AN ASSESSMENT OF FRUIT OFFERINGS FOR 7TH AND 8TH
GRADE STUDENTS IN TEXAS

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Childhood obesity in America is reaching epidemic proportions. This study explored whether daily online lunch menu information was sufficient to enable parents to advise their children about healthy and unhealthy menu choices in 350 Texas middle schools and whether online menu information strongly correlated with the descriptions of the offerings given by 52 school cafeteria managers in telephone interviews.

Although schools are making efforts to describe their offerings, they are not vigorously taking advantage of the opportunity to aggressively inform or educate. They are not coding their descriptions in such a way as to explicitly brand food as healthy or unhealthy. They are also not labeling food as generally required by law for consumer services that provide food (except for the fresh produce that lines supermarket shelves). Instead, they only briefly describe what they are serving in the way of fruit in one or twoword snippets. Finally, cafeteria managers’ online descriptions were inconsistent with what they described in interviews. Online and verbal descriptions were sometimes contradictory, raising questions about the accuracy of either type of description.
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CHAPTER 1
INTRODUCTION

This study is an inquiry regarding the fruit options presented in online daily lunch menus on Texas middle school websites. I performed a content analysis of the wording of online menus to determine what nutritional information, if any, accompanied the fruit dishes being offered. I also analyzed whether the online menu postings were accurately mirrored by the cafeteria managers’ responses to supplemental telephone interviews.

Guidance from the Middle School Cafeteria

Many middle school cafeterias publish online menus advising students of their daily menu offerings, sometimes giving interpretive or even educational descriptions in some detail. The United States Department of Agriculture (USDA) states online menus are the most important tool for cafeteria managers to communicate to their students. Some cafeterias provide labels such as those following the USDA’s voluntary child nutrition (CN) labeling program guidelines (USDA Food and Nutrition Service, 2012), and they position them right next to a food item being offered in the cafeteria and close to the checkout line. These labels typically contain key nutritional information such as calories, fat, nutrients, serving size, and USDA serving recommendations, similar to the labels seen on many packaged foods in the supermarket. The CN labeling program applies to both traditional and enhanced food-based menu planning because CN labels on products show the product’s contribution toward meal pattern requirements (USDA Food and Nutrition Service, 2012). Other information may be placed more remotely, for example, in the school newspaper, in display cases in the hallways, on flyers in the school office, in graphic displays in the cafeteria, or online on the school’s website.
Online Cafeteria Menus

This study focuses on the online cafeteria menus published by a random sample of 350 Texas middle schools. Today’s middle school menus resemble commercial restaurant menus in that they contain general descriptions of what will be served daily in the middle school cafeteria, but do not provide explicit, detailed nutritional information. Evaluating such a menu involves speculating about, for example, whether “fresh fruit” means fresh-picked, fresh-frozen, fresh-sliced, fresh out of the refrigerator, fresh-served, fresh before cooking, fresh-blanced, fresh-stewed, fresh-dried, fresh-caramelized with sugar, “fresh” meaning not left over, “fresh” meaning not bruised, “fresh” meaning not rotten, or “fresh” meaning not old, among other possibilities. In other words, the general expression “fresh” can be interpreted to mean many things, and because general descriptions are open to considerable interpretation, there may also be uncertainty about the kind and extent of processing, what ingredients the food may contain besides fruit, and how much caloric impact per serving it may have, among other concerns. In 2010 the US Congress passed and the president signed into law an important technical amendment to the Federal Food, Drug, and Cosmetic Act known as Section 4205, Nutrition Labeling Standard Menu Items at Chain Restaurants (HR 3590, 2010). Categorically and figuratively, this was an extension of the Nutrition Labeling and Education Act (NLEA) of 1990, which required food manufacturers to provide nutrition information on nearly all packaged foods after 1994, and which was subsequently amended to become more similar to the broad-based labeling which most shoppers are familiar with today (National Restaurant Association, 1996).

Even though middle school cafeterias are not yet subject to the new national law or to a similar law that would require nutrition labeling of menu items for restaurant chains, they may be subject to the spirit of the law, because it may be just a matter of time before public school
cafeterias in all localities in all states will be required to abide by similar standards since most public schools are publically-owned facilities as well as being a part of the US government’s school lunch program. It may be just a matter of time until public school menus must be changed because disclosure in menus has clearly become the trend. If public school cafeteria menus are not as yet regulated by the federal government, then they may soon be regulated by states and localities such as the following, which have already established their own more specific standards for state and local property (Greene, 2010): State of California (California Health and Safety Code, 2008), New York City (New York City Board of Health, 1996; 1998), Philadelphia, Pennsylvania (2008), San Francisco, California (2008), and Seattle, Washington/King County (2008). The 2010 law is just beginning to be enforced by the US Food and Drug Administration (FDA) for large restaurant chains that own more than 20 outlets under one name, and will require point-of-purchase nutrition labeling for all items listed on restaurant menus (Center for Science in the Public Interest, 2012). Proponents of the law have openly stated that they hope these laws spread everywhere and that they will become instrumental in encouraging restaurants to offer healthier alternatives that may be instrumental in lowering obesity (Burton, Creyer, Kees, & Huggins, 2006 as cited in Robert Wood Johnson Foundation, 2009).

Menu labeling and individual dish labeling, online or elsewhere, are clearly creating a greater degree of nutritional disclosure, but they are only one step toward meeting the larger challenge of educating students about healthy nutrition practices. At present, nutrition education is covered only minimally or in a general way in public schools or other outlets. Consumers have been found to be poor judges of the caloric and fat content of foods (Chandon & Wansink, 2007; Burton, Creyer, Kees, & Huggins, 2006, as cited by the Robert Wood Johnson Foundation, 2009). It is not hard to believe that they are also poor judges of other nutritional factors as well.
In addition, even when comprehensive labeling has been implemented in restaurants, research has been mixed as to the ability of consumers to decide upon healthier meals (Balfour et al., 1996 as cited by the Robert Wood Johnson Foundation, 2009).

Current disclosure laws cover only large restaurant chains, so many small restaurants and cafeterias are still unregulated and unaffected by the laws. What has been discovered is that nutritional menu labeling reduces consumption of high fat and high calorie items when it is put in conspicuous locations.

Fruit and Vegetable Matters

The foregoing information provided a context for a discussion of the fruit options that appear in online middle school menus and how these fruits were described by cafeteria managers when they were asked about them in a phone survey. Motivating this was a concern about the current childhood diabetes epidemic in America, which has been linked to the current childhood obesity epidemic that, in turn, has been traced back to insufficient fruit consumption by children in school cafeterias.

In the last two decades, the nutritional intake of children in public schools has been a matter of discussion, concern, and research. The American Dietetic Association emphasized that the adoption of proper eating patterns could provide significant benefits for the development of children (Addison et al., 2006). Unfortunately, children in the US do not follow the dietary guidelines for Americans (Story, Nanney, & Schwartz, 2009). Specifically, children in the US do not eat adequate amounts of fruits and vegetables (Swanson, Branscum, & Nakayima, 2009). In fact, the evidence is clear that not only do children not eat adequate servings of fruit and vegetables, but they actually go out of their way to avoid them. Buzby and Guthrie (2002) found
that salad, vegetables, and fruits were the items wasted most often in school plates in a study of the efficiency of the National School Lunch Program (NSLP) and the School Breakfast Program (SBP). Perry et al. (1998) reported that only 32% of adults and 16% of children aged 6-11 ate the minimum of 5 servings of fruits and vegetables recommended per day for both adults and children. Guthrie et al. (2004) confirmed these findings, showing that Americans consumed only 1.4 of the 4 servings of fruits recommended by federal guidelines and 3.7 of the 5 vegetable servings recommended.

The Linkage between Poor Nutrition and Bad Health

Poor nutrition, which includes inadequate consumption of fruits and vegetables, has been linked to poor health outcomes in individuals. Poor nutritional intake can lead to health problems in the short and long run, which can affect children and adults. For example, cancer is responsible for 23% of all deaths in the US (Havas et al., 1995). Havas et al. (1995), Perry et al. (1998), and Serdula et al. (2004) reported that low consumption of fruits and vegetables has been strongly associated with epidemiological evidence of a variety of cancers of the digestive and gastrointestinal tract (the oral cavity, pharynx, larynx, esophagus, pancreas, stomach, colon, and rectum), bladder, endometrium, cervix, ovaries, prostate, and lungs. Moreover, inadequate consumption of fruits and vegetables has also led to chronic diseases such as cardiovascular disease and diabetes (Casagrande et al., 2007; Serdula et al., 2004).

Lock et al. (2005) reported that low consumption of fruits and vegetables is prevalent among children and adults worldwide and the worldwide mortality rate of 2.635 deaths per year is attributed to low consumption of fruits and vegetables.
Need for Additional Research

A fortuitous opportunity has been initiated by middle school cafeteria managers in online menus to educate and inform others about the nutritional content of their offerings. The question is, how well are they doing this? Specifically, answers have be sought to questions about menu descriptions of fruit freshness, processing, handling, spoilage, waste, cleansing, safety, shelf life, storage, refrigeration, and preservative content and labeling, among other questions that deserve further scrutiny. Menu labeling at the point of purchase, in particular, has been the focal point of intense national and scholarly interest, as evidenced by renewed national, state, and local legislation regulating restaurant menu labeling in an effort to seek ways to remedy the national obesity epidemic; and interest in health care and healthy eating research has been high on the national agenda for at least the past decade. A 2008 national survey found that 63 percent of adult consumers use nutrition labels to select packaged foods (International Food Information Council Foundation, 2008). The Robert Wood Johnson Foundation has reported on the specifics of a high level of investigator activity during this period in their Healthy Eating Research Synthesis study presented in June, 2009, (Robert Wood Johnson Foundation 2009). They reported on two studies that have found that consumers who read nutrition labels on packages have healthier diets and referred to numerous other studies that have analyzed the impact of nutrition information access on purchasing behavior, all of which has demonstrated acute interest in the topic.

With the momentum of these investigations in mind, I focused on a small aspect of the topic, related to fruit presentation in online middle school cafeteria menus, where there seems to be a lack of published research. School menus serve important educational functions (Goldberg, 2007). Conklin and Parks (2005) asserted that, depending upon how these functions are fulfilled,
this podium for expression may or may not support the nutritional health of children. The opportunity may be there for schools to be a positive force. Experimental menu descriptions to encourage healthier food choices in public secondary schools have demonstrated that these kinds of activities can be successful (Fulkerson, French, Story, Nelson, & Hannan, 2003).

Research Questions

In the process of investigating the details of the furnishing fruit to adolescents in middle school cafeterias, it became apparent that the extent to which the details of fruit processing are discernable in online menus, the freshness and the implied healthfulness of these offerings may be revealed.

Three research questions were formulated to probe what information school cafeteria managers were providing in their online websites to describe their offerings. I was curious to discover to what extent the realities of food processing could be detected in these descriptions. What might happen if a translation code was developed to reveal the kind of processing that had been done? In what way do the cafeteria managers portray their offerings? The research questions were as follows:

Research Question 1: Are schools providing enough information to describe the fruit in their online menus?

Research Question 2: Do online school menus accurately mirror the number of fruit offerings that cafeteria managers describe as being offered? Are schools listing and/or describing all fruit offerings or only specialty items for a specific day?

