutes or slowed cooked all day, food is meant to provide pleasure and nutrients. Food that tastes good, greatly increases the pleasure and the chance of obtaining the necessary nutrients that provide health and vitality. As a profession, we need to heed the advice of Mary Sue Waismen, step back, breathe, and not lose those methods, knowledge, and activities that are the root of our profession.

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Appendix A

Food & Culinary Professionals DPG
Core Food & Culinary Competencies

Updated/approved 11/20/14

This document identifies core competencies for registered dietitians active or interested in food and culinary career options within the profession. The Food & Culinary Professionals DPG is looked to as the expert on these topics, and the DPG uses the core competencies to guide educational content and programs for our members, positioning them for success in food and culinary roles within the dietetics field.

I. Sensory Perception and Evaluation

a. Physiology of taste and flavor, including factors affecting tasting ability
b. Taste and flavor variability with age (across the lifecycle), disease, and culture
c. Organoleptic properties of food
d. Descriptive taste and flavor terminology
e. Texture and flavor changes with fat, sodium, and other nutrient-modified foods
f. Plate composition and presentation: food color, texture, flavor, and shape
g. Comparative tasting and evaluation of food

II. Basic Cooking Skills

a. Culinary terminology
b. Measuring and weighing skills
c. Cooking equipment for home and commercial kitchens – selection and appropriate use
d. Knife skills and safety: appropriate use and care of knives
e. Communicating cooking skills to "non-cooks"

III. Cooking Techniques

a. Specific ingredients require appropriate techniques
b. Basic food preparation techniques
c. Dry-heat cooking techniques-sautéing, grilling, broiling, roasting, smoking
d. Moist-heat cooking techniques-steaming, poaching, boiling, stewing, braising
e. Preparation of basic savory and sweet sauces
f. Basic baking techniques and optimal uses
g. Nutrient retention in cooking
h. Cooking foods to appropriate temperature or endpoint for optimal food safety and quality
i. Techniques to reduce calories and/or nutrients of concern: saturated and trans fats, cholesterol, sodium, added sugar, sodium.
j. Incorporating healthier fats and oils, fruits, vegetables, and whole grains into foods, meals, and menus

IV. Menu and Meal Planning

a. Home and commercial menu planning principles for single-meal, daily, and weekly menus

b. Menu planning for specific age, health and/or special needs limitations
c. Menu planning considerations for cultural, ethnic, and religious groups (specific foods ingredients, cooking methods, and restrictions)
d. Evaluation of menus using U.S. Dietary Guidelines, USDA Food Guidance Systems (i.e. MyPlate), Daily Values, and Diabetes Exchange Lists
e. Common food sources of essential nutrients
f. Consumer food, ingredient, and purchasing trends
g. Economical and available food choices in each food group
h. Flavor balancing within meals
i. Seasonal menu planning
j. Food cost controls

V. Ingredient Selection

a. Functions, characteristics, and selection of ingredients
b. Seasonal availability/quality indicators of foods from each food group
c. Choosing ingredients using food labels and point-of-purchase systems and programs
d. Food laws and standards – federal nutrition label requirements
e. Standards of quality in purchasing and storing food
f. Food storage for best quality and safety. Length of storage (dry, refrigerator, freezer)
g. Beverages: cooking uses, health effects, pairing with food

VI. Recipe Development and Modification

a. Use of herbs, spices, seasonings, condiments, aromatics, and marinades as well as cooking techniques for flavor development and enhancement
b. Standard and appropriate portions of commonly consumed foods
c. Ingredient substitution and food quality effects of substitution
d. Creating, modifying, and writing standardized recipes for consumers and food service
e. Nutrition analysis of recipes using calculation methods and software, and understanding of food laboratory analysis
f. Altering recipes to improve the nutritional value

VII. Communicating About Food

a. Selection of audience-appropriate messages (merging consumers' desire for taste, convenience, and economy with nutrition/health messages)
b. Writing for consumers and professionals
c. Ability to present basic food demonstrations and presentations
d. Communicating and partnering with chefs, food professionals, and the food industry
e. Communicating newsworthy food topics
f. Communicating on foods purchased away from home
g. Understanding of the political, environmental, economic, and sociologic significance of food
h. Working with and through the media, including traditional and social media
i. Public speaking
j. Communicating the enjoyment of food "Taste and Nutrition go hand-in-hand" (to health professionals and consumers)
k. Knowledge of food photography and styling

