

CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

DEVELOPING A NUTRITION EDUCATION WEBSITE TO INCREASE
NUTRITION KNOWLEDGE AND IMPROVE DIETARY BEHAVIORS AMONG
CALIFORNIA STATE UNIVERSITY, NORTHRIDGE STUDENTS

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

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DEDICATION

To my parents, who taught me to always try my best in everything I do. Thank you for believing in me and supporting me every step of the way. To my father, who is always in my thoughts, I know you would be so proud!

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ABSTRACT

DEVELOPING A NUTRITION EDUCATION WEBSITE TO INCREASE NUTRITION KNOWLEDGE AND IMPROVE DIETARY BEHAVIORS AMONG CALIFORNIA STATE UNIVERSITY, NORTHRIDGE STUDENTS

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Prior research indicates that college students have a lack of knowledge regarding proper nutrition and have been shown to have undesirable nutrition behaviors (Kolodinsky, Harvey-Berino, Berlin, Johnson, & Reynolds, 2007). However, consuming a diet that meets college students' nutritional needs, among other factors, plays a significant role in optimizing academic and athletic performance and reducing risk of chronic disease (Brunt & Rhee, 2008; Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). Furthermore, educating college students about nutrition has been shown to improve dietary behaviors (Kolodinsky et al., 2007). Therefore, the current graduate project aimed to develop a personalized nutrition education website for California State University, Northridge (CSUN) students. The content of the website targeted three distinct student groups, including 1) students under stress, 2) student athletes, 3) students with children. Members of each group completed a survey inquiring about their specific nutritional interests and needs. Results of the surveys indicated that most respondents from all three groups use the Internet for nutrition education, are interested in increasing vegetable intake, and would like to learn more about healthy snacks and eating healthy on a budget.

CHAPTER I

INTRODUCTION

Prior research studies report poor nutrition habits among a range of university students, which may increase their risk for becoming overweight, obese, and developing long-term health conditions (Brunt & Rhee, 2008; Racette et al., 2005). These effects may negatively impact academic performance and levels of energy for participating in extracurricular and exercise activities. As cited in Cousineau, Franko, Ciccazzo, Goldstein, and Rosenthal (2006), college students have a tendency to skip meals, engage in unhealthy dieting, consume a large amount of fast foods, and consume minimal amounts of dairy products, fruits, and vegetables. These behaviors are largely due to lack of time and space available for meal preparation when confined to a dorm, shared housing, or apartment (Dunn, Turner, & Denny, 2007). Other factors contributing to poor intake include financial issues and misconceptions about healthy eating behaviors (Shive & Morris, 2006). According to the National Center for Education Statistics (NCES), roughly 21 million (41%) 18-24 year old students in the U.S. enrolled in degree-granting institutions in 2010 (NCES, 2014), therefore, a large number of students in this population may be potentially at risk.

Research shows that many college students are not well educated about healthy eating and may not be aware of the long-term consequences associated with a poor diet (Kolodinsky et al., 2007). In fact, one study showed that college students whose mothers did not educate them about nutrition as children had worse eating habits than students who received nutrition education (Unusan, 2005). Promoting health by educating students can have a positive effect on dietary and physical activity behaviors (Dinger, 1999). Both

athletes and non-athletes may require assistance in selecting healthy foods (Dunn, Turner, & Denny, 2007), especially since many athletes have unique nutrient needs.

Because of today's technology, students have access to an abundance of resources including nutrition-based websites, workshops, clubs, media, and social media.

Influencing students to use the nutrition-related resources available to them and to decipher which resources are accurate, are issues of concern. Encouraging students to become educated about nutrition and providing them with accurate information could increase their probability of following current nutrition recommendations and using valuable resources.

Computer-based nutrition education has been shown to have positive outcomes on nutrition knowledge and dietary behaviors (Oenema, Brug, & Lechner, 2001). Oenema and colleagues found significant improvements in dietary intake and motivation to improve intake in participants of their web-based personalized education intervention group compared to participants of the control group (Oenema et al., 2001). Similarly, in 2008, Franko et al. revealed that participants of their web-based nutrition education intervention groups improved in nutrition knowledge, intake of fruits and vegetables, and willingness to make dietary behavior changes compared to the control group (Franko et al., 2008). In a systematic review of web-based tailored nutrition and physical activity education studies, 3 out of 11 physical activity studies and 20 of 26 nutrition studies showed significant positive effects of tailored interventions compared with non-tailored interventions and control groups (Kroeze, Werkman, & Brug, 2006). The most consistent results among the studies were found between personalized web-based interventions and reduction in fat intake among participants (Kroeze et al., 2006).

Purpose

The purpose of this project is to develop a personalized nutrition education website for students at CSUN based on students' individualized needs. The website will focus on three major categories of students, 1) nutrition for students under stress, 2) nutrition for student athletes, and 3) nutrition for students with children. The website will assist in improving nutrition knowledge and nutrition behavior among CSUN students. It will also provide students with useful nutrition-related resources within the community. The information will be readily available for all students, faculty, coaches, and athletic trainers to use as a source for nutrition education. Personalizing the nutrition-based website can be used to help build a foundation for healthy eating habits.

Definitions

1. Nutrition - the intake of food, considered in relation to the body's dietary needs
[World Health Organization (WHO), 2014]
2. Body Mass Index (BMI) – Method for determining a person's weight status by calculating weight in kilograms divided by height in meters squared:
$$\text{BMI} = \text{weight (kg)} / [\text{height (m)}]^2$$

BMI is calculated the same for both adults and children but interpreted differently (Centers for Disease Control and Prevention [CDC], 2011).
3. Overweight and obesity – abnormal or excessive fat accumulation that may impair health, (WHO, 2014).
 - a. Underweight – BMI less than 18.5 (adults age 20 years or older).
 - b. Normal weight – BMI between 18.5 and 24.9 (adults age 20 years or older).

- c. Overweight – body mass index (BMI) greater than or equal to 25 (adults age 20 years or older).
 - d. Obesity – BMI greater than or equal to 30 (adults age 20 years or older).
4. College student – a student enrolled in a college or university, usually between the ages of 18-24 years old.
5. Macronutrient: a substance required in large amounts in the body for growth and health, including carbohydrates, protein, and fats (Merriam-Webster, 2014)
6. Micronutrient: a substance required in small amounts in the body including vitamins and minerals (Merriam-Webster, 2014)
7. Low-income student: student whose family's household taxable income for the preceding year did not exceed 150% of the poverty level amount (U.S. Department of Education).
8. Tailored materials – intended to reach one particular person, related to the product of interest, based on characteristics that are distinctive to that person, and are a derivative from an individual evaluation (Kreuter, Stretcher, & Glassman, 1999, p. 276).

Assumptions

The needs assessment for this nutrition education website project was created based upon the following assumptions:

- Participants (members of the CSUN Children's Center, student athletes, and members of the Student Health Center) were representative of the majority of students attending CSUN.

- Participants can read and understand English and understood the questions asked on the surveys.
- Participants answered the survey questions honestly and completely.
- Participants gave honest feedback on the type of information they believe should be included on the nutrition website.
- The possible answers to the survey questions were not biased and pertained to the type of students responding to the questions.
- There were no errors made on the surveys distributed to participants.
- There were no errors made in the data analysis of the surveys.

Limitations

This project will contribute to giving CSUN students a website to find nutrition information and resources to better their health and well-being. However, certain limitations do exist:

- The sample size of students was relatively small, including a total of 160 students [Student Health Center (n=109), Children's Center (n=50), and student athletes (n=11)].
- The nutrition website only focuses on college students at CSUN. Therefore, the website may not represent the needs of all college students.
- The content of the website was suggested for only three groups of students: members of the CSUN Children's Center, Student Health Center email list, and student athletes. Therefore, the content may not be specific to all students.

- The nutrition website is only useful for individuals who are able to read and understand English.
- The website includes various resources, which may not be useful for all CSUN students.
- The website content was only evaluated by the committee members and CSUN dietetic intern.
- Student Health Center survey results were tabulated by a member of the Student Health Center using a different software program than the Children's Center and student athlete surveys, which may have caused differences among results.
- All 3 groups received different questions and possible answers on the surveys. Therefore, not all of the responses may represent all three groups of students.
- Students were able to choose more than one answer for most questions. Therefore, responses may not have been representative of their first choice for each question.
- The possible answers to questions were different for each survey based on assumptions of what typical students in each group may have chosen. Therefore the answers may have been biased and may not have represented all possible answers to questions.
- Some students did not answer all of the questions on the surveys. Therefore, the response percentages for each question may not represent the entire sample size for each survey.

CHAPTER II

REVIEW OF LITERATURE

Profile of Students at CSU, Northridge

Demographic Information

In Fall 2011 at California State University, Northridge (CSUN), 77.8% of students who enrolled as freshman were 18 years of age or younger (Huber, 2012), suggesting many would live independently for the first time. Also, the number of CSUN students who were first-generation college students increased to 45% due to the increasing amount of parents with no more than a high school education. Sixty-four percent of CSUN students came from families with a combined income of less than \$50,000, making it more difficult to pay for college, living expenses, and healthy foods. In Fall 2006, the number of students stemming from Hispanic backgrounds at CSUN was 27.7% (Huber, 2007). Having a Latino background has been associated with overweight and obesity (O'Brien, Davey, Alos, & Whitaker, 2013).