Research Question 3: Do online school menus accurately mirror the processing descriptions of fruit offerings that cafeteria managers describe as being offered?
Research Methodology

A concurrent mixed-method, triangulation approach, described in more detail in Chapter 4, was selected as a means of increasing the credibility and validity of the results. This approach meant that both quantitative and qualitative data were collected and merged simultaneously, and then the data were integrated in the interpretation of the overall results (Creswell, 2009).

The concurrent mixed-method, triangulation approach was chosen because of the inherent nature of this research project as complex, continually changing, and involving many participants. The overall objective of the research was to determine precisely what information was being provided about the fruit being served in the school cafeteria.

Significance of the Study

This study has practical significance. The outcome may identify a gap showing that cafeteria managers should make an effort to provide better descriptions of fruit in their online menus as compared to their responses to interview questions. This gap may exist due to the pressures they are under and the complexities they face in attempting to balance regulatory requirements, financial realities, nutrition standards, and information clarity.

Definition of Terms

CFP - United States Department of Agriculture (USDA) Commodity Foods Program – This program provides foods (fresh, frozen, canned, and dried fruits, vegetables, meats, cheeses, dry and canned beans, fruit juices, vegetable oils, peanut products, rice, pasta, flour, and other grain products), which have been purchased by the USDA, to schools at minimal cost.
Descriptiveness - Descriptiveness in this study was the extent to which the factual nature, grounding, and classifications of fruit qualities were interpreted and explained. Fruit may be categorized in many ways such as its nutritional characteristics, taste, color, degree of processing, rate of deterioration, caloric content, health benefits, and the like.

DOD FFVP–United States Department of Defense Fresh Fruit and Vegetable Program – Under this program, the USDA uses commodity program funds to reimburse the DOD for the purchase and distribution of fresh fruits and vegetables for schools and Indian Tribes.

Fresh (applicable to fruit) – Fresh fruit generally refers to raw fruits–uncooked, unfrozen, and unprocessed–as distinguished from fruit that is dried, preserved, or has a long shelf life. Freshness also refers to the relative degree of aging or fruit decomposition after a fruit has been picked from a parent plant, which occurs usually, but not always, in a relatively short period of time after picking.

FFVP – Under this program, the USDA provides free fresh fruits and vegetables and dried fruits to children in selected schools participating in the NSLP.

Fruit – The sweet, fleshy, usually edible part of a flowering plant, or the ovaries that surround the plant seeds. Fruit is usually high in fiber, water, vitamin C, and sugars.

Minimally processed onsite – This phrase is used to describe raw fruit that has been prepared in some way at a school. Examples include fruits that have been cooked, sliced, cut, added to a side dish, or made into a juice.

NSLP–National School Lunch Program–A federally assisted meal program providing low-cost or free lunches to millions of children each school day. Children from families with incomes at or below 130% of the poverty level are eligible for free meals. Children with family incomes between 130% and 185% of the poverty line are eligible for reduced-priced meals.
Processed prior to receiving – This phrase describes fruit that has been prepared in some way before it is purchased. It includes fruit that has been canned, cooked, bottled, frozen, or added into a dessert or side dish, off-site before being delivered to the school kitchen.

Raw unprocessed – This phrase describes fruit that has only been washed and has not been prepared in any way. Raw unprocessed fruit has not been cut, sliced, cooked, preserved, refrigerated, or processed in any way.

TAKS – Texas Assessment of Knowledge and Skills – a curriculum test list required of all students participating in the HSEP. Associated with TAKS is a list of all schools participating in the TAKS standardized test, which is administered to Texas students by the TEA.

TEA – the Texas Education Agency— is the agency administering operating rules and standards for all Texas public schools.

How the Thesis is Organized

This thesis is organized into six chapters. In Chapter 1, I define the scope of the research problem and the study context, present the research questions, explains the gap that exists in knowledge, and describe the significance of the study. In Chapter 2, I present a literature review of many of the context issues and studies that have been performed by other researchers on various areas related to the topic. In Chapter 3, I describe the purpose of the study and its delimitations. In Chapter 4, I present the research design, data collection techniques and justification for using these methods, and the study sample and participants. In Chapter 5, I present the data related to the research questions, analysis, and interpretation of the results. In chapter 6, I discuss the overall findings and how they are related to the other studies presented in the literature review. Chapter 6 is followed by an appendix and a bibliography.
CHAPTER 2

LITERATURE REVIEW

Mystery Meat: USDA Labels May Not Mean What You Think

www.mommypotamus.com

Parental Role in Guiding the Cafeteria Food Choices of their Children

The United States Department of Agriculture (USDA) states online menus are the most important tool for cafeteria managers to communicate to their students, (USDA, 2009). Adolescents who attend middle school every school day are the ultimate arbiters of what they will eat at lunch, and many are eating at least some of their lunches in the school cafeteria (Braannen & Storey, 1998). Try though parents may, even preparing lunches for their children to pack and take to school won’t necessarily guarantee that children will actually eat them according to researcher McConnel-Schaarsmith (2012), who cited a recent poll by Harris Interactive Market Research in which about two thirds of the 75% of parents who claimed to have packed lunches for their kindergarten through middle school children reported having portions or all of those lunches returned home. In the same poll, about half the children admitted to throwing away entire home lunches, trading lunch items with peers, or purchasing something from the school cafeteria. Thus, while many parents may have made an effort to control their children’s choices by preparing their school lunches themselves, at least some of their efforts have been confounded by their children (McConnel-Schaarsmith, 2012). Thus parents are finding it is actually healthier to buy a school lunch if a child eats all of its contents (McConnel-Schaarsmith, 2012). Parents however, may not know what is offered to their children for lunch.
According to a study that surveyed over 10,000 parents in 2011, over 43% did not feel they received enough information about school meals, and many wanted to see this information available via email and online (LACA, 2011).

Why Are Fruits and Vegetables Wasted in School Cafeterias?

Schwartz (2007) attempted to explain why students do not choose to consume higher amounts of fruits and vegetables in their diets. Schwartz conducted a qualitative study to compare the barriers to eating more fruits and vegetables before and after subjects’ participation in an intervention to increase such consumption. The intervention promoted the consumption of 5 or more servings of vegetables and fruits a day. Additionally, the intervention asked participants to describe those barriers they perceived as preventing them from consuming the higher amount of fruits and vegetables that were recommended by the intervention. The study used a qualitative approach, in which a semi-structured interview design was applied. Participants were asked to narrate their experiences, and their responses were analyzed using qualitative methods. The results of the study revealed that there is a perception that fruits and vegetables are expensive, which worked against the participants’ willingness to include them among their dietary choices. Thus, the inflexibility of food budgets did not allow the participants to consume more fruits and vegetables. Another challenge reported was the difficulty to acquire fruits and vegetables when routines were disrupted, when traveling or over the weekends, for instance. Taste and preferences were also listed among the barriers to choosing to consume more fruits and vegetables. Furthermore, there was the perception among adults that eating a healthier diet is costly. Especially among people of low socioeconomic backgrounds, the cost of fruits and vegetables is a barrier to healthy eating. Additionally, the lack of local sources of reasonably
priced and good quality fruits and vegetables creates a never-ending cycle of inadequate demand and supply. Another interesting factor is that the adults in the study reported that they perceive that fruits and vegetables are difficult to prepare or cook (Schwartz, 2007).

The above mentioned barriers to the consumption of fruits and vegetables may provide a good foundation to explain why children do not choose to consume more fruits and vegetables in school cafeterias and, consequently, why fruits and vegetables are the most wasted foods. According to Schwartz (2007), families are a strong influence on diet. As women are the main agents of food selection and preparation in the households, they control what is eaten in their homes. Thus, if women don’t like certain foods such as fruits and vegetables, they will not be purchased, prepared, or consumed in the household. They prefer to eat the same foods repetitively rather than to serve something they don’t care for (Schwartz, 2007).

Most of the factors in choosing to consume fruits and vegetables previously mentioned are external. The cost of fruits and vegetables, along with their availability, are external factors that may be easier to solve with an intervention to increase the consumption of fruits and vegetables by decreasing their cost or increasing their availability. However, the internal factors that may lead to choosing to eat more or fewer fruits and vegetables may be more difficult to explain and to overcome.

Schwartz (2007) reported that “liking” fruits and vegetables is a strong predictor of whether or not those foods are chosen and eaten. Although this finding may not lead to the discovery of a way to solve the waste of fruits and vegetables in schools, another study shared by Schwartz may provide an interesting perspective on the consumption of fruits and vegetables. A study conducted among 3,000 women in the US found that one of the most important and determinant factors in whether or not someone is inclined to consume fruits and vegetables was
whether or not that habit has been instilled in them during childhood. This finding may provide
an important foundation for the education of families in the incorporation of more fruits and
vegetables into their food offerings at home, which could have a future impact on the children’s
fruits and vegetable choices in schools.

Why Don’t Children Want to Consume Fruits and Vegetables?

It is not evident that there are biological causes to children’s not wanting to eat more
fruits and vegetables. Although causal relationships between fruit and vegetable consumption
among children and external factors have not been established, there are three factors that have
been identified as having at least a limited influence over the eating habits of children: (a)
parents, (b) choices in school cafeterias, and (c) education.

The Influence of Parents

One important finding was that the actions of parents seem to be the most important
determinant of fruit and vegetable preference among their children, despite evidence to the
contrary. Williams (2008) reported that providing fruits and vegetables as snacks and for dinner
can have a short and long term influential effect on young children. One of the most effective
interventions to increase the intake of fruits and vegetables by children is to educate parents
about their benefits. The influence of parents on the dietary choices of their children may
explain why children do not eat more fruits and vegetables. When parents consume more fruits
and vegetables in the household, so do the children (Williams, 2008).
Offerings of Fruits and Vegetables in School Cafeterias

Availability of fruits and vegetables in the school cafeteria can be an important determinant of the food choices of children. Until recently, fruit and vegetable choices have been relatively limited, but that has changed, and increases in consumption statistics demonstrate that if you offer it, they will come, especially if it is farm fresh (Kloppenburg, Wubben, & Grunes 2007).

Another explanation for the low consumption of fruits and vegetables in school cafeterias involves other internal and external factors. Internal factors such as level of hunger and caloric need at the time of breakfast or lunch may dictate what foods the child chooses during a meal. Conversely, the availability of competitive foods – and especially high fat, sugary foods and drinks - may also deter children from choosing more nutritious foods, such as fruits and vegetables, in school cafeterias (Guthrie & Buzby, 2002).

Education

There have been multiple approaches to increasing the consumption of fruits and vegetables among children and youth. Williams (2008) reported a 5-year study in a rural area in southeast Missouri among a sample of 1,306 parents of children ages 2-5. The participants were enrolled in a national parent education program and assigned randomly to two groups. One of the groups was the High 5 for Kids program, and the others just received standard visits from representatives of the parents and teachers program. The parents of the High 5 for Kids group had to complete a pretest interview to describe their children’s consumption of fruits and vegetables. Parent nutritional educators visited the homes 4 times during the program and engaged them in activities that were specifically designed to center around nutrition. The
selection of fruits and vegetables was one of the main activities that were the purpose of the visits. Moreover, education and educational materials about the importance of the consumption of fruits and vegetables were shared with the participants. The results of the study showed that parents who participated in the High 5 for Kids program increased their fruits and vegetables intake significantly, as compared to the control group. Furthermore, change in the parents’ servings of fruits and vegetables proved to be a predictor of change in the children’s preference for such fruits and vegetables and an increase in their consumption in their diets.

