A graduate project submitted in partial fulfillment of the requirements for the degree of Master of Science in Family and Consumer Sciences

By

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in collaboration with

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DEDICATION

This graduate project is dedicated to our families and friends. Thank you for your continuous support, understanding, motivation and love.
ACKNOWLEDGMENT

We would like to thank our committee members who supported our efforts in writing this graduate project. We recognize the value of your commitment, encouragement and time. You are the guiding force that pushes us to great accomplishments.

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ABSTRACT

NUTRITION EDUCATION CURRICULUM: HEALTHY EATING SUMMER CAMP FOR KIDS, A PILOT PROGRAM

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Master of Science in Family and Consumer Sciences

Due to the alarming increase of childhood obesity, its related medical conditions, and complications of treatments options, the importance and need for preventive measures is evident. Nutrition education, utilized as an early intervention tool, can be beneficial in preventing childhood obesity. The purpose of this graduate project was to develop a pilot program that included nutrition lessons, physical activity, and cooking sessions to provide a curriculum for children ages 8-to-11 years old, in the hope of increasing nutrition knowledge that may help improve their lifestyle habits. The Healthy Eating Summer Camp for Kids was implemented through the Summer Academic Program for Elementary School Students (SAPESS) on California State University, Northridge campus. The curriculum included lesson plans, cooking sessions and physical activity, which were tailored to each food group of the Food Guide Pyramid for each week of the five week long course. The three learning theories, cognitivism [cognitive], humanism [affective], and behaviorism [psycho-motor] were implemented throughout the course. The same pre- and post-tests were administered to evaluate the effectiveness of the curriculum regarding students’ nutrition knowledge status. This project was successful in evaluating the effectiveness of the nutrition education component of the curriculum. Knowledge was most increased regarding the students’ ability to identify the
different types of dairy, to recall specific foods in the grain group that were emphasized in the curriculum, and the appropriate daily intake of foods in the grain group.

Conclusions regarding the impact of the physical activity and cooking session components of the program on students’ knowledge cannot be made at this time, as they were not evaluated.
CHAPTER 1
INTRODUCTION

Obesity has increased at an alarming rate in the past 20 years in the United States (U.S. Obesity Trends, 2011). In 2009, there were only two states with the prevalence of obesity at less than 20 percent. Thirty-three states had equal to or greater than a 25-percent of their population who were defined as obese, with nine of these states having a prevalence equal to or greater than 30 percent (U.S. Obesity Trends, 2011). These numbers are especially disturbing since obesity can lead to more serious medical conditions such as diabetes mellitus (DM) and cardiovascular disease (CVD). These conditions were once a concern primarily for the adult population, but in the last 20 years they have become a more common reality among youths. According to the 2007-2008 National Health and Nutrition Examination Survey (NHANES), an estimated 16.9 percent of children and adolescents between the ages of 2 and 19 years were obese (Ogden & Carroll, 2010). Children and adolescents who are obese have a greater risk of developing adult health problems such as DM, CVD, stroke, several types of cancer and osteoarthritis (Childhood Obesity, 2010). The childhood obesity epidemic continues to grow, affecting children from infancy to adolescence and further into adulthood. Studies have shown that nutrition education has been a useful tool in the prevention of obesity. Programs regarding nutrition education currently exist in the elementary school system, and generally include one or two of the following components: nutrition lessons, physical activity, and cooking sessions. Rarely, if at all, do programs include all three components in one combined program. The combination of nutrition lessons and cooking sessions teach healthy eating; these, along with different types of activities that emphasize
exercise, can help to develop healthy lifestyle habits. The lack of any of the three components weakens the ability of nutrition education programs to fully educate students on the importance of maintaining a healthy lifestyle. The Healthy Eating Camp curriculum presented in this project incorporates all three components: nutrition lessons, physical activity, and cooking sessions, in order to provide a well rounded understanding of healthy living for the elementary school student.

**Statement of the problem**

According to the Center for Disease Control and Prevention (CDC), in the past 30 years the childhood obesity rate has more than tripled (Childhood Obesity, 2010). Between 1980 and 2008, the obesity rate among children 6 to 11 years of age has increased from 6.5% to 19.6%. Those aged between 12-to-19 years increased 5.0% to 18.1%. Thus, the urgency for prevention is evident. Past research has shown healthy dietary habits to be an effective preventive method for CVD, DM and obesity (Willett, Skerrett, Giovannucci, & Callahan, 2001). Nutrition education, utilized as an early intervention tool, can be beneficial in preventing childhood obesity. There are different learning theories (e.g. behaviorism [psycho-motor], humanism [affective], and cognitivism [cognitive]) that can be applied to any education program (Guey, Cheng, and Shibata, 2010). The combination of the three domains intensifies learning when applied to objectives in curriculum (Guey, Cheng, and Shibata, 2010). It is the mutual interdependence of these domains that creates a learning experience that is most beneficial for a student. According to Contento (2011), nutrition education is improved when the learning experience allows for the student to feel, do, and think. The application of these domains is apparent in curriculum that encompasses nutrition lessons with
motivational activities, along with physical activity and cooking sessions. Unfortunately, most existing programs lack one or more areas of these components.

**Purpose**

The purpose of this graduate project was to create a curriculum that combined nutrition lessons, physical activity, and cooking sessions for children ages 8-to-11 years old, in the hope of increasing nutrition knowledge that may help improve their lifestyle habits, thus decreasing the risk of developing obesity.

**Definitions**

1. Diabetes Mellitus (DM): commonly referred to as diabetes, a disease that occurs when a person’s body cannot metabolize glucose (Gropper, Smith, & Groff, 2009).