Health Behaviors

Data from the Spring 2013 American College Health Association National Health Assessment II (ACHA-NCHA II) survey reported that 59.7% of CSUN students regularly consumed 1-2 fruits and vegetables per day, 26% consumed 3-4 per day and only 6.7% consumed the recommended 5 or more servings per day (ACHA-NCHA II, 2013). In addition, only 43.9% of CSUN students met the American College of Sports Medicine and American Heart Association's guidelines for moderate-intensity, vigorous-intensity exercise, or a combination of the two. In regards to body weight measured by body mass index (BMI), 5.4% of CSUN students were considered to be underweight, 57% were a healthy weight, 22.4% were overweight, and 5.3% were considered obese (ACHA-

NCHA II, 2013). This data shows that a significant amount of CSUN students are not meeting the recommended guidelines for diet and physical activity, which makes them suitable candidates for web-based nutrition intervention.

Use of Technology

In a 2011 survey conducted by the CSUN Office of Institutional Research, freshman students reported that during their senior year of high school, about 79% of students used the Internet for homework or research and 25% spent more than 6 hours per week using online social media (Huber, 2012). This data illustrates that the majority of CSUN students are expected to use the Internet for both educational and leisurely activities and may be more likely to visit a nutrition education website versus reading a pamphlet or brochure containing the same information. Presently, CSUN does not have a portion of their website dedicated to nutrition education. A personalized nutrition education website would be a convenient resource for CSUN students that could be easily updated with current information as needed.

Dietary Behaviors and Nutrition Knowledge Among College Students

Dietary Behaviors

Research has shown that healthy dietary patterns decline when college students live independently of their parents (Brunt & Rhee, 2008). It is also known that healthy lifestyle habits that are established during the transitional years (18-24 years of age) may have a lasting impact on future health and wellbeing (Brunt & Rhee, 2008). In spring 2013, the American College Health Association National College Health Assessment II (ACHA-NCHA II) surveyed 96,911 undergraduate students from 153 college campuses across the U.S (ACHA, 2013). The nutrition-related findings revealed that 6.6% of

students reported consuming 0 servings of vegetables per day, 60.1% report consuming 1-2 servings, 27.7% report consuming 3-4 servings, and 5.6% report consuming 5 or more servings of vegetables per day. The reported intake was similar for male and female students. Furthermore, the results showed that 5.3% were considered underweight, 61% were considered to be at a healthy weight, 21.7% overweight, and 12% were considered to be obese (ACHA, 2013). These results support the idea that overall, college students tend to fall short of nutrient intake recommendations and are prone to weight gain.

A study conducted by Brunt and Rhee (2008) revealed that students who live on campus have healthier eating behaviors than students who live off-campus or with their parents. They believe this is attributed to the availability of nutrition information and wide variety of foods, especially fruits and vegetables available in college dining halls. They also found that students living off campus consumed a greater amount of alcohol than students living with parents or on campus (Brunt & Rhee, 2008). These research findings suggest that students living on campus have the potential to eat healthier due to the access to healthy foods, set costs, and little to no preparation required. However, not all students take advantage of these factors and often choose convenient foods from fast food restaurants both on and off campus. Also, many dining halls offer buffet style dining making it easy for students to overeat. Students who live off-campus have the extra responsibility of purchasing foods and preparing meals and should be educated on healthier options.

College athletes have been shown to consume less than optimal diets for optimal athletic performance (Hinton et al., 2004). At the collegiate level, athletes usually become more competitive and may feel it is necessary improve performance by altering

their body weight or diet. Athletes at high risk for unhealthy weight change are those in sports with an emphasis on weight class or leanness such as gymnastics, wrestling, and track and field. These athletes have been known to restrict overall calories, specific macronutrients, and fluids to control their weight. Additionally, college athletes have been known to take various types of supplements that may have an effect on weight gain or loss, muscle building, strength, endurance, and energy levels (Hinton et al., 2004). Different dietary behaviors have been observed as well as different nutrient needs among endurance and non-endurance sports.

One study measured the dietary intakes of 345 male and female athletes from various sports teams at a university (Hinton et al., 2004). The researchers found that the female athletes in light to moderate activity sports had energy intakes at the recommended levels but male athletes had energy intakes below the recommendations by an average of 400 calories. The intake of carbohydrates and protein were below the recommended amounts used in the study for both male and female athletes (6 to 10 grams of carbohydrate per kilogram of body weight and 1.2 to 1.7 grams of protein per kilogram of body weight). Carbohydrates are the most important macronutrient for athletes' energy and replenishing glycogen stores. However, only 10% of male athletes and 19% of female athletes consumed the recommended minimum amount of carbohydrate in this study. Male athletes also consumed a higher percentage of calories from fat, saturated fat, cholesterol, and sodium than female athletes. Most of the female athletes reported wanting to lose at least 5 pounds of body weight while the male athletes reported higher use of dietary supplements for weight control (gain or loss), especially for weight gain. In addition, 6% of the male athletes, who belonged to the university

wrestling team, reported a restriction of fluid intake for weight control. Athletes who reported a desire to lose weight were more likely to restrict intake of carbohydrates and fat than those who desired to maintain their weight (Hinton et al., 2004). The results of this study exemplify the importance of nutrition intervention in college athletes for healthy weight control and to reduce the health risks associated with certain diet restrictions and supplements. The nutrition education website will include information regarding sports nutrition and eating disorders for those athlete who need more information on these topics.

Nutrition Knowledge

Studies show that many college students fail to meet physical activity and dietary recommendations (ACHA, 2013; Dinger, 1999; Franko et al., 2008). According to the 2013 CSUN ACHA survey, only 43.9% of students met weekly recommendations for physical activity (Huber, 2012). In 1999, Dinger assessed the dietary intake and physical activity among 743 college students residing in residence halls and sorority and fraternity housing (Dinger, 1999). Several students received nutrition and physical activity information before the study and several other students living in residence halls were members of the university's Residence Hall Wellness Center (RHWC). The findings were compared to the present-day public health recommendations and national data from the Centers for Disease Control of 1997. The results showed that none of the groups met the recommendations for vigorous and moderate exercise. Males participated in more vigorous exercise and consumed more servings of high fat foods than females. Students who did not receive nutrition information and were not members of the RHWC consumed more servings of high fat foods. The intake of fruit, juice, and vegetables did

not differ between any of the groups and was below the recommendation of 5 per day at only 2.9 average servings. Only the students who received prior nutrition and exercise information and those who were members of the RHWC met the recommendations for muscular strength and endurance (Dinger, 1999). The results of this study suggest that disseminating health information to students can have a positive effect on dietary and physical activity behaviors (Dinger, 1999).

A lack of proper nutrition can have a negative impact on athletic performance. Most college athletes receive some nutrition education from coaches or athletic trainers and many have been participating in sports for many of their adolescent years. However, the information athletes receive is not always accurate and may be hindering them from optimizing athletic performance.

Athletes' eating behaviors is related to their knowledge of nutrition and their attitudes towards nutrition become more positive as their knowledge increases (Dunn et al., 2007). Research has shown that athletes lack nutrition knowledge and have a poor understanding of the relationship between diet and disease. Results of a study assessing 190 student athletes' nutrition knowledge, food choices, expert recommendations of food group intake, and the relationship between nutrition and disease revealed that most students had positive outlooks about dietary behaviors but lacked nutrition knowledge. The study included male and female athletes from several different sports teams with the exception of the gymnastics team due to disordered eating behaviors. The study revealed that, 76.1% athletes agreed that it is beneficial to increase fruit, vegetable, and fiber intake but only 35% of students knew the recommended daily servings for fruits and vegetables and were aware of the health risks linked to low fruit, vegetable, and fiber

intake. Most were able to identify foods with a high fat content but could not distinguish between different types of fats. Also, 53% of the athletes falsely believed that they should decrease their carbohydrate intake and 56% believed that the current amount of meat that Americans consume is the recommended amount. When asked to select the best food for meals low in fat and salt and high in fiber, the majority of the athletes chose incorrectly (Dunn et al., 2007).

The results of the study exemplify the lack of basic nutrition education among student athletes. Providing student athletes access to accurate and current information from nutrition professionals, such as the nutrition education website, may help to improve their athletic performance.

Effect of Nutrition Knowledge on Nutrition Behavior

Nutrition knowledge and behavior vary among college students due to factors such as family eating habits. Family often has the greatest influence on adolescent's health behaviors, especially their eating habits (Unusan, 2005). A study conducted in Turkey showed that children whose parents offered them nutrition education and healthy foods had more nutrition knowledge and healthier diets as adults. Researchers compared the current diets of 684 university students to their diets as children and to their mothers' diets. They found a significant relationship between adolescents being picky eaters and mothers' education levels and related students making healthy food choices with mothers talking to them about nutrition (Unusan, 2005). Therefore, it is important to educate children about nutrition at an early age to positively impact nutrition behavior throughout adulthood. It may be especially important for college students with children to learn

healthy eating habits, as their dietary habits may also reflect on the dietary behaviors of their children.

A study involving the eating patterns of 200 college students found that healthier food choices are related to nutrition knowledge (Kolodinsky et al., 2007). They related students' food choices with their nutrition knowledge to determine how well they followed the Dietary Guidelines for Americans 2005 by using questions from the USDA Diet and Health Knowledge Survey. In addition to information about their diet and exercise habits, students were asked a series of nutrition knowledge questions pertaining to recommendations such as types of fats, added sugars, fiber, importance of consuming a variety of fruits and vegetables, and importance of sustaining a healthy weight. Significant differences were found between nutrition knowledge and greater intakes of dairy, fruits, whole grains, and protein to meet dietary recommendations (Kolodinsky et al., 2007).

