Food Dessert No More, They're Getting a Grocery Store: Plains Grocery Store Initiative

by

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Dietetics

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Abstract

Plains, a small town in western Kansas, has started working towards building a grocery store after years of being a food desert. They reached out to the K-state extension office for assistance in adding a nutrition component to the store. The project began with a broad focus of providing nutritional information for individuals with altered needs, and over the years it was focused into creating information for an in-store kiosk. The kiosk will contain articles, product considerations, and healthy recipes. The kiosk will also ideally have an online component so customers can easily access the information when away from the kiosk. The information contained on the kiosk will hopefully provide customers guidance on how to make healthy dietary choices applicable to them and their needs.

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Kiosk Details

The proposed Plains grocery store kiosk will contain nutritional information to aid the grocery store in its aim to improve the health of the Plains population. The contents will include MyPlate guidelines and articles on topics such as nutrition guidelines for pregnant women, diabetics, and athletes. The kiosk will also have healthy recipe ideas and videos to aid consumers in purchasing for and preparing nutritious meals. A study published by Ashley Holmes in the *Journal of the Academy of Nutrition and Dietetics*, demonstrates the role of kiosks in promoting healthy choices. This study sought for a method of teaching healthy eating practices to children through the median of a grocery store. Kiosks were set up in grocery stores, containing recipes with foods that demonstrated all the different areas of the MyPyramid illustration (Holmes, 2012). During the study, "100% whole-wheat mini bagels, baked tortilla chips, sunflower seeds, almond butter, honey, bananas, and fresh radishes " (Holmes, 2012) showed an almost 25% increase in sales. Also, 27.2% of customers who interacted with the kiosks purchased at least one of the items featured in the healthy recipe (Holmes, 2012). This study shows a beneficial method store owners can use to increase sales of healthier items at little cost to them after the initial investment. Even though this study was intended to target children, it had benefits for all age ranges. Highlighting healthy foods through recipes allowed visitors of the kiosk to see practical ways they could use ingredients they had possibly never used before.

Additional studies have shown further benefits of providing customers healthy recipes. Recipes, especially ones with accompanying pictures, allow individuals to see appealing ways to prepare healthy items. Seeing healthy recipes at the beginning of a trip to the grocery store could prove especially beneficial, as healthy cues can subconsciously affect following decisions (Papies, 2005). In a study published by Dr. Esther Papies in the *International Journal of Obesity*, participants received a recipe with cues indicating health benefits before they began shopping at a grocery store. Overweight participants who viewed the recipe purchased almost 75% less unhealthy snack items than those who did not receive a recipe with healthy cues (Papies, 2005). Simply having a healthy reminder through a recipe encouraged customers to make smarter choices while shopping.

The core of the kiosk will use an all in one business level touch screen computer set to only access the store website. Using a website as the database for the kiosk will make it possible for Plains residents to access the information introduced through the kiosk on their phones and computers, while also making it possible to easily update the kiosk contents. The kiosk will be securely contained and attached to the floor to prevent damage or theft. The mounted height of the screen will be no more than 36 inches and it will not protrude more than 4 inches from the wall in order to comply with ADA standards.

Kiosk Monitor Options

New OptiPlex 7760 All-in-One

~~$2,093.00~~ $1,459.00

Intel Core™ i5-8500

Windows 10 Pro 64bit English

8GB 1X8GB 2666MHz DDR4 Non-ECC

2.5 inch 500GB 7200rpm SATA Hard Disk Drive

Touch display

Customizable: Choose to include more processing power, more memory, and a larger hard drive to fit your exact business needs.

New OptiPlex 7460 All-in-One

~~$1,798.57~~ $1,259.00

Intel Core™ i5-8500

Windows 10 Pro 64bit English

8GB 1X8GB 2666MHz DDR4 Non-ECC

2.5 inch 500GB 7200rpm SATA Hard Disk Drive

Touch: Harness the power of a responsive touch display as well as the flexibility of a height adjustable stand.