2. Cardiovascular disease (CVD): disease of the heart and/or blood vessels (Cardiovascular Disease, 2004).

3. Obesity: A person who has a body mass index (BMI) of 30 or above (U.S. Obesity Trends, 2011).

4. BMI: A ratio of a person’s weight to height (kg/m²) providing an indicator of body fatness. (U.S. Obesity Trends, 2011).

5. Centers for Disease Control and Prevention: an agency of the U.S. Department of Health and Human Services, investigates public health trends, and helps control and prevent diseases (Centers for Disease Control and Prevention, 2004).
6. Cognitivism: learning theory that focuses on cognitive processes regarding schemata development and gaining understanding during discovery (Guey, Cheng, and Shibata, 2010).

7. Humanism: learning theory that focuses on the psychological needs and values of students, rather than the process of learning (Guey et al., 2010).

8. Behaviorism: learning theory that focuses on the process that requires a person’s understanding of simple concepts before moving on to the complex (Guey et al., 2010).

9. Food Guide Pyramid: A pyramid shaped diagram which portrays dietary guidelines based on the recommended number of servings from five different food groups. (Food Pyramid, 2011).

10. Pre-test: an instrument which is given prior to the implementation of a class or program to evaluate the knowledge of a student about the subject for further studies (Pretest, 2011).

11. Post-test: an instrument given after the completion of a class or program, and it is utilized with the pre-test to measure the achievement of the program being tested (Posttest, 2011).

12. Healthy Eating Camp: A five-week summer class which is part of the Summer Academic Program for Elementary School Students (SAPESS) at California State University, Northridge.

13. Food and Drug Administration (FDA): Government agency that monitors the safety and efficacy of drugs and therapeutic devices prior to marketing (Food and Drug Administration, 2011).
14. Bariatric Surgery: A treatment for weight loss by altering the digestive system’s anatomy, which limits the amount of food that is consumed and digested (Bariatric Surgery, 2004).

**Assumptions**

The needs assessment for this Healthy Eating Camp for Kids project was based upon the following assumptions:

- A pre-test and post-test and curriculum, were designed with the assumption that subjects’ ages ranged from 8-to-11 years old.
- All student participants were able to read and write in English.
- Students would attend the entire five-weeks of the summer camp.

**Limitations**

- The curriculum was delivered to a small group of students at CSUN in the San Fernando Valley of Southern California and cannot be generalizable.
- Students ranged from 8-to-11 year olds, making nutrition lesson plans difficult to tailor to the needs of each grade level specifically.
- The curriculum was not evaluated prior to implementation.
- Knowledge of physical activity, cooking techniques or skills in either of these arenas was not evaluated in the pre- and post-test.
CHAPTER II
REVIEW OF LITERATURE

Overview

According to the National Center for Chronic Disease Prevention and Health Promotion, obesity is defined as a result of consuming more calories than expended, which causes a caloric imbalance (Childhood Obesity, 2010). A chronic caloric imbalance can lead to negative health effects such as dyslipidemia, high blood pressure, diabetes mellitus (DM) and cardiovascular disease (CVD) (Deckelbaum & Williams, 2001). According to Must, Jacques, Dallal, Bajema, & Dietz (1992) adolescents who are overweight have a higher risk of developing health complications such as cardiovascular and other chronic diseases in adulthood even if they had lost the weight later in life. Research conducted by Ferraro, Thorpe, and Wilkinson (2003) found that childhood obesity is a risk factor for severe obesity throughout one’s life. Children with a body mass index (BMI) greater than the 95th percentile are more likely to develop obesity-related chronic diseases early in life requiring lifetime maintenance (Ferraro, Thorpe, and Wilkinson, 2003).

The dramatic increase in obesity is not unique to the United States. These changes are also apparent in countries where there is an increase in westernization of behavioral and dietary lifestyles (Deckelbaum & Williams, 2001).

Causes

Behavior, environment, and genetics are all factors in the development of childhood obesity (Childhood Obesity, 2010). Childhood obesity is most likely caused by an imbalance of energy intake and expenditure. This may be brought on by several
factors such as lack of physical activity, television viewing, and dietary patterns (Spear et al., 2007). Deckelbaum and Williams (2001) reviewed studies related to obesity in childhood that can predict overweight later in adulthood, and they made the assumption that prevalence of obesity was associated with food accessibility and energy intake exceeding activity level. Television advertisements that include less healthy food products can influence food selection. In 2004, the Federal Trade Commission estimated that ten billion dollars was spent on the marketing of food and beverage products to children, particularly things such as sweetened beverages, sugary cereals, candy and processed foods with sugar, fats and sodium (Dietz, Benken, & Hunter, 2009). In a study by Clancy-Hepburn, Hecken, and Nevill (1974), a randomized trial showed that increasing television viewing will result in increased caloric intake and decreased energy expenditure. This suggests that children who watch more television consume more calories and spend less time being physically active. A study by Dixon, Scully, Wakefield, and Crawford (2007) further validates the assumption that television advertisements influence children’s behavior regarding food consumption. The lack of physical activity, television watching and dietary patterns seem to influence one another, collectively impacting the rate of childhood obesity.

Genetics seems to be another factor affecting the development of childhood obesity. According to Hitaker, Wright, Pepe, and Seidel (1997), obese and non-obese children alike are at twice the risk of continuing on to being obese adults if they have at least one parent who is obese. Genetics does influence the risk of obesity, but it does not explain the doubling of the obesity rate in the past two to three decades. The study by Dehghan, Akhtar-Danesh & Merchant (2005) found a number of cases where childhood
obesity was due to genetics or medical causes, but influences such as personal lifestyle choices and cultural environment also seemed to have an impact on obesity. Genetic factors cannot be denied, but behavioral and environmental factors can be influenced to help prevent or reduce the rate of this epidemic.