Relationship Between Stress and Nutrition Behaviors

The relationship between stress and weight gain has been well researched. In a study conducted by Kandiah et al., researchers found many students used food as a coping strategy throughout the semester, which often leads to poor eating habits (Kandiah, Yake, Jones, & Meyer, 2005). When asking female students the question, "Do you experience a change in appetite when stressed?" 81% answered yes, and 63% of those students reported an increase in appetite when stressed (Kandiah et al., 2005, p. 121). Researchers observed stress-induced eating habits such as an increase in consumption of high fat and sweet foods. Most students experience stress throughout

their academic career so it is important to learn how to nourish their bodies with healthy foods to protect the immune system and maintain energy levels throughout the semester.

A study conducted in the United Kingdom compared students' stress levels to their weight change and health behaviors during their first year attending a university (Serlachius, Hamer, & Wardle, 2007). Students reported if they experienced a change in weight since starting at the university and were asked to report and rank all stress-related events that occurred in the past 2 weeks. Researchers found that stress frequency and severity was significantly higher among students who gained weight (55%) and lost weight (12%) than students who remained the same weight (33%) ($p < 0.001$). Overall, 268 students at the university gained an average of 1.53 kilograms (3.36 pounds, $p < 0.001$) by the end of their freshman year. Students who reported frequent snacking at the university also reported higher weight gain. Behaviors that are often affected by stress, such as sleep, alcohol intake, and exercise significantly changed after enrolling at the university. Although they were not able to directly relate the change in weight to stress, researchers found a strong association between stress and weight change, especially among women (Serlachius et al., 2007).

The 2013 CSUN National College Health Assessment shows evidence of stress among CSUN students, since many students reported feeling overwhelmed (82.7%) or felt overwhelming anxiety (50%) at least once during the last 12 months. Because the relationship between stress and nutrition are well documented and stress is evident among CSUN students, these topics will be addressed within the contents of the website.

Consequences of Poor Dietary Intake

Studies show that dietary habits worsen throughout the college years (Grace, 1997). It is also known that healthy lifestyle habits that are established during the transitional years (18-24 years of age) may have a lasting impact on future health and wellbeing (Brunt & Rhee, 2008). Poor dietary behavior can lead to nutrient deficiencies, overweight and obesity, increased risk for chronic degenerative diseases, and reduced academic and athletic performance.

Nutrient Deficiencies

Poor eating habits and disordered eating can lead to nutrient deficiencies among college students. A study examining dietary intake and behaviors of 918 students at a university in Spain revealed that overall, students consumed lower than recommended intakes of magnesium, iron, zinc and higher than recommended intakes of fat and protein (Soriano, Molto, & Manes, 2000). Burke et al. found that overall, female students at the University of New Hampshire did not meet the recommended intakes for vitamin D, calcium, potassium, iron, and folate and the majority of males did not meet folate or potassium recommendations (Burke, Reilly, Morrell, & Lofgren, 2009). Both men and women in the study consumed excessive amount of sodium (Burke et al., 2009).

College athletes are at a high risk of developing nutrient deficiencies due to having higher nutrient demands (Hinton, Sanford, Davidson, Yakushko, & Beck, 2004). When assessing nutrient intakes of college athletes, Hinton et al., 2004 found that in general, female athletes exceeded micronutrient recommendations while male athletes did not meet micronutrient recommendations. However, low nutrient intakes have been associated with female athletes who participate in sports that promote leanness. The

nutrient intakes that were predominantly inadequate for male and female athletes in this study were zinc, magnesium, folate, and vitamin E (Hinton et al., 2004). Nutrient deficiencies leave students at risk for poor bone health, cardiovascular disease, and increased risk for neural tube defects during pregnancy. (Burke et al., 2009).

Overweight & Obesity

According to data from the 2009-2010 National Health and Nutrition Examination Survey, 35.7% of adults above age 20 in the U.S. were obese and 16.9% of adolescents aged 2-19 were obese (Ogden, Carroll, Kit, & Flegal, 2012). In 2006, the California Center for Public Health Advocacy (CCHPA) reported that California spends roughly \$21 billion and \$20.2 billion dollars annually on the consequences of obesity (CCHPA, 2006), which is more than any other state in the U.S. (CCPHA, 2011). Of the \$41.2 billion dollars spent, \$11.8 billion dollars are spent in Los Angeles County alone, more than any other county in the state (CCHPA, 2006). Also, the rates of childhood obesity in Latinos are higher than any other ethnicity in California at 46.2%. CSUN may be at high risk, as it is located in Los Angeles County and reports that over 50% of their students are Hispanic.

Obesity is most often caused by poor diet and a lack of exercise but can also be caused by factors in the environment, health conditions, and genetic factors. Obesity is partially due to the amount of high calorie foods available and the lack of nutrition education in the community. In 2007, a report showed that there were over 4 times as many convenience stores and fast food restaurants compared to produce vendors and supermarkets in Los Angeles County making it convenient to shop for high fat foods and less nutrient dense foods (CCPHA, 2007).

College-aged students are at risk for obesity due to their dietary behaviors and lack of physical activity (Racette et al., 2005). A study assessing weight changes, exercise, and dietary patterns in 764 university freshman and sophomore students found that about 70% of the students gained an average of 9 pounds during their first 2 years of college ($p < .001$), about 50% engaged in regular aerobic exercise, and 30% did not regularly participate in any physical activity. Greater than 50% of students reported eating foods high in fat or fast foods 3 times or more during the previous week and only 30% met the daily fruit and vegetable recommendations of 5 servings per day (Racette et al., 2005). These findings illustrate that early intervention by promoting healthy dietary behavior and physical activity among college students is crucial to prevent weight gain, which may have lasting benefits throughout adulthood.

Risk of Developing Chronic Degenerative Disease

Overweight and obesity are associated with numerous chronic diseases, such as type 2 diabetes, high blood pressure, coronary heart disease, high cholesterol, stroke, osteoarthritis, gallbladder disease, sleep apnea, and certain types of cancers (CCPHA, 2011). An unhealthy college lifestyle can lead to a lifelong pattern of poor eating habits and lack of physical inactivity leading to obesity and its comorbidities (Brunt & Rhee, 2008). Specifically among college athletes, long-term consequences from poor diet choices have been linked to poor reproductive and bone health (Dunn et al, 2007).

The prevalence of metabolic syndrome has also increased in the college-age population with the coexisting rise in obesity (Morrell, Lofgren, Burke, & Reilly, 2012). As cited in Morrell et al., data from the 2003-2006 NHANES National Health and Nutrition Examination Survey (NHANES) shows that roughly 34% of adults were at risk

for metabolic syndrome and males have a high risk of developing metabolic syndrome than females. Metabolic syndrome can be characterized by having a cluster of symptoms related to obesity that increase the risk of developing diabetes and cardiovascular disease, including abdominal obesity, low high-density lipoprotein (HDL) cholesterol, elevated fasting glucose, elevated triacylglycerides, and elevated blood pressure. Morrell and colleagues investigated the risk of metabolic syndrome of 18 to 24 year olds attending the University of New Hampshire (UNH) from 2005 to 2008. Researchers found that almost half of the men (46.9%) and over a quarter of the women (27.2%) were overweight or obese; roughly a quarter of men (24.7%) and women (25.8%) had elevated levels of total cholesterol; and roughly a quarter of men (30.6%) and women (23.7%) had low high-density lipoprotein (HDL) cholesterol. The overall findings of the study showed that 10% of men and 3% of women attending UNH had at least 1 of the risk factors for metabolic syndrome (Morrell et al., 2012).

The prevalence of diabetes in Mexican-American adults is almost twice as high as whites (O'Brien et al., 2013) and Latino women (Latinas) have the highest risk of developing diabetes within their lifetime compared to any other demographic group (Narayan, Boyle, Thompson, Sorensen, & Williamson, 2003). In California, there are approximately 7 million Latinas (Latino women). A study comparing behaviors associated with diabetes in 21,112 non-Latinas and 4,321 Latinas living in California revealed that Latinas were younger, had lower income, were less educated, and reported poorer health than non-Latinas. Latinas were also more likely to consume fried potatoes, sugar-sweetened beverages, and most of all fast food ($p < 0.001$) (O'Brien et al., 2013). These eating behaviors reflect the large percentage of Latinos who are reportedly

overweight. The results of this study may be generalizable to the high percentage of Latinos attending CSUN.

Effects to Academic Achievement

Adequate nutrition is vital for academic performance (Gutierrez, Benna, Fernandez, Shanah, & Cruz, 2013). Poor dietary intake has a negative effect on brain function and may disrupt learning, and impair memory and abstract reasoning. As cited in Gutierrez et al., 2013, several studies have shown positive relationships between healthy eating and academic achievement, such as higher grade point average. Gutierrez and colleagues found a correlation between greater nutrition knowledge, higher learning scores, and better performance on a verbal learning and memory test, (Gutierrez et al., 2013).

