

Bridging the Gap: Investigating the Matches/Mismatches of
Nutrition Messages Between the Classroom and Cafeteria at
AISD High Schools

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CHAPTER 1: Introduction

The Problem

Despite the implementation of health promotion programs in schools nationwide, food options in cafeterias have historically contrasted to the foods taught in classrooms; this may contribute to the rise in child obesity in the US (Braxton, G., 1982; Brockett, D., 1998; Paley, A., 2005). Students receive mixed messages, however, if they are taught about healthy eating in class, but are then able to eat fries, pizza and candy for lunch with no visible fresh fruit or vegetable alternatives (Cama et al., 2006).

Schools also send contradictory messages when they offer nutritious meals while offering competitive high-fat foods and less likely to contain fruits and vegetables (Cama et al., 2006). Competitive foods are defined as foods that ‘compete’ with breakfast and lunch programs (e.g., a la carte lines and vending machines). This is significant because unhealthy food options generate confusion about good nutrition (Brooks, K., 2012). For example, students feel conflicted when presented unhealthy foods because of temptation, even if they are made aware of the foods’ nutritional value. This leads to decreased consumption of healthy meals and undermines the integrity of classroom education (Cama et al., 2006). Focus groups with high school students have discussed the impact of these conflicting messages (Brooks, K., 2012). Access to healthy food choices makes it easier for students to make better choices.

The Need for Alignment

In order to provide a successful food environment where children choose to eat healthy, what is taught in classrooms must be aligned to and match what is served in cafeterias. A healthy/successful food environment also involves the idea of consistent messaging and how it reinforces children's learning to influence their decision-making and behavior.

Purpose of the Research

My research focuses on the relationship between the nutrition information delivered in health classrooms and the food options served in cafeterias in Austin Independent School District high schools. The objective is to explore the challenges associated with teaching nutrition in the classroom, as well as providing nutritious meals in cafeterias to students. It examines the connection (or lack thereof) between the instructional material of teachers and cafeteria food menus, as well as the perspectives of 6 health/nutrition-affiliated teachers and 1 food service personnel. Two primary issues are at the heart of this study: child obesity and the role of consistent messages on child learning and development.

Primary Issues: Child Obesity and Consistent Messages

Prevalence of Child Obesity in the US

Having nutritious meals as a child is crucial since an unhealthy diet may lead to obesity. In Texas, 32.2% of children between ages 10-17 are considered overweight or obese, which is higher than the national estimate of 31.6% (Texas Fact Sheet, 2007). This is also

significant because obesity in childhood can progress into more serious health conditions such as cardiovascular disease (CVD) later in life. Cardiovascular disease is the leading cause of death for both men and women, black and white in the US (Lonnquist & Weiss, 2011). As rates of obesity and CVD rise, so do healthcare costs.

The average taxpayer spends about \$175 per year to finance obesity-related medical expenses among Medicare and Medicaid recipients (Lonnquist & Weiss, 2011). Obesity also takes between 5-7% of annual medical expenditures, or about \$75 billion, in the US (Lonnquist & Weiss, 2011). These costs are then pushed onto present and future taxpayers because employers cover expensive obesity-related illness costs by having higher insurance premiums, and government programs shift money to medical assistance programs to compensate for overall obesity-related healthcare spending (Runge, 2007). For these reasons, weight management and nutrition education should be addressed early.

Consistent Messages and Child Learning & Development

Another central issue is the role of consistent messages for child learning and development. Messages are designed to stimulate critical thinking and responses in the targeted audience using text, language, graphic style, images, colors, dress, personal appearance, etc (Dervin, B., 1981). The classroom and cafeteria are sources of explicit and implicit nutrition messages. Nutrition messages, or nutrient-based messages, “generally address a nutritional problem (deficiency or excess) which has been identified in the population” (Cerqueira, 1990). Such messages aim to change an eating practice that is considered to be the cause of the nutritional problem. Overall, consistent messages are

significant because they allow children to learn better and develop decision-making skills. When children receive certain information from one source (e.g., fruits and vegetables are healthy foods to eat) and it converges with information from another (e.g., eat apples every day to live longer), they are more capable of making associations and decisions geared towards those messages; this produces consistent learners (Christenson & Sheridan, 2001).

Inconsistent messages, however, from multiple sources can produce inconsistent learners. For example, one study showed that inconsistent messages between home and school produced negative educational outcomes. The students did not take school and class assignments seriously and lacked an overall connection with the school (Christenson & Sheridan, 2001). Ultimately, inconsistent messages make it more difficult for students to apply what they learned in class. In the following chapters, I will further discuss the influence of messages from media advertising and education-related studies.

Significance of School and Health Promotion

School is a significant obesity-related factor because most children from elementary to high school received most of their meals from food served from the cafeteria. To illustrate, more than 95% of children, ages 5-17, are enrolled in school, and no other institution has as much interaction and influence on children during their first quarter of their life (Nanney et al., 2009). Although up to 50% of total daily energy intake comes from school food, it has been found that fewer than 30% of schools meet the existing nutrition requirements under

the National School Lunch Program (Federal School Nutrition Programs, 2013). In particular, high school is important to study because this is where kids develop independent dietary choices and have more freedom from parental monitoring of food intake due to increased mobility (further discussed in the following chapter).

One way to reduce child obesity, as well as increase children's exposure to consistent nutrition messages, is through health promotion. Health promotion is relevant because habits developed from childhood and adolescence can transition to adulthood. Although it is essential at all grade levels, the health education of high school students is the primary focus of this study. High school grades (9-12) encompass a critical period for physical, psychological and emotional development. Compared to elementary and middle school, high school is a time period that marks the development of independent dietary choices (Nanney et al., 2009; Pérez et al., 2007).

Still, how can we effectively promote health and nutrition in schools? According to Contento, dietary change is more likely when the physical environment is health promoting, so that personal decisions and motivations are supported and reinforced (2007). This occurs when healthful foods are available and accessible in the workplace, communities and schools. "The environmental component can involve altering the physical food choice environment by such means as making changes in the foods offered in school meal programs and in workplace cafeterias, or increasing the availability of neighborhood markets" (Contento, 2007). Although there are several physical environmental factors at play, this study concentrates on the prevalent, influential role of schools.

Taking this into account, I propose that all stakeholders – specifically principals, teachers and food service personnel – should work together in order to promote a successful healthy-eating cafeteria environment (Cama et al., 2006). Although policy-makers and community members are also key stakeholders, my research focuses on the roles of teachers and food service personnel in nutrition education and policy.

Defining Nutrition Education and Nutrition Policy

Health promotion involves the efforts of both nutrition education teachers and nutrition policy personnel. It is important to recognize that nutrition education and policy are distinct terms. Nutrition education is defined as “any combination of educational strategies designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being. It is delivered through multiple venues and involves activities at the individual, community and policy levels” (Contento, 2007). It helps people to develop positive dietary habits and decisions by targeting the “personal motivations and competence, interpersonal interactions, and environmental factors that influence individual and community patterns of behavior” (Contento, 2007).

Nutrition policy contains many facets: “food production and processing methods to improve nutrition, feeding the hungry, identifying new links between health and diet, educating the public, overseeing the highest standards, and generating improvements in the safety and quality of the food supply, and encouraging healthy eating and exercise behaviors”. These issues and others are all components of nutrition policy (Bittle & Gorton,

2001). Schools have nutrition, fundraising and vending policies that specify what types of food to allow in the classroom, vending machines and cafeteria, as well as at what times of the day that fundraising and selling is allowed (This will further be explained in the following chapter).

Significant Challenges Faced by Educators and Food Service

The path towards alignment between classroom education and cafeteria food options is very complex and difficult. Educators and Food Service Personnel face many challenges within their respective departments.

Three examples of the challenges that teachers face include having too little time for so much information (Ling & Lai-Yeung, 2011), spending more time on non-nutrition related topics such as sex education and substance abuse (Perez et al., 2007), and changing their students' mindsets to eat healthier (Carson, 2010).

Some challenges faced by nutrition and food service include insufficient time for serving lunch meals to every student, the provision of healthy food options that are less likely to be wasted, and food cost (Rida, Z., 2012).

More studies must be done to evaluate such challenges since teachers and food service personnel are key stakeholders in promoting health-eating among students.

My Research

My research question addresses the following question: What is the relationship between the nutrition information delivered in classrooms and the food options offered in cafeterias at AISD high schools?

Previously mentioned studies have involved suburban, urban, and rural high schools in states such as Minnesota and Alabama. My research focuses on three Austin Independent School District (AISD) high schools in Austin, Texas. Each high school represents a predominantly low-, middle-, or high-income student population. Income was assessed using the percentage of students enrolled in the Free & Reduced Lunch program. The federal poverty line for a family of four was \$22,350 (Child Nutrition Programs – Income Eligibility Guidelines, 2011). My study will investigate the matches and mismatches between the nutrition information being taught in health/nutrition-affiliated classes and the food options offered in school cafeterias. It will also include the perspectives/attitudes of health education teachers and Nutrition & Food Services personnel.

CHAPTER 2: Literature Review

Significance of Studying Adolescence

Although obesity is also a problem that must be addressed among adults, adolescence (ages 10-19, according to World Health Organization) is a critical period to evaluate because it marks the transition to adulthood and the development of independent dietary choices. For example, adolescence is a time when there is increasing independence and autonomy in food habits, and less parental monitoring of food intake (Pérez et al., 2007). Adolescents also gain increased mobility since they are able to drive and go eat out without the influence of their family. Furthermore, there are less traditional meal times, as well as increased access to food and money to buy food (Nanney et al., 2009). Such aspects of adolescence may contribute to why some become obese.

Obesity-Related Factors: Biological, Social and Environmental

There are several obesity-related factors that are biological, social and environmental. For instance, one biological factor of obesity is genetic heredity. Some children may have a family history of chronic weight conditions that increases their likelihood of obesity.

Parental Upbringing

One example of a social, or interpersonal environmental factor, is parental upbringing. Family is an important influence on adolescents' eating behaviors. Not only is the family a mediator for providing food, it affects eating habits through food attitudes, preferences and values (Neumark-Sztainer et al, 2002). For example, some families eat a home-cooked dinner

together only a few days a week. Busy or conflicting schedules of parents and their kids can increase the frequency of dining out (Neumark- Sztainer et al, 2002). Additionally, parents may influence their children's diets at a young age by introducing healthful foods.