Some interventions are carried out at the school site. Guthrie and Buzby (2002) reported that increasing meal flexibility may lower waste in school cafeterias. Thus, an offer versus serve approach may help children choose better for themselves and choose only the items and portions they will actually consume. This strategy has proven to increase fruit and vegetable consumption in some school districts. Guthrie and Buzby reported on this study:

Many elementary schools in Oregon offer a Food Pyramid Choice Menu that features 6 or more fruit and vegetable choices. Daily food waste decreased by as much as 36% in participating school districts, according to the Oregon Department of Education, and students ate more fruits and vegetables. (p. 39)

Some interventions have made only minor changes to the school meal experience for children. Schwartz (2007) reported that positive results in the consumption of fruits and vegetables in schools might be obtained by using verbal cues during the offering of foods to students. For example, asking students if they want to add a juice, a fruit, or a vegetable to their trays has resulted in higher consumption of fruits and vegetables and less waste in school cafeterias.
What Have Students Been Eating?

What, then, are children choosing to eat instead of fruits and vegetables? What are the choices they are being offered? Do parents know, for example, what is being served on a daily basis in their children’s school cafeteria?

The short answer to the first question is that we don’t know and may never know, but the likelihood that they are choosing healthy meals is probably not very high. Researchers Siega-Riz, Carson, and Popkin (1998) reported that adolescents (aged 11-18) consumed food (supplemented by excessive snacking) that was too high in fat, salt, and protein, and too low in fiber, despite the fact that 96.5% consumed meals, including school lunches, sufficiently dense in nutrients and calories. In a national longitudinal sample of 18,177 adolescents, Videon and Manning (2003) found that 71% reported consuming less than the recommended amount of vegetables, and 55% reported consuming less than the recommended amount of fruits. These facts speak for themselves. The American Heart Association (2012) reported that among children aged 2-19 in the U.S., about 1 in 6 (17.9% of all boys and 15.9% of all girls) are obese as measured by body mass index (BMI), that is, at or above the 95th percentile of the Centers for Disease Control (CDC) 2000 growth charts for their age; and about 1 in 3 (32.1% of all boys and 31.2% of all girls) are overweight and obese (BMI-for-age at or above the 85th percentile of the 2000 CDC growth charts). If this isn’t discouraging enough, the trends are alarming. In the 35-year period between 1973-1974 and 2008-2009, 5 times as many children aged 5-17 years became obese.

The longer answer to the first two questions (What are these children choosing to eat instead? What are the choices they are being offered?) may never be known because children may choose not to disclose that information; and as to the third question (Do parents know, for
example, what is being served on a daily basis in their children’s school cafeteria?), it is almost certain that parents don’t know what is being served. If parents are to be guided by the Physicians’ Committee for Responsible Medicine (PCRM) they should certainly be concerned about not knowing. According to PCRM’s nutrition education director, Susan Levin, in their recently released assessment of school lunch guidelines (PCRM, 2012), “Meat, cheese, and junk are still front and center in school lunches.” Schools have made an effort to offer fruits, vegetables, and whole grains in recent years, but they haven’t given up offering the other less healthy choices that underlie the causes of obesity (PCRM, 2012).

The precise proportion of school children’s diet that cafeteria food makes up is not clear, but it is suspected that the selection of lunch food that students make in the school cafeteria on a consistent basis may, in part, determine the kind of day they will have, the way they will make food choices in adulthood, and the course of their long-term health (Barnes, 2012). Unfortunately, what children choose to eat in the school cafeteria every day, to the extent they have choices, isn’t necessarily in their own best interests, nor is it as visible to their parents as it should or might be. Along these lines, one key point to note is that middle school marks the beginning of the time in which adolescents are given a substantial option to make food choices, which clearly have consequences on adolescent health, on their own (Braannen & Storey, 1998). Related to this, Conklin, Johnson, and Lambert (2002) found that parents did not trust the National School Lunch Program (NSLP) to provide more nutritious meals than they themselves could provide in lunches packed at home, although evidence has been building that this perception has been improving with the increase in the amount of whole grains, salad bars, fresh fruits, and lower fat options now being offered in NSLP schools (USDA, 2011).
Parents and community can play a more effective role than they are currently playing in preventing childhood obesity and other unintended food consumption outcomes (Heier, Briano-Simeral, Wolff, & Goto, 2010; Goh et al., 2009; Lindsay, Sussner, Kim, & Gortmaker, 2006; Videon, & Manning, 2003; Grossbart, Crosby, & Smith, 1986; Hess, n.d.). Parental education may play a role despite the fact that research shows that many parents have little understanding of a balanced meal, healthful eating habits, or nutrition information (Grossbart, Crosby, & Smith, 1986). Social marketing intervention in school cafeterias may influence daily fruit and vegetable consumption in low-income schools (Heier, Briano-Simeral, Wolff, & Goto, 2010). Parental presence with adolescents at the evening dinner meal has been shown to have a positive influence (Videon & Manning, 2003). Parental involvement in packing school lunches has also been shown to have a positive effect. In a recent study of the parents of elementary school children, it was found that parents who pack lunches for their children at least three days a week perceive school lunches to be lower in nutritional content than parents who provide money to their children to purchase a cafeteria lunch in schools where the NSLP is in effect (Steinmetz, 2012). This may indicate why 78% of the parents in this study of 495 parents of elementary school children packed their children’s lunch despite their perception that NSLP lunches are more cost effective (Steinmetz, 2012). Other suggestions by nutritionists (Hess, n.d.) have included shopping for food with children, cooking with children, and exploring information about nutrient-rich foods online. Besides this, among the possible actions parents may take is acquiring a better awareness of foods being offered daily in the school cafeteria through online menu postings and related online interpretive nutritional education programs designed to boost awareness; if they do this, they may then be able to better guide their children in making better dietary choices.
Hints that these approaches may be effective have come from community nutrition education programs (Dollahite, Hosig, White, Rodibaugh, & Holmes, 1998), which have achieved some (although limited) success. These programs have begun to confirm suspicions that parents are not aware of what their children’s school cafeterias are serving and that what they are serving may lead to obesity. Statements of opinion to this effect have been circulating in the mainstream press (Larsen, 2012) as well as in academic circles (Beamer, Betz, Buck, Foley, & Lee, 2011). If it turns out that there is substance here, renewed efforts may be made to make school cafeteria offerings significantly more transparent and accessible than they have ever been, and new technologies may be employed to make this possible. Made possible by the development of the personal computer and the internet in recent decades, the online cafeteria menu located on the school website is one of the few ways schools have developed to communicate current, daily menu information to parents and children about the food they serve.

School Lunch Nutrition

Some food preparation processes that expose food to heat, light, or oxygen, whether intended to preserve food or to enhance food for consumption, reduce the amount of nutrients and microorganisms that can improve digestibility (Breene, 2006). Processing includes freezing, drying, cooking, cooking and draining, and reheating. Even without any of the above processing methods, nutrients in food are lost due to the natural cellular breakdown that occurs over time. Cooking typically separates vitamins from food. For example, if a potato or beet is boiled, a significant amount of vitamin B or C liquefies into the water and will be lost if the water is discarded. Similarly, if food is broiled, fried, or roasted in oil, the drippings will contain
a significant amount of the food’s original nutrients, which will be lost if the drippings are discarded.

Fresh raw fruit carries both healthful (vitamins and minerals) and unhealthful nutrient contents (heavy metals, nitrates and nitrites, cyanide, and enzyme inhibitors) along with other unhealthful constituents (toxic substances, hazardous chemical residues, and pathogenic microorganisms) depending upon a whole host of factors including pre-harvest factors such as soil nutrient content, moisture, growing location, season, year, and stage of maturity at harvest. Fruit handling may cause physical damage to fruit, and improper care, temperature, and humidity during harvesting, packaging, washing, transportation, storage, and distribution can also destroy nutrients. Thus, it is not necessarily the case that fresh fruit is more healthful than processed fruit (Breene, 1994). Some processing that cleanses fruit may prevent illness and slow decomposition, while the fruit is on display in the cafeteria may be beneficial. Also, all fruits are not the same. Some fresh fruits, such as peaches and strawberries, perish rapidly after picking, while others, such as apples and pears, do not.

All things being equal, however, the approximate expected nutrient losses by type of processing are shown in Table 1 (Self-Nutrition Data, 2012):

Table 1

<table>
<thead>
<tr>
<th>Vitamins/Minerals</th>
<th>Freeze</th>
<th>Dry</th>
<th>Cook</th>
<th>Cook-Drain</th>
<th>Reheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>5</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Retinal activity equivalent</td>
<td>5</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Alpha carotene</td>
<td>5</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Beta carotene</td>
<td>5</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>10</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 1 (continued).

<table>
<thead>
<tr>
<th>Vitamins/Minerals</th>
<th>Freeze</th>
<th>Dry</th>
<th>Cook</th>
<th>Cook-Drain</th>
<th>Reheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta cryptoxanthin</td>
<td>5</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Lycopene</td>
<td>5</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Leutein+zeaxanthin</td>
<td>5</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>30</td>
<td>80</td>
<td>50</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Thiamin</td>
<td>5</td>
<td>30</td>
<td>55</td>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>0</td>
<td>10</td>
<td>25</td>
<td>45</td>
<td>5</td>
</tr>
<tr>
<td>Niacin</td>
<td>0</td>
<td>10</td>
<td>40</td>
<td>55</td>
<td>5</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>0</td>
<td>10</td>
<td>50</td>
<td>65</td>
<td>45</td>
</tr>
<tr>
<td>Folate</td>
<td>5</td>
<td>50</td>
<td>70</td>
<td>75</td>
<td>30</td>
</tr>
<tr>
<td>Food folate</td>
<td>5</td>
<td>50</td>
<td>70</td>
<td>75</td>
<td>30</td>
</tr>
<tr>
<td>Folic acid</td>
<td>5</td>
<td>50</td>
<td>70</td>
<td>75</td>
<td>30</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>0</td>
<td>0</td>
<td>45</td>
<td>50</td>
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<tr>
<td>Calcium</td>
<td>5</td>
<td>0</td>
<td>20</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Iron</td>
<td>0</td>
<td>0</td>
<td>35</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>Potassium</td>
<td>10</td>
<td>0</td>
<td>30</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>Sodium</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td>Zinc</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Copper</td>
<td>10</td>
<td>0</td>
<td>40</td>
<td>45</td>
<td>0</td>
</tr>
</tbody>
</table>

Concern about the nutritional value of fruit that has been and is currently being served in the cafeteria has been increasingly expressed in recent years. The USDA commodity foods program regularly provides participating public school cafeterias with canned fruits that have been stored after harvesting and canning for long periods in warehouses.
### Table 2

**Comparison of Nutrient Retention Value Remaining in Fruits(%) According to Preparation Style**

<table>
<thead>
<tr>
<th>Nutrient Name</th>
<th>Generic Canned</th>
<th>Frozen</th>
<th>Dried</th>
<th>Cooked Citrus&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Stewed (Cooked-Drained)&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Reheated Dried</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>95</td>
<td>95</td>
<td>100</td>
<td>100</td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>Iron</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Magnesium</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Potassium</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Sodium</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Zinc</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Copper</td>
<td>90</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Vitamin C Ascorbic acid</td>
<td>50</td>
<td>70</td>
<td>20</td>
<td>95</td>
<td>70</td>
<td>95</td>
</tr>
<tr>
<td>Thiamin</td>
<td>80</td>
<td>95</td>
<td>80</td>
<td>95</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>80</td>
<td>100</td>
<td>70</td>
<td>95</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Niacin</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>95</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>90</td>
<td>100</td>
<td>90</td>
<td>95</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Folate, total</td>
<td>50</td>
<td>95</td>
<td>50</td>
<td>70</td>
<td>50</td>
<td>95</td>
</tr>
<tr>
<td>Folic acid</td>
<td>50</td>
<td>95</td>
<td>50</td>
<td>70</td>
<td>50</td>
<td>95</td>
</tr>
<tr>
<td>Folate, food</td>
<td>50</td>
<td>95</td>
<td>50</td>
<td>70</td>
<td>50</td>
<td>95</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*Note: The table continues.*
Table 2 (continued).