Effects to Sport Performance

It seems that one of the greatest barriers to meeting recommended nutrient requirements in college athletes is the lack of time they have to prepare healthy meals when having practice, class and other sports related activities each day. Athletes' increased nutrient and hydration needs also make it difficult to meet nutrient recommendations. Research shows that improper dietary intake, nutrient timing, and hydration may decrease athletic performance (Rodriguez, DiMarco, & Langley, 2009). Insufficient intake of carbohydrates and protein can deplete glycogen stores and impair building and repairing of tissues. Lack of fat intake can lead to insufficient calorie intake and cause the body to break down muscle for energy. In addition, macro and micronutrient deficiencies can suppress the immune system, causing potential illness and decreased strength and endurance (Rodriguez et al., 2009). For these reasons it is

essential for college athletes to consume proper nutrition to optimize athletic performance and reduce fatigue.

Web-Based Nutrition Education Programs for College Students

Students have several tools available to them regarding nutrition education but they must be educated on how to find reliable information. Computer-tailored interventions provide learners with information specifically related to their individual needs, behaviors, and motivations.

One study has shown that computer-tailored nutrition education may promote and improve dietary behaviors in college students (Oenema, Brug, & Lechner, 2001). Oenema and colleagues conducted a randomized control trial to investigate the impact of web-based personalized nutrition education on students' and faculty's intake of fruits, vegetables, and fat (Oenema et al., 2001). The intervention group received a web-based tailored nutrition information letter and a questionnaire along with feedback and suggestions on how to meet dietary recommendations at the end of the survey. Each question was based on the answer to the previous question so that no question was considered irrelevant to the participant. For example, a participant who was vegetarian was not asked questions about meat consumption. Members of the control group were given general nutrition information based on brochures and a paper version of the questionnaire, each containing the same non-personalized questions. At the end of the questionnaire, the control received general suggestions to improve fruit and vegetable intake. The researchers found significant differences between personal awareness and motivation to improve dietary intake in participants in the web-based personalized group compared to the control group. The computer-tailored group also reported that the

information was newer to them and more personally relevant to them regarding fat and vegetables than the control group. One significant correlation found was between computer illiteracy within the intervention group and difficulty using the computer-tailored program (Oenema et al., 2001). Although most students are becoming more computer savvy, the information available on the nutrition education website will be clear and easy to navigate for ease of use by computer-illiterate students.

In 2008, Franko and colleagues created an internet-based nutrition and exercise program based on the specific needs of college students, called MyStudentBody.com-Nutrition (MSB-N) (Franko et al., 2008). Four hundred seventy-six students from 6 universities were assigned to 3 different groups including 2 experimental groups and a control group. One experimental group used the educational program 2 times, the second control group used the program 3 times, and the control group used an interactive anatomy education website, which did not include nutrition or exercise education. Results from the post-test revealed that compared to the control group, participants in the experimental groups increased their intakes of fruit and vegetables ($p < 0.01$) and were more likely to increase their willingness to change dietary fat consumption ($p < 0.05$) although there was no difference in stage of change for exercise between any of the groups. The second experimental group had significantly greater scores in nutrition knowledge and social support for change in dietary behaviors compared to the control group ($p < 0.05$).

Interactivity has been shown to increase the learning process when added to a computer-based learning program (Evans & Gibbons, 2007). Another study conducted by Cousineau and colleagues gathered feedback from students regarding what type of

interactive learning tools they would prefer to use (Cousineau et al., 2006). They created the site based on the students' recommendations to include quizzes and polls and the results were positive. These results along with results from similar research suggests that adding an interactivity component to the CSUN nutrition website would be beneficial (Evans, Gibbons, Shah, & Griffin, 2004). Although web-based nutrition education programs lack interpersonal support, they have the potential to reach large groups of people via the web. This is one key factor for creating the CSUN nutrition education website.

CHAPTER III

METHODOLOGY

This current project fulfilled the objectives of a funded California State University, Northridge (CSUN) Campus Quality Fee grant proposal titled, “Student Nutrition and Cooking Knowledge (SNACK) Grant” to provide CSUN students with web-based nutrition education and nutrition-related resources. The sections below outline the three phases of development for the website, including 1) Development and distribution of surveys; 2) Content development; 3) Web design; 4) Website Launch.

Phase 1: Development and Distribution of Surveys

Surveys were created for the three categories of students targeted, including 1) students under stress, 2) student athletes and 3) students with children. Members of the CSUN Children’s Center were chosen to represent the parents on campus since they were a convenient sample, due to the center’s location on the CSUN campus. The Student Health Center was chosen to represent students under stress because it provides both physical and mental health services often related to stress. Student athletes representing five sports teams were chosen to receive the survey, including men’s basketball and women’s basketball, water polo, tennis, and softball. These teams were chosen because they were part of a preexisting CSUN mailing list intended for dissemination of information to student athletes.

Directors of the Children’s Center, CSUN Department of Athletics, and CSUN Student Health Center aided in the dissemination of the surveys to their respective target audience for the purpose of gaining information about the specific nutrition-related needs and interest of each group (see Appendix A-C for surveys). The surveys were tailored for

each target audience and included questions about: 1) where and how they search for nutrition information, 2) what they currently do to improve their nutrition, 3) what they would like to do to improve their nutrition, 4) what nutrition-related topics they would like to learn more about, 5) whether or not they follow a special diet, 6) how stress affects their diet, and 7) if they would be willing to participate in a focus group. The Children's Center (CC) survey (consisting of 8 questions) included additional questions about the WIC program and other types of services geared towards families. The Student Health Center (HC) and student athlete (SA) surveys (consisting of 9 questions each) included additional questions regarding diet in relation to stress, academic performance, and eating disorders. Students were instructed to check off all responses that applied to them and many questions included an "other" option with an open text box for them to write additional individualized responses to the survey questions.

Faculty and staff working with each group were instructed to send a survey monkey link via email to students at the Children's Center, Student Health Center, and Student Athletes. Students were able to respond up to 2 weeks after receiving the link to the survey. After the 2-week period, the results were recorded and analyzed.

Phase 2: Content Development

The content of the website was developed by a registered dietitian (RD). Development of the website began by creating an outline of the primary nutrition topics identified by each of the three groups' survey results, including the most requested topics and common topics of concern for college students. Responses to open-ended questions were grouped into categories for each question. Students' suggestions were considered if

they could be addressed using evidence-based content, appropriate for the current site. The content outline of the website can be found in Appendix D.

Using the initial outline, the content of the website expanded to include a short paragraph summarizing current information for each topic along with links to resources and interactive tools to enhance student learning. The website content was reviewed by three committee members, each of which are Registered Dietitians (RDs). Two of the committee members hold a doctorate degree in Education (Ed.D.) and one holds a doctorate in Nutritional Biology (Ph.D.). The website was also reviewed by a CSUN dietetic intern that holds a bachelor's degree in nutrition as well as communications.

Phase 3: Web Design

Using the funds awarded through the SNACK grant, CSUN's on-campus Center for Visual Communications (VISCOM) was hired to design the website. After proposing the idea of the website, several meetings were held among the web designers and members of the committee regarding the budget, layout and, importance of interactivity throughout the site. The website designers, who referred to the website as a "nutrition pagelet", created a sitemap based on the initial content outline (see figure 1 on p. 27).

The website will be a part of CSUN's Institute of Community Health and Well Being website, which serves as a resource for various health topics to CSUN students, faculty, staff, and the community. However, because the Institute of Community Health and Well Being name may be difficult for students to remember, the web designers and committee decided to use the website title "CSUN Nutrition Experts". This title along with the logo (see Appendix E), will help with branding the website, promote the reliability of the content, and make it more attractive to CSUN students.

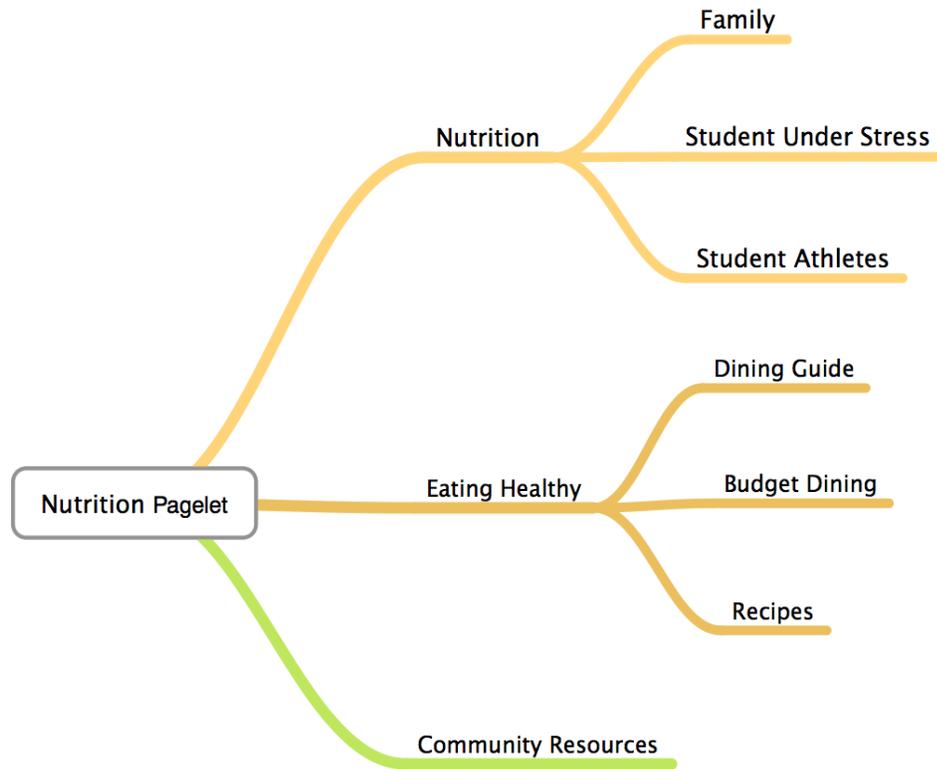


Figure 1. Sitemap outline created by VISCOM graphic designers. Each topic represents a link on the website that will include various subtopics.