VIII. Food Retailing

a. Knowledge of food retailing locations (supermarkets, farmers markets, gourmet shops, online, etc.)

b. Factors that influence consumers' shopping needs and habits, including nutrition, location, cost, and convenience

c. Helping consumers make point-of-purchase decisions using food labels (Nutrition Facts Panels, nutrition and health claims, ingredients, allergen labeling) and retail systems (shelf-edge communication, pricing, etc)

IX. Food Safety

a. Home food safety: preparation, service, and storage

b. HACCP, HARPC, and other food safety considerations and regulations for commercial food service, agricultural production, manufacturing, distribution, and retail systems

c. National Restaurant Association's Servsafe® certification or equivalent knowledge of food safety auditing, available tools, pest control, cleaning chemicals and SDS use

d. Microbiology and common food-borne illnesses

X. Sustainable Agriculture

a. Basic understanding of agribusiness and food production on the farm or ranch

b. Understanding national and international standards for production claims, including organic, fair trade, animal welfare, and local

c. Communicating the potential environmental, economic, flavor, and other factors of locally produced and artisanal foods

d. Understanding of technological advances in food production, including biotechnology, management information systems on the farm, food safety at farm level (product traceability, livestock biosafety), biofuels and their impact on food production, pricing, access to food and carbon footprint

e. Knowledge of and ability to communicate about topics including: water stewardship, climate change, biodiversity, agricultural policy, integrated pest management, low-tillage approaches, composting, resource reduction (waste water treatment, recycling, energy efficiencies)

XI. Food Trends

a. Identifying trends in eating habits, attitudes, behaviors, knowledge, and skills

Appendix B

Culinary Knowledge Assessment: **Number**_____

Name the 5 tastes stimuli:

1.

2.

3.

4.

5.

Name 2 factors that can affect a persons' ability to taste:

1.

2.

Organoleptic properties of food include:

1.

2.

3.

4.

5.

Flavor is a combination of _____, _____, and _____.

Name 2 factors that can affect perception of flavors:

1.

2.

What is the main difference between **yeast bread** and a **quick bread**? _____.

A fluid ounce measures _____, and an ounce measures _____.

The temperature danger zone is _____º F to _____º F.

Foods reheated should be brought to _____º F for 15 minutes.

A food allergen is a _____ in a food or ingredient that some people are sensitive to.

Of the following grains, which are gluten free: (write GF in the blank beside the grain that is gluten free and NO by the grain that is not gluten free)

Buckwheat_____

Quinoa_____

Bulgur Wheat_____

Rye_____

Millet_____

Wild Rice_____

Name common food sources of:

Vitamin D _____

Vitamin A _____

Iron _____

Calcium _____

Omega 3's _____

Omega 6's _____

Potassium _____

Vitamin B12 _____

Name 3 dry heat cooking methods:

1.

2.

3.

Name 3 moist heat cooking methods:

1.

2.

3.

Name 3 ways to retain nutrients in cooking food:

1.

2.

3.

Identify the following as an herb (H), or a spice (S).

_____ thyme

_____ basil

_____black pepper

_____cinnamon

_____ ginger

Appendix C

Number_____

Culinary Skills Assessment: (Instructors will place a check mark if properly demonstrated, and write NO in the blank provided if it was not.)

_____Demonstrate proper hand washing methods according to the standards set by Servsafe.

Choose the best piece of equipment for the job and demonstrate ability to:

_____ Chop an onion into a medium dice

_____ Mince garlic

_____ Peel a carrot and julienne

_____ Zest a lemon

_____ score a baguette

Communicating cooking skills and knowledge of terms: These questions will be asked by the instructor and video-taped for accuracy.

If a recipe asks you to "cream" butter and sugar, what does that mean? _____

What are you doing when you proof dough? _____

What are you doing when you are reducing liquids, as in making a sauce? _____

Give an example of when you might use a "folding" technique _____

What tool would one use to "cut" butter into flour? _____

What does it mean to "score" in culinary terms?_____

What does it mean to "blanch" vegetables?_____

If a recipe calls for vegetable oil, which of the following would be the best substitute: canola oil, coconut oil, or olive oil.

In order to reduce cholesterol in the following muffin recipe, what three items could you substitute?