Treatment Options

There are different treatment options that address the issue of childhood obesity.

Surgery

Bariatric surgery is a popular treatment option for obese adults and in recent years has become a treatment option for obese children. Bariatric surgery is usually performed on patients who are morbidly obese, with a BMI above 40, to promote weight loss (Bariatric Surgery, 2004). Two of the most common types of bariatric surgery include gastric banding and gastric bypass. Gastric banding is a reversible procedure in which a band is inserted into the GI tract that restricts the size of the opening between the esophagus and the stomach. This reduces the amount of food a person can consume. Gastric bypass surgery takes a portion of the stomach, which is then used to create a smaller pouch, which is then connected to the intestine. This permanent procedure reduces the normal length of the intestine, and therefore reduces the portion of food consumed by the patient (Bariatric Surgery, 2004). Currently, the Food and Drug Administration (FDA) only approves the gastric bypass procedures to be performed on adolescents (Inge et al., 2004). Case studies examining bariatric surgery in adolescents resulted in weight loss, but there were many complications associated with the surgeries (Strauss, Bradley, & Brolin, 2001; Sugerman et al., 2003). These complications included
nutrition deficiencies, pulmonary embolism, dehydration, wound infections, small bowel obstructions and mortality (Strauss, Bradley, & Brolin, 2001; Sugerman et al., 2003). According to Inge et al. (2004), selection criteria recommendations for bariatric surgery restricts the use of the surgery for patients under the age of thirteen.

**Medication**

Medication is another treatment option to help control obesity in children. Medication alone is not an effective measure for obesity treatment (Ioannides-Demos, Proietto, & McNeil, 2006; Yanovski, 2005; Moyers, 2005). Even with lifestyle changes, weight loss is only reduced by 5-10%. After a six month period, weight regain is typical (Ioannides-Demos, Proietto, & McNeil, 2006; Yanovski, 2005; Moyers, 2005). The FDA has approved six drugs for the treatment of obesity, but only two are approved for pediatric use, orlistat and sibutramine (Yanovski, 2005). In the lumen of the stomach, orlistat blocks the absorption of dietary fat, which reduces weight gain (Yanovski, 2005; Zhi et al., 1994). Individuals who take orlistat may experience abdominal cramping, gas and oil leakage (Zhi et al., 1994). Sibutramine functions by suppressing appetite (Bray & Greenway, 1999). This medication is utilized in adolescents age 16 and above (James, Astrup, Finer, Hilsted, & Kopelman, 2000). Side effects of the drug include vasoconstriction, which leads to increased heart rate and blood pressure (James et al., 2000).

**Dietary Restrictions**

Dietary restriction is yet another intervention, which can be utilized as an approach to weight management (Spear et al., 2007). There have been several studies that
were conducted with 6-to-12 year old children who were given a reduced energy diet, which revealed effectiveness in weight loss (Flodmark, Ohlsson, Ryden, & Sveger, 1993; Golan, & Crow, 2004; Eliakim et al., 2002; Levine, Ringham, Kalarchian, Wisniewski, & Marcus, 2001; Nuutinen, 1991; W. Chen, S. C. Chen, Hsu, & Lee, 1997). Although, in two of the studies, weight gain was seen after treatment or at follow-up assessment (Nuutinen, 1991; W. Chen, S. C. Chen, Hsu, & Lee, 1997).

Bariatric surgery and medication may be options for adolescents, but they are not applicable to children under the age of thirteen. Energy-reduced diets are a safer treatment option, but have not demonstrated long term effectiveness. Therefore prevention measures are of vital importance.

**Prevention Options**

Due to the many complications and lack of research on some of the treatments discussed, prevention measures seem to be an important necessity to address the childhood obesity epidemic. According to Deckelbaum and Williams (2001), prevention should be a primary goal in the fight against childhood obesity. There are different prevention methods that can be utilized such as changing eating habits, cooking style, and increasing physical activity. Dehghan, Akhtar-Danesh, and Merchant (2005) state that in the last decade food has gone from being a nutritional necessity to a source of pleasure and a marker of lifestyle. Food consumption should be pleasurable, yet the concept of “bigger is better” has convoluted the notion to one resulting in poor eating habits. Further more, Dehghan, Akhtar-Danesh, and Merchant (2005) hypothesize that there is a steady decline in physical activity across all age groups, which heavily relates to the increasing
rate of obesity. Involving students in the cooking process of foods has shown to help influence their eating habits. Klise (2007) describes a class designed to teach healthy cooking to children in an afterschool program. Based on surveys, children reported eating more vegetables, cutting down on fats and sugars and eating more meals at home after their participation in the project. In addition, a program implemented by Speroni, Earley & Atherton (2007), which promoted physical activity in a nutrition education curriculum found a decrease in the body mass index of most students in the program.

An ultimate prevention method would include a nutrition education program, which incorporates healthy eating habits, physical activity and healthy cooking.