After the website was approved, VISCOM developed a tentative timeline for the launch of the website. Currently, the website is in its preliminary stages and is expected to be completed by the end of April 2014. Before its final launch, we plan to gather feedback from students regarding the ease of use, navigation, readability, personalization, and interactivity of the site. Feedback may be in the form of surveys or focus groups from the students who participated in the initial content development surveys. Edits and updates will be made continually to assure that the most current nutrition information is available to students.

Phase 4: Website Launch

The nutrition education website titled, “CSUN Nutrition Experts”, is scheduled to launch at the end of May 2014. It includes information based on the highest response percentages from each of the 3 surveys as well as the most common recommendations for open-ended questions. The website can be found at www.csun.edu/CsunNutritionExperts.

CHAPTER IV

RESULTS

The purpose of this project was to develop a personalized nutrition education website for students at CSUN based on their specific recommendations and needs. Surveys were administered to three groups, including students from the CSUN Student Health Center, Children's Center, and student athletes to gather information regarding their specific needs and recommendations for website content.

Responses from the Children's Center (CC) and student athlete (SA) surveys were analyzed using SurveyMonkey's analyze tool, while the responses from the Student Health Center (HC) survey were analyzed by an employee from the Student Health Center. The self-reported questionnaire was completed by a total of 160 students from the HC (n=109), CC (n=50), and SA (n=11).

Summary of Survey Responses

Children's Center Survey (CC)

Eighty-six percent of the students from the CC reported using the Internet to search for nutrition information, more than any other source. When asked which nutrition-education resources would be most useful for their family, CC respondents most frequently responded by requesting more information on child day care centers (81.4). A majority of CC respondents (81.4%) selected "increasing vegetables" as their top choice for what they are currently doing to improve their family's nutrition. Over half (65.2%) also expressed that "increasing vegetables" is what they would currently like to do to improve their family's nutrition. The nutrition topic CC respondents were most interested in learning more about was healthy snacks and recipes (84%). When asked if

their family follows a special diet or specific cultural diet behavior at home, 79.6% answered “no”. Suggestions, provided by 14.4% of respondents included: adding information on portion sizes, using interactive educational games for children, and stating where to find affordable organic produce. Twenty-six percent of respondents were willing to participate a focus group for the development website in the future.

Student Health Center Survey (HC)

Almost all HC survey respondents reported using the Internet to search for nutrition education (91.7%), which was significantly greater than all other selections. When asked what they are doing now to improve their nutrition, the response with the highest frequency was “increasing vegetables” (66.1%). HC respondents reported that lack of sleep (30.3%) has the most negative effect on them academically and that stress affects their diet by causing a decrease in appetite (31.2%). Respondents were most interested in learning more about eating healthy on a budget (66%). When asked if they have ever had an eating disorder, 17% of respondents reported “yes” and 16% reported “maybe”. There were 20.2% of HC respondents who reported following a special diet or culture-related diet behaviors at home. Respondents who answered, “yes” to following a special diet most commonly reported consuming Mexican foods. Suggestions provided by 16% respondents, included: providing healthy food choices at on campus dining halls, identifying healthy gluten-free foods and vegan foods on campus. A total of thirty-nine percent were willing to participate in a focus group for the development of the website in the future.

Student Athlete Survey (SA)

Similar to the other student groups, a majority of SA respondents reported using the Internet as their primary source of nutrition information (81.8%). There were 2 responses that were equally selected by athletes when asked what they are doing now to improve their nutrition. These included eating more vegetables (63.6%) and eating more whole grains (63.6%). The SA respondents mostly would like to increase vegetable intake (63.6%) to improve their nutrition. Student athletes were most interested (72.7%) in learning more about healthy snacks. Forty-five and a half percent reported that stress affects their diet by decreasing appetite. None of the respondents reported following a special diet or cultural diet behavior at home, while, 9.1% reported having had a current or past eating disorder. None of the SA respondents had suggestions for the site and none were willing to participate in a focus group for the development of the website.

Survey Results: Figures

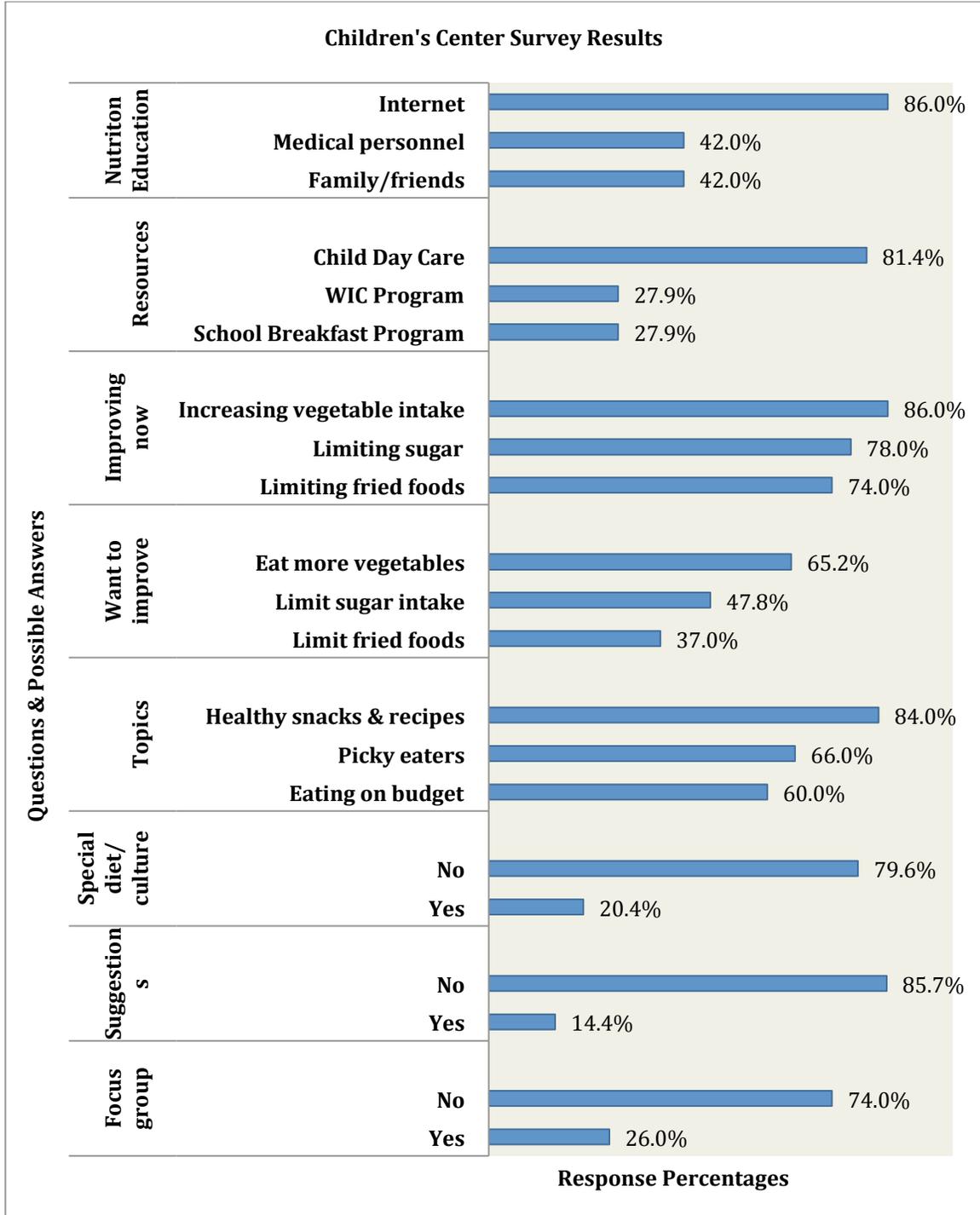


Figure 2. Nutrition education website content development: CSUN Children’s Center survey results (n=50, complete survey in Appendix A). The figure includes the three highest percentage responses for each question. Participants were invited to “Select All” appropriate responses for each question. Therefore, the response options for each question are not mutually exclusive.