OptiPlex 7450 All-in-One with Intel® Optane™ Memory

~~$2,556.31~~ $1,798.88

Intel® Core™ i5-7500

Windows 10 Pro

8GB DDR4 at 2400MHz

2.5 inch 500GB 7200rpm Hard Drive accelerated with M.2 Intel® Optane™ Memory 16GB

Touch display

Customizable: Choose to include more processing power, more memory, and a larger hard drive to fit your exact business needs. Overall system performance is up to 28% faster with **Intel® Optane™ memory.**

(Dell)

Kiosk Mounting Ideas

Articles

Pregnancy

During pregnancy, making healthy food choices becomes even more important. These choices affect the health of both the mother and the child. When women are pregnant, their bodies need even more of some vitamins and minerals such as folic acid, calcium, and iron (Klemm, 2018a). Taking prenatal vitamins as prescribed by their health care provider can help supply these nutrients alongside a balanced diet (USDA, 2018.a). It is important to eat whole grains, fruits and vegetables, lean protein, low-fat dairy, and healthy fats. Fortified grains, green leafy vegetables, and legumes are good sources of folic acid. Eating iron-containing foods like fortified grains, spinach, or red meat, in combination with vitamin-C containing foods, can help a pregnant woman meet her iron requirements. Adding bell peppers or oranges to a spinach salad, or tomatoes to a meal containing lean ground beef, can help meet these needs!

http://img.webmd.com/dtmcms/live/webmd/consumer_assets/site_images/articles/health_tools/what_not_to_eat_when_pregnant_slideshow/getty_rm_photo_of_woman_washing_vegtables.jpg

Calcium, essential for forming strong bones and teeth, is readily available if a woman eats or drinks low-fat dairy products and fortified 100% fruit juices. Iodine which is found in seafood, iodized salt, and dairy products is very important for fetal development.

As a pregnancy progresses, the mother's caloric needs begin to increase. While there is not an increase in calories needed during the first trimester, an increase of 340 calories per day in the second trimester and 450 per day in the third trimester is recommended (Wolfram, 2017). That's only equivalent to eating a whole wheat bagel with two tablespoons of peanut butter and half of a small apple in the second trimester, or a cup of oatmeal with a medium banana and two tablespoons of peanut butter in the third trimester. Limiting foods high in saturated fat and

added sugar can help keep pregnancy weight gain within the healthy range. This reduces the chance of problems such as gestational diabetes (diabetes that develops during pregnancy) and gestational hypertension (high blood pressure related to pregnancy). Alcohol and tobacco should be avoided during pregnancy as they can harm a developing baby. Food safety is especially important, so there are a few foods expectant women should avoid. Raw sprouts, unpasteurized dairy products, and raw or large fish should be avoided pregnant women have higher risk of contracting food borne illnesses (Klemm, 2018a). Ready-to-eat meats such as deli meat, hot dogs and refrigerated smoked fish should be reheated to 165 degrees Fahrenheit before consumption (Klemm, 2018a). Fish such as salmon, tilapia, canned light tuna, and cod are safe choices for pregnant women to eat in moderation (up to 8-12 ounces per week), and a great source of protein, iodine and omega-3 fatty acids (Moores, 2017). Up to 6 ounces of albacore (white) tuna can be safely eaten per week. Fish such as shark, swordfish, and king mackerel should be avoided, because they may be high in methylmercury, which could damage your baby's health (Moores, 2017).

Athletes Nutrition and Sports Performance

In order to keep up with the increased demands on their bodies, athletes need to focus on providing their body with the fuel it needs. This is especially important for student athletes since they are still growing. Athletes have an increased nutrient need, including calories, that can best be met through careful choice of carbohydrates, lean protein, and healthy fats in the diet.

http://detroit.cbslocal.com/2011/09/10/michigan-high-school-football-site-is-a-stats-nerds-dream/

Carbohydrates are extremely important for athletes as it is the preferred energy source of the body. Whole grains should be chosen whenever possible, but simple carbohydrates are more easily digestible and can be a good choice before activity (Travis, 2016).

http://www.usatf.tv/

Protein needs are also slightly higher to help build and repair muscles, but the recommended daily needs can still be met through the foods an athlete eats. Lean meat, fish, and dairy products can help you meet the requirement of 1.2 to 2.0 grams per kilogram of body weight per day for athletes (Travis, 2016). To receive the most benefit from a workout or practice, athletes should try to eat a snack or meal containing protein and carbohydrates within two hours. Chocolate milk makes a great post-exercise snack.