In order for nutrition education, as well as any education program to be effective, it must captivate the learners’ attention. There are many theories that can be applied to an education program to make it effective, such as cognitivism, humanism and behaviorism. Guey, Cheng, and Shibata (2010) define cognitivism as dealing with the cognitive processes regarding learning, which includes induction, deduction, pattern recognition, law discovering and rule finding. This theory focuses on schemata development and gaining understanding during discovery. Individuals are seen as active processors of information, as they explore an idea they are able to make it their own. The ability to connect a new idea with an older familiar idea increases the learning process. The humanism theory focuses on the psychological needs and values of students, rather than the process of learning. This approach is concerned about why one learns rather than how or what is learned. Education is about instilling self-motivation within the child. Developing a high self-esteem is important in order to help the individual achieve the appropriate goals. The child takes responsibility for learning, a theory where participatory
methods are emphasized. The teacher becomes a facilitator rather than a dictator, motivating the student to learn on their own desire rather than fear. The third theory, behaviorism, describes a learning process that requires understanding simple concepts before moving on to the complex. The changes in a student’s behavior are developed from how the student response to stimuli. Knowledge in this theory is defined as remembering information, while understanding is the ability to see patterns, and application of information is learned through training (Guey et al., 2010).

In developing learning objectives, there are three domains that are applied, which correspond to the three different learning theories: cognitivism (cognitive), humanism (affective), and behaviorism (psycho-motor). The ultimate objective of the cognitive domain is the students’ creativity in thought. The main concern of the affective domain is the motivation of the student. The psycho-motor domain’s main purpose is learning through imitation. According to Guey et al. (2010), learning objectives are incomplete if they do not incorporate all three domains.

**Nutrition Education Programs**

Effective nutrition education programs generally incorporate the three learning domains: cognitive (promote abilities in thought), affective (promote changes in attitude) and psycho-motor (promote improvement in physical skills) (Contento, 2011). Powers, Struempler, Guarino, and Parmer (2005) developed a six-week curriculum on the Food Guide Pyramid. The curriculum was structured around the three learning theories. This particular program integrated behavioral factors and environmental influences, through the use of a board game, Pizza Please. The Pizza Please game was an interactive board game, which included 24 dietary behavior questions and 16 nutrition knowledge
questions. Hands on activity and nutrition bulletin boards were further implemented throughout the program. Based on pre-test and post-test results, there was an increase in the consumption of fruits, vegetables, and dairy throughout the day after completion of the class (Powers et al., 2005). This exemplifies how nutrition education can greatly influence a child’s healthy meal choices by increasing their own knowledge in the classroom. Speroni, Earley & Atherton (2007) implemented a nutrition education program at an elementary school, which also included a physical activity component in its curriculum. This program was unique in that it gave the students the ability to decipher best, good and limited nutritious food choices. This program linked physical activity and nutrition together, teaching the students what a balanced lifestyle is; Participants showed a lower body mass index in a majority of the students (Speroni et al., 2007).

Wang et al. (2010) presented a three-year educational program for fourth and fifth graders in four different schools, implementing nutrition education in areas such as gardens, cooking classes, the cafeteria and through formal academic subjects. The goal of the program was to help increase the knowledge of nutrition and consumption of fruits and vegetables. In a similar program, Cooking with Kids, presented by Walters and Stacey (2009) the authors suggest that positive experiences develop from hands on activities with food. It was found that curricula focusing on nutrition and cooking support healthy dietary choices in students.

Each of these programs, all resulting in positive outcomes, combined nutrition education with either physical activities or cooking lessons. All programs incorporated the combination of the three domains that are necessary in developing successful learning objectives.
The curriculum for Healthy Eating Summer Camp for Kids (supplementary CD) incorporates the cognitive, affective and psycho-motor domains. It is unique in that it incorporates all three prevention methods: nutrition lessons, physical activity, and cooking sessions. The students were educated on the benefits of a certain food followed by the utilization of the food in activities which include art day, science day and cooking day. The goal of incorporating these different activities was to allow the students to develop a positive experience with the food, thereby creating a higher likelihood that he or she will try the food and enjoy it. The program hopes to enable the child to feel confident about making healthy choices regarding their food intake. This will set a strong foundation to help prevent the onset of childhood obesity.
CHAPTER III

METHODOLOGY

With the increase in the incidence of childhood obesity in the last few decades, preventive measures are necessary. Nutrition education programs contain components such as nutrition lessons, physical activity, and cooking sessions. These programs usually incorporate one or two of the three components (nutrition lessons, physical activity, or cooking sessions). The Healthy Eating Summer Camp project integrates all three components in order to develop a more effective curriculum, in hopes of increasing nutrition knowledge to help fight the obesity epidemic. The curriculum including lesson plans, PowerPoints and handouts can be found in the accompanying CD.

Participants

The Healthy Eating Summer Camp for Kids was implemented through the Summer Academic Program for Elementary School Students (SAPESS) on California State University, Northridge campus. Participants are students between the ages of 8-to-11 years old, from the San Fernando Valley in Southern California. There are a total of 42 student participants who were divided into two class sections, section one (n=23) and section two (n=19). This study was approved by the Institutional Review Board (IRB) at California State University, Northridge (Appendix A).

Curriculum Design

The Healthy Eating Summer Camp for Kids program was aimed at providing nutrition education, combined with healthy cooking and exercise. The curriculum was developed for a five week course. Lesson plans, including cooking sessions and physical activity, were tailored to each food group of the FGP for each week of the five week-long
course. Weeks were dedicated to the food groups as follows: week one – Grains, week two – Fruits and Vegetables, week three – Dairy, week four – Meat and Beans and week five-Review. The three learning theories, cognitivism [cognitive], humanism [affective], and behaviorism [psycho-motor] were implemented throughout the course through lesson plans, activities, and cooking sessions. Specific foods were emphasized each week corresponding to each food group to be used for evaluation of the program at completion. The foods emphasized within each group are listed as follows: Grains week - barley, buckwheat, cream of wheat, oatmeal, popcorn. Fruits and Vegetables week – tomato, avocado, quince, squash, starfruit, guava, bok choy, jicama, beets, fennel, radish, zucchini, leek, artichoke, arugula and rhubarb. Dairy week – yogurt, frozen yogurt, soy milk and lactose free milk. Meat and Beans week - eggs, fish, tofu, bean and nuts.