Children's Center Survey – Open-Ended Questions & Response	
Q1. Where do you usually search for nutrition education for you and your family? (Select all that apply.)	
Responses	Quantity
Food pyramid	1
I am a Nutritionist	1
Documentaries	1
Q2. What types of nutrition education resources or services would be most helpful for you? (Select all that apply.)	
Responses	Quantity
Don't qualify?	2
Nutrition education classes, cooking demos for children	1
None, only interested in organic foods and not offered in these programs	1
Program called Community Supported Agriculture for constant veggies and fruits (CSA)	1
Q3. What are you doing now to improve your family's nutrition? (Select all that apply.)	
Responses	Quantity
Buying organic/natural products/avoiding additives & preservatives	2
More fruits and vegetables	1
Eating a better breakfast	1
Mediterranean cooking	1
More water	1
Home-cooked meals	1
Restricting animal protein and dairy products	1
Eating a balanced diet	1
Meatless meals	1
Q4. What would you like to do to improve your family's nutrition? (Select all that apply.)	
Responses	Quantity
More recipes and larger variety of foods	2
Eat out less	1
All organic products	1
More nutrition advice	1
Prohibit all dairy products, especially cheese	1
Improve the school program	1

Q5. Does your family base meals around a particular culture of food or follow a special diet?	
Responses	Quantity
Home-made Mexican food	3
Vegetarian/plant-based diet	3
Japanese dishes	1
Plant based diet with organic eggs	1
More Mediterranean dishes	1
Mostly rice, fish, stew	1
Latina	1
Q6. Which nutrition topics are you most interested in learning more about? (Select all that apply.)	
Responses	Quantity
Tasty meals for entire family	1
Organic vs. conventional foods	1
Encouraging healthy eating/behaviors in children	1
Q7. Do you have any additional suggestions on nutrition related topics, resources, or interests for the website?	
Responses	Quantity
Importance of fruits and vegetables using interactivity	1
Portion sizes	1
Obesity	1
Where to find affordable organic produce	1
Encourage students/parents without pressuring or instilling guilt	1
Healthy lunch ideas	1
Resources: Let's Move! Program and National Head Start Association	1

Figure 3. Nutrition education website content development: Children’s Center Survey open-ended questions. Includes students’ responses to open-ended questions and questions allowing students to answer “other” with an explanation.

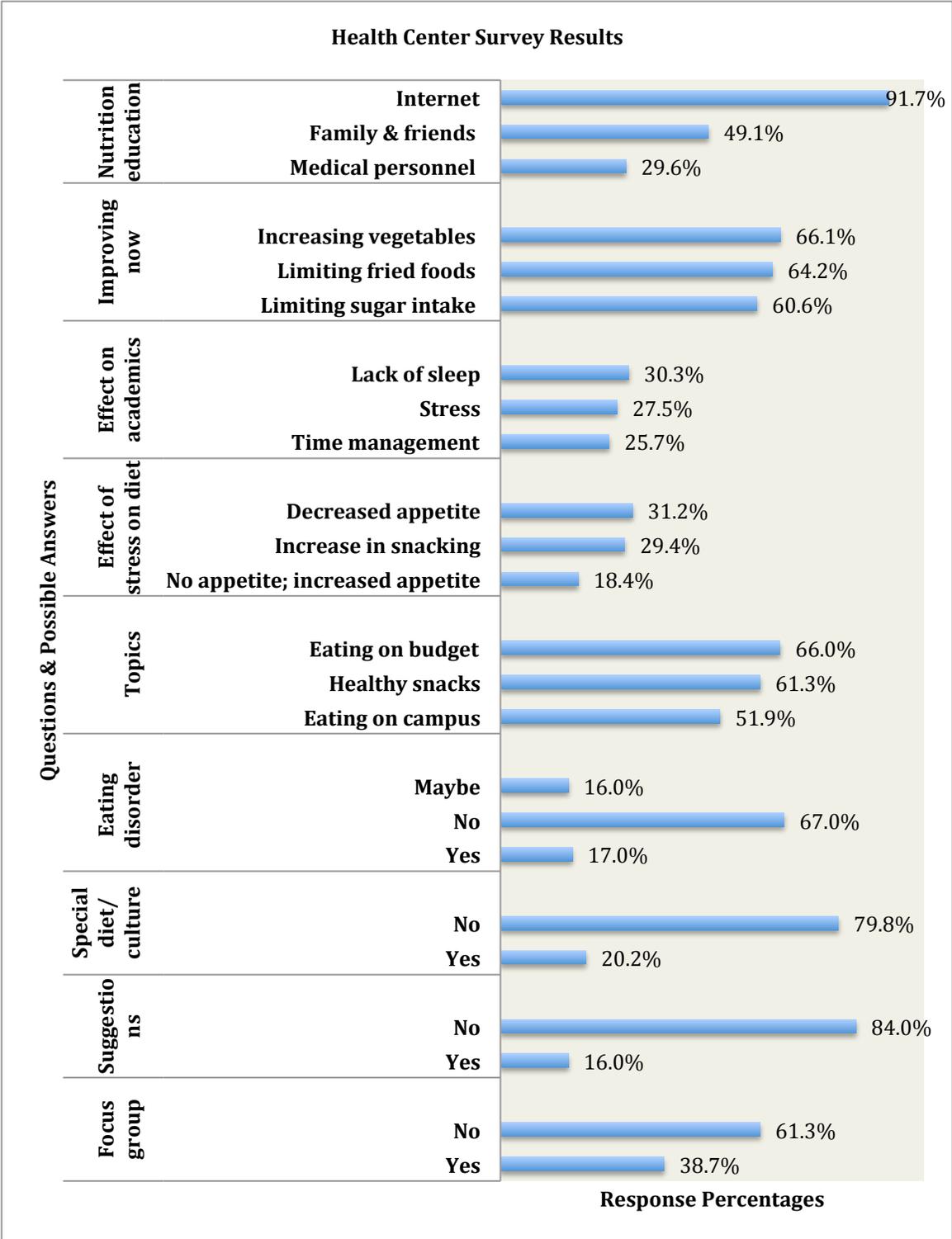


Figure 4. Nutrition education website content development: CSUN Student Health Center survey results (n=109, complete survey in Appendix B). The figure includes the three highest percentage responses for each question. Participants were invited to “Select All” appropriate responses for each question. Therefore, the response options for each question are not mutually exclusive.

Student Health Center Survey Results: Open-Ended Questions & Responses	
Q1. Where do you usually search for nutrition information? (Check all that apply).	
Responses	Quantity
Labels	1
Weight Watchers	1
Q2. What are you doing now to improve your nutrition? (Check all that apply).	
Responses	Quantity
More water	2
Portion sizes	2
Currently dieting	1
Drinking green tea	1
No red meat	1
Gluten-free	1
Gluten-free and vegan	1
Counting calories	1
More fruit	1
Q3. Which of the following do you feel has the most negative effect on you academically?	
Responses	Quantity
Family	1
Medical ailments	1
Q4. When you are stressed, how does it usually affect your diet?	
Responses	Quantity
Less time to eat or forget to eat	1
Neither	1
No effect	1
Q5. Do you base meals around a particular culture of food or follow a special diet?	
Responses	Quantity
Mexican	5
Follow diet plan	2
Monitor calories	2
Hispanic	2
Diabetic	1
Puerto Rican	1
MyPlate	1
Korean	1
Kosher	1
Rise diet app	1
Vegetarian	1

Q6. Which nutrition topics are you most interested in learning more about? (Check all that apply).	
Responses	Quantity
Athletic dieting and maximum performance dieting	1
Nutrition/weight loss drinks	1
Q8. Do you have any additional suggestions on nutrition related topics, resources or interests for the website? Or is there something you would like to be included on the CSUN website?	
Responses	Quantity
Healthy food choices on campus, especially dining halls	2
Healthy gluten-free & vegetarian/vegan diet (especially options on campus)	2
Exercise tips	1
Juicing	1
Vitamins and minerals	1
Preventing anemia	1
Vegetarian diet	1
Down-to-earth nutrition info	1
Interactive nutrition program	1
Super foods	1
Added sugar, especially juice/soda	1
Skipping meals for detoxing, does it impact academic performance?	1
Nutrient timing and effects	1
Nutrition and exercise program to promote healthier lifestyle for students	1

Figure 5. Nutrition education website content development: Children’s Center Survey open-ended questions. Includes students’ responses to open-ended questions and questions allowing students to answer “other” with an explanation.