To ensure their best performance, it is essential to stay hydrated. Drink plenty of water throughout the day. Sports drinks should not be the first solution, but after prolonged exercise of two hours or more, consuming a sports drink can help replace lost electrolytes including sodium and potassium (Travis, 2016).

While vitamins and minerals are important for everyone's health, some are especially important for keeping athletes healthy. Vitamin B12 and iron help with the transport of oxygen in the body (Travis, 2016). Fortified breakfast cereals, seafood, and beans are some good sources of these nutrients. However, B12 is primarily found in animal products, so vegan athletes may want to ask their health care provider about the need to take a supplement (Klemm, 2018b). Iron absorption in the body is increased when eaten with vitamin C, so try adding vitamin C-rich foods to meals containing an iron source – such as bell peppers added to black beans for a healthy side! Vitamin D and calcium are important for bone health. Fortified cereals, dairy products, eggs, and spinach can help an athlete, whether aspiring or elite, meet their nutritional needs.

Some sports place extra emphasis on the weight of the athletes. Sports such as wrestling have weight divisions, and sports such as long-distance running encourage athletes to remain lean. Not following healthy eating practices can lead to many detrimental effects, including low energy and weak bones. When a person does not eat enough calories, their body does not have the energy it needs to repair itself. The Female Athlete Triad occurs when a female athlete suffers from disordered eating, amenorrhea (loss of regular menstrual cycle), and stress fractures. It is important to address this problem quickly to try and minimize any long-term health problems.

When attempting to lose weight in a healthy manner, the off-season as the best time to do this to prevent decreased performance (Travis, 2016). Working with a registered dietitian can help athletes accurately determine how many calories they should aim to get per day. Recommendations are to simply reduce daily calories by about 250-500kcal/day (Travis, 2016). Healthcare professionals can help males make sure they do not drop below 5% body fat, and females do not drop below 12% body fat. It is also very important to make sure dehydration is

not used to lose more than 2% of body weight before pre-event weigh-ins. By simply making slight changes to a healthy diet full of carbohydrates, protein, and healthy fats, athletes can reach a healthy weight while still competing well.

Diabetes

One of the major factors that could require a person to alter his or her eating habits is diabetes. Diabetes is one of the most common diseases in the United States, and many people are unaware they have it. There are two major types of diabetes, type 1 and type 2. Insulin is a hormone that the body uses to take up glucose, a product of sugars and starches, from the blood. This process does not work correctly for people who have diabetes. According to the American Diabetes Association, only 5% of people with diabetes have Type 1 Diabetes. It is typically early onset (often during childhood) and occurs when a person's pancreas does not produce enough insulin (American Diabetes Association[ADA], a). People with type 1 diabetes must supplement the insulin for their bodies through injections or pumps, and a careful eating and physical activity plan is an important part of disease management (ADA, 2018).

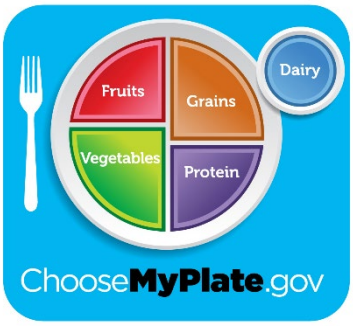
http://www.medicalnewstoday.com/categories/diabetes

Type 2 diabetes is the more common type and must be managed partly through diet and exercise. In this type, the pancreas produces insulin, but the body does not use it correctly causing blood glucose to remain high. Obesity and overweight are predictors of type 2 diabetes and insulin resistance, along with sedentary lifestyles and poor diet (ADA, b). The good news is that studies show that it is possible to reverse Type 2 diabetes by following healthy nutrition and physical activity guidelines (Taylor, 2013)!