<table>
<thead>
<tr>
<th>Nutrient Name</th>
<th>% Retention Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Generic Canned</td>
</tr>
<tr>
<td>Vitamin A, IU</td>
<td>75</td>
</tr>
<tr>
<td>Vitamin A RE</td>
<td>75</td>
</tr>
<tr>
<td>Alcohol, ethyl</td>
<td>100</td>
</tr>
<tr>
<td>Carotene, beta</td>
<td>75</td>
</tr>
<tr>
<td>Carotene, alpha</td>
<td>75</td>
</tr>
<tr>
<td>Cryptoxanthin, beta</td>
<td>75</td>
</tr>
<tr>
<td>Lycopene</td>
<td>75</td>
</tr>
<tr>
<td>Lutein + zeaxanthin</td>
<td>75</td>
</tr>
</tbody>
</table>

Source. USDA, 2003. Examples of fruits from each category:
- Frozen  – Berries, peaches
- Dried - Apricots, peaches, prunes, figs, raisins, cherries, and bananas
- Cooked citrus - Lemon and orange cooked as sauces accompanying other foods, and as fruit preserves found in pie, yogurt, and ice cream.
- Stewed - Some of the dried and fresh fruits offered in school cafeterias, such as apples, apricots, peaches, prunes, raisins, rhubarb, and cherries, are stewed or cooked-drained and served in sugar syrup known as compote.
- Reheated dried - Apples, apricots, peaches, prunes, raisins, rhubarb, and cherries
Summary

Given their newly developed freedom to choose in middle school and the hormonal changes they experience at the onset of puberty, adolescent children ultimately decide what they will consume in school cafeterias. Although schools and parents continue to try to exert their influence, data show that adolescents don’t especially care for fruits and vegetables, as evidenced by their under-fulfillment of federal portion guidelines, discarding of prepared home lunches, and wasting of large amounts of served fruits and vegetables in school cafeterias. Other reasons for this behavior are their own preferences for high fat sugary foods, peer influences, lack of nutritional and healthcare knowledge, lack of sufficiently educated and persistent parental influences, and lack of effective school education policies. Growing obesity, diabetes, asthma, and cancer statistics, among other problems, point to the impact that this behavior is having now and will have in the future even though school lunch may make up only a fraction of the total food adolescents consume every day.

Fruits and vegetables consumed at lunch in the school cafeteria can be important to growing adolescent children and may alter the course of their lives in healthier directions. There are a number of promising interventions reported by researchers that may succeed in persuading these young adults to eat healthier. One of the more intriguing directions for additional research is better education and access to information about fruit offerings at middle school cafeterias through online menus, which may contain descriptive information. The USDA states that many times student choose to purchase their meals based solely on a consideration of the information on the menu for a specific day (USDA, 2009). We need to make sure all of the information needed to make the right decisions is there.
CHAPTER 3
PURPOSE OF THE STUDY ITS DELIMITATIONS AND LIMITATIONS

Study Purpose

The overall purpose of the study was to determine what online menu information has been provided by middle school cafeterias about the fruit that is served to their children and to assess the processing of the fruits described on online menus and phone interviews. The study specifically aimed to determine the processing and descriptiveness of daily cafeteria fruit offerings in terms of the extent of fresh fruit processing of each fruit menu item as described in the words of cafeteria managers in online menus and orally in direct structured interviews. Descriptiveness in this study was the extent to which the factual nature, grounding, and classifications of fruit qualities were interpreted and explained. Fruit may be categorized in many ways such as its nutritional characteristics, taste, color, degree of processing, rate of deterioration, caloric content, health benefits, and the like. The degree of processing was especially of interest. I also carried out statistical comparisons of online descriptions and descriptions expressed by cafeteria managers in order to measure the congruence of the two forms of expression.

Nutrition may be many different things, not necessarily what any particular individual expects, thinks, or imagines it to be. I was interested particularly in exploring the online media format as an informational and educational interactive communication tool used to describe the fruit offered.

Delimitations of the Study

This was a study delimited by the fact that the best sources of information available in
making a determination about what was represented as fruit in the school cafeterias were the school online menus and the testimony of cafeteria managers.

I adopted the practice of using available research methods that would reveal precisely what information existed within the bounds of online school websites and cafeteria manager knowledge.

The concurrent mixed-method, triangulation approach was relied upon as the best methodological approach to ascertain that information in a way that was credible, valid, reliable, and generalizable.

A structured interview technique by telephone was selected for the interviewing of cafeteria managers in order to produce better response patterns than could be achieved with other alternative polling techniques. Fruit was selected as the focus of the study because of the high esteem in which it is held in the eyes of researchers as a health-producing food.

Middle school aged children were selected as a focus as the age of puberty represents a significant turning point in the life development of children; at this stage, their independence expands on the one hand, and they have a sufficient accumulation of parental advice to follow on the other.

Texas middle schools were selected for the convenient accessibility of their websites, because of the convenient accessibility of cafeteria managers by telephone, and because their large numbers were suitable for study sampling.

Made possible by the development of the personal computer and the internet in recent decades, the online cafeteria menu located on the school website is one of the few ways schools have developed to communicate current, daily information to parents and children about the food
they serve. All of the protocols that different middle schools have used in creating, organizing, and updating information on websites delimited the accuracy and currency of the data.

Study Limitations

Texas is a very large state, with thousands of middle schools. I was limited by resources and time in my effort to interview a large enough sample of cafeteria managers in a broad variety of circumstances. Although I started with 350 potential candidate schools, the numbers were cut down by nearly 20% due to the fact that some schools had no online menus or no websites. 106 schools had cafeteria contact information, and of those 52 responded to a telephone interview. With a larger sample, the findings may be more generalizable to the 3,925 middle schools in the Texas school system. The degree of accessibility and the cooperativeness of these cafeteria managers limited the quality of the survey responses.

Additionally, the veracity and validity of the findings would have been considerably improved had I been able to confirm statements made by the cafeteria managers about their offerings by visiting their cafeterias and personally observing what was laid out for students to select from. I sensed a number of inconsistencies in the interviews, which led me to believe that a visit might be enlightening. I would also have liked to extend the interviews to gather more background contextual information.

Summary

The purpose of this study was to determine whether daily online middle school menu information is descriptive of fruit offerings in school cafeterias.
The study was delimited by the logistics of daily online menus provided by school cafeteria managers in Texas middle schools and the accessibility and cooperativeness of cafeteria managers as they participated in a structured interview survey of their fruit offerings.

In the next chapter, I describe the research methods in detail.
CHAPTER 4

METHODOLOGY

The importance of school cafeteria menus to provide detailed information and promote healthy nutrition is key according to a report done by the United States Department of Agriculture (USDA). The USDA stated students often decide to purchase lunch based solely on the day’s menu or the promotions announced with it. Menus are the cafeteria’s best opportunity to show that the complete lunch is the best buy. Online menus might play a more effective role than they currently play in preventing childhood obesity and other unintended food consumption, if used efficiently to fully describe fruit offerings. Among the possible roles they might play is creating a better awareness of foods being offered daily in the school cafeteria through online menu postings and related interpretive nutritional education programs to boost awareness. If they do so, they may then be able to better guide children in making better dietary choices. Hints that this approach may be effective have come from successful community nutrition education programs that have achieved some, although limited, success (Dollahite, Hosig, White, Rodibaugh, & Holmes, 1998). Suspicions that the insufficient awareness of school cafeterias menus may be leading to obesity have been circulating in the mainstream press (Larsen, 2012) as well as in academic circles (Beamer, Betz, Buck, Foley, & Lee, 2011).

This study is an inquiry about the kinds of information provided by cafeterias of Texas middle schools. Specifically, I sought to discover if Texas middle schools provide enough descriptive information in their daily online menus about the fruit choices they provide.

In this chapter, the research design methodology, background variables, and methods of analysis that were used to obtain the study’s findings are described in detail.
Mixed Methods Research Design

I used data and methodological triangulation method procedures described by Creswell (2009) as a research design to evaluate the fruit offerings of a sample population of Texas middle schools. There are 6 basic sources of evidence (data sources) in most research projects: documentation, archival records, interviews, direct observation, participant observation, and physical artifacts (Yin, 2009). Triangulating data sources is a means of seeking convergence across qualitative and quantitative methods (Jick, 1979). Patton (2002) described four types of triangulation: 1) data triangulation; 2) investigator triangulation; 3) theory triangulation; and 4) methodological triangulation. Triangulation compares the findings from either 2 or more different methods of data collection (in this case documentation and interviews) or two or more data sources. It is thought of as a means of attesting to the adequacy of a set of findings based on the assumption that imperfection in one method will be counterbalanced by provisions in another (Pope & Mays, 2006). This approach was used to increase the credibility and validity of the results and to overcome any weakness, intrinsic bias, or other problems that might arise from single method, single-observer approaches.

I used the online descriptions of the daily fruit offerings within contained school lunch menus of a sample population of Texas middle school websites in order to prepare a quantitative analysis.

I also conducted a short qualitative telephone survey of school cafeteria managers and their official representatives to compare, supplement, or confirm some of the quantitative analysis findings. First, I did a pilot study of 10 test schools. The purpose of doing this pilot study was to help refine my data collection methods with respect to both the data content and the procedures to be followed. The pilot was set up to assist in the development of relevant lines of
questions and to achieve conceptual clarification of the research design. The scope was broader and less focused than the data collection finally used. It was not a pretest to determine findings.

I utilized a structured interview technique in carrying out this survey. I also analyzed the descriptive statistics (means, medians, modes, frequency distributions, and standard deviations) based on responses to this survey instrument to evaluate and validate the criteria.

Taking this broad approach provided the best basis for understanding the research problem and the results of the investigation. This approach was chosen because of the inherent nature of this research project as complex, continually changing, and involving many participants. The overall objective of the research was to determine precisely what marketing information is being provided in the online menu compared to the phone interview answers to questions regarding fruit offerings.

The best available sources of information that are available to the researcher for the purpose of making a partial determination concerning what is being represented as fruit in the school cafeterias are the schools’ online menus and the testimony of cafeteria managers. The researcher has therefore sought out appropriate research methods that are capable of revealing the comprehensible information that lies within the boundaries of online school websites and cafeteria manager knowledge. The concurrent mixed-method, triangulation approach was selected as the methodological approach most capable of unearthing that information in a way that is credible, valid, reliable, and generalizable. The credibility of the research was determined by analysis of the acceptability and soundness of the research methods. Validity will be accomplished if the researcher’s proposed methods produce what the researcher says they will produce. Reliability will be determined to be high if all of the different sources of information – notes, self-memos, quantitative analysis, and interviews – result in similar findings.
Generalizability will be determined by the strength and uniformity of the findings.

Data Collection Site

Data were collected remotely from school websites and in phone interviews with cafeteria managers and/or their authorized representatives. There was not a need for on-site visits.