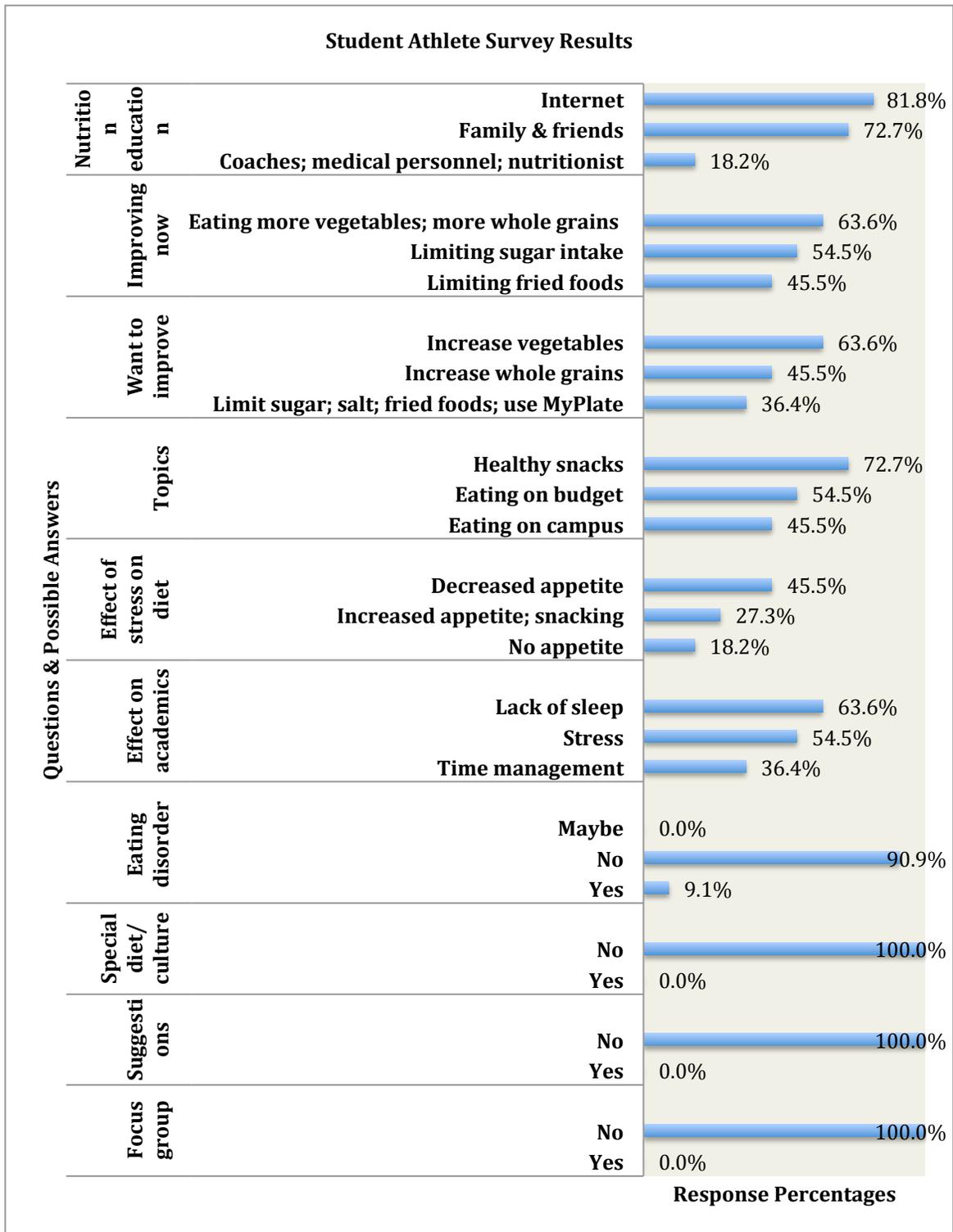


Figure 6. Nutrition education website content development: CSUN student athlete survey results (n=11, complete survey in Appendix C). The figure includes the three highest percentage responses for each question. Participants were invited to “Select All” appropriate responses for each question. Therefore, the response options for each question are not mutually exclusive.

CHAPTER V

DISCUSSION

This chapter revisits the purpose of the project, reviews the findings of the surveys used for the purpose of content development, and provides implications and areas for future study.

Summary of the Problem and Purposes

The problem addressed in this project was the lack of a nutrition education website available for students at the California State University, Northridge (CSUN). It is well documented that college students are generally undereducated in nutrition (ACHA, 2013; Diner, 1999; Dunn et al., 2007; Franko et al., 2008) and have a high risk of becoming overweight or obese due to their unhealthy eating behaviors (Brunt & Rhee, 2008; Racette et al., 2005). The purpose of this website was to create a personalized nutrition education website based on the recommendations and needs of the current CSUN students, specifically among students under stress, student athletes, and students with children. The website contains evidence-based nutrition information and resources designed to help students improve dietary behaviors. It can be used as a nutrition education resource for students, coaches, athletic trainers, and faculty.

Implications

Among each of the three student groups surveyed, respondents reported using Internet as the most common source of nutrition education. This was not surprising since the CSUN freshman survey revealed that the majority of students used the Internet for homework and leisurely activities (Huber, 2012). Additionally, among all student groups, the two most requested nutrition topics of interest included 1) eating healthy on a

budget, and 2) healthy snacks (HC & SA) or healthy snacks and recipes (CC).

Specifically, students requested healthy snacks and recipes that are convenient for eating on the go and pertaining to their personal food preferences. This infers that students are interested in learning more about healthy foods and improving their dietary behaviors.

These results are consistent with a study conducted in 2004, in which researchers held focus groups with college students to identify their nutrition concerns and suggestions for a nutrition education website prototype (Cousineau, Goldstein, & Franco, 2004).

Interestingly, they found that eating healthy on a budget was the most common concern among both college students and the health staff at the college (Cousineau et al., 2004).

The majority of students among all groups (HC, SA, and CC) reported to have an interest in increasing their intake of vegetables to improve their health. This is consistent with research indicating that many college students do not consume enough vegetables (ACHA, 2013; Racette et al., 2005; Hinton et al., 2004).

The HC and SA surveys indicated that eating disorders might be less common among CSUN athletes than non-athletes. However, due to a small sample size of athletes, the prevalence of eating disorders may not be generalizable to all athletes. Furthermore, it may be due to the specific teams that completed the surveys, including men's basketball, and women's basketball, water polo, tennis, and softball, which generally are not prone to eating disorders. A total of 19 students from the HC and SA surveys reported having a current or past eating disorder and 17 were uncertain if they had a current or past eating disorder. Based on this data, it appeared necessary to include information and resources about eating disorders on the website, due to a lack of knowledge or current

concern of this condition among the students. An average of 87% of students reported not following a special diet or specific culture-related diet behaviors.

When asked about stress in relation to diet, most students reported a decrease in appetite or an increase in snacking. This finding is similar to results from Serlachius et al. (2004), who reported that most students reported a change in weight and increased snacking when stressed. However, in another study related stress to diet, female students reported a decrease in appetite when experiencing stress (Kandiah et al., 2005). A decrease in appetite may reduce intake of nutrient-rich foods and essential nutrients needed for optimal academic and athletic performance.

Among the students surveyed, a large number of respondents did not complete the open-ended questions and indicated that they were not interested in participating in a focus group. Their lack of interest may be related to lack of time or lack of compensation to complete the surveys. Specifically, the athlete group did not give additional information for the open ended questions, The fact that many students did not answer the open-ended questions may suggest that they chose from the available answers due to convenience, though it may not have been the answer most representative of their needs.

Conclusions

Lack of nutrition knowledge and poor dietary behavior among college students is well documented in the research. Like most college students in the United States, many CSUN students lack fruit and vegetable intake and do not meet recommendations for physical activity. These factors leave college students at risk for obesity and other nutrition-related diseases. Research shows that among college students, nutrition education leads to positive changes in dietary behaviors. This website provides

personalized nutrition education for CSUN students, specifically 1) students under stress, 2) student athletes, and 3) students with children, to facilitate in improving their nutrition knowledge and behavior.

Recommendations for Future Research

This project focused on the recommendations and needs of students, but it did not assess students' current knowledge. Therefore, further research is needed to determine nutrition knowledge among students to aid in further development of the website. This study also paves the way for future research to determine the effectiveness of the current nutrition education website on nutrition knowledge and whether that knowledge translates to improved dietary behaviors. It should also be determined if the current nutrition education website is effective among specific groups and ethnicities at CSUN and to investigate if specific dietary habits were improved. It would also be noteworthy to compare the current site to similar nutrition education sites at other universities that have been successful in promoting a change in dietary behaviors among college students, such as "The Nutrition Source" at Harvard School of Public Health.

Because the surveys of the current project only represented a small population of CSUN students, other groups of students should be surveyed to determine what type of nutrition education and resources they are interested in learning more about. Providing students with a small incentive payment to complete surveys may encourage them to spend more time on the survey questions and to compose more detailed answers.

The creation of the website has made it convenient to update students with the latest nutrition-related information as new research is conducted. Since students' nutrition knowledge and needs are likely to change each year, surveys should be distributed on an

annual basis to assess whether or not the current site remains personalized for the current CSUN students. Further research should also assess if the website is an effective tool for the Los Angeles County and Ventura County communities.

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APPENDIX A

Children's Center Survey

Dear students, we are planning on developing a nutrition education website for the students and community of California State University Northridge. Please answer the brief survey below to help us better serve you.

1. Where do you usually search for nutrition education for you and your family?
Check all that apply:
 - a. Internet
 - b. Family/friends
 - c. TV Shows/infomercials
 - d. Nutrition books
 - e. College courses
 - f. Medical personnel (doctors, nurses, etc.)
 - g. Nutritionist
 - h. Registered Dietitian
 - i. Other (please specify)

2. What types of nutrition education resources or services would be most helpful for you?
Check all that apply:
 - a. Special Supplemental Nutrition Program for Women, Infants, and Children (WIC Program)
 - b. Supplemental Nutrition Assistance Program/Food Stamps (SNAP/Cal Fresh)
 - c. Community food bank
 - d. The Emergency Food Assistance Program (TEFAP)
 - e. Commodity Supplemental Food Program (CSFP)
 - f. National School Lunch Program
 - g. School Breakfast Program
 - h. Summer Food Service Program
 - i. Child day care centers
 - j. Other (please specify)

3. What are you doing now to improve your family's nutrition?
Check all that apply:
 - a. Eating more vegetables
 - b. Limiting sugar intake
 - c. Limiting salt intake
 - d. Limiting fried foods
 - e. Eating whole grains
 - f. Using MyPlate
 - g. None of the above

h. Other (please specify)

4. What would you like to do to improve your family's nutrition?

Check all that apply:

- a. Eat more vegetables
- b. Limit sugar intake
- c. Limit salt intake
- d. Limit fried foods
- e. Eat whole grains
- f. Use MyPlate
- g. None of the above
- h. Other (please specify)

5. Does your family base meals around a particular culture of food or follow a special diet?

- a. No
- b. Yes (please specify)

6. Which nutrition topics are you most interested in learning more about?

Check all that apply:

- a. Infant nutrition
- b. Breastfeeding
- c. Tips for kids who are picky eaters
- d. Healthy snacks for busy parents/easy recipes
- e. Food safety
- f. Reading nutrition Labels
- g. Preservatives and other food additives
- h. How alcohol can affect your academic performance
- i. Healthy recipes for every culture
- j. Eating disorders
- k. Eating healthy on campus
- l. Eating healthy on a budget
- m. Other (please specify)

7. Do you have any additional suggestions on nutrition related topics, resources or interests for the website? Or is there something you would like to be included on the CSUN website?