Family Influence on Children's Food Preferences

It is challenging to introduce new foods to young children. By the time they are 12 months old, children are expected to consume a variety of foods from each of the five food groups: Fruits, Vegetables, Grains, Protein, and Dairy (Nutrition Australia ACT Division, 2013). However, young children have a natural preference for certain tastes over others. For example, sweet and salty flavors are preferred over sour and bitter due to adapted survival instincts (Nutrition Australia ACT Division, 2013). A natural preference for familiar tastes over new tastes can be explained through the adaptation of avoiding eating poisonous and unsafe foods. Moreover, at home, children learn to prefer the flavors of food that are most familiar to them and especially if they feel good after eating it (Nutrition Australia ACT Division, 2013). According to Roberts et al, children can learn to like new food with repeated tasting (2009). It may take up to 15 tries of a food before a child becomes familiar with it and actually likes it. It is reasonable to think that older children would respond in the same way (Birch, L.L., 1998).

Influence of Peers

Peers are another social or interpersonal environmental factor. Peer pressure and the need to conform to group norms are landmarks of adolescence. This desire for approval and social identity from peers contributes to food acceptability and selection (Neumark- Sztainer

et al, 2002). Considering this, adolescents are more likely to conform to their peers' food attitudes and eating behaviors, even if it contrasts to their own.

School as a Significant Obesity-Related Factor

Although there are several factors related to obesity, school is a physical environmental factor that can potentially offset family and peer influences on food attitudes or perceptions of younger age groups (Neumark-Sztainer et al, 2002). School has the potential to be a major environmental influence in promoting healthy behaviors, especially with what is taught in the classroom and in what the cafeteria offers. In the cafeteria, flyers for food sales and menu boards serve as food cues. For example, research has shown how high school students assess visual nutrition information in the cafeteria and utilize it to change eating habits. Nutrition information, if visibly placed on cafeteria menu boards, can influence the choice of lower calorie and fat options (Fresques, A.D., 2013). Although visual nutrition labels do not significantly change food purchases, they do change how the purchases were eaten (Fresques, A.D., 2013). For example, after buying the same food items, students only ate a portion of the meal, either by neglecting an unhealthy item or eating half of it.

Perez et al. further emphasized the influence of the cafeteria food environment at different grade levels (4th, 8th and 11th grade; 2007). They found that the “consumption of more healthy foods among elementary school students compared with students in secondary school could be caused by the school meal environment (e.g., presence of fast food and á la

carte lines), greater parental monitoring and control of food intake, social norms about food intake, and the increased off-campus mobility and independence of middle and high school students” (Perez et al., 2007).

As mentioned earlier, parents hold the power to influence dietary change. This may be achieved by incorporating new, healthy foods at home on a daily basis. As a result, it aids in the implementation of healthy-eating strategies at school.

Focus on High School Grade Levels

To reiterate, although it is essential to evaluate the classroom and cafeteria environment at all grade levels, high school is the primary focus of this study. One reason is that “in elementary school, parental concerns may be more focused on nutrition and physical activity; however, as children grow and physically develop, other health-related issues such as substance abuse, alcohol consumption, and sexual behaviors may increase in frequency and importance and may tend to take precedence over nutrition and physical activity “ (Perez et al., 2007) In other words, it is important to look at high school health education curriculum since it may emphasize substance abuse, alcohol consumption and sexual behaviors over nutrition and physical activity. Additionally, it is important to look at the messages received in the cafeteria environment since compared to elementary and middle school cafeterias, high schools have an increased presence of a la carte lines, snack bars, and competitive foods (foods other than what the cafeteria serves); also there is increased mobility where adolescents have access to go off-campus to eat.

Influence of Explicit and Implicit Nutrition Messages

Before moving on, it is important to define Explicit and Implicit Learning since messages from these terms will be discussed. Explicit learning is a form of conscious, intentional, and declarative process of knowledge acquisition (Yang & Li, 2012). This differs significantly from implicit learning: a form of unconscious, incidental, and procedural knowledge acquisition (Yang & Li, 2012).

As mentioned in Chapter 1, nutrition messages received from cafeteria and classroom are a central component to this study. In order to understand what children gain from nutrition messages, one must further understand how children are exposed to such explicit and implicit messages.

Exposure to Nutrition in the Media

Visual and verbal food cues found in TV advertisements can be related to cues from school classrooms and school food environments. In a classroom setting, positive “gain-framed” and positive “loss-framed” messages have the potential to impact children’s eating preferences. A positive gain-framed message shows the benefits of something (e.g., eating vegetables), while a loss-framed message shows the negative consequences of not doing something (Bannon and Schwartz, 2006). Both types of nutrition messages have a positive influence on children’s behavior, and correspond to the idea that children are influenced, almost immediately, by foods shown to them in visual presentations (Bannon and Schwartz, 2006). Visual strategies are important because they cater to diverse learners. For example,

visual learners may become confused when teachers speak too fast or use words that are unfamiliar (Blagojevic et al., 2011). Confusion can inhibit children's ability to learn, socially interact and be engaged due to the level of discomfort they feel in the classroom. As a result, visual presentations help fill in the gaps left by oral presentations. Visual learners benefit from the use of photos, drawings, objects, and gestures, as well as print and environmental cues in presentations (Blagojevic et al., 2011).

Importance of Consistent Messages – Explicit and Implicit

This brings us back to the importance of students receiving consistent messages between various sources from different environments. The brain works in a way where consistency strengthens neural networks and enhances learning (Willis, J., 2014). Consequently, memory and recall are reinforced. This increases the likelihood of modifying behavior, ideas, beliefs and decisions according to what has already been learned (Willis, J., 2014).

Scientific Background: Learning and Development

When we learn, we develop synaptic connections in our brains, where neurons connect to each other through dendritic pathways. As a result, communication between neurons increases. Once these dendrites are formed, the brain's plasticity allows it to reshape and reorganize the neural connections depending on how often they are used (Willis, J., 2014). In the classroom, the more ways nutritional material is learned and introduced into the brain, the more dendritic pathways of access will be created (Willis, J., 2014). There will

be more synaptic cell-to-cell bridges, and these pathways will become stronger (Willis, J., 2014).

Reinforcing Memory and Recall

Once information is learned, there are two ways that reinforce memory and recall: multiple stimulations and repetition. Multiple stimulations consist of teaching relevant material through multiple learning pathways, such as several senses (hearing, seeing, touching) (Willis, J., 2014). For example, the visual representation of a certain message is reinforced by the oral presentation of the same message. This redundancy means individuals, especially students, will have more opportunities to pull up all those related bits of data from multiple storage areas in response to a single cue. This cross-referencing of data strengthens the data into something we've learned rather than just memorized (Willis, J., 2014).

To illustrate, when we learn about fruits, we store the information into brain association areas under several categories (Willis, J., 2014). When we see a fruit, it goes into the visual image brain area. When we see the word F-R-U-I-T spelled out, that information goes into a language-association brain area. After learning about vitamins and minerals, the association is related to learned nutrition messages such as “fresh strawberries are a good source of fiber and vitamin C.” Later we build associational memories with the fruits we've grown up with.

Because the information about fruits is stored in multiple brain areas, it permits multiple cues or stimuli to trigger all of our fruit knowledge instantaneously. Just seeing the word “fruit” will put our recall systems online to provide all the stored data we have connected pertaining to fruits (Willis, J., 2014). We may not need all that information, but because the associations are activated, any of the stored information that we do need will be rapidly and efficiently accessible (Willis, J., 2014).

Repetition Reinforces Learning

Repetition also strengthens neural networks. After repeated practice, learned information transfers from short-term, working memory to long-term memory (Willis, J., 2014). When a memory has been recalled often, its neuronal circuits are highly developed because of their repeated activation (Willis, J., 2014). Like an exercised muscle, these circuits then become more efficient and easier to access and activate (Willis, J., 2014).

Overall, repetition has the ability to enhance the information coming from various sources. The learned material, for example learning that fruits and vegetables should comprise half your plate at mealtime, will more easily ‘stick’ in your brain and retain in your memory in the long-run (Willis, J., 2014). Furthermore, this information is easily accessed when real life situations call for its application. A child deciding on what to eat for lunch at the school cafeteria may recall nutritional information taught in the classroom. This can be seen when different food options are presented to him/her such as a pepperoni pizza versus roasted chicken, or a chocolate bar versus trail mix.

Recollection and Familiarity

Yet, making one healthy food decision is only one part of the story. The rest involves making the same healthy decision consistently, and on a long-term basis (it doesn't do much good – with learning and recall) if there are multiple unhealthy food decisions for every one healthy one). Multiple mechanisms are involved in this process to maintain stored memory, including recollection and familiarity (Willis, J., 2014). Once the information is remembered correctly and applied in decision-making and behavior, it still needs to be reviewed on a regular basis. Varied repetition of learned information results in consolidation of information (Willis, J., 2014).

Consolidation of Information

Consolidation of information involves using the most effective strategies to first acquire information and then practice and rehearse it. The best-remembered information is learned through multiple and varied exposures followed by authentic use of the knowledge by processing it through the executive function centers. This executive function processing of new information can be achieved by active problem solving or connecting the information to real-world situations (Willis, J., 2014).

Examples of Consistency and Matches

Fresh Food Supplies

One match between the classroom and the cafeteria is the availability of fresh food supplies. For example, nutrition messages are consistent when students are taught to eat fresh

meat and produce, and the cafeteria provides such options. In 2007, public schools in Portland, Oregon, began their Harvest of the Month farm to school program in which a fresh, locally produced food is featured, promoted and served to students each month (Hayes & Berdan, 2013). Since then, the program has spread toward many other districts across the country. Another program they created is called Local Flavors in which 30% of food purchases come from local farms and food producers. Such public school programs are an example of how the cafeteria food options may match with healthy foods taught in the classroom (Hayes & Berdan, 2013).

Additionally, in Fairfax County, Virginia, Public Schools have School Gardens which provide students with home-grown snacks, as well as fresh ingredients for the cafeteria such as lettuce and spinach (Hayes & Berdan, 2013). Such practices engage students in what they have learned in the classroom and allow them to apply it within the campus environment.

Utilizing Food-Labeling

A second example of a match is when food-labeling is taught in classrooms, and is utilized in the cafeteria. Students' attention to food-labels is a significant practice because it increases their awareness of the food items that they choose to eat on a daily basis. The point is to make them think about what they are eating, and how their choices would affect their bodies on both the short-term and long-term.