Data Source and Participants

The source of data used for the study was the online menus of middle schools, schools defined for the purposes of this study as consisting of at least one seventh or eighth grade class, in the State of Texas. They are schools that are included in the most current Texas Assessment of Knowledge and Skills (TAKS) list of schools participating in 2010 in the TAKS standardized curriculum test administered to Texas students by the Texas Education Agency (TEA).

Data collected for this study were specifically related to the occurrences of school lunchtime fruit servings in the schools’ cafeteria. Occurrences in the study were recorded for a time period of five consecutive days, Monday through Friday in a one-week time period. This sample frame was used since most school cafeterias use either a static menu where menu items do not change from day to day or a cyclical menu that repeats after four weeks; thus, a five-day period was representative of fruits served in middle school cafeterias.

I took the following steps to find school online menus: First, I went to the Independent School District (ISD) or Common School District (CSD) website. If the school was listed on the website of the ISD/CSD and the ISD/CSD had a school menu, I recorded this finding. Following this step, I manually reviewed the school website in the parent, student, menu and
cafeteria subsections, or any other potential cafeteria menu areas, when these were available. If
the school menu was found, the results were recorded. Second, if the school was not listed on
the ISD/CSD website, and the menu was not found during a manual search of the school website, I
searched using the search engine within the school’s website for the terms “lunch” and “menu.”
All of the search results were reviewed for relevant hits. If the menu was found, the results were
recorded. Fourth, if the menu was not available in steps 1-3 or the school did not have a website
on the first page of the search engine page to review, then the school name and the term “lunch”
were searched using a search engine such as Google. If something was returned, the first page
was reviewed for potential menus, and if no lunch menu sites were found, then I recorded this
finding as “No online menu available.” These four steps were repeated for the 350 schools in the
sample.

I also gathered contact information from cafeteria managers representing 106 schools.
After the online menu search and after contact information published by schools was recorded,
this contact information was used to conduct the phone interviews.

Sampling and Selection of Study Participants

The study sample consisted of 350 public middle schools randomly selected, using a
random number generator from a sampling frame of 3,925 middle schools in the State of Texas.
The schools were identified through the Texas Assessment of Knowledge and Skills (TAKS) list
of schools participating in the TAKS standardized test administered to Texas students by the
Texas Education Agency (TEA). The 350-school sample size was selected in order to achieve a
confidence level of 95% with a confidence internal of ± 5% on selected statistical tests of the
tabulated data. Additionally, among the 350 middle schools, above 90 percent of participants
qualified for, participated fully in, and substantially depended upon the USDA Commodity Foods Program (CFP), the National School Lunch Program (NSLP), and the Department of Defense (DoD) Fresh Program in Texas.

The cafeteria managers in a subsample of 52 schools were surveyed via phone interviews regarding the fruit choices they were offering in their school cafeterias during a recent selected school week (Monday-Friday) about the type of fruit (apples, bananas, pears) being offered, how they offered the fruit (processed prior to receiving, raw, or processed on site after receiving raw), and if they served organic labeled fruit.

Research Questions

The research questions and their associated independent and dependent variables in the quantitative analysis portion of the study are shown below.

Research Question 1: Are schools using enough nutritional information to describe the fruit on the online menus?

Fruit with nutritional descriptiveness is defined as:

a. Actual fruit name

b. Fruit stated to be whole or fully intact

c. Fruit for which a health factor, such as low fat, low carb, low sugar, or sugar free, is named

d. Fruit accompanied by use of the terms fresh, just picked, farm fresh, organic, or natural

e. Fruit for which a nutritional explanation is given

f. Use of processing terms, e.g., processed, canned, frozen, preserved, preserves, dried, fortified, enriched, supplemented, sweetened, energy, energized, syrup, syrupy, baked, diced, stewed, fruited, smiles, warm, hot, crisped

g. Food preparation terms: sliced, baked, parboiled, gelatin, diced, chilled, tidbits, wedges, juiced, halved, smiles, fruited, stewed, cake, hot
h. Use of the term sweet, or specific desert names such as “Bahamas blaster”

i. Mention of another ingredient added, e.g., yogurt, almond, cinnamon, Jello, gelatin, crisp, salad, candied

j. Selected marketing terms that may be suspect: peachy, jewels, delight, Hawaiian, decorated, Jell-O, strawberry almond, cocktail, rainbow, fruity

k. Functional terms: dessert, pudding, pie, cake, sherbet, parfait, shortcake, cobbler, gelatin.

Thus, the descriptions of each fruit serving from the lunch menus were coded in two ways: (1) whether the fruit was described as above or not. Both variables were coded as yes/no: each fruit serving description is coded.

Research Question 2: Do online school menus accurately mirror the number of fruit offerings that cafeteria managers describe as being offered? Are schools listing and/or describing all fruit offerings, or only specialty items for a specific day?

Research Question 3: Do online school menus accurately mirror the processing descriptions of fruit offerings that cafeteria managers describe as being offered?

Presumably, the more closely the interview responses reflect the online descriptions of the processing of fruit offerings, the closer the school menu is to actual fruit served.

Each of the fruit offerings reported during the week by the cafeteria managers was compiled and coded by amount of processing it had received:

a. Unprocessed: raw unprocessed fruits

b. Minimally processed: some processing on-site

c. Processed: the raw fruit was processed (canned, baked, etc.) prior to the school receiving fruits

In order to compare the three-category interview ratings of fruit offerings to the descriptions of fruit offerings on the online menus, the menu data were recoded into the same three categories, processed, minimally processed and unprocessed. In this study, the primary rubric of descriptiveness involved establishing a rating system for various amounts of fruit
processing. Three categories were established for fruit processing: 1) Unprocessed – meaning raw unprocessed fruit; 2) Minimally processed – meaning some processing was done on-site, such as refrigeration, washing, and/or slicing; and 3) Processed – meaning the raw fruit was processed (dried, canned, baked) prior to delivery to the middle school.

In the study, each individual online description of a fruit dish in the sample middle school cafeterias was interpreted, then coded by the researcher as being a member of one of these three nominal data categories for the purposes of statistical analysis.

<table>
<thead>
<tr>
<th>Unprocessed</th>
<th>Fruit was raw and unprocessed served as it was delivered to the middle school.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimally processed</td>
<td>Fruit was raw and unprocessed delivered to the middle school and then some processing was done on-site, such as refrigeration, washing, slicing.</td>
</tr>
<tr>
<td>Processed</td>
<td>The fruit was processed (dried, canned, baked) prior to the middle school receiving</td>
</tr>
</tbody>
</table>

*Figure 1. Processing descriptiveness rubric.*

**Investigative Process**

*Sequencing of the Online Menu Review and the Interview*

The online menu review was conducted prior to the interviewing of the cafeteria managers or their designated representatives. As part of this process, at the time of the interview, I collected all available phone numbers and email addresses for the school, the school
cafeteria, and the school cafeteria manager, and put that information into an interview database, associated with a unique school identification number.

*Online Menu Review*

A protocol was developed for collecting these data from all 350 schools. Fruit servings data listed and described on daily or weekly online menus were generally collected from school websites. Specifically, these are data that are specified in the descriptions of the three research questions above.

*Interview Process*

A protocol was also developed for collecting interview data. The researcher interviewed cafeteria managers or their designated representatives for only those schools that have daily or weekly online menus on their websites and telephone or other contact information. Not all of the 350 middle schools had websites, published daily or weekly online menus, or online menus containing the necessary telephone or other contact information. I selected for inclusion in the sample only those schools that had contact information and online menus.

To initiate the interview process, I looked up the school phone number in the database and asked for the cafeteria manager by name if the manager was available or, failing that, asked to speak to someone in the cafeteria. I used the script provided in the appendix to interview the receiver of the call. If the recipient agreed to participate, the results were recorded. If the recipient refused to participate in the interview, the school was immediately marked off the list. I attempted to contact each school three times to participate in the interview. After three different failed attempts, the school was marked off the list and not included in the survey.
Attempted phone contacts that went to voicemail answering services or live persons were counted as one of the three attempts. For each of these attempts, a message was left with a contact phone number. Attempts were made on varying days and times, such as Monday at 9AM, Wednesday at 1PM or Friday at 4PM, in an effort to increase participation.

*Structured Interview*

The following is an outline of the interview that was used to confirm and compare telephone interview responses with online menus.

Questions:

1. Do you use USDA commodity fruits?
   a. If yes, which ones do you serve?

2. I am going to ask you a question about the preparation of these fruits. For this you will need to know how I am defining the preparation terms. You will be able to select from raw unprocessed, minimally processed on-site, and processed prior to receiving.

Definitions:

- Raw unprocessed is fruit that has only been washed and is not prepared in any way. Raw unprocessed fruit has not been cut, sliced, cooked, preserved, refrigerated, or processed in any way.

- Fruit minimally processed on-site is raw fruit that has been prepared in some way at your school. Examples include fruits that have been cooked, sliced, cut, added to a side dish, or made into a juice.

- Fruit processed prior to receiving is fruit that has been prepared in some way before you purchased it. This includes fruit that has been canned, cooked, bottled, frozen, or added into a dessert or side dish, off-site before it was delivered to your kitchen.

Please feel free to ask me to repeat any of these definitions at any time.

   a. What Raw-Unprocessed-Fruits did you serve last Monday?
   b. What Minimally-Processed-On-site-Fruits did you serve last Monday?
c. What Processed-Prior-to-Receiving-Fruits did you serve last Monday?

d. Were any of the fruits served last Monday locally grown?
   i. If Yes, which ones, and were they raw unprocessed, minimally processed, or processed prior to receiving?

3. Now I am going to ask you about the fruits served last Tuesday. Please feel free to ask me to repeat any of the definitions at any time.

   a. What Raw-Unprocessed-Fruits did you serve last Tuesday?
   b. What Minimally-Processed-On-site-Fruits did you serve last Tuesday?
   c. What Processed-Prior-to-Receiving-Fruits did you serve last Tuesday?
   d. Were any of the fruits served last Tuesday locally grown?
      i. If Yes, which ones and were they raw unprocessed, minimally processed, or processed prior to receiving?

4. For last Wednesday …

   a. What Raw-Unprocessed-Fruits did you serve last Wednesday?
   b. What Minimally-Processed-On-site-Fruits did you serve last Wednesday?
   c. What Processed-Prior-to-Receiving-Fruits did you serve last Wednesday?
   d. Were any of the fruits served last Wednesday locally grown?
      i. If Yes, which ones, and were they raw unprocessed, minimally processed, or processed prior to receiving?

5. For last Thursday…

   a. What Raw-Unprocessed-Fruits did you serve last Thursday?
   b. What Minimally-Processed-On-site-Fruits did you serve last Thursday?
   c. What Processed-Prior-to-Receiving-Fruits did you serve last Wednesday?
   d. Were any of the fruits served last Thursday locally grown?
      i. If Yes, which ones, and were they raw unprocessed, minimally processed, or processed prior to receiving?

6. For last Friday…
Please feel free to ask me to repeat any of the definitions at any time.

a. What Raw-Unprocessed-Fruits did you serve last Friday?

b. What Minimally-Processed-On-site-Fruits did you serve last Friday?

c. What Processed-Prior-to-Receiving-Fruits did you serve last Friday?

d. Were any of the fruits served last Friday locally grown?
   
i. If Yes, which ones, and were they raw unprocessed, minimally processed, or processed prior to receiving?

Observation Set

Field Notes and Self-Memos

Field notes and self-memos were taken to make possible the recording of ideas and reflections (occurring to the researcher) that emerged while the interviews were being conducted.