A general outline was designed for a five-day week instruction, which was then tailored to each food group in the FGP (Grains, Fruits, Vegetables, Dairy, Meat and Beans) for each week of the course. The three learning theories (cognitive, affective and psycho-motor) were considered during the development of the skeleton of the curriculum. The five days of instruction included a lecture day, art day, science/math day, cooking day and movie/game day. The first day of the week was designated to lecture on the specified food group, including examples of foods, health benefits and serving sizes. Lectures were designed to keep the attention of the students by having the students follow along with handouts and/or filling in notes and drawings during instruction. In addition to day one was the dedicated lecture day, shorter lectures were given prior to each activity throughout the week. These lectures were developed to satisfy the cognitive theory of learning by providing understanding of nutrition and food concepts through discovery.
The lectures influenced creativity in thinking by asking students to participate by answering questions on the topic, providing examples of foods, and filling in handouts.

Day two was designated as art day in the general outline of the course. Art day was designed to implement the specified topic of the week within creative projects, incorporating foods as decorative tools. The focus of art day was to implement the psycho-motor learning theory to help amplify the learning process. The ability to touch and feel the food items during art day that were discussed during the prior lecture would provide the students a second introduction to the topic. Day three was designated as science/math day where each week’s topic would be discussed in greater detail regarding the nature of foods and experiments. Day three was organized with the utilization of the cognitive and psycho-motor theories, implementing lectures that would allow students to discover as they learned as well as use concepts of induction, deduction and critical thinking. These concepts also flowed into lectures on calorie and nutrient calculations. Experiments allowed students to further understand the foods they wear exposed to.

Day four was dedicated to cooking. The foods emphasized during each week were used during cooking day to make healthy kid friendly meals. The psycho-motor theory was the primary focus of day four. Students were allowed to learn through imitation. Day five completed the learning experience by incorporating the affective learning theory. The last day of each week was either a movie or game day. Concepts taught throughout the week were used in different games to motivate students to learn. Students were also rewarded with a movie at the end of the week for participating throughout the week in activities. Movies were focused on the topic of the week. Physical activity in the form of a choreographed dance and song was incorporated throughout the weeks as breaks.
between learning. This further applied the affective theory by engaging the students in physical fun as a reward for completing the day’s work. The affective theory was also implemented throughout the curriculum by providing mind games after lectures to reinforce the material presented.

This general outline for the curriculum was applied to each week of the five week course, with minor differences. The designated activity days (lecture day, art day and science/math day) did not always occur on the assigned days (day one, day two and day three), however they did occur on one of the three days. The order of activities did correspond with the general outline, but due to time restraints activities were combined within a day when necessary. Other topics covered throughout the weeks included Kitchen Safety, Sanitation, and Menu Planning.

**Descriptive Analysis**

Students were given a pre-test during the first week of class, and a post-test that was taken in the last week of class (Appendix B). The pre- and post-tests consisted of the same questions for numbers one and two, and with a slight modification on question number three. Students were identified only by numbers on the pre- and post-tests, which were assigned by the investigators and kept confidential. The age of the students were also collected. The pre- and post-tests included questions to help identify students’ ability to differentiate foods based on the food’s role in the Food Guide Pyramid, along with their recommended serving sizes. The pre- and post-tests were based on a point system. The results of the pre- and post-tests were based on the first two questions. The last question from the post-test is used for descriptive purposes. The first question is comprised of six parts, each part worth four points. The second question is comprised of
five parts, each part worth one point. Part f (Fats, Oils and Sweets) of question two was excluded from the data, since the information was not included in the curriculum. The curriculum was developed to emphasize certain foods within each food group of the FGP throughout the five weeks of the course. Question one of the pre-and post-tests was also used to evaluate how well the students remembered the specific food items that were highlighted throughout each week.

The pre- and post-tests were used to evaluate the possible increase in nutrition knowledge of the overall group of students, as well as to see whether there is a difference in the increase of nutrition knowledge among 8-9 year olds compared to 10-11 year olds.
CHAPTER IV

RESULTS

Chapter IV presents the results and descriptive analysis of the data collected for this study. Please see Appendix C for the summaries of pre- and post-test results. The purpose of this study was to develop a pilot program that included nutrition lessons, physical activity and cooking sessions to provide a curriculum that will increase nutrition knowledge in students aged 8-11 years.

The results were collected from the two class sections to test nutrition knowledge by using the same questions in a pre-test and post-test. There were 42 students enrolled in the program; five students completed only the pre-test, three students completed only the post-test, and six students declined to take either the pre- or post-test. The data collected included the results for the 28 students who completed both tests. The age range of students was from 8-11 years old (8 years=2, 9 years=14, 10 years=5, and 11 years=7). The mean age of student participants was 9.5 years.

The values calculated in the pre- and post-test were used to compare children’s nutrition knowledge before and after the five-week program. The same two questions were used on the pre- and post-tests: Name four foods from each group in the Food Guide Pyramid and how many servings of each group from the Food Guide Pyramid should you eat each day. Question three in the post test was used for descriptive analysis. There was a maximum of 29 points possible for the pre and post test. Based on 28 students who completed the pre- and post-tests, the overall maximum points possible was 812. The students’ combined score was 544 for the pre-test and 632 for the post-test, with the difference of 88 points (Appendix D). This suggests a possible increase in nutrition
knowledge. Results showed a greater difference in the increase of nutrition knowledge in 8-9 year olds compared to 10-11 year olds. Students 8-9 years old had a combined score of 309 on the pre-test and a score of 369 on their post-test, giving a difference of 60 points (Appendix D). Students 10-11 years old had a combined score of 235 on the pre-test and a score of 263 on the post-test, giving a difference of 28 points (Appendix D). The results suggest that 8-9 year olds had a higher increase in nutrition knowledge compared to the 10-11 year olds.