One study examined how the cafeteria purchases of high school students were affected by calorie and fat information exposure (Fresques, A. D., 2013). Researchers also studied how daily exposure to nutrition information affected their food choices. Information

on high school food sales and menu boards were collected before researchers posted nutrition information in the cafeteria. Responses from a self-report student survey indicated that 64% of respondents saw the information posted while purchasing lunch at school, which suggests that the postings were effective in making students aware that nutrition labels existed (Fresques, A. D., 2013). In total, about half of respondents who saw the information utilized the information in some way over the course of the study. It was found that when respondents used this information, most of the time they changed their behavior by choosing meal options lower in calories/fat (Fresques, A. D., 2013). Another way it affected students was that it changed how they ate their food.

After seeing food labels, some students continued to order the same food items but would eat a portion of the meal, for example throwing out the fries or only eating half a pizza. This behavior is an example of the participants' level of critical thinking when assessing their options (Fresques, A. D., 2013).

Interactive Opportunities for Healthy Eating

A third example of a match is when students are taught eating healthy is less of a mundane obligation, but more of an enjoyable lifestyle, and when cafeterias provide students with fun, interactive opportunities to choose healthy fruits and vegetables. It has been documented that interactive garden-based curricula can help to increase preference for and consumption of a variety of vegetables and fruits. For example, garden-based nutrition education affects fruit and vegetable consumption in sixth grade adolescents. Garden

enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables (Hayes & Berdan, 2013).

Examples of Inconsistency and Mismatches

Contrast in Food Selection: Recommendations vs. Offerings

One example of a mismatch is when teachers emphasize eating more foods from a certain food group than another, while the cafeteria serves a smaller selection of foods from the recommended food. For instance, it is inconsistent when students are instructed to eat more fruits and vegetables, yet the cafeteria provides a small selection of them. Rather, there are more food options on proteins such as meats over fruits and vegetables. In a study by Bauer et al, focus group interviews investigating student nutrition choices revealed that “if the cafeteria offered fruits and vegetables in greater quantity and quality, they would choose to eat them instead of the less nutritious entrees” (2004).

Healthy Food vs. Junk Food

Another example of a mismatch is promotion of healthy food in the classroom versus the presence of junk food (including fried food) in the cafeteria. For instance, students may be taught to choose food options with less grease/cholesterol and less fat, yet are served food options that are deep-fried and high in fat in the cafeteria. In the same Bauer et al study, a student described the cafeteria food as “deep-[fried] everything” and the grease from a pizza slice could be patted down with a napkin and rung out (2004).

Taste vs. Appearance of Food

Another example of a mismatch is the appearance and taste of food between the classroom and cafeteria. For instance, certain food options served in the cafeteria may appear or taste differently than how it is depicted in the classroom. For example, students may be discouraged from eating healthy meals due to poor palatability (Bauer et al., 2004). Moreover, students who participate in the Free and Reduced Lunch Program are not likely to be able to purchase healthier options if they find the school lunch unappealing. In one study, a researcher found that the fruits or vegetables made available at some schools were bruised and “nasty” looking (Neumark-Sztainer et al.1999). “Fresh” carrots served to students appeared dry or old.

Challenges in Promoting Healthy Eating

Teachers and food service personnel face many challenges when educating children on health and nutrition, and putting healthy food choices on the table, respectively.

Three examples of the challenges that teachers face include having too little time for so much information (Ling and lai-Yeung, 2011), spending more time on non-nutrition related topics such as sex education and substance abuse (Perez et al., 2007), and changing their students’ mindsets to eat healthier (Carson, 2010). One study examined the barriers to implementing a quality school lunch and providing nutrition education in Massachusetts's schools (Cho & Nadow,2004). Food service directors, administrators and other relevant staff

identified lack of funding and time, academic requirements, and students' preference for unhealthy foods as primary barriers (Cho & Nadow, 2004).

Some challenges faced by nutrition and food services may include the limited amount of time given for students to eat, providing food options that are healthy, yet less likely to go to waste, and food cost (Rida, Z., 2012).

Time, Waste, Food Cost

In high schools, the food service is responsible for serving hundreds to thousands of students within a limited time-frame. Moreover, it is typical for a student to seek the fastest food option in order to avoid long lunch lines, which are typically the unhealthiest foods. This is challenging because if students are in a rush to eat, they may bypass the healthier, warm entrees for the unhealthier options (Westervelt, E., 2013). In addition, if students are in a rush, they may not eat all of the items on their plate, which contributes to waste (Narducci, P. A., 1986).

Another challenge involves the financial budget that food service personnel have for purchasing food products. Food service personnel may have limited options for foods that are low in cost, despite there being healthier, more expensive options (Fresques, A.D., 2013)

In a study done by Drewnowski and Specter (2004), it was found that there was an inverse relationship between energy density and energy costs of food. Individuals, with a strained budget due to limited income, consumed less expensive foods to maintain energy intakes at a lower cost Drewnowski and Specter (2004). This may be applied to schools and the foods that they offer to students, especially since they have been faced with diminished

budgets every year for the last few years Drewnowski and Specter (2004). Many districts have attempted to reduce overall cost through labor cost: decreasing staffing and lowering equipment expenditures.

Many schools also have implemented centralized kitchens in which there is a much higher production volume of food at a lower cost. Although such foods are easy to prepare, they contain high levels of sodium, preservatives, and additives Drewnowski and Specter (2004). In their study, Drewnowski and Specter observed that few school meals comprised of base product foods or foods that were served in their natural state (2004). For example, many of the items were made from processed foods: canned chicken instead of fresh, canned fruit instead of fresh fruit, liquid nacho cheese, and mashed potatoes made from powder. Few items contain whole grains (Drewnowski and Specter, 2004). This shows that there is a challenge in providing healthy, palatable and low-cost meals in schools.

Other Challenges: Outside Influences from School

Food service directors and other staff identified lack of communication and leadership, lack of support materials and training, and lack of parental support as additional challenges (Cho & Nadow, 2004; Mosack, J., 2010). Also, other staff felt that the media focus on junk foods, and a lack of reinforcement of nutrition messages in the home and school (e.g. vending machines) were challenges to providing nutrition education (Cho & Nadow, 2004; Mosack, J., 2010).

As one can see, this shows the difficulty in creating and maintaining consistent environments in school.

Dietary Change

Referring back to Contento, dietary change is more likely when the physical environment is health promoting, so that personal decisions and motivations are supported and reinforced. This occurs when healthful foods are available and accessible in the workplace, communities and schools. "The environmental component can involve altering the physical food choice environment by such means as making changes in the foods offered in school meal programs and in workplace cafeterias, or increasing the availability of neighborhood markets" (Contento, 2007).

Creating a Healthy Food Environment

Important Role of Teachers

Teachers facilitate a healthy-eating environment by providing students with the necessary knowledge to make informed decisions in the cafeteria. Many studies have highlighted the effects of nutrition education on students' learning, behavior and decision-making (Cortez, L., 2012; Crawford, L., 2007; Sovyandhi & Cort, 2004).

Role Models; Guards Against Mixed-Messages

Since teachers are key role models for students, it is even more important that their actions and decisions in school reflect the information taught. In one study, teachers supported healthy-eating guidelines, yet continued to give out candies as a reward and serve unhealthy options at class parties such as pizza and ice cream sandwiches. This emphasizes the significance of both mixed nutrition messages and teachers as role models for students (Quintanilha, M., 2011).

Principals, Food Suppliers, and School Districts

Role of Principals and Food Service Managers

It is important to recognize the central role that school personnel have in shaping a school's culture, and the degree to which health initiatives are valued. Several surveys have examined the perceived barriers to health initiatives of school personnel. Principals and Food Service Managers specifically have involvement with significant barriers to providing healthy, nutritious meals in school (Cama et al., 2006).

Role in Food Cost

Principals and food service managers hold a great concern for keeping foods costs low, while still providing high quality and healthful foods. However, as mentioned above, unhealthy food tends to be cheaper and more convenient. In an Alberta study, principals described that it was very difficult to find snacks that were healthy and affordable, and above all that students liked (Quintanilha, M., 2011):

“So things are very expensive. We’re trying to – we have a couple of these vending machines and there’s one over there, we’re trying to implement healthy snacks. But finding a healthy snack is like – it’s so difficult.” (Principal)

Role in Waste

Every year, Americans throw three billion dollars worth of food into garbage cans (Narducci P. A., 1986). Of this food being wasted, 60% of it is identifiable as whole or partially consumed food items (Narducci P. A., 1986). A significant amount of waste has been noted on school campuses as well. In a study of plate waste of a University dining hall, it was

found that \$26,400 worth of a food was wasted in one semester at the dining hall (Narducci, P. A., 1986). It is important to note that there have not been many studies on waste at local high school campuses. Through implementation of waste minimization practices, district food service managers have the ability to simultaneously lower expenses and reduce disposal costs and provide nutritious meals. School districts play a vital role in reducing waste up to 40 – 60% through policies that decrease the amount of uneaten food, decrease or remove disposables, and implement recycling and composting (Food Service/Cafeteria Waste Reduction, 2011).

Role of Food Suppliers

Where do school districts usually get their food supplies? Companies that create and/or distribute food products for the local school lunch market make crucial decisions about the kinds and contents of foods they offer, based on their sense of market demand, feasibility, potential profits, and costs. These decisions also can result in more healthful meals for school children (Commodity Foods, 2008).

Commodity Foods and the Nutritional Quality of the National School Lunch Program

USDA Commodity Foods

The U.S. Department of Agriculture purchases agricultural commodities (unprocessed or partially processed foods) which are provided to schools at minimal cost (Commodity Foods, 2008). Often, USDA-provided commodities are less expensive to schools than their commercial products purchased on the open market by school districts because USDA can

take advantage of national bulk purchases and is watching the marketplace all year for good buys (Commodity Foods, 2008).

Importance to Schools

Schools may rely on USDA foods as an important resource for the National School Lunch Program since it frees up funds that schools would otherwise have to use to purchase commercial food products (USDA Foods, 2008).

State Agencies and Role Providing Nutritious Meals

The state agencies responsible for commodities are known as Distributing Agencies (DAs). DAs give out commodities to local school districts, which are called Recipient Agencies (RAs). These RAs ultimately serve the food to students as part of meals (Commodity Foods, 2008).