Method of Observation Analysis

The online data were coded by school and category and transferred onto spreadsheets after the data were found, copied, and noted, so that they could be statistically analyzed. Each school was given a numerical coding, along with categorical scores for their data corresponding to research questions 1 and 2 for each day of the week and a total score for the entire week. When all the school scores had been compiled, descriptive statistics were run for all schools: medians, modes, and standard deviations for the interval data. Following that, the data were compared to one another statistically to analyze the differences between schools. The initial online data from each school were then statistically compared with the interview data within schools and between schools to reveal similarities and discrepancies.
The qualitative commentary about the data obtained from the cafeteria managers or their designated representatives as well as field notes and self-memos were analyzed to see if there were patterns, similarities, and differences that emerged between schools.

Other Methodological Considerations

The credibility of the research was determined by analysis of the acceptability and soundness of the research methods. Research validity was accomplished because the methods produced what it had been predicted they would produce. Research reliability was determined by comparing all the different sources of information—notes, self-memos, quantitative analysis, and interviews. Finally, research generalizability was determined by the strength and uniformity of the findings.

Summary

In chapter 4, I presented the research methodology employed to collect data in this study. Both quantitative and qualitative research methods were described. I extracted, coded, compiled, and ran statistical and correlation analysis on as many online websites in a sample of 350 Texas middle schools as possible in an attempt to address two research questions. I also interviewed as many of the cafeteria managers of the 350 middle schools as possible to address a third research question and to compare the online data to the interview data. All of these data plus interview notes and self-memos formed a triangulated database that was melded into a mixed analysis in order to address the three research questions in a credible, valid, reliable, and generalizable manner. In the following chapter, the results of the study will be presented.
The purpose of this study was to determine what online information is being offered on Texas middle school websites to describe what is being served in their cafeterias. Besides recording the descriptive details, the researcher wanted to discover how the fruit was being offered by the relative degree of fruit processing done. In addition, the study purpose was to determine to what extent the verbalized descriptions of fruit offerings by cafeteria managers was congruent with their online descriptions of fruit offerings.

Research Question 1

The first research question was: Are schools using enough descriptive information to describe the fruit in the online menus?

Fruit with descriptiveness is defined as:

a. Actual fruit name

b. Fruit stated to be whole or fully intact

c. Fruit for which a health factor is named, such as low fat, low carb, low sugar, or sugar free

d. Fruit accompanied by use of the terms fresh, just picked, farm fresh, organic, or natural

e. Fruit for which a nutritional explanation is given

f. Use of processing terms, e.g., processed, canned, frozen, preserved, preserves, dried, fortified, enriched, supplemented, sweetened, energy, energized, syrup, syrupy, baked, diced, stewed, fruited, smiles, warm, hot, crisped

g. Food preparation terms: sliced, baked, parboiled, gelatin, diced, chilled, tidbits, wedges, juiced, halved, smiles, fruited, stewed, cake, hot

h. Use of the term sweet, or specific desert names such as “Bahama blaster”
i. Mention of another ingredient added, e.g., yogurt, almond, cinnamon, Jello, gelatin, crisp, salad, candied

j. Selected marketing terms that may be suspect: peachy, jewels, delight, Hawaiian, decorated, Jell-O, strawberry almond, cocktail, rainbow, fruity

k. Functional terms: dessert, pudding, pie, cake, sherbet, parfait, shortcake, cobbler, gelatin

Table 3 presents the descriptions of each fruit serving from the lunch menus. These descriptions were coded in two ways: whether the fruit was described as (1) using the terms above or (2) not described in that manner.

Table 3

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using descriptive terms</td>
<td>1,535</td>
<td>91.9</td>
</tr>
<tr>
<td>Not using descriptive terms</td>
<td>135</td>
<td>8.1</td>
</tr>
<tr>
<td>Total</td>
<td>1,670</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note. Both variables were coded as yes/no: each fruit serving description is coded. Of the 350 schools in the original sample, 66 or 19% did not have online menus, and thus 284 were included in the online menu survey portion of the study. Each school that listed fruit on the menu used a different number of menu descriptions for their offerings.

Table 4 presents a breakdown of the number of Texas middle schools that used descriptive terms for fruit offerings, being either descriptive terms accompanied by an actual fruit name or just descriptive terms alone. Table 5 presents a breakdown of the number of Texas Middle Schools that used descriptive terms for fruit offerings, with descriptive terms along with an actual fruit name.
Table 4

*Descriptive Terms Used With and Without Actual Fruit Names in Texas Middle School Online Menus*

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used descriptive terms and/or actual fruit name</td>
<td>825</td>
<td>49.4</td>
</tr>
<tr>
<td>Used descriptive terms without fruit name (including fruit name e.g. apple, orange)</td>
<td>710</td>
<td>43.7</td>
</tr>
<tr>
<td>Used general but not descriptive term (fruit)</td>
<td>135</td>
<td>8.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,670</td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Note.* Of the 350 schools in the original sample, 66 or 19% did not have online menus, and thus 284 were included in the online menu survey portion of the study. Each school that listed fruit on the menu used a different number of menu descriptions for their offerings.

Table 5

*Descriptive Terms Used With and Without Actual Fruit Names in Texas Middle School Online Menus*

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used descriptive terms AND actual fruit name</td>
<td>624</td>
<td>37.4</td>
</tr>
<tr>
<td>Used descriptive terms without fruit name (not including fruit type without descriptive word e.g. red apple, sliced pear)</td>
<td>710</td>
<td>42.5</td>
</tr>
<tr>
<td>Used general but not descriptive term (fruit)</td>
<td>135</td>
<td>8.1</td>
</tr>
</tbody>
</table>

*Note.* Of the 350 schools in the original sample, 66 or 19% did not have online menus, and thus 284 were included in the online menu survey portion of the study. Each school that listed fruit on the menu used a different number of menu descriptions for their offerings.

Table 6 presents the number of Texas middle schools with online cafeteria menus that included fruit on the menu and those that had no fruit at all on the menu.

Table 11
Table 6

*The Number of Texas Middle Schools with Online Cafeteria Menus that Included Fruit*

<table>
<thead>
<tr>
<th>Description</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Included fruit in the menu</td>
<td>1,670</td>
<td>85.8</td>
</tr>
<tr>
<td>No fruit on menu at all</td>
<td>276</td>
<td>14.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,946</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Note.* Of the 350 schools in the original sample, 66 or 19% did not have online menus, and thus 284 were included in the online menu survey portion of the study. Each school that listed fruit on the menu used a different number of menu descriptions for their offering.

Figure 2 shows the breakdown of tables 8-10. At the top with the largest percentage (91.9%) is the use of broad terms to describe fruit. Nearly half of the description included in this 91.9% did not even describe the type of fruit. In the middle section of the pyramid is description of fruit by type (apple, pear) AND/OR by type and descriptive word (red apple, fresh pear, canned peaches) which is 49.4%. The bottom section is description of fruit including the type of fruit AND a descriptive word.

*Figure 2. Visual of Tables 4-6.*
Research Question 2

The second research question was: Are schools listing and or describing all fruit offerings or only specialty items for a specific day?

There were 350 Texas middle schools in the sample. The school lunch dataset and analyses were based on the individual school as the unit of analysis. Each school had anywhere from 0 to 45 fruit servings per week. Data for each school consisted of counts of items in each category, and the analyses were based on these counts, yielding means and standard deviations across schools for each category.

The number of fruit servings in school lunches obtained from the online menus and the cafeteria manager interviews was recorded for each day of the week in one typical week sample. The numbers of fruit servings per day were too small for meaningful analysis, so the analyses were conducted only on weekly occurrences of fruit servings.

Table 7 presents descriptive statistics for the lunch menu descriptions of fruit servings. The schools averaged 5.96 servings of fruit per week on their online menus.

Table 7

<table>
<thead>
<tr>
<th>Description</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online menu description</td>
<td>5.96</td>
<td>(4.88)</td>
<td>284</td>
<td>100.0</td>
</tr>
<tr>
<td>Interview description</td>
<td>13.69</td>
<td>(10.96)</td>
<td>521</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Note. Items that were missing were not coded as belonging to a category.*

The 52 middle school cafeteria managers who were interviewed in the study reported that they served an average of 13.69 servings of fruit per week. This contrasted with this study’s findings that there was an average of only 5.96 servings of fruit per week listed on their online menus.
menus. If the cafeteria managers’ statements are factual, then this discrepancy of 7.73 servings suggests that they (the cafeteria managers) are either inaccurately reporting what they are offering or not taking advantage of their menus to communicate as well as they might about extent (the number, kind, variety, choice and healthfulness) of their fruit offerings. Simply stated, if students and their parents don’t know what their choices are, how can they make good choices?

An analysis was conducted of how two of the most popular fruits (apples and peaches) were described online. In 169 descriptions given for apples in the 284 online middle school menus (59.5% of the total), 53 (31.4%) school menus just described the apple as it was, while 116 (68.6%) described how the apple had been prepared. Similarly, in 155 descriptions given for peaches in the 284 online middle school menus (54.6% of the total), 45 (29.0%) school menus just described the peach as it was, and 110 (71%) described how the peach had been prepared. Table 8 shows how many words were used to describe [apple (1) vs. fresh apple (2) vs. chilled sliced apple (3) vs. baked cinnamon sliced apple (4)] and prepare (e.g., sliced) the apple.

Table 8

<table>
<thead>
<tr>
<th>Number of Words</th>
<th>Describing</th>
<th>Preparing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>%</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>19</td>
<td>11.2</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
<td>62.1</td>
</tr>
<tr>
<td>3</td>
<td>42</td>
<td>24.8</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>99.8</td>
</tr>
</tbody>
</table>
As a comparison, Table 9 shows how many words were used to describe and prepare the peach.

Table 9

<table>
<thead>
<tr>
<th>Number of Words</th>
<th>Describing n</th>
<th>%</th>
<th>Preparing n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>59</td>
<td>30.2</td>
</tr>
<tr>
<td>1</td>
<td>44</td>
<td>28.4</td>
<td>89</td>
<td>55.6</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
<td>67.7</td>
<td>2</td>
<td>14.8</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>0.6</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0.6</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>5 or more</td>
<td>4</td>
<td>2.6</td>
<td>4</td>
<td>2.6</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>99.9</td>
<td>155</td>
<td>99.5</td>
</tr>
</tbody>
</table>

*Cafeteria Managers Interview Sample*

Table 10 presents the data for the cafeteria managers’ interview sample. The 52 schools in the interview sample reported an average of 13.7 servings of fruit per week.

Cafeteria managers reported weekly averages of 6.31 unprocessed (fresh) fruit servings, 1.98 minimally processed fruit items, and 5.98 fruit servings that had been processed before reaching the school. Proportionally, the average amount of fruit served per week reported in the cafeteria managers’ interviews was 42% unprocessed, 14% minimally processed, and 44% processed.
Table 10

Descriptive Statistics Presented by Cafeteria Managers of Weekly Fruit Servings in School Lunches

<table>
<thead>
<tr>
<th>Interview Description</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td># of fruit servings</td>
<td>13.69</td>
<td>(10.96)</td>
<td>52</td>
<td>100.0</td>
</tr>
<tr>
<td>Amount of processing of fruit - cafeteria interviews</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unprocessed</td>
<td>6.31</td>
<td>(6.19)</td>
<td>21.79</td>
<td>43.0</td>
</tr>
<tr>
<td>Minimally processed</td>
<td>1.98</td>
<td>(1.88)</td>
<td>7.49</td>
<td>11.7</td>
</tr>
<tr>
<td>Processed off site</td>
<td>5.98</td>
<td>(6.36)</td>
<td>22.72</td>
<td>45.3</td>
</tr>
</tbody>
</table>

Research Question 3

The third research question was: Do online school menus accurately mirror the processing descriptions of fruit offerings that cafeteria managers describe as being offered? Presumably, the more closely the interview responses reflect the online descriptions of the processing of fruit offerings, the closer the school menu is to the actual fruit served. Each of the fruit offerings reported during the week by the cafeteria managers was compiled, coded by amount of processing it had received, and called the Phone Menu:

a) Unprocessed: raw unprocessed fruits

b) Minimally processed: some processing on-site

c) Processed: the raw fruit was processed (canned, baked, etc.) prior to the school receiving the fruit.