To further understand the increase in nutrition knowledge, each part of the questions were evaluated separately. The results for question one showed the greatest difference between the pre and post test regarding the dairy group. This suggests a greater increase in nutrition knowledge regarding the ability to name four examples of foods in a specific food group of the FGP. The same trend in the dairy group can be seen in both the overall results as well as age specific results (Appendix C). Question one was also evaluated to see if students remembered specific food items presented throughout the curriculum. Foods specified during each week in the grains group showed up 17 more times in the post-test than the pre-test. Results for the other food groups were similar but not as large as the grain group: fruit group 6 more times, vegetable group 6 more times, dairy group 10 more times and meat and beans group 11 more times (Appendix D). In question two the greatest difference between the pre and post test was seen in the grains group. This can suggest a greater increase in nutrition knowledge of grains compared to the other food groups. Similar to question 1, question 2 showed the same trend in both the overall results as well as age specific results (Appendix C).
CHAPTER V
DISCUSSION

This project is a five-week curriculum of nutrition education for students aged 8-to-11, which includes nutrition education, physical activity, and cooking sessions. The purpose of this project was to create a pilot program that combines these components in order to provide students the tools to make healthy choices in order to improve their wellbeing. The same pre- and post-tests were administered to evaluate the effectiveness of the curriculum regarding students’ nutrition knowledge status. This project was successful in evaluating the effectiveness of the nutrition education component of the curriculum. The physical activity and cooking session components of the curriculum were not tested for, therefore conclusions regarding their impact on students’ knowledge cannot be made at this time.

Discussion of the Findings

An improvement is evident between the pre-test and post-test scores, which suggests an increase in nutrition knowledge after implementation of the curriculum. A greater difference between the pre and post test was seen in the 8-9 year olds compared to the 10-11 year olds. These results can imply that the curriculum was effective in increasing nutrition knowledge. More specifically, the curriculum was more effective for 8-9 year old students. The evaluations of questions one and two showed improvements in nutrition knowledge regarding the dairy and grain groups among all ages. Knowledge was most increased regarding the students’ ability to identify the different types of dairy, to recall specific foods in the grain group that were emphasized in the curriculum, and the
appropriate daily intake of foods in the grain group. This may imply that the lesson plans developed and presented for the dairy and grain weeks were most effective.

The effectiveness of this project is further supported by the commentaries of the students in question three of the post-test, which asked students to list two concepts they learned throughout the program. Comments included: “I learned how to make healthier choices when eating out”, “what tofu is”, “what lactose means”, “what serving sizes are”, “how to exercise”, “how to eat in moderation”, and “how to make cooking healthy foods fun and delicious” (Appendix C). Parents’ feedback was welcomed regarding the program at its finale during parents’ day. Comments from parents further supported the success of this project. For example, a parent stated that her son ate salad for the first time after being enrolled in the course. Another parent mentioned that her daughter started to pay attention to the portions of food on her plate, taking care to include healthier options.

Results of this pilot project help analyze the effectiveness of the lesson plans within the curriculum. The greater increase in knowledge regarding the dairy and grains groups suggests more effective and well-developed lesson plans during the dairy and grains weeks of instruction. Dairy week combined all three learning theories with the greatest emphasis on the psycho-motor theory. Day one combined lecture day with art day. The lecture differed from other weeks as it began with a hands-on activity. Students were asked to travel around the room to different posts, performing different physical activities along the way. At every post students answered questions regarding the dairy group (milk, cheese, yogurt). The team with the most correct answers would be the winners of the game. This activity combined the cognitive and affective theory, allowing
students to use their critical thinking skills as well as motivating them to complete the task. The day continued with a lecture on the topic. A distinct feature present in the dairy lecture was a video, which showed the process on a dairy farm, further utilizing the cognitive theory of learning by discovery. The psycho-motor theory was than implemented throughout art day and the rest of the week to reinforce the information taught. Students created their own milk cartons, evaluated dairy food labels (milk, cheese, yogurt) and experimented with dairy tasting (types of milk, cheese, yogurt). These activities allowed students to absorb the information they were exposed to throughout the week. These same food examples and information was utilized during cooking day where students made macaroni and cheese and frozen yogurt. The affective theory was utilized during the last week when students rewarded themselves to the frozen yogurt they made the day before along with a movie. The consistent exposure to the different types of dairy (milk, cheese, and yogurt) within the week may explain the high scores regarding the ability to identify different examples of dairy during the post-test.

Grains week incorporated all the learning theories with the greatest emphasis on the cognitive theory combined with the psycho-motor theory. The food samples (buckwheat, barley, oatmeal, cream of wheat, pasta and popcorn) in the grains group were emphasized most during the lesson plans for the grain week, incorporating them in the lectures, art activities, cooking day and movie day. The lecture on grains incorporated these foods as examples regarding health benefits as well as in serving sizes. These same foods were used as decorating tools during art day in the Pasta Face activity. They were also used as samples during the Grain Anatomy lecture. Furthermore, these samples were used during cooking day where students made oatmeal, cream of wheat, barley and
buckwheat pancakes, as well as during movie day where they made popcorn. Students were exposed to the same foods throughout the week, which may explain the greatest increase in knowledge regarding serving sizes and ability to recall specified foods during the post-test.