The Food and Nutrition Service (FNS) is an agency within USDA that governs the federal nutrition programs. The FNS determines the schools' share of commodity funds and FNS informs the state DAs of the projected amounts and kinds of available items, and the states are supposed to survey their school districts about what they would like, in what quantities, and on what delivery schedule USDA purchases commodities from vendors (Commodity Foods, 2008). Finally, a key part of the USDA commodity program is processing. Companies sign agreements to be allowed to process commodities and they write detailed specifications for their products so that school districts know what they are ordering (Commodity Foods, 2008).

State Distributing Agencies (DAs) make decisions about which products from the list

of items offered by USDA to bring into the state. States base this determination, to a greater or lesser extent, on school district orders and/or their perceived preferences. States may depend on individual school districts to order, or cooperatives made up of school districts, or even a commodity advisory committee made up of several local school food service managers (Commodity Foods, 2008).

Role of School District Guidelines

The Local District Nutrition Policy Guidelines originate from the National United States Department of Agriculture (USDA) Dietary Guidelines and the Texas Public School Nutrition Policy Guidelines. Compared to the national and state guidelines, district guidelines are much more stringent. According to federal law and regulations, school districts are under no obligation to choose particular foods or amounts of foods in their commodity orders (Commodity Foods, 2008). Their decisions can result in more healthful meals for school children. They do this by deciding which commodities to order and how much; which commodities to have processed; which companies to do business with, and which and how much of their products to order; and the nutritional content and specifications of the end products they want as a result of further processing (Commodity Foods, 2008).

Examples of Local Policies

All high school campuses are not allowed to provide food or beverages to students during meal times where meals are served or consumed (Nutrition, Fundraising, and Vending Policy, 2013).

Fundraising: Campuses are not allowed to sell food and/or beverages as a fund-raiser during the school day. However, there are three exempted days under the Texas School Nutrition Policy (Nutrition, Fundraising, and Vending Policy, 2013).

Vending machines: Vending machines must be turned off during meal periods (Nutrition, Fundraising, and Vending Policy, 2013). All campuses may choose 3 events in which students may participate in a pizza party, popcorn party, food fund-raiser, track and field, etc.. where food/beverages are provided (Nutrition, Fundraising, and Vending Policy, 2013). Individual teacher may not have pizza parties or food-fundraisers. These events are not allowed to be held in the cafeteria or areas where meals are consumed during meal times (Nutrition, Fundraising, and Vending Policy, 2013).

Other policy guidelines:

- Candy (including chocolate) may not be provided at any time in the classroom (Nutrition, Fundraising, and Vending Policy, 2013).
- Students may consume any food or beverage item that is provided by his/her parent/guardian. On birthdays, items from home cannot be provided to students in

the cafeteria during meal serving times (Nutrition, Fundraising, and Vending Policy, 2013).

Surveillance Plus National, State and Local Guidelines

Although teachers follow USDA nutrition guidelines due to the nutrition component of each course, it does not compare to the stringent rules placed on food service personnel (Nutrition, Fundraising, and Vending Policy, 2013). Food service staff must operate strictly under the guidelines set by national, state and local governance. Moreover, food services are under constant surveillance of the district coordinator of Health Services. This position monitors campuses compliance with nutrition policy. For example, the three exempted days (for events such as pizza parties) must be identified and submitted annually to the Coordinator (Nutrition, Fundraising, and Vending Policy, 2013).

Campuses that violate the rules are disallowed meal reimbursement by the Texas Department of Agriculture (TDA) for the week that the violation occurred (Nutrition, Fundraising, and Vending Policy, 2013). Additionally, campuses are required to reimburse the food service account for the lost reimbursement. In this case, TDA compliance monitors determine the severity and longevity of the violation by interviewing school staff to collect evidence about the violation (Nutrition, Fundraising, and Vending Policy, 2013). In the end, campuses are required to create a corrective action plan and are continued to be monitored to ensure compliance (Nutrition, Fundraising, and Vending Policy, 2013).

Working Together Towards a Healthier Cafeteria Environment

After describing the roles of stakeholders such as principals, teachers and food service personnel, it is easier to see that it is imperative for them to work in sync to achieve a successful healthy-eating cafeteria environment.

Cooperation and Staff Support

Cooperation and staff support from teachers, school administrators and food service personnel facilitate the implementation of healthy eating strategies that come from local district guidelines. Cooperation and staff support are best described in the following interview quote. This is taken from a study examining the challenges and facilitators of healthy eating in schools (Quintanilha, M., 2011):

“When the principal and the vice principal came across to us and said, ‘This is coming from Division. This is what we believe as a Division, it’s what we’re going to support – healthy eating, that sort of thing, this is how we’re going to do it.’ Nobody said, ‘It can’t be done.’ It was all, ‘What can we do to help?’ And, ‘What do you want us to do?’ And so I mean, there’s a few of us who are kind of the key people that are leading it right? But everybody else does so willingly. And they help and they’re supportive of it as well.”
(Teacher)

In this study, certain factors increased cooperation and support: a fairly young staff, passion for health and fitness, positivity and enthusiasm. Such factors facilitated the uptake of local district guidelines (Quintanilha, M., 2011). This further emphasizes how important collaboration between teachers, principals and food service personnel. Although policy-makers and the community are also essential stakeholders, my research focuses on the bridge between teachers and food service personnel.

CHAPTER 3: Methodology

As mentioned in previous chapters, obesity is a prevalent issue among children ages 2-19. School is a factor that may aid in reducing child obesity. High school grade levels are the primary focus of this study since it is where adolescents strive for independence and autonomy from parental monitoring, and begin to develop dietary patterns that are likely to transcend to adulthood. Since adolescents spend such a large proportion of their day in school and have one or two of their meals there each weekday, schools provide an ideal setting to positively influence diet and physical activity (Bauer et al., 2004).

While many schools offer opportunities for students to participate in programs that promote healthful nutrition and physical activity, such as the National School Lunch Program and the School Breakfast Program, physical education classes, extracurricular sports and health education, there may be aspects of school environments that prevent students from gaining the full benefits of these programs (Bauer et al., 2004).

Qualitative Analysis

To identify factors in interpersonal physical environments (classroom and cafeteria) that support or interfere with efforts to promote healthy food decisions in school, I conducted a qualitative research study involving interviews with health/nutrition-affiliated educators and food service staff, as well as a content analysis of nutrition instructional material and cafeteria food menus (March and April). The study was initially focused on

health education teachers. However, due to recruitment difficulties, the sample expanded to include any teachers with a health or nutrition-related component in their course.

This research offers an opportunity to hear from teachers and food service personnel about their experiences with, and perspectives on, nutrition and their schools' food environments.

Sample and Research Design

High School Characteristics

The study sample was drawn from three Austin Independent School District (AISD) public high schools in Austin, Texas. The high schools are low-, middle-, and high-income, respectively. Income was assessed using the percentage of students who were considered poor in 2011-2012 in school, which was based on the percentage of students who qualified for the Free & Reduced Lunch (FRL) program. FRL was the indicator and the percentage of students who were poor was the variable. The federal poverty line for a family of four was \$22,350 (Child Nutrition Programs – Income Eligibility Guidelines, 2011). For the purposes of confidentiality, the high schools were labeled L, M and H (signifying low-, middle-, high-income) from highest percentage of students in school considered poor to the lowest. Low-income schools fell in the range of over 80% of poor students, middle-income school fell in the range of 40-80%, and high-income schools fell in the range of less than 40% poor students (Jasani, S., 2013). In other words, in High School L, over 80% of students was part of

household that had an income at or less than \$22,350. Three high schools were chosen due to limited time and resources.

Participants

Six health/nutrition-affiliated teachers and 1 food service manager took part in the study, making a total of seven participants. All high school teachers taught a nutrition component in their courses: Health Education, Lifetime Nutrition and Wellness, Health Science and Family and Consumer Sciences. Although each course is very different in organization, lecture plans and content, it is still important to examine due to the nutrition component. There are several other courses that carry a nutrition aspect, however, I will only be talking about the ones pertaining to my study.

Two teachers participated from each high school. They were contacted using their high school's staff directory and invited to volunteer to participate in individual face-to-face interviews. One teacher at each high school also helped by recommending the names of relevant teachers. The teachers were also asked to have copies of nutrition-related instructional material (e.g., powerpoint lectures and the *Guide to Good Food* textbook) at the time of the meeting. All interviews took place at their respective high schools. The food service manager was contacted through the same method as the teachers; she was responsible for overseeing the nutrition and food services at High School L and High School M. The food service manager was also interviewed face-to-face. The district nutritionist and food service manager for High School H were unable to participate in the study due to a lack of communication.

Questions addressed in the teacher interviews were designed to solicit information about the positives/negatives of the education curriculum, positives/negatives of school food, challenges in teaching nutrition, and interaction opportunities with food service staff. Some examples of interview questions for teachers were as follows:

- What are the things that you like the most/least about the nutrition education curriculum?
- What kinds of guidance do you receive from state or ISD about lecture content in class, if any?
- What are the challenges that you face when you teach nutrition to students at your school?
- What do you think would help reduce these challenges?
- What is your opinion on the food selection at your school?
- What do you know about the district/school policies on food?

Questions addressed in the food service interviews were designed to solicit information about the positives/negatives (if any) of the nutrition policies, positives/negatives (if any) of school food, challenges in providing nutritious meals, and interaction opportunities with teachers. Some examples of interview questions for food service personnel were as follows:

- How are the food menus created? Do the menus vary from school to school or are they standardized throughout the whole district?
- What are the things that you like the most/least about the cafeteria food?
- What are the challenges that you face when implementing the food policies at your school?
- Are there opportunities for the classroom teachers and you/your staff to talk about what nutrition information is being taught in the classroom?

The interviews took approximately 30 minutes to complete and were audiotaped.

Interviews were not transcribed, but notes were taken. Verbal informed consent was

obtained from teacher and food service participants. All participants received a \$25 gift certificate from Restaurant.com, a local dining deals website, as an incentive for taking part in the study. The study was approved as an exempt review by the ORS at the University of Texas at Austin.

Data Coding and Analysis

I analyzed the instructional material (lecture powerpoints and selected chapters of *Guide to Good Food*) and interview audio recordings using the grounded theory approach (Bauer et al., 2004). The themes and matches/mismatches that arose during content analysis were identified to develop an understanding of the relationship between the nutrition education curriculum and cafeteria food menus, as well as its consistency dealing with explicit and implicit nutrition messages.