In order to compare the three-category interview ratings of fruit offerings to the descriptions of fruit offerings on the online menus, the menu data were recoded into the same three categories and called the Online Menu:

a) Unprocessed: raw unprocessed fruits
b) Minimally processed: fruit with some processing on-site such as being washed, sliced, peeled, or combined with other fruits

c) Processed: fruit that had been heavily processed (canned, baked, pasteurized, refrigerated, dried, or packed in preservatives) prior to the school receiving the fruit.

Comparison of the Online School Menus to the Cafeteria Managers’ Descriptions

The following hypothesis test was setup comparing the online menu coding to the phone menu coding:

Null Hypothesis: The frequency distribution of the different amounts of food processing found on the online menu mirrors the frequency distribution of food processing on the phone menu.

Alternative Hypothesis: The distribution of different food processing of the online menu does not follow the distribution of the phone menu

Table 11 presents the observed frequencies for the three fruit processing categories in the Texas middle school online menus compared to cafeteria managers’ phone menus.

Table 11

<table>
<thead>
<tr>
<th>Categories</th>
<th>Online Frequency</th>
<th>Online %</th>
<th>Phone Frequency</th>
<th>Phone %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Unprocessed</td>
<td>753</td>
<td>55</td>
<td>314</td>
<td>43</td>
</tr>
<tr>
<td>2 = Minimally Processed</td>
<td>264</td>
<td>20</td>
<td>103</td>
<td>14</td>
</tr>
<tr>
<td>3 = Processed</td>
<td>333</td>
<td>25</td>
<td>311</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>1,350</td>
<td>100</td>
<td>728</td>
<td>100</td>
</tr>
</tbody>
</table>

Note. Of the 350 schools in the original sample, 66 or 19% did not have online menus, and thus 284 were included in the online menu survey portion of the study. Each school that listed fruit on the menu used a different number of menu descriptions for their offering.
Table 12 presents a cross tabulation of observed frequencies and expected frequencies assuming that the online menu observed frequencies are the expected values of these frequencies and the phone menu observed frequencies are the observed values.

Table 12

Cross Tabulations of Observed Values (Online Frequencies) x Expected Values (Phone Frequencies) for the Three Fruit Processing Categories in Texas Middle Schools

<table>
<thead>
<tr>
<th>Categories</th>
<th>Observed Values (Online)</th>
<th>Expected Values (Phone)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Unprocessed</td>
<td>0.56</td>
<td>0.43</td>
</tr>
<tr>
<td>2 = Minimally Processed</td>
<td>0.20</td>
<td>0.14</td>
</tr>
<tr>
<td>3 = Processed</td>
<td>0.24</td>
<td>0.43</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 13 presents the hypothesis (chi-square) test of independence (goodness of fit) of the online values compared with phone values.

Table 13

Goodness of Fit Test of the Online Values Compared with Phone Values

<table>
<thead>
<tr>
<th>Observed Values</th>
<th>Expected Values</th>
<th>O – E</th>
<th>(O-E)^2/E</th>
<th>% of chi-sq</th>
</tr>
</thead>
<tbody>
<tr>
<td>753</td>
<td>582.280</td>
<td>170.720</td>
<td>50.054</td>
<td>27.66</td>
</tr>
<tr>
<td>264</td>
<td>191.003</td>
<td>72.997</td>
<td>27.898</td>
<td>15.42</td>
</tr>
<tr>
<td>333</td>
<td>576.717</td>
<td>-243.717</td>
<td>102.993</td>
<td>56.92</td>
</tr>
<tr>
<td>1,350</td>
<td>1,350.000</td>
<td>0.000</td>
<td>180.945</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Chi-square = 180.94

Degrees of freedom = 2

p-value = 5.11^{-40}
The chi-square is large and the p-value (probability value) was found to be significantly lower than 0.05 significance. Thus the null hypothesis is rejected and the online and the phone frequencies are found to be independent of one another. The online menus and information from cafeteria managers’ interviews regarding the processing of fruits do not match. SPSS for Windows (Version 15.0, 2006, SPSS Inc., Chicago, IL) was used for this data analysis.

*Observations Noted Comparing Interviews to Online Data*

The following are some of the observations made by the researcher that were not captured in the descriptive or correlation statistical measures, but which shed light on the research question.

- There were 20 instances of the term “canned” used to describe fruit in the online menu review, whereas there were 280 instances of the term “canned” used to describe fruit in the cafeteria manager interviews.
- There were 272 instances of the term “no fruit” listed in the online menu review, whereas there were only 6 instances of “no fruit” reported in the cafeteria manager interviews.
- Half of the 52 cafeteria managers–26–described USDA CFP processed fruits in the cafeteria manager interviews, including 3 that described using recipes to create cobblers, whereas there were no online menu descriptions that included any mentions of USDA fruit or recipes.
- One of the 52 middle schools that didn’t list any fruit on their online menu mentioned in the cafeteria manager interview that they served locally grown apples, oranges, and watermelon weekly.
- One of the 52 middle schools that didn’t list any fruit on their online menu mentioned in the cafeteria manager interview that they served fruit only one day during the week.
• One of the 52 middle schools that didn’t list any fruit on their online menu for the 5 days of the study survey mentioned in the cafeteria manager interview that this year was the first time they listed what fruits were served.

• One of school cafeteria managers, whose school was one of the 287 that had an online menu, said that they were offering “15-17 grapes and 4oz frozen peach and strawberry cups” to which they added a small amount of sugar, but their online menu just said “fruit.”

• Eight of the 52 cafeteria managers interviewed (15%) specifically stated they had to refer to production sheets, not to their menus.

One example of the disparity between cafeteria manager descriptions and online menus is shown in the following response. The difference between what is described online and what was described orally is clear:

Monday

Stated - Fruit yogurt delight

Actually served - Canned sliced apricots, canned sliced apples

Tuesday

Stated - None

Actually served - Boxed raisins and applesauce

Wednesday

Stated - None

Actually served - Canned mandarin oranges, canned sliced pears

Thursday

Stated - Fresh fruit plate

Actually served - Cut up fresh strawberries, cut up fresh cantaloupe
I also compared interview descriptions to online descriptions of two of the most popular fruits, apples and peaches, served in these cafeterias (Table 14).

Table 14

<table>
<thead>
<tr>
<th></th>
<th>Apples</th>
<th>Peaches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interview</td>
<td>Online</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td># Unprocessed</td>
<td>100</td>
<td>63.7</td>
</tr>
<tr>
<td># Minimally processed</td>
<td>11</td>
<td>7.0</td>
</tr>
<tr>
<td># Processed offsite</td>
<td>46</td>
<td>29.3</td>
</tr>
<tr>
<td>Total</td>
<td>157</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The data in Table 14 show significant disparities between what was reported in interviews with cafeteria managers and what is described online. For example, cafeteria managers reported over twice as many apples (63.7%) as are described online (30.2%). Cafeteria managers are doing themselves a disservice by not reporting all of the unprocessed apples in their online menus. There are even disparities for peaches. For example, cafeteria managers reported over 97.2% of peaches were described processed offsite, as compared with apples, at 20.6%. The cafeteria managers essentially report that almost all (97.2%) of their peach offerings are processed offsite with only a miniscule amount unprocessed (2.8%), whereas the online offering shows most of the peaches (79.3%) as minimally processed (50.3) or unprocessed.
(29%). This is about as contrasting a set of statistics as can be imagined suggesting that: 1) there is some major error or anomaly in the reporting; 2) cafeteria managers are completely out of touch with their online menus; or worse 3) cafeteria managers don’t realize the importance of descriptiveness for menus.

The data in Table 14 show even greater disparities between what was reported in interviews with cafeteria managers and what is described online. For example, cafeteria managers described over 97.2% of peaches as processed offsite, as compared with their online description, at 20.6%.

Summary

This chapter has provided a description of the data that were gathered and the statistical analysis that was performed. In the final chapter an analysis of this data will be presented, the study’s limitations will be discussed, and conclusions will be drawn from the findings.
CHAPTER 6

CONCLUSIONS

Findings about the Research Questions

The aim of this study was to explore what daily online lunch menu information is being presented by Texas middle school cafeterias. An additional purpose was to discover how the information presented in these online menus compared with menu information furnished by school cafeteria managers in telephone interviews.

Fruit offerings were selected as an evaluation tool because research has revealed that fruits and vegetables are the foods least liked by school children and are among the most wasted foods on the menu (Connors, & Rozell 2004).

A sample of 350 Texas public middle schools were randomly selected to participate in the study. Of the 350 schools participating in the study, 81.1% or 284 schools were found to be publishing online menus. A content analysis of the online daily menus in these schools for a five-day period was performed to discover what fruit choices were being offered, how many were being offered, and the extent to which the fruit offerings were processed and prepared for consumption.

I investigated three research questions in line with the study purpose described above and used data and methodological triangulation, along with concurrent mixed method procedures described by Creswell (2009) as a research design. I devised coding systems to facilitate addressing the research questions. These coding systems were used in evaluating the online menus and phone interviews. A three-category coding system (Unprocessed, Minimally processed, and Processed) was set up to analyze daily menus that 52 cafeteria managers described in telephone interviews with the researcher.
Discussion

Research Question 1

As to Research Question 1, whether schools are providing enough descriptive information online, it was found that while 92% of schools offered some kind of descriptor, only 49% of the descriptions included what type of fruit was being served. Additionally, 14% of schools neglected to have any type of fruit offering on their online menu. I did a supplemental analysis of the “descriptiveness” of information on apples and peaches—two of the most popular fruits in the online menus—shown in Tables 1-3 in Chapter 5. Description of how the apples or peaches were prepared dominated the approach taken by the schools as can be seen from the fact that two-thirds or more of the descriptions for both fruits were preparation-oriented. I interpreted this as an indicator that the fruit being offered had been furnished by the USDA Commodity Foods Program (CFP).

Another notable finding was that in general, the online descriptions under-reported the information that was available about what is being served, thus making it more challenging for online observers to interpret what they see in the menus. Some indicators of this are found in the word counts in descriptions of apples and peaches seen in Tables 13-16, Chapter 5. The bulk of words describing the fruit itself—more than two-thirds—are either 1 or 2 words in the case of both apples and peaches. This is a minimalist expression in light of what the online observer might need to know or want to know about the nutrition properties of fruits presented online. I found this to be puzzling as adding more description to an online menu adds only a marginal amount of labor cost to pay the writers of the online material. The cost is also minimal in comparison to the descriptions given for other less healthy types of food on the online menu offerings, and it is minimal in and of itself in describing the properties and benefits of the fruit.
The online menus could have broken down the fruit descriptions into the same kinds of categories that are employed in this study to represent types of processing or healthiness, but they did not do so. The online menus could have presented information to parents the way point-of-purchase food labeling is required to do in supermarkets, describing both nutritional and unhealthy ingredients, but they did not do so.