- a. No
- b. Yes (please specify)

8. Will you be willing to participate in a focus group regarding nutrition education for this website?
- a. No
 - b. Yes (If yes, please provide us with your phone number and/or email address so we can contact you with more information.)
-

APPENDIX B

Health Center Survey

Dear students, we are planning on developing a nutrition education website for the students and community of California State University Northridge. Please answer the brief survey below to help us better serve you.

1. Where do you usually search for nutrition information?

Check all that apply:

- a. Internet
 - b. Family/friends
 - c. Coaches
 - d. TV Shows/infomercials
 - e. Nutrition books
 - f. College courses
 - g. Medical personnel (doctors, nurses, etc.)
 - h. Nutritionist
 - i. Registered Dietitian
 - j. Other
-

2. What are you doing now to improve your nutrition?

Check all that apply:

- a. Eating more vegetables
 - b. Limiting sugar intake
 - c. Limiting salt intake
 - d. Limiting fried foods
 - e. Eating whole grains
 - f. Using MyPlate
 - g. None of the above
 - h. Other (please specify)
-

3. Which of the following do you feel has the most negative effect on you academically?

- a. Lack of sleep
 - b. Poor sleep quality
 - c. Stress
 - d. Diet issues
 - e. Time management
 - f. Alcohol
 - g. Prescription drugs
 - h. Other drugs
 - i. Other (please specify)
-

4. When you are stressed, how does it usually affect your diet?
- a. No appetite
 - b. Decreased appetite
 - c. Increased appetite
 - d. Increased intake of snack foods
 - e. Other (please specify)
- _____
5. Do you base meals around a particular culture of food or follow a special diet?
- a. No
 - b. Yes (please specify)
- _____
6. Which nutrition topics are you most interested in learning more about?
Check all that apply:
- a. Healthy snacks
 - b. Hydration
 - c. Food safety
 - d. Reading nutrition Labels
 - e. Preservatives and other food additives
 - f. How alcohol can affect your academic performance
 - g. Healthy recipes for your culture
 - h. Eating disorders
 - i. Eating healthy on campus
 - j. Eating healthy on a budget
 - k. Other (please specify)
- _____
7. Do you feel that you have ever had an eating disorder?
- a. No
 - b. Yes
 - c. Maybe
8. Do you have any additional suggestions on nutrition related topics, resources or interests for the website? Or is there something you would like to be included on the CSUN website?
- a. No
 - b. Yes (please specify)
- _____
9. Will you be willing to participate in a focus group regarding nutrition education for this website?
- a. No
 - b. Yes (Please provide us with your phone number and/or email address so we can contact you with more information.) _____

APPENDIX C

Student Athlete Survey

Dear students, we are planning on developing a nutrition education website for the students and community of California State University Northridge. Please answer the brief survey below to help us better serve you.

1. Where do you usually search for nutrition information?

Check all that apply:

- a. Internet
- b. Family/friends
- c. Coaches
- d. TV Shows/infomercials
- e. Nutrition books
- f. College courses
- g. Medical personnel (doctors, nurses, etc.)
- h. Nutritionist
- i. Registered Dietitian
- j. Other _____

2. What are you doing now to improve your nutrition?

Check all that apply:

- a. Eating more vegetables
 - b. Limiting sugar intake
 - c. Limiting salt intake
 - d. Limiting fried foods
 - e. Eating whole grains
 - f. Using MyPlate
 - g. None of the above
 - h. Other (please specify)
- _____

3. Which of the following do you feel has the most negative effect on you academically?

- a. Lack of sleep
 - b. Poor sleep quality
 - c. Stress
 - d. Diet issues
 - e. Time management
 - f. Alcohol
 - g. Prescription drugs
 - h. Other drugs
 - i. Other (please specify)
- _____

4. When you are stressed, how does it usually affect your diet?

- a. No appetite
 - b. Decreased appetite
 - c. Increased appetite
 - d. Increased intake of snack foods
 - e. Other (please specify)
-

5. Do you base meals around a particular culture of food or follow a special diet?
- a. No
 - b. Yes (please specify)
-

6. Which nutrition topics are you most interested in learning more about?

Check all that apply:

- a. Healthy snacks
 - b. Hydration
 - c. Food safety
 - d. Reading nutrition Labels
 - e. Preservatives and other food additives
 - f. How alcohol can affect your academic performance
 - g. Healthy recipes for your culture
 - h. Eating disorders
 - i. Eating healthy on campus
 - j. Eating healthy on a budget
 - k. Other (please specify)
-

7. Do you feel that you have ever had an eating disorder?
- a. No
 - b. Yes
 - c. Maybe

8. Do you have any additional suggestions on nutrition related topics, resources or interests for the website? Or is there something you would like to be included on the CSUN website?
- a. No
 - b. Yes (please specify)
-

9. Will you be willing to participate in a focus group regarding nutrition education for this website?
- a. No
 - b. Yes (Please provide us with your phone number and/or email address so we can contact you with more information.)
-

APPENDIX D

CSUN Nutrition Experts Website Outline

Nutrition for Families

- Tips for Picky Eaters
 - Feeding Tips
 - Portion Sizes
- More Feeding Tips
 - Resources
- 10 Tips from Choose MyPlate
 - Videos by Choose MyPlate.gov
 - Whole Grains for Healthy Family Meals
 - Whole Grains at School
 - On the Go Snack Boxes
 - The “Fruit and Veggie Pokey”
 - Fruit and Veggie Swag
- Nutrition Education Games for Kids – 3rd Grade and Up
- Feeding Tips for Parents – 30 minute video

Nutrition for Students Under Stress

- Nutrition and Lack of Time
 - Tips for Healthy Eating on the Go
- Diet, Caffeine, and Academic Performance
 - Common Beverages and Foods Containing Caffeine

Nutrition for Student Athletes

- Nutrition Tips for Athletes
- 2012-2013 NCAA Sports Medicine Handbook
- Hydration
- Nutrient Timing
- General Sports Nutrition Information
 - Sports, Cardiovascular, and Wellness Nutrition (SCAN) Fact Sheets
 - NCAA Fact Sheets
 - Nutrition and Fitness Apps
- Nutrition Facts Label Tips for Athletes
- Eating Disorders
 - Academy for Eating Disorders (AED) Information
 - National Eating Disorder Association (NEDA) Information
 - National Association of Anorexia Nervosa and Associated Disorders (ANAD) Information
- Female Athlete Triad

- SCAN Fact Sheets
- Female Athlete Triad Coalition – Educational Videos
- Making Up an Energy Deficit: Food and Meal Ideas
- Alcohol
 - Resources

General Nutrition Information

- Beverages/sugar
- MyPlate
 - Sample Menus
 - Tips for Vegetarians
 - Videos from ChooseMyPlate.gov
 - Whole Grains
 - Benefits of Whole Grains
 - How to Cook with Budget-Friendly Whole Grains
 - Whole Grains for Breakfast
 - Fruits and Vegetables
 - On the Go Snack Boxes
 - Gardening
- Nutrition Facts Label Information
 - Nutrition Fact Label Reading Information
 - Food Safety
 - FoodSafety.gov
 - ServSafe: Food Protection Manager Certification Course
 - Food Safety Tips from MyPlate.gov
 - FDA – Free Food Safety Brochures and Cooking Guides
 - Whole, Organic, and Processed Foods
 - Food Additives
 - Pesticides
 - Dirty Dozen & Clean Fifteen
 - Preservatives
 - Other Ingredients
 - Genetically Modified Foods (GMs or GMOs)

Healthy Cooking

- Kitchen Cheat Sheet Guide for Basic Cooking Techniques
- Stocking a Healthy Pantry
- Navigating the Grocery Store – 7 Tips to Help You Shop
- Time Trimmers

Healthy Cooking On and Off Campus

- Healthy Dining Guide
- Nutrition Information for Fast Food Restaurants

- Tips for Eating Healthy When Eating Out
- Fast Food Quiz

Healthy Eating on a Budget

- 10 Tips for Eating Healthy on a Budget

Recipes

- 8 Healthy and Quick Recipes
- Gluten-Free
- Cooking with Whole Grains
- Quick and Easy Snacks
- Vegan/Vegetarian
- Child-Friendly Meals
- Culture-based
 - Mexican
 - Kosher
 - Latino
- SNAP-ED's Recipe Finder
- Cooking with MyPlate – Healthy Asian Dishes
- Healthy Recipes for Athletes

Eating Healthy on a Budget

- 10 Tips for Eating Healthy on a Budget
- ChooseMyPlate.gov Tips for Eating Healthy on a Budget

Community Resources

- Child Day Care Centers
- Department of Public Social Services (DPSS)
- Child Development Consortium of Los Angeles (CDCLA)
- Child Care Resource Center (CCRC)
- National School Breakfast and National School Lunch Program
- Women, Infants, and Children Program (WIC)
- SNAP/CalFresh
- Summer Food Service Program
- Farmers' Markets
- Community Supported Agriculture