The nutrition information from the instructional material were divided into the major food groups as featured from *www.myplate.gov* (which follows USDA dietary guidelines): Fruits, Vegetables, Grains, Protein Foods, and Dairy. Nutritional information were also examined: carbohydrates (simple and complex) and fats (unsaturated, saturated, and trans fats). This information was further sorted into explicit and implicit messages (as defined by the literature mention in Chapter 2). Instructional material from the three high schools were evaluated altogether as a group, not individually. The instructional material consisted of lecture power-points from 4 teachers, and selected chapters from *Guide to Good Food* from 2 teachers. The material was organized by food category. Then a

matches/mismatches scheme was used to identify matches and mismatches of explicit and implicit nutrition messages.

Matches/Mismatches Scheme

To reiterate from Chapter 2, explicit learning is a form of conscious, intentional, and declarative process of knowledge acquisition. Implicit learning is a form of unconscious, incidental, and procedural knowledge acquisition (Yang & Li, 2012). A match was identified when classroom nutrition messages agreed with cafeteria messages. A mismatch was identified when classroom nutrition messages disagreed with cafeteria messages.

Instructional Material

Healthy and unhealthy foods were identified by noting the foods that teachers explicitly and implicitly conveyed as ‘should eat more of’ and ‘should eat less of’.

Some explicit messages in teacher’s powerpoints included direct text stating “the best source for Vitamin C are from citrus fruits such as strawberries and tomatoes” or “choose foods with unsaturated fats such as avocados over saturated and trans fats foods such as fried foods, pastries, and junk food.”

Some implicit messages included photos and pictures under phrases such as “healthy”, “good”, “empty calories”, “should eat”, and “eat less of”. Such photos consisted of specific foods (fruits, vegetables, meats, and grains), with some features of individuals with smiling or disgusted facial expressions. In particular there was a phrase with “You are what you eat.”

Next to the phrase, there was a child with a burger face eating a cheeseburger. This conveys a negative impression about burgers, which I considered in my analysis.

Food Menus: Frequency of Food Items

I also looked at the frequency of how often food items appeared on the food menus each day in comparison to total school days in a month. The purpose was to see if there were certain types of foods that were served more often than others. In order to measure frequency, I took note of all food items on the menus and grouped them into categories: Vegetables, Fruit, Grains, Protein Foods (entrees and sides included), and Dairy. Under these categories were the following subcategories: General food item (vegetable, fruit, grain, etc.), and Combo item (combination of two general items). The computer command CTRL + F was used to count how many times the certain food appeared on the food menu. The top three in each category were recorded.

Interviews: Themes and Matches/Mismatches

From the interviews, themes were identified by listening to the recordings and taking notes of significant topics/issues that participants explicitly said or alluded to.

CHAPTER 4: Results/Discussion

Content Analysis of Instructional Material and Food Menus

Both positive and negative trends were identified after analyzing interviews, and comparing lecture material and food menus. Positive trends consisted of matching nutrition messages between lecture material and food menu options. Four positive trends included the following: a greater amount of fresh, roasted, and steamed options than fried options, all whole wheat and grain options instead of refined grains, and all reduced fat/skim dairy products.

On the other hand, three negative trends were found which indicated nutrition message mismatches between classroom and cafeteria settings. The trends included the following: burgers, fries and pizza as daily food choices, limited options of fruits and vegetables, and a lack of interaction opportunities between teachers and food service personnel. Below I will discuss these trends more in-depth.

Classroom and Cafeteria Comparisons: Matches

More Fresh Food, Less Fried Food

On the food menus, there are less fried food options and more fresh, roasted, and steamed options. For food menus, the words 'fresh', 'roasted' and 'steamed' were repeated 46 times out of 16 days in March, and 62 days out of 21 days in April. The words 'fried' were repeated 5 times out of 16 days in March, and 5 times out of 21 days in April. As far as food preparation

and providing healthier food options, this demonstrated a match between classroom and cafeteria nutrition messages.

“Not many teachers eat at the cafeteria. But they have lots of choices now- kinda like collect a salad...pre-made salads.” – Teacher, Health Education, High School M

“They made a lot of changes. They do a good job of steaming their vegetables. The mixed vegetables have green beans, carrots, broccoli and cauliflower.” – Teacher, Family and Consumer Sciences, High School M

More Whole Grains, Less Refined Grains

Grains on the food menus also matched with messages in the classroom. Students are told to “eat more of” whole grain and whole wheat food options as opposed to refined grains every day. In the cafeteria, whole wheat bread and grains are offered. For example, the buns for burgers and bread for sandwiches are entirely whole wheat, as well as the rice. There are no white bread, pasta or rice options.

“It’s gotten a lot better, a lot healthier, they use wheat flour. They have a lot of choices.” – Teacher, High School H

Low-Fat Dairy Products

Dairy products on the menus also match with information taught in classrooms. For example, reduced-fat and skim milk, low-fat yogurt and cheese are offered every day. However, it is important to note that ice cream is still offered in vending machines.

Classroom and Cafeteria Comparisons: Mismatches

Despite the matches found between lecture material and food menus (more fresh food options than fried, more whole grains than refined, and all low-fat dairy products), three mismatches were identified: daily offerings of burgers, fries and pizza, a lack of diversity for fruits and vegetables, and a lack of interaction opportunities between the teachers and food service staff.

Burgers, Fries, and Pizza Every Day

Burgers, fries, and pizza were offered every school day. This contrasts to the information taught in classrooms where burgers and fries are foods that should be eaten less often. Moreover, they are most associated with high cholesterol, fat and calories. Pepperoni Pizza was not shown in the classroom as a specific food to eat less often, yet it was identified as the food option with the greatest amount of calories and fat content. One teacher brought up a good point that visual repetition of certain foods may make students less willing to try new, healthy foods.

“Sometimes, the more times that you see a food and the more times that it is offered to you, the more times you’re going to recognize it as something you want to eat. So if offered the same foods over and over again, they’re not really likely to expand their palate, and expand their diet, and get all of the vitamins and minerals that they need. So, I really wish there was more variety in fruits and veggies offered. Otherwise, everything is pretty good.” Teacher, High School L

This refers back to the literature, where research on taste preferences has found that repetition of food facilitates the acquisition of food preferences (Nutrition Australia ACT

Division, 2013; Birch, L.L., 1998). A different teacher also referred to improvements with salads as food offerings, but in a disappointing voice, added that pizza was still being served. She also mentioned that there were some food items that she avoided. They were unappealing to her because she did not know exactly how the food was prepared.

“They have chef salads and regular salads, but they still have pizza. Some foods I don’t like because of personal choice. I don’t eat a lot of their enchiladas because I don’t like combination foods that other people make. I don’t really know what they put in ‘em. I don’t eat a lot of their meat. Just because of personal preference.” Teacher, High School M

Lots of Choices, but No Diversity (within food groups)

Another finding was that cafeterias had a significantly smaller selection of fruits and vegetables than there were of main entrees (protein foods). In the classroom, it was emphasized that fruits and vegetables should comprise half of a student’s plate, and that one should eat from a diverse selection of vegetables. A diverse selection includes dark green, leafy, red and orange, dry beans and peas and starchy vegetables (kale, bell peppers, etc.) For example, the most common fruits and vegetable options were peaches, strawberries and pineapple, and broccoli, carrots, and potatoes, respectively. In contrast, there were 10 options for protein foods: Chicken Tenders, Chicken Burger, Hamburger, Cheeseburger, Fish Burger, Fish Burger with cheese, Pepperoni Rolls, Cheese Pizza, Reduced Fat Cheese Pizza and Pizza Sub. Overall, there was a greater number of different protein/main entrée options (chicken, beef, turkey, pork, fish, etc.) than fruit and vegetable options served in the cafeterias.

“ [It’s] not perfect, but there has been a lot of really good changes: comparing meals in mid 90s to now. There is a lot more choice, more whole grains, fruits and veggies, a lot less sugary foods, less chips, just a lot more choice. They have more freedom to choose, but there are lot of choices. You could go in there with knowledge and eat healthily. But breakfast should be better - more fruit, more diversity in the types of food. I feel like there are a lot of similar fruits and vegetables that are offered every day, not much wide variety – they don’t see a lot of that either.” - Teacher, High School L

Despite being visually presented every day, fruits and vegetables comprise a smaller variety and selection of the food menu. This relates to one study by Bauer et al, where students stated that they would have chosen to eat more fruits and vegetables if the offerings were greater in quantity and quality (2004).

Lack of Interaction Opportunities

Both teachers and the food service personnel were asked if there were any opportunities to interact with one another to discuss school food and food policies. While there were opportunities for collaboration among teachers, there were no interaction opportunities between teachers and food service personnel. This indicated a gap between the two departments.

Collaboration between Health Education Teachers

A small group of teachers gather and interact over the summer to create the curriculum for the following school year. Health Ed teachers still have the discretion to change certain topics depending if it pertains to their student population or not.

“Every summer there are a series of meetings where we administer surveys – what you like, what you don’t like. We then establish the curriculum from there. We improve it by keeping information updated –making sure that it is recent, and also

customizing it according to student population. What is taught in my high school may not be relevant to what is being taught in another school – for example, food stamp programs: “It’s not something we talk about, so maybe we don’t need to talk about it”. For health education, teachers over summer get together to write up curriculum for health teachers. But there’s still freedom to modify it. Like if something that’s relevant [in one high school] is not relevant over here, I have to change it.” – Teacher, High School M

Obstacles for Teacher-Food Service Interaction Opportunities

Many teachers expressed that opportunities to collaborate with the Food Service Department in sharing what nutrition is taught in class and what is served in the cafeteria would be beneficial. The responses showed that it would be helpful by increasing awareness of healthy food options, as well as the reasons behind such changes.

“I think it would be helpful to know the food policies so [students] know why that we don’t have vending machines anymore or high fat foods that used to be served in the cafeterias.” – Teacher, High School H

“There are Healthy vending machines – organic snacks like popcorn and kids love them. But nobody has made a point of showing that and talking about it. And there’s just one vending machine.” – Teacher, High School L

However, three main factors hindering such opportunities included: the separate structures of the departments, and time and effort.