Basic Muffins:

2 cups white flour

1 tablespoon baking powder

½ teaspoon salt

2 Tablespoons sugar

1 egg, slightly beaten

1 cup milk

¼ cup melted butter

_____

_____

_____

Choose the proper tools and demonstrate how to measure:

_____8 oz of water

_____8 oz of rice

_____1 cup of flour

_____1 cup of water

_____1 tsp of salt

_____Demonstrate how to crack and _____ separate an egg.

Identify the following equipment and tools: (The items will be displayed and the students must identify them by sight, they will not have a list.)

_____ saucepan

_____ skillet

_____ pastry blender

_____ paring knife

_____ spoon for stirring while cooking in a pot

_____ stock pot

_____ the attachment (for the Kitchen Aid mixer) used to beat egg whites

_____ double boiler

_____ serrated knife

_____ jellyroll pan

_____ cookie sheet

_____ candy thermometer

_____ instant read thermometer

Identify the following ingredients: (These items will be available and the students will have to identify it by sight).

_____ a scallion

_____ a shallot

_____ fresh thyme

_____ fresh mint

_____ cream of tartar

_____ a mango

_____ turnip

_____ asparagus

_____ a summer squash

_____ a winter squash

Choose food items that are considered seasonal for the current season.

1.

2.

3.

Appendix D

How the core competencies are included in the assessments and laboratories.

Core Competency	Assessment Question-Skills	Assessment Question-Knowledge	Lab
Sensory Perception and Evaluation		Name the 5 taste Stimuli. Organoleptic Properties of Foods include: Flavor is a combination of _____, _____, & _____. Name 2 factors that affect a person's ability to taste.	Introduction Lab
Basic Cooking Skills	Asked to perform tasks— Chop and onion, mince garlic, peel a carrot and julienne, zest a lemon, score a baguette. Asked to choose the proper tool and demonstrate how to measure— 8 oz water, 8 oz rice, 1 cup flour, 1 cup water, 1 tsp salt Asked to crack and separate and egg. Asked to identify equipment and tools.		Every lab
Cooking Techniques	Asked to define terms— Cream, proof, reduce, folding, cut, score, blanch.	Name 3 dry heat cooking methods. Name 3 moist heat cooking methods. Name 3 ways to retain nutrients in cooking food. Name 2 factors that affect a person's ability to taste.	Vegetable Lab Egg lab
Menu and Meal Planning	Choose 3 food items that are considered seasonal for the current season.	Name common sources of: Vitamin D, Vitamin A, Iron, Calcium, Omega 3, Omega 6, Potassium, Vitamin B12	Fruit lab Vegetable lab Final Exam
Ingredient Selection	Asked to identify a variety of fresh fruits, vegetables, and herbs.	Name common sources of: Vitamin D, Vitamin A, Iron, Calcium, Omega 3, Omega 6,	Yeast breads and Quick breads lab Grains Lab

		Potassium, Vitamin B12 Identify the following as an herb or a spice: (thyme, basil, black pepper, cinnamon, ginger)	Healthy Snack Foods lab Final Exam
Recipe Development and Modification	If a recipe calls for vegetable oil, which of the following would be the best substitution? Canola oil, coconut oil, or olive oil. In order to reduce the cholesterol in the following muffin recipe, what three items could you substitute?	Of the following grains, which are gluten free? (Buckwheat, Quinoa, Bulgar Wheat, Rye, Millet, Wild Rice)	Vegetable lab Yeast bread and Quick breads lab Grains lab
Communicating about Food	Communicating cooking skills and knowledge of terms: Questions were asked by instructor and video-taped.		Every lab Discussion post Final Exam
Food Retailing		A food allergen is a _____ in a food or ingredient that some people are sensitive to.	Scavenger Hunt project
Food Safety	Demonstrate proper handwashing methods according to the standards set by Servsafe.	The temperature danger zone is _____^{o}F to _____^{o}F. Foods reheated should be brought to _____^{o}F. A food allergen is a _____ in a food or ingredient that some people are sensitive to.	Introduction lab Meat, Poultry, and Fish lab
Sustainable Agriculture	Choose 3 food items that are considered seasonal for the current season.		Discussion post
Food Trends			Healthy Snack Foods lab Discussion post

Appendix E

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

June 25, 2015

MEMORANDUM

TO:	Nancy Buckley Mechelle Bailey
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	15-06-777
Protocol Title:	*Culinary Competence: Skills Assessment for Dietetic Students*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 06/24/2015 Expiration Date: 06/23/2016

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (https://vpred.uark.edu/units/rscp/index.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 44 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.

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