All lessons were developed with the goal to include all three theories for a well-rounded learning experience. The curriculum for the grains and dairy weeks differed from the rest in regards to the greater emphasis placed on the psycho-motor learning theory. All three theories were implemented and were necessary for instruction, but the ability for students to have physical exposure to the food items was greatest in the dairy and grain groups, which may be responsible for the greater increase in knowledge in the post-test. The curriculum for both days also differed in that they were the only two days to include a movie day rather than a game day as motivation to learn during the week, validating the effectiveness of the affective learning theory.

The impact of the curriculum in its entirety cannot be concluded at this time. There was an increase in nutrition knowledge in certain areas more than in others, suggesting the need for further evaluation of the curriculum. Students’ knowledge was tested based on the information presented during nutrition lessons and activities throughout the five weeks of the program. The physical activity and cooking session components of the curriculum were not tested. In addition, this curriculum was not evaluated before implementation. These are areas that should be addressed for future implementation of this pilot program.
Conclusion

The goal of the Healthy Eating Summer Camp graduate project was to develop a curriculum that included nutrition education, physical activity and cooking sessions to help educate students on the importance of healthy eating. The project was shown to be effective based on the positive results of the pre and post tests regarding an increase in students’ nutrition knowledge. Based on the results, lesson plans were most effective in increasing nutrition knowledge regarding the dairy and grain groups. In future implementation of this curriculum, lesson plans should be modeled after those taught during the dairy and grains weeks. The Healthy Eating Summer Camp program is a pilot project that set to evaluate a curriculum with three components: nutrition lessons, physical activity and cooking sessions. The physical activity and cooking session components were not tested for. Future implementation of the program with defined standards and evaluations for all three components should be conducted in order to assess the effectiveness of the curriculum in its entirety.
REFERENCE


APPENDIX A
Human Subjects Protocol Form

HUMAN SUBJECTS PROTOCOL APPROVAL FORM
CALIFORNIA STATE UNIVERSITY, NORTHridge

This Protocol Approval Form must be completed for all California State University, Northridge faculty and student research which involves human subjects. Additional material(s), as described below, must be attached to this form at the time it is submitted to the Standing Advisory Committee for the Protection of Human Subjects (SACHSIS) in the Office of Research and Sponsored Projects (UHR 265, ext. 2901). In ALL cases, RESEARCH MAY NOT PROCEED until authorized by the Committee. You will be notified of the action of the Committee following the receipt of an original and nine copies of this form and all required supplementary information (see below) in the Office of Research and Sponsored Projects.

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION.

Brief, excepted definitions and guidelines regarding research involving human subjects appear on the attached instructions. For a copy of complete regulations, contact the Office of Research and Sponsored Projects. Read all instructions before completing the form. ONLY TYPEWRITTEN FORMS WILL BE ACCEPTED.

1. Title of research Healthy Eating Summer Camp for Kids

2. Name of researcher(s) Karen Ossepyan & Anet Piridzhanyan
   Consumer Sciences

3. Address P.O. Box 1851, Glendale, CA, 91209
   Home phone 818-631-3300
   Email Address karen_ossepyan@yahoo.com

4. Name of Faculty Advisor Nidarme Little, MS, RD
   Faculty Advisor ext. 3124

5. Period of Project (see pg. 1-Itemized Instructions) From June 28, 2010 To July 30, 2010

6. Check one: Faculty Research ☒ Student thesis ☐ Other (specify) ☐
   Course prefix and number ☐ Course title ☐

7. Check one: ☐ Unfunded ☒ Funded $900.00 - SAPESS Date (to be submitted)

8. History of Protocol: ☒ New ☐ Renewal Approval Date ☐

9. Does this protocol contain modification(s) from a previously approved protocol? ☐ Yes (explain) ☐ No ☐ N/A

10. Special procedures: (give detailed description on separate sheet)
    ☐ Radioactive materials ☐ Drug(s), Specify:

11. Is a Subject Bill of Rights attached? ☒ Yes ☐ No

12. Are copies of any questionnaire(s), survey instrument(s) and/or interview schedule(s) referred to in this protocol statement attached? ☒ Yes ☐ No

13. Is draft informed consent form(s) attached? ☐ Yes ☒ No
    14. Is a letter of permission attached? ☐ Yes ☐ No

15. SIGNATURES: Refer to page 1, General Instructions, before signing.

   Signature of Faculty Researcher or Student Advisor Date

FOR SACCHS AND RESEARCH OFFICE USE ONLY

☐ Exempt, exempt approval, standard risk ☐ Not exempt, approved, new, review
☐ See attached memo
☐ Not approved, see attached memo

Chair, SACCHS Date
   (or Director, RSCH)
   (date received)

Revised 2/98
SAPESS HEALTHY Eating Camp PRE-TEST

Number: ___________________  Age: __________

Grade completed: __________

1. Name 4 foods from each group in the Food guide Pyramid:
   a. Breads, Grains, Cereals
   b. Fruits
   c. Vegetables
   d. Dairy
   e. Meats and Beans
   f. Fats, Oils and Sweets

2. How many servings of each group from the Food Guide Pyramid should you eat each day:
   a. Breads, Grains, Cereals
   b. Fruits
c. Vegetables

d. Dairy:

e. Meats and Beans

f. Fats, Oils and Sweets

3. Write down two things that you would like to learn in this class.

a.____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

b.____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
SAPESS HEALTHY Eating Camp POST-TEST

Number: __________________________ Age: ______________

Grade completed: ______________

1. Name 4 foods from each group in the Food guide Pyramid:

a. Breads, Grains, Cereals

b. Fruits

c. Vegetables

d. Dairy

e. Meats and Beans

f. Fats, Oils and Sweets

2. How many servings of each group from the Food Guide Pyramid should you eat each day:

a. Breads, Grains, Cereals

b. Fruits

c. Vegetables
d. Dairy:

e. Meats and Beans

f. Fats, Oils and Sweets

3. Write down two things that you learned in this class.

a. ________________________________________________________________
   ________________________________________________________________

b. ________________________________________________________________
   ________________________________________________________________
APPENDIX C
Pre-Test/Post-Test Summary Sheets

QUESTION 1: Name four foods from each group in the Food Guide Pyramid.