Independent Departments

Education and Food Services are two individual departments that have separate objectives and tasks (outlined in the following chapter). This is one obstacle since there is no overlap.

[The two departments] are independent. The Food services department works under a food service company that does everything, so we’re not affiliated with them. They

are on their own by following USDA guidelines and guidelines for the district. There is no relationship because it is contracted out to some company. But I think it would be helpful (to collaborate). I have worked with them and the menu, but I'm not sure how much can be done since they follow guidelines for USDA and the district."

- Teacher, High School L

Not enough time and effort

This separation further leads the next two factors of insufficient time and effort. It is understood that both departments are largely different and independent of each other, so little time and effort are put into establishing a relationship. Different goals and tasks may also factor into conflicting schedules, further reducing opportunities for collaboration.

"We probably could (collaborate) if we had time. But there's just no time. I honestly wish we had time to do that. It would have to be before August." - Teacher, High School H

(On cooking foods in class) "There are interaction opportunities, but there isn't much effort put into it...[there is a] huge agriculture department – it would be cool to collaborate with them. They grow foods on their farm, so it would be cool to get vegetables from them because they always have excess vegetables." - Teacher, High School L

As demonstrated by Quintanilha, cooperation and staff support are important to facilitate the implementation of healthy eating strategies (2011). The comments made in this study indicate that building a more integrated relationship would be beneficial in reducing challenges faced by teachers and food service personnel.

Vending Machine Findings

Although the options in vending machines were not fully examined in this study, interviews revealed a few trends: removal of junk food, healthier, but more expensive options, and fewer vending machines.

Removal of Soda and High Calorie, Fat and Sugar Snacks

One finding was that all soda machines were replaced by Powerade and bottled water vending machines at each high school. A second finding was that previous snack machines were replaced by “Healthy” vending machines. One teacher and the food manager briefly explained the rationale behind removing some snacks over others:

“For at least 10 years, they went through the vending machines – if something had nutritional value, it stayed - if the first thing on the ingredients was sugar, like skittles or starburst, they kicked it out. Snickers has peanuts so they kept it in there. There’s only one healthy snack machine and then just Powerade and water.” -Teacher, High School M

“Vending was restricted by the district. There is a SHAC (Student Health Advisory Committee) and the SHAC director takes a look at what snacks are offered by companies and they choose which snacks meet the requirements for vending. No soft drinks like Mountain Dew. Snacks are limited the same way.” – Food Service Manager, High School L & M

Despite higher prices, healthier snacks (low calorie, fat and sugar content) are offered, such as pistachios and trail mix, as opposed to hot Cheetos or Hostess products.

Healthier Options, Higher Prices

Some teachers also referred to the cost trade-off of healthier food options. Although the snacks are healthier, they are more expensive.

“Any soda machines, they got rid of it. Based on high calories, sugar, fat. Only one health machine. It’s a little more expensive...” – Teacher, High School H

“One of my students went up to me the other day and asked if she could go get pistachios. And I said, where? She said she could buy them at the healthy vending machine, and I thought ‘Oh my gosh, they must charge a fortune for it’. But we got rid of sodas, and replaced snacks with healthy ones, so that’s great.” – Teacher, High School H

The concerns on the prices of healthy snacks was mentioned in Chapter 2, where principals remarked how snacks were both difficult to find and very expensive (Quintanilha, M., 2011).

Significantly Fewer Vending machines

A third finding was that there were a lot fewer vending machines compared to the past. For the most part, there were between 2-3 snack and beverage vending machines at each high school. There were three vending machines at High School H, two vending machines at High School M and three vending machines at High School.

Teachers' and Food Managers' Perspectives

Curriculum

Three positive aspects of the curriculum were that it promoted self-awareness and self-evaluation, allowed flexibility, and kept nutrition information up-to-date. Three negative/challenging aspects included: insufficient time to cover all nutrition topics, changing students' views on healthy eating habits, and convincing students that the body changes with age (long-term effects of an unhealthy diet).

“Sometimes we have too much information, so topics are killed” – Teacher, High School H

“I think they generally know how to eat healthy, they just don't understand the ramifications of it. I don't necessarily know the effect of education, but I've had some students say that they've changed their habits. They think, 'You're talking about somebody else, you're not talking about me. That's not going to happen to me.' – Teacher, High School L

“Trying to get them to understand that even though they are young and thin, most of them now, that doesn't mean that you're always going to be thin. That mentality, that metabolism...that just because you can eat everything that you want now, doesn't mean that you're going to stay thin, or that you're healthy.” - Teacher, High School M

As mentioned in previous studies, common teacher challenges were also limited time in covering all the topics suggested (Ling & Lai-Yeung, 2011), and the difficulty in changing student's mindsets about their body and eating healthier (Carson, D., 2010).

Food Service Personnel

The food service manager was not familiar with the nutrition information taught in classrooms.

School Food

While a majority of participants typically bring their own lunch and do not eat at the cafeteria, they believe that the food has improved greatly.

Teachers

All teachers agreed that there were more whole grains than refined grains, more choices and fewer high-sugar and high-fat foods. Some teachers did not hold any strong opinion for the cafeteria food, besides knowing that it generally has gotten better.

“Not many teachers eat at the cafeteria. But they have lots of choices now- kinda like collect a salad...pre-made salads”. – Teacher, High School M

“It’s gotten a lot better, a lot healthier, they use wheat flour. They have a lot of choices.” – Teacher, High School H

“They made a lot of changes. They do a good job of steaming their vegetables. The mixed vegetables have green beans, carrots, broccoli and cauliflower.” – Teacher, High School M

Food Service Personnel

The food service manager pointed out three positive aspects of the school food: lots of fresh food choices, better preparation of vegetables (steamed options), and flexibility to customize/modify food options according to the student population.

“There is a lot of fresh produce. A lot. We have a lot of canned fruits and vegetables. We steam a lot and offer a lot of fruit.” – Food Service Manager, High School L & M

Food Policies

When asked about food policies, all participants agreed that their school food policies were good and all teachers showed some, but not complete, familiarity with them. There was less familiarity with vending policies. However, two teachers mentioned some significant disagreements with Fundraising. All participants mentioned concerns with Open-Campus Food Policies.

Selling Unhealthy Snacks at Fundraisers

Organizations are only allowed to sell food after school, but often times, it consists of unhealthy options.

Teachers

Two teachers remarked of the mixed-messages that may result from selling unhealthy snacks at fundraisers.

“Our groups try to raise money for afterschool sales: they have sodas, chicken rolls and pizza rolls. Chicken rolls are really high in fat. Can’t sell during school but after school. Orgs know that students will buy them, so they sell them. The cafeterias are doing a good job of serving healthier food, but then organizations sell those foods... they’re getting a double-message of ‘Oh, that’s okay to eat’. I think we’re defeating the purpose a little bit there.” – Teacher, High School H

“That’s one of things that I have issues with is when they have fundraisers, selling candy bars, things like that, sometimes chips, things that are really unhealthy...there was one that sold frito pie, nachos...there was even one with bacon. I’ve tried talking to principals but they haven’t gotten far with it.” – Teacher, High School L

Allowing Seniors to Eat Lunch Off-Campus

Each high school has an open-campus food policy during lunch. Seniors are allowed to leave campus and eat, where they have access to unhealthy food options in surrounding fast food restaurants.

Teachers

Some teachers referred to the open-campus food policy as a great obstacle for getting students to eat healthier at school.

“One of the issues we have here is that seniors can leave to get lunch. A lot of people frequently leave during lunch. Not every day but frequently, so fast foods are everywhere, you know, because of low-income neighborhoods, so that’s what they’re going out to get. If I were to make a change, lunch would be closed and everybody would have to eat here.” – Teacher, High School L

Food Service Personnel

While claiming that the current food policies are a good guideline and goal to promote nutritionally-balanced meals, it would be even more beneficial to enforce a decent lunch schedule and a closed-campus food policy. During the interview, the manager mentioned three significant challenging aspects of ensuring nutritious meals. These aspects included the following: labor cost, food cost, and waste.

Labor Cost: Labor cost rises when there is insufficient time for students to eat their meals. When there is a limited amount of time to serve all students, there is a need for more lunch lines. Consequently, more people must be hired. However, labor cost increases because

there was an increase in the number of employees while the same number of students are being served.

“There is one lunch per high school. If you force to jam all students in one 45 minute lunch, then that means more lines, and more employees. We don’t hire for 1 hour shifts, we hire for 4 hour minimum. The same number of students with more employees means increased labor cost.” – Food Service Manager, High School L & M

This issue of labor cost is also reflected in a previous study done by Drewnowski and Specter (2004), where schools with a strained budget and limited income have attempted to reduce overall cost through decreasing staffing and lowering equipment expenditures.

Food Cost - Quality vs. Quantity: One of the significant challenges of food managers is purchasing healthy and inexpensive food items for students’ meals. However, often times, they are not one in the same. Better quality items tend to be more expensive, while lower quality items tend to be the least expensive.

“On items like ground beef and chicken patties, it would be great to have a little bit more money to spend for better quality – not the lowest price. Take turkey taco meat, for example. Some looks great, some looks like mush, like a blob where you can’t see the defined meat. It would make a big difference. You’re feeding more students because you have a better quality product. It may cost you 2 more cents per plate and you think that the food cost will go up, but food cost is based on number of people you serve and how many plates are going out and how much waste you have.” – Food Service Manager, High School L & M

Increased food cost is also related to waste, as discussed in Chapter 2. Another challenge involves the financial budget that food service personnel have for purchasing food products. Food service personnel may have limited options for foods that are low in cost, despite there being healthier, more expensive options (Fresques, A. D., 2013). In previous studies, many

schools opted to produce a higher volume of food at a lower cost. Yet many of the items purchased were lower in quality such as texture and less healthy. For example, the foods were made from processed foods: canned chicken instead of fresh, canned fruit instead of fresh fruit, liquid nacho cheese, and mashed potatoes made from powder (Fresques, A. D., 2013).

Less Familiarity, More Waste: While there are a lot more healthy food options in the cafeteria, some of these foods are still not accepted very well by students. This results in students throwing away certain foods. For example, although breads have transitioned to whole wheat options, it is not something that students are familiar with - especially back home.