Thus, to the question of whether schools are providing enough descriptive information online to help online observers evaluate the nutritional content of the daily school menu, there must be a response of no. There is much more that can be done. At present, the rule of caveat emptor – let the buyer beware – probably governs.

Research Question 2

Table 7 presented data showing that fruit offerings were minimal on the online menus. On average, there are only six fruit offerings per week in a Texas middle school cafeteria if the online data is accurate (which they may not be, as suggested by some of the other data).

Surprisingly, when I asked 52 Texas middle school cafeteria managers in a phone survey about how many servings of fruit they offered per week, the managers’ average response, shown in Table 7, was 13.7. This amount was substantially more than the average of 5.96 servings per week listed in the online menus in the full sample of 284 middle schools. This suggests either that the online menus do not accurately reflect the amount of fruit served in school cafeterias, the person preparing the online presentation isn’t coordinating well with the cafeteria manager, the numbers of fruit servings are being exaggerated by the cafeteria managers, or the response is too different because the different sample sizes – 284 schools as compared with 52 cafeteria managers – are too different and thus are non-comparable. Presumably the cafeteria managers’
verbal responses to direct questions carry more authority than the online menus presented, and should be viewed as more accurate than the online description, but this is not known for certain.

Research Question 3

As to Research Question 3, whether online school menus accurately mirror what fruit offerings cafeteria managers describe as being offered, what was found is shown in Tables 8 and 9 comparing the interview descriptions to the online descriptions of fruit offerings.

The null hypothesis was rejected (chi-square = 180.94, p-value $\leq 0.05$) so the online menu was found to be independent (not mirroring) the phone menu for the three food processing categories. This is a conclusion suggesting that what was published online should be corrected to be more congruent with the cafeteria manager’s descriptions. For example, the amount of fruit involving processing was portrayed to be only 25% of the total online menu in Table 11, whereas the cafeteria managers portrayed the amount of fruit involving processing to be 43% of the total online menu. Conversely, 55% of the fruit on the online menu was portrayed as unprocessed in Table 11, whereas only 43% of the fruit was portrayed by the cafeteria managers as being unprocessed. These findings would appear to mean that the online menu may have been misleading the online observer to think that the menu offering contained less processed, perhaps more natural or fresher fruit than was actually there. Additional support for this was found in comparing the proportion of processed fruit and that of unprocessed fruit, which were found to be equal at 43% to 43% in the cafeteria manager phone survey, as shown in Table 11, whereas the proportion of processed fruit to unprocessed fruit was found to be 55% to 25% in the online menu.
Other observations add evidence to suggest that all of these interpretations may be closer to the truth than not. For example, the term “canned” was used in descriptions 280 times in the interviews with cafeteria managers as compared with its mention only 20 times online. “Canned” is a description of a high level of fruit processing, interpreted as unhealthy in the coding. On the opposite end of the scale, there were 272 uses of the term “no fruit” in the online menus, whereas the term was used only 6 times in the phone interviews. Half of the 52 cafeteria managers described USDA CFP processed fruits in the interviews, whereas there were no online references to the USDA CFP online. Other anecdotal evidence similar to these findings was found as well, all suggesting that the USDA CFP program strongly influences the fruit offerings in the Texas middle schools, including the sample online menu listing for 5 days shown in Chapter 5.

Tables 10 and 11 illustrate how the coding scheme is applied to the two most popular fruits – apples and peaches. Those tables also show the bias towards unhealthy/processed fruit in both descriptions by cafeteria managers and online descriptions, with some exceptions. In Table 14, apples are described in the interviews and are overwhelmingly unprocessed (63.7%) as compared to processed offsite (29.3%), whereas quite the opposite is shown online, where the unprocessed category (30.2%) underperforms the processed (45.6%). As also seen in Table 14, peaches are reported in interviews to be processed offsite (97.2%) overwhelmingly as compared with being unprocessed (2.8%), whereas online the unprocessed category (29%) exceeds the processed (20.6%).

All of this evidence reveals that while there is a correlation between what the cafeteria managers describe verbally and what appears online, the correlation is moderate, possible quirky, and variable or even unreliable. This may not be an ideal situation.
**Recommendations for Further Research**

The study findings suggest that an old English proverb may be at work in these Texas middle school cafeteria settings, namely – “There’s many of slip twixt the cup and the lip.” By this, I mean that there may be large differences between what offerings are actually being served in the cafeteria and: 1) the online menus describing these offerings, 2) the perceptions or intentions of the cafeteria managers about what is being served, and 3) the perceptions of other interested parties (students, parents, and school administrators) about what is being served on any given menu on any given day or week. Further study might confirm or clarify this suspicion. It is important that all interested parties be aware of these differences and take steps to minimize them.

The study findings also suggest cafeteria menus are not following the USDA recommendations. The USDA recommends all cafeterias include contact information on their menus, while only 106 schools out of the 350 schools (30%) included in the online menu collection had this information. Placing USDA recommended contact, servings, serving sizes and other recommendations on the menus, including placing nutrient listings on food offerings (as are required in food stores) may alter consumption patterns in middle schools. Further research is needed to explore these options in more detail.

The study methodology, while generalizable to other Texas middle schools, may not be generalizable to other regions of the U.S. where climatic, urban and rural, and cultural differences, along with logistical differences in the distribution of USDA foods, may alter the findings.
Summary

Eight of the 52 cafeteria managers interviewed (15%) specifically stated they had to refer to production sheets, not to their menus, in responding to questions during the interview. This is a disturbing finding suggesting one or more of the following possibilities: 1) They don’t know what they are putting in their online menus and what they are intending to serve for various reasons (being new to the job, undergoing significant changes, or having delegated the authority to decide on menus to others); 2) They’ve delegated so much to their staffs that they have lost touch with what is going on; or 3) The production sheets offer descriptions of what fruit is being served vs. what is being reported as being served.

The cafeteria managers must utilize their menus to the best of their abilities. Ideally there should be a consistent, factually accurate, and transparent story message about what’s being served and distributed to all parts of the food serving cafeteria enterprise.

Cafeteria managers have a significant opportunity in the use of online menus to both inform and educate about what is being served. Although most schools are making efforts to describe their offerings, they aren’t vigorously taking advantage of this opportunity to inform, and they are not taking sufficient advantage of it to educate. They are only briefly describing what they are serving in the way of fruit in one or two words. Finally, cafeteria managers aren’t describing online what they describe in interviews. Descriptions are even sometimes contradictory, raising questions about the accuracy of either description. Informing and educating more adequately about middle school menus may be an important way of approaching and resisting the momentum of the obesity epidemic that threatens to shorten and damage the long term health and welfare of the nation. There are many opportunities that may be taken advantage of to move in this direction, as this research has revealed.
APPENDIX

THE INTERVIEW QUESTIONNAIRE
“Hello, my name is Ryan Paschal. I’m a graduate student at the University of North Texas. I’m conducting a research study about the fruits that you serve with your school lunches. You are invited to participate in this research project because you serve 7th and/or 8th grade students lunch. With your ok, I would like to ask you a few questions regarding last week’s fruit. You may want to refer back to your menu or production documents. The interview should take about 15 minutes of your time, and your responses will be anonymous. If there are any questions that you would prefer to skip, just let me know. If you decide to participate in this research survey, and change your mind, you may withdraw at any time.

With that, shall we begin?” (pause . . . wait for the affirmation.)

“Great, thank you. Before I begin the survey, I would like to provide you with some contact information in case you have any questions about the research or about your rights as a participant in the study. Again, my name is Ryan Paschal; I’m a graduate student in the Department of Hospitality Management & Tourism, and Dr. Connors is my thesis advisor. Dr. Priscilla Connors can be reached at 940-565-4493. Also, if you have any questions about your rights as a participant in the study, you can call the Internal Review Board at the University of North Texas at (940) 369-7428.

Do you need me to repeat any of that information?”

CONFIRM CONTINUE TO QUESTIONS

QUESTIONS

1. Do you use USDA commodity fruits?
   a. If yes, which ones do you serve?

2. I am going to ask you a question about the preparation of these fruits. For this you will need to know how I am defining the preparation terms. You will be able to select from raw unprocessed, minimally processed on-site, and processed prior to receiving.

   DEFINITIONS

   Raw Unprocessed is fruit that has only been washed and is not prepared in any way. Raw unprocessed fruit has not been cut, sliced, cooked, preserved, refrigerated, or processed in any way.

   Minimally Processed On-site is raw fruit that has been prepared in some way at your school. Examples include fruits that have been cooked, sliced, cut, added to a side dish, or made into a juice.

   Processed Prior to Receiving is fruit that has been prepared in some way before you purchased it. This includes fruit that has been canned, cooked, bottled, frozen, or added into a dessert or side dish, off-site, before it was delivered to your kitchen.

Please feel free to ask me to repeat any of these definitions at any time.

   a. What Raw Unprocessed fruits did you serve last Monday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   b. What Minimally Processed On-site fruits did you serve last Monday?
i. Were any of these fruits labeled as organic or 100% organic?
   a. If Yes, which ones?

c. What Processed Prior to Receiving fruits did you serve last Monday?
   i. Were any of these fruits labeled as organic or 100% organic?
      a. If Yes, which ones?

d. Were any of the fruits served last Monday locally grown?
   i. If Yes, which ones, and were they raw unprocessed, minimally processed, or processed prior to receiving?

3. Now I am going to ask you about the fruits served last Tuesday. Please feel free to ask me to repeat any of the definitions at any time.

   a. What Raw Unprocessed fruits did you serve last Tuesday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   
   b. What Minimally Processed On-site fruits did you serve last Tuesday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   
   c. What Processed Prior to Receiving fruits did you serve last Tuesday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   
   d. Were any of the fruits served last Tuesday locally grown?
      i. If Yes, which ones, and were they raw unprocessed, minimally processed, or processed prior to receiving?

4. For last Wednesday ...

   a. What Raw Unprocessed fruits did you serve?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   
   b. What Minimally Processed On-site fruits did you serve last Wednesday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   
   c. What Processed Prior to Receiving fruits did you serve last Wednesday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   
   d. Were any of the fruits served last Wednesday locally grown?
      i. If Yes, which ones, and were they raw unprocessed, minimally processed, or processed prior to receiving?

5. For last Thursday...

   a. What Raw Unprocessed fruits did you serve?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   
   b. What Minimally Processed On-site fruits did you serve last Thursday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
c. What Processed Prior to Receiving fruits did you serve last Thursday?
   i. Were any of these fruits labeled as organic or 100% organic?
      a. If Yes, which ones?

d. Were any of the fruits served last Thursday locally grown?
   i. If Yes, which ones, and were they raw unprocessed, minimally processed,
      or processed prior to receiving?

6. For last Friday...

   Please feel free to ask me to repeat any of the definitions at any time.
   a. What Raw Unprocessed fruits did you serve last Friday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   b. What Minimally Processed On-site fruits did you serve last Friday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   c. What Processed Prior to Receiving fruits did you serve last Friday?
      i. Were any of these fruits labeled as organic or 100% organic?
         a. If Yes, which ones?
   d. Were any of the fruits served last Friday locally grown?
      i. If Yes, which ones, and were they raw unprocessed, minimally processed,
         or processed prior to receiving?

END
This concludes my questions. Thank you again for your time.
REFERENCES


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