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<th>Difference</th>
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<td>Meat &amp; Beans</td>
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<td>Fats, oils &amp; Sugar</td>
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<th>Difference</th>
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<td>Vegetables</td>
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<td>Dairy</td>
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<td>10</td>
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<tr>
<td>Meat &amp; Beans</td>
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</tr>
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<td>Fats, oils &amp; Sugar</td>
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<th>Difference</th>
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<td>Fats, oils &amp; Sugar</td>
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QUESTION 2: How many servings of each group from the Food Guide Pyramid should you eat each day?

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<th>Pre-Test</th>
<th>Post-Test</th>
<th>Difference</th>
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<td>Vegetables</td>
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<td>Dairy</td>
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<td></td>
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<th>Post-Test</th>
<th>Difference</th>
</tr>
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<tr>
<td>Fruits</td>
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<tr>
<td>Dairy</td>
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<tr>
<td>Fruits</td>
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<td>7</td>
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<tr>
<td>Vegetables</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Dairy</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td></td>
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<tr>
<td>Meat &amp; Beans</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Question 3: Write down two things that you learned in this class (Post-test only)

I learned the serving size of a plate, I learned how to make food healthy, how to make a salad healthier, how to eat healthy, how to exercise, I learned that things with seeds are fruits, you should not have too much dairy, one thing I learned in class is that you should have food in moderation, I also learned you have to exercise 30 min or an hour each day, I learned what jicama is, I learned what quince is, you shouldn’t have a lot of fats, oils and sweets, you should have 2 cups of fruit a day, I learned to make healthy choices when eating, I leaned you can grow lentils without dirt, I learned when you eat chicken it is better to eat it boneless or skinless, I learned that you should have ½ a plate of veggies, ¼ meat and beans, and ¼ grains, I learned how much fat was in a hamburger, I learned fish is a better source of protein than beef or pork because fish has unsaturated fat, many foods have lots of fat even healthy things, you need to make good choices, fruits have natural sweets, a tomato is a fruit, I have learned how much to eat of everything, I have also learned how to bake a couple of things, the different groups in the food guide pyramid, how to read the nutrition label, what type of beans there are, eat from every food group in a day, what lactose means, that eggs are part of the meats & beans group.
### APPENDIX D

#### Tables

**Table 1**  
*Overall Pre-test/Post-test Scores for Students*

<table>
<thead>
<tr>
<th>Subject Number</th>
<th>Age</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Difference</th>
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Table 2

*Overall Pre-test/Post-test Scores for 8-9 Year Olds*

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<td>309</td>
<td>369</td>
<td>60</td>
</tr>
</tbody>
</table>
Table 3
*Overall Pre-test/Post-test Scores for 10-11 Year Olds*

<table>
<thead>
<tr>
<th>Subject Number</th>
<th>Age</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>11</td>
<td>22</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>11</td>
<td>19</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>18</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>21</td>
<td>17</td>
<td>-4</td>
</tr>
<tr>
<td>13</td>
<td>11</td>
<td>19</td>
<td>18</td>
<td>-1</td>
</tr>
<tr>
<td>22</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>26</td>
<td>10</td>
<td>20</td>
<td>23</td>
<td>3</td>
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<td>31</td>
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<td>22</td>
<td>22</td>
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<tr>
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<td>11</td>
<td>21</td>
<td>20</td>
<td>-1</td>
</tr>
<tr>
<td>39</td>
<td>10</td>
<td>22</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>42</td>
<td>10</td>
<td>20</td>
<td>26</td>
<td>6</td>
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<tr>
<td>43</td>
<td>10</td>
<td>16</td>
<td>23</td>
<td>7</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>235</td>
<td>263</td>
<td>28</td>
</tr>
</tbody>
</table>
Table 4

Occurrence of Specified Food Items in Pre-test/Post-test

<table>
<thead>
<tr>
<th></th>
<th>Grains (Week 1)</th>
<th>Fruits (Week 2)</th>
<th>Vegetables (Week 3)</th>
<th>Dairy (Week 4)</th>
<th>Meats &amp; Beans (Week 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barely, buckwheat,</td>
<td>Tomato, avocado, quince, squash,</td>
<td>Bok choy, jicama, beets, fennel,</td>
<td>Yogurt, frozen yogurt, soy milk</td>
<td>Eggs, fish, tofu, beans &amp; nuts</td>
<td></td>
</tr>
<tr>
<td>cream of wheat,</td>
<td>starfruit &amp; guava</td>
<td>radish, zucchini, leek, artichoke,</td>
<td>&amp; lactose free milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>oatmeal, popcorn &amp;</td>
<td></td>
<td>arugala &amp; rhubarb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pasta</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occurrence of</td>
<td>27</td>
<td>3</td>
<td>8</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>answers in pre-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occurrence of</td>
<td>44</td>
<td>9</td>
<td>14</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>answers in post-test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>17</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

The occurrence of the specific foods emphasized in each week's lesson plans.