The Academy of Nutrition and Dietetics recommends talking to a registered dietitian for specific lifestyle changes that will help you meet your nutritional needs, but they also provide some good basic guidelines to follow. These suggestions include eating a variety of foods such

as healthy carbohydrates, including whole grain foods full of fiber, and making half your plate fruits and veggies. Physical activity recommendations suggest aiming for at least 30 minutes per day of moderate to intense activity, trying to include a mixture of aerobic, strength and flexibility throughout the week (ADA, 2017).

MyPlate



MyPlate is a tool created by the USDA to help people visualize what a healthy and balanced meal looks like. MyPlate shows a plate broken into four sections with a cup on the side. The plate is divided into fruits, vegetables, grains, and protein, while the cup represents dairy. Choosing foods from each of these areas will help you receive the nutrients you need from what you eat and drink. MyPlate also provides additional recommendations based on dietary guidelines to assist you in making healthy choices, such as limiting saturated fat, added sugars, and sodium (USDA, 2019). Limiting fast food, sugary drinks, and, desserts with added sugar and instead building your plate at meals to look like this MyPlate diagram can help you meet these requirements and fuel your body with nutrient rich foods.

Filling half your plate with fruits and veggies allows you to receive vitamins and minerals that keep your body healthy. Switch up which fruits and vegetables you choose in order to receive the most benefit. Different colors of vegetables provide different benefits to your body (USDA, 2019). When choosing and preparing fruits and vegetables, it is best to keep them close to their original state. Fresh, frozen, and canned fruits and vegetables are all good options, but try to choose ones without heavy syrup or sauces (USDA, 2018.b). Fill a quarter of your plate with grains, trying to make at least half of these grains whole grains (USDA, 2017). Whole grains are a great source of fiber, which is good for heart and digestive health. When choosing bread, read ingredient labels to look for “whole wheat” instead of “wheat” or “white” flour. Brown rice and oatmeal are other good choices for whole grains. Fill the remaining quarter of your plate with plant or animal protein. Nuts, avocado, and legumes are some good sources of plant protein

(USDA, 2018.c). Eggs, fish, poultry, and lean meats are good options for animal protein. Aim to eat 4oz of omega-3 rich seafood at least twice a week (USDA, 2018.c). Consuming three cups of dairy or calcium-fortified soy milk a day is recommended for receiving calcium and vitamin D to help keep your bones strong (USDA, 2018.c).

Product Considerations

Hypertension

Hypertension is when a person's blood pressures rises above 120/30 mmHg. Making certain dietary choices can help you manage your blood pressure in addition to any medications prescribed by your doctor.

- Potassium rich products:
    - Fruits, vegetables, and low-fat dairy are high in potassium which helps naturally lower blood pressure through counteracting sodium (Academy of Nutrition and Dietetics Evidence Analysis Library [EAL], 2015.a).
    - Choose high potassium produce such as bananas, potatoes, and kiwi.
    - Enjoy a variety of dairy products such as milk, yogurt, and cottage cheese.
- Decide on dairy:
    - Low-fat dairy is a great source of calcium that has been shown to help reduce blood pressure (EAL, 2015.b)
    - Try consuming 2-3 servings per day through products such as yogurt, milk, or cottage cheese.
- Scale back sodium:
    - Limit sodium to 2,300mg per day (EAL, 2010)
    - Look for products labelled "no salt added", "sodium free", and "low sodium".
    - Always check the nutrition label to determine sodium in a product, and don't forget to adjust the value for how many servings you eat.
- Alcohol alternatives:
    - Dietary guidelines recommend consuming no more than 1 drink per day for women and no more than 2 drinks per day for men(American Heart Association, 2016).
    - Sipping on alternative beverages such as flavored sparkling water or hot tea can help you stay within these guidelines.
    - Try mocktail recipes like the one below for a fun treat!

Simple Margarita Mocktail

Serves 2

Ingredients:

- 1 can lemon-lime diet soda
- ¼ cup orange juice
- ¼ cup lime juice
- Ice
- Lime Wedges(*optional*)

Directions:

1. Mix together soda, orange juice, and lime juice.
2. Pour into an ice-filled glass.
3. Garnish with a lime wedge if desired.