“Overall, the policies are good in theory because of the reasons behind them. But it increases the food cost so much. And when it is designated that they must take a fruit or vegetable for a reimbursable meal – that’s where you see a tremendous amount of waste. I see it every day in high school – ‘Ugh, whatever’, they take the fruit or vegetable and dump it in the trash. They think ‘Oh, I really just wanted the pizza’ and then they throw it away.” – Food Service Manager, High School L & M

This indicates a new finding where requirements from local guidelines and principals contribute to waste and increased food cost. In addition, the food service manager faced challenges from the principal’s stipulation of serving times (how many plates go out, and how much time you have to serve them). For example, the manager explained that a 45 minute lunch may be allotted for 27,000 students, yet the principal’s goal is to serve 50% of students within that time frame. This contrasts to previous studies because in order to

accomplish the 50% goal, principals must increase labor cost by hiring more people to serve, which is not preferable by food service managers (Drewnowski & Specter, 2004).

Main Point: A Gap Between Curriculum and Policy

Although there are several matches between the cafeteria and classroom, the mismatches found in food options and interaction opportunities indicate an apparent division between nutrition education curriculum and nutrition policy.

That being said, one main question remains: *why* do we see these mismatches? I propose that an answer lies in the separate goals and tasks of the education and food service departments. For example, teachers must ‘teach to the TEKS’ and the food service staff are subject to USDA/Texas/District guidelines, and the interests of both principals and food suppliers’ interests. These different objectives are a contributing factor as to why mismatches occur. In the next section, I will further discuss the driving force behind such trends.

CHAPTER 5: Analysis of Jobs, Goals and Tasks

The mismatches found in food options and interaction opportunities may be explained by the gap between the education department from the food and nutrition department. Each department functions as a separate entity where goals and tasks are independent from one another. Moreover, they are directed by different authorities. Below, I will further explain the goals and tasks of teachers and food service personnel, as well as what each job entails.

Every Day Practices of Educators and Food Service Personnel

Teachers: *“Teach to the TEKS”*

One goal of health/nutrition educators is to cover material according to the Texas Essential Knowledge and Skills (TEKS) of the Texas Education Agency (TEA). The TEKS provides a standardized curriculum arranged into various subjects or chapters (e.g., English Language Arts and Reading, Physical Education, etc.). They are the state standards for what students should know and be able to do from prekindergarten to 12th grade (separated by elementary, middle school and high school) (Texas Essential Knowledge and Skills, 2012). In my study, the health/nutrition-affiliated teachers taught a nutrition component in their courses: Health Education, Lifetime Nutrition and Wellness, Family and Consumer Sciences and Health Science. The specific TEKS typically used for these courses are Health Education and Human Services.

Examples of State Standards

Health Education, Lifetime Nutrition and Wellness, Family and Consumer Sciences and Health Science share one common goal: helping students to acquire the information and skills necessary to make informed, healthy choices and reduce health risks throughout their life. Some of the expected skills that students learn include: recognizing and utilizing health products, classify nutrients and their functions, compare personal food intake to recommended dietary guidelines, prepare nutritious snacks or meals through the life span, and identify wellness strategies for the prevention of disease (Texas Essential Knowledge and Skills, 2012). More about each course may be found at the TEA website (Texas Essential Knowledge and Skills, 2012).

Discretion and Flexibility with Curriculum

Teachers still have much discretion in deciding what they teach in class, as long as all TEKS topics are covered. For example, they are able to add or modify topics to better suit their high school's student population. On the district level, there is flexibility in modifying the TEKS curriculum. For instance, one AISD teacher decided to cover food trailers since many of her students ate food from them. As mentioned earlier, a summer committee of health education teachers collaborate and discuss curriculum changes that they would like to implement for the next year.

Food Service Personnel: “*Follow the Guidelines*”

The goals and tasks of food Service personnel follow the policies established by the National United States Department of Agriculture (USDA) Dietary Guidelines, as well as State and Local guidelines. The policies become more stringent as it is filtered from the national to the local level (Food and Nutrition Service, 2012; Texas Public School Nutrition Policy, 2010).

Main Goals

The main goal of the Texas Public School Nutrition Policy is to “promote a healthier environment in schools” with the help of federal Child Nutrition Programs such as National School Lunch Program (these policies supplements federal policies of the USDA) (Texas Public School Nutrition Policy, 2010). The goal of the National School Lunch Program is to “serve healthy, low-cost or no-cost meals to millions of Texas students in public and non-profit private schools” (Nutrition Standards for School Meals, 2012). Other goals include “offering fruits and vegetables as two separate meal components every day, and increasing whole grains while decreasing calories and sodium” (Nutrition Standards for School Meals, 2012).

District Nutritionist and Food Service Managers

Two important positions dealing with local nutrition and food policies are: nutritionist and food service manager. Although I could not interview the AISD nutritionist

and a second food service manager, I was able to collect sufficient information on the goals and tasks of each position from one interview (Food Service Manager, High School L & M).

District Nutritionist

The Nutrition and Food Services nutritionist is responsible for creating the food menus for the entire district. The nutritionist also works with different managers from elementary, middle school and high school levels in testing recipes to ensure that it meets the requirements of local district rules on nutrition and food policies. These policies are filtered from the National USDA food guidelines, to Texas Nutrition Policy guidelines to local district guidelines – which are more stringent than National guidelines.

The Nutrition and Food Services Department purchases products and the department nutritionist analyzes recipes by looking at servings requirements for carbohydrates, fat and sodium. The nutritionist also collaborates with a departmental chef to help create recipes that meet the requirements. In addition to menu writing, the nutritionist produces the planning production of menus (e.g., how much is served on a daily basis; how many plates to produce according to student population preferences). Afterward, a menu committee consisting of food managers meets to discuss different options and combinations of the day.

Food Service Manager

In AISD, there are multiple food service managers that supervise at the elementary, middle school and high school levels. Their job is to make sure that all of the menus within their assigned area are standardized. For example, the job is analogous to a restaurant chain where there are multiple restaurants, yet each have the same menus. The area supervisor has

the discretion to modify how much to order for food supply. For instance, one high school population may like one entrée more than another high school. The food service manager will order a greater amount of food supply for that entrée at the first high school than the second school.

Unlike teachers, personnel have limited flexibility within their daily tasks. The food service managers may choose certain seasonal fruits and vegetables according to their student population's preferences. For example, a high school may serve bananas, grapes and watermelon four days week while another would serve it less than four.

This relates back to Chapter 2 where State Distributing Agencies (DAs) base what USDA food items they will bring into the state on school district orders and/or their perceived preferences (Commodity Foods, 2008). In AISD, the school districts order food items themselves through the collaboration of several local school food service managers (Commodity Foods, 2008).

Identifying and Understanding the Gap

The trends seen in the lecture material/food menu comparisons indicate a strong disconnect between two departments: Education and Food Services. This is because each department's priorities are from separate guidelines set by independent entities. Yet one factor that is key to understanding this classroom-cafeteria gap is that the food services department at each high school caters to the interests of three main groups: Principals, food suppliers, and Austin ISD.

Significance of Principals

In Austin ISD high schools, labor cost is influenced by the principals' interests. As mentioned in Chapter 2, labor cost is a significant challenge for food service managers. Many districts have attempted to reduce overall cost through labor cost: decrease staffing and lowering equipment expenditures (Drewnowski & Specter, 2004). This is no different for managers in AISD. Moreover, labor cost typically gets higher from elementary to high school level. In my study, it was found that labor cost is influenced by the directions of principals. For instance, principals stipulate serving times for the lunch schedule. This means that they decide how many plates go out, and how much time is allotted to serve the meals.

To illustrate, an average AISD high school contains one 45 minute lunch and 27, 000 students. The principal's goal is to serve at least 50% of the students within that time frame. However, this goal is feasible if there are more serving lines. More serving lines mean more people to hire and more money to pay for all of the employees. Essentially, labor cost rises because the school is paying more food service employees to serve the same amount of students.

No previous studies were found that mentioned principals stipulating lunch periods. Perhaps it is only within AISD, however, more research must be done to investigate this practice. Regardless, this emphasizes the principal's key role in providing an effective food and wellness policy (Cama et al., 2006).

Significance of Food Suppliers

In AISD, food cost, and quality/quantity of food are influenced by the interests of food suppliers, or vendors. As mentioned in Chapter 2, both principals and food service managers face a challenge of low cost and high quality foods (Quintanilha, M., 2011) The influence of food suppliers is most seen during a process that the AISD food service manager called 'bidding'. Suppliers and the bidding process are powerful driving forces as to what quality and brand of food that students are served.

The Bidding Process

Firstly, the district chooses the student health advisory committee and the director of student health department, and they take a look at the snacks that the companies select. In terms of cafeteria food options, there are food bids that occur annually. Bid speculations (specs) are typed up on a website where vendors may look at what food products the district is looking for. For example, the SHAC and SHAC director may post that a 2-inch breaded chicken patty with a certain amount of sodium is wanted. The bid is then sent out to vendors and anybody may bid on products that they would like provide to the district. All bids are tabulated and publicly seen. There may be 2 people bidding on the chicken burger, as 10 people are bidding on ground beef. This relates back to Chapter 2, where vendors process commodities and write detailed specifications for their products so that school districts know what they are ordering (Commodity Foods, 2008).

Out of those bids, the three lowest priced bids are tabulated. These vendors then bring samples of their product if it has not been tested or approved in the district before. The

products are tested with the student population and the food service and student health department receive feedback from students. A valid reason must be given if a product will not be purchased for the district, even with the products that did not have the lowest priced bid. It is a long process that starts in January until May.

Implications of the Bidding Process

This brings about a significant challenge because the lowest priced product from a certain vendor may not be of the highest quality to serve to the students. The AISD food service manager also mentioned that she tended to have issues with low-priced products since she would observe poor palpability and appearance. This is especially with main entrees, which comprise the center of the plate. For example, the lowest price turkey meat may not be eye-appealing and have a mushy texture, while a higher priced turkey meat may look more appealing and have a defined texture. Additionally, although the food service department has flexibility with ordering fresh, seasonal vegetables and fruit, these products are not usually from large companies and are outside of the bidding process. As highlighted in the literature review, principals stated that it was very difficult to find and implement healthy snacks for students because of what particular vendors sold (Quintanilha, M., 2011).

Significance of the District

In AISD, waste is influenced by local district dietary guidelines. Although the nutrition and dietary guidelines must comply with National and State guidelines, they are a contributing factor to waste. As stated by the AISD food service manager, “When students are required to take a fruit or vegetable, or any menu item that they do not want, it leads to

tremendous waste”. In addition, students are more likely to throw away or refuse to eat food items that are least familiar to them. It is least familiar to them especially if the food items are not eaten at home. At High School L, whole wheat bread and grains were not accepted very well due to this reason.