Diabetes

One way individuals with diabetes can work to control their blood sugar levels is through dietary choices. While there is no one set ideal number of carbohydrates to eat per day, your healthcare provider will help you determine a daily carbohydrate goal that works best for you (ADA, 2019).

- Substitute sugars:
    - Try replacing sugar in your favorite recipes with alternative sweeteners such stevia for help with carbohydrate and weight control (ADA, 2019).
    - Look for sugar free versions of your favorite products, such as beverages, baking mixes, or sauces/marinades.
        - Make sure to still account for other carbohydrates present in the products
        - Avoid overconsuming these products to prevent GI issues
- Complex carbs:
    - Meeting your carbohydrate goal with complex carbohydrates will provide you with the fiber, vitamins, and minerals your body needs.
    - Try filling a quarter of your plate with whole grains or starchy vegetables (ADA, 2019).
        - Choose whole grains over refined grains: brown rice over white rice, whole wheat bread over white or wheat bread, old-fashioned or steel-cut oats over instant
        - Starchy vegetables such as beans, squash, and potatoes are higher in carbohydrates but still provide important nutrients.
- Petite produce:
    - Select fresh or canned fruit over fruit juice (ADA, 2016).
    - Select smaller pieces of fruit or enjoy half of a larger piece, saving the rest for later.
    - One 15g carbohydrate serving of fruit is about 1 small piece, ½ cup canned fruit, or ¾ -1 cup melon and berries (ADA, 2016).

High Fiber, Lower Carbohydrate Brownies

Adapted from diabetesfoodhub.org

Serves 12

Ingredients:

- ¾ cup black beans
- ¼ cup canola oil
- 2 tablespoons water
- 1 egg + 2 egg whites
- ¼ cup cocoa powder
- 5 tablespoons alternative sweetener(look for 1:1 substitute ratio with sugar)
- 1 teaspoon vanilla
- 1/3 cup biscuit/baking mix
- ¼ cup mini-chocolate chips

Directions

1. Preheat oven to 350°F and spray a 9x9 baking pan with cooking spray.

2. Puree beans, oil, and water in a blender. Add eggs, cocoa powder, alternative sweetener, and vanilla and blend until mixed well. Add baking mix and pulse until just incorporated.
3. Stir in chocolate chips.
4. Pour into prepared baking pan and bake 18-20 minutes. Let cool 15 minutes before cutting into 12 portions and enjoying!

Cholesterol

- Focus on Soluble Fiber
    - Oats, apples, and beans are great sources of soluble fiber which binds to cholesterol to decrease the total level in your blood (Mayo, 2018).
- Substitute Saturated Fat
    - Choose unsaturated fat sources to fill you up while reducing your LDL 'bad' cholesterol (Mayo, 2018).
    - Olive oil, walnuts, avocados, and fish are al excellent sources of unsaturated fat.
- Plant Proteins
    - Plant proteins such as quinoa, beans, or lentils can help meet your protein requirements while keeping your intake of saturated fat low (Harvard School of Public Health).
    - Explore the frozen department for new plant-based versions of your favorite foods.

Vegetarian Sloppy Joes

Adapted from jillweisenberger.com

Ingredients:

- 1 tablespoon olive oil
- 1 large yellow onion, chopped
- 1 large carrot, chopped
- 1 orange bell pepper, chopped
- 2 garlic cloves, chopped
- 1 teaspoon cumin
- 1 teaspoon chili powder
- 2 tablespoon tomato paste
- 3 cups vegetable broth
- 24oz canned tomato sauce
- 1 tablespoon Dijon mustard
- 1 tablespoon brown sugar
- 1 cup green lentils, rinsed and sorted

Directions:

1. Heat olive oil in a large pot over medium heat. Add onion, carrot, and bell pepper, and sauté' until softened. Mix in spices and tomato paste.
2. Mix in vegetable broth, tomato sauce, Dijon, and brown sugar. Stir in lentils and increase heat to high until the mixture comes to a boil. Reduce heat and simmer partially covered for 45 minutes, stirring occasionally.
3. Serve on buns, potatoes, rice, salad greens, or any base of your choosing!

Celiac's/Gluten Intolerance

- Great grains
  - Enjoy a variety of healthy carbohydrate options such as those listed below:

Contain Gluten	**Gluten Free**
Wheat	Quinoa
Barley	Farro
Rye	Corn
	Rice
	Amaranth
	Buckwheat
	Millet
	Sorghum
	Teff
	Oats*

(Oldways Whole Grains Council)

**Choose certified gluten free oats to guarantee no cross-contamination with gluten containing products.*

- Gluten-free guarantee
  - Look for products that are certified gluten free to ensure there is no cross-contamination.
- Veiled vegetables
  - Alternatives to typically wheat-containing products, such as cauliflower pizza crust, help you avoid gluten while also increasing your vegetable intake.
  - Trying swapping wheat pasta for spaghetti squash or zucchini noodles paired with your favorite sauce.

Roasted Spaghetti Squash

Serves 2-4

Ingredients:

- 1 spaghetti squash
- 2 tablespoons olive oil
- Salt and pepper

Directions:

1. Preheat the oven to 400°F.
2. Slice the squash in half and scoop out seeds.
3. Rub inside of squash with olive oil, salt, and pepper.
4. Place the squash halves cut-side down in a baking sheet and cook for 30-45 minutes, until the squash scrapes out easily with a fork.
5. Use a fork to scrape out squash and toss with your favorite sauce and toppings.

Future Needs

Over the past three years I have worked with the Plains grocery store board members to determine and help implement ways for the new grocery store to improve the nutrition of members of the community. It took some time to determine the best way to meet the community's needs, but in the end it was determined a kiosk would be the best way to do this. The idea for the kiosk is a permanent touch-screen fixture that contains a variety of information for customers as they enter the store. The kiosk will contain information about nutritional recommendations and product considerations for a variety of conditions, along with a selection of healthy and affordable recipes.

The desired contents for the kiosk have evolved over time as the realities of what will best serve the customers was understood. The current contents will ideally provide short, yet thorough, summaries of what individuals should keep in mind as they shop for their groceries. Customers will likely not want to stand at a kiosk for very long, so another plan for the kiosk is to have the information provided on a website so that customers can access it at home or on smart-phones as well. Another benefit of having a website is the ability to remotely update content as needed.

While the grocery store has faced multiple road blocks regarding funding, hopefully the work put in so far will provide a solid foundation for creating the

kiosk when the store obtains the necessary funds to continue moving forward with construction. My work on the project has been overseen by K-State extension, and ideally whoever continues the work with Plains will have a similar oversight, to ensure quality and accurate nutrition information is provided. After the kiosk is officially installed and operational, there was discussion of having someone in Plains oversee the addition of new information. While this could easily be done for the addition of new recipes, as the current suggested recipes are from the USDA What's Cooking recipe database, any updates or additions to provide nutrition information should be overseen by a nutrition professional.

Background Research

Food for Thought: Grocery Store Intervention Literature Review

As individuals become increasingly health conscious, food deserts have gained attention as harmful to those located in them. According to the USDA, a food desert is a low-income census tract where 33% of the population lives more than 10 miles away from a large grocery store in a rural area, or 1 mile in an urban area. Individuals in these areas have less access to healthy foods, which decreases the overall health of the surrounding community. A 2015 study led by Daniel Fuller observed the change in a Canadian community, previously a food dessert, which recently built a grocery store. The study reported an average of a $0.70/person increase spent on vegetables and a $1.10/person decrease spent on prepared food than those in food deserts (Fuller, 2017). Simply having an increased option of healthy items due to the presence of a grocery store showed an improvement in the food purchases of a community. Many studies have been conducted to investigate the further effect groceries stores can have on the surrounding community through grocery store initiatives which encourage customers to purchase healthier items.

Before the implementation of additional measures to encourage good purchasing decisions on the part of the consumer, grocery stores must first stock the products involved in these healthy decisions. The Nutrition Environment Measures Study, otherwise known as NEMS, provides a method for measuring the nutritional quality of a store's inventory. NEMS rates grocery stores based on their stock of "fruit, vegetables, milk, ground beef, hot dogs, frozen dinners