In other words, when the district attempts to introduce a new fruit or vegetable to the students which they do not eat regularly, it creates a significant amount of waste. As mentioned in Chapter 2, food service managers play a direct role in waste minimization practices (Food Service/Cafeteria Waste Reduction, 2011). Considering this, not many studies have focused on the issue of waste in relation to school district guidelines. However, this topic only pertains to the high schools that participated and may not apply elsewhere.

Ways to Reduce Challenges & Promote Dietary Change

If the school environment cannot change, then what can?

When the participants were asked what could help reduce their challenges in promoting healthy eating, there one overlapping theme that emerged: the influence of family and home life.

Relevance of Family and Home Life on Dietary Habits

“[It]’s not just what you eat, but what habits you have that affect your health. For example, if you’re always busy, you’re always on the run, or how many times you actually sit down with family to eat and have a meal. Do you help plan the meals? Do you have set meals?” – Teacher, High School M

“Most kids don’t have etiquette because they just eat in their rooms [laughs]” – Teacher, High School M

“Caregivers and parents are children’s role models. They should watch what they eat too.” – Teacher, High School L

“I think the reason is because a lot of kids aren’t raised with vegetables or the right ones. Keeping attention span for an hour and a half classes.” Teacher, High School H

“In high school, you see it every day - students are more likely to throw away or refuse to eat food items that they are the least familiar with...especially if these foods aren’t eaten at home.” – Food Service Manager, High School L & M

(on health-conscious parents) “I don’t know if [students] can change [their diet] if they don’t have any control on what their parents buy.” – Teacher, High School M

Relating back to the literature review, one significant interpersonal environmental factor included parental upbringing. Not only is the family a mediator for providing food, it affects eating habits through food attitudes, preferences and values (Neumark-Sztainer et al, 2002).

Moreover, food preferences are established at an early age and parents are able to influence preferences for healthy foods by facilitating familiarity through repetition. At older ages, family and home life may further affect children’s food preferences and dietary habits by eating home-cooked meals rather than dining out, and coordinating schedules to eat dinner together (Neumark- Sztainer et al, 2002).

In addition, peer influence was identified as a significant factor in reducing challenges and promoting dietary change. One teacher described a story of her niece going to college and being influenced by her peers:

“[my niece was] a choir girl in high school, never ran... but she went to college and said, ‘everyone works out here and runs’, so she should start. She’s like, ‘I want workout clothes for Christmas’ (laughs) I think it helps when they have friends, or people they are surrounded with, who are into health and are into fitness”. – Teacher, High School H

Other suggested ways to reduce challenges:

For teachers, two repeated suggestions were made to help reduce challenges in relation to changing student's mindsets: increasing self-awareness and self-evaluation. While teachers stated that personalizing nutrition information was a good aspect of the education curriculum, it was also an area that they would like to see more improvement on. For example, one teacher liked the idea of inviting guest speakers such as local nutritionists, food scientists and dieticians for class.

"I would like to incorporate more speakers, just to relate more to real life – inviting teachers, or inviting the science teacher from across the hall so kids will learn how food is digested. The problem is just matching teacher's schedules with each other. Because they're busy too. More speakers is always good." – Teacher, High School M

Other teachers discussed beneficial that made nutrition information relate to students' personal experiences, further increasing self-awareness and self-evaluation:

"We pull in personal struggles and talk about bad habits. I try to get them to think about the choices they make in life and why they make them." – Teacher, High School M

"I try to make [the lessons] as personal as possible. I put it into perspective. Like, for every soda, how long does it take to burn off 30 calories -- you must do like 3 hours of running. I mention stuff that I know that they eat, and I try to show them why it is unhealthy, so they can relate. I usually show them a documentary on fast food chicken, which isn't really chicken." - Teacher, High School H

"[The curriculum] is really focused on them, and they can apply it to their own lives. It helps to personalize it for themselves and understand the ramifications of an unhealthy diet...since we have kids already with diabetes and hypertension." - Teacher, High School L

CHAPTER 6: Conclusion

Summary

Both matches and mismatches were identified after analyzing interviews, and comparing lecture material and food menus. Matches consisted of matching nutrition messages between lecture material and food menu options. Four matches included the following: a greater amount of fresh, roasted, and steamed options than fried options, all whole wheat and grain options instead of refined grains, and all reduced fat/skim dairy products. However, three mismatches were found which indicated nutrition message mismatches between classroom and cafeteria settings. The mismatches included the following: burgers, fries and pizza as daily food choices, limited options of fruits and vegetables, and a lack of interaction opportunities between teachers and food service personnel.

Recap of Department Differences

On one hand, teachers are tasked to provide the necessary knowledge for students to make healthy food choices and must follow the TEKS. On the other hand, the nutrition and food service personnel are tasked to provide healthy food options for children and must follow USDA/State/Local Nutrition Guidelines as well as comply with TDA regulations.

Although teachers' TEKS are based on the USDA guidelines, job priorities are set to teaching to the TEKS and getting students to internalize information 'just getting them to think about it'. Teachers have more flexibility in curriculum, yet the only flexibility granted

to food service personnel is either increasing or decreasing food supplies at each high school, depending on the demand of certain foods. Food services have very little room to deviate from guidelines. This is because food service personnel's goals and tasks revolve around the control and interests of other groups: principals, food suppliers and Austin ISD. To illustrate, food cost and items are influenced by the prices and choices offered by food suppliers. Principals stipulate serving times for lunch which contributes to labor cost. Finally, strict AISD dietary guidelines also influences the large amount of waste seen in schools.

It is important to note that the results should not be generalized to other public high schools. These results only pertain to the 3 high schools within AISD in Austin, Texas. This is valuable to future research since there have not been many studies focused on AISD High Schools.

Bridging the Gap: Reducing Challenges

Although there are challenges that are individual to each department, I believe the biggest obstacle involves both departments: the lack of interaction opportunities. Increasing opportunities for collaboration may help reduce such challenges. Below, I make a couple of suggestions for AISD high schools.

Education and Food Services Coalition

One interaction opportunity would be to establish a committee which consists of members from both the Education and Food Services Department. This coalition may meet at the end of the academic school year to discuss ways to better provide nutritious meals and

educate students on healthy-eating. From the three high schools involved in this study, many participants agreed that more interaction would be beneficial. In addition, some teachers commented about what changes they would like to see in the school food environment. For example, more diversity in fruits and vegetables.

School Gardens

Another interaction opportunity would be through School Gardens, where students may grow their own fruits and vegetables. This is a great and fun way to teach students about organic foods, and preparing and choosing healthy fruits and vegetables. At the same time, the food services staff may also use the grown fruits and vegetables for school meals. This may reduce food cost since it is locally sourced. In addition, teachers and students would be more knowledgeable of the food items served in the cafeteria, and more willing to eat at school.

There are some Austin elementary schools that already have school gardens. One in particular is The University of Texas Elementary School. It is a charter school, meaning that it is independent of the school district. The school gardens have been used to promote healthy eating habits among the student population and their families (UT Elementary, 2011). They have also served to teach students about environmental conservation, as well as social and emotional learning (UT Elementary, 2011). Despite its independence from the school district, public schools in Portland, Oregon and Fairfax County, Virginia have successfully implemented Farm to School and School Garden programs (Hayes & Berdan, 2013). While my suggestions focus on the School domain, it is important to note that Family

and Home life are also essential to the success of implementing healthy-eating strategies in school.

Limitations

Interviews

One limitation was that not every nutrition-affiliated teacher was able to be interviewed. In addition, only one food service manager was interviewed. The research would have been more thorough if all nutrition-affiliated teachers and all relevant food service personnel, including the District Nutritionist, were interviewed. Expanding the sample size would have helped provide more concrete matches and mismatches especially with perspectives and attitudes. There was also an opportunity to ask more about the content of the general cafeteria food items (fresh fruit variety and pacific vegetables), and to further investigate the repetition of burgers, fries and pizza every day. It would have also helped to obtain the nutrition and contract information of vending machine snacks.

Instructional Material

Another limitation was that only lecture powerpoints and a textbook were examined. Teachers gave names of nutrition-related videos and movies, but there was insufficient time to evaluate each one. This would have given more insight into the explicit and implicit nutrition messages shown in the classroom.

Food Menus

Another limitation was that only March and April cafeteria menus were examined. This was because the Austin ISD website only provided the menus for two months at any given time. The findings in this study would have been stronger and held more weight if all of the menus from August to May were examined. Since fruits and vegetables offerings may vary seasonally, the findings on mismatches could have changed. For example, perhaps there is a greater variety of fruits and vegetables during certain months compared to others.

Other Factors That May Give More Insight to Mismatches

Income

Although income level was used to select the participating high schools, it was not a main component of this research. During interviews, some teachers indicated that they were aware of the income level and socioeconomic status of their high school's student population. The food service manager could have been asked questions involving the financial budget at their high school. However, the limited amount of time was taken up by other questions. It would have been very helpful to study how income level affected the cafeteria food offerings. Additionally, there may be differences in implementation based on income. For example, high schools with a higher income student population may have had more money to spend on food and labor, meaning better options and less waste.

Student's Attitudes

Gathering some students' perspectives and attitudes towards school food and healthy eating would have given more insight into the school food environment.

Recommendations for Future Studies

Overall, there are a handful of items that future related research may consider. Future studies may expand the sample size to include elementary and middle schools as well to potentially discover differences in food choices. In addition, videos, movies, posters in the classroom, and the nutritional information of vending machine snacks and beverages may be included for further content analysis. Lastly, looking at gender differences between student's attitudes toward health and nutrition may give more insight into how children make certain dietary choices.

Final Comments: Keys on Achieving Healthy-Eating Environments in School

As one can see, teachers and the food service have separate goals authorized by different authoritative institutions. Such differences may account for the lack of interaction opportunities and relationship between the two departments. However, it is necessary for both to come together in order for a complete, healthier environment to exist.

It is one story to have such goals/tasks from the education curriculum and nutrition policies, yet it is another to achieve a health-focused school culture. That being said, successful implementation should not only be fueled by the cooperation and support of teachers, principals and food service personnel, but also of school board members, parents and community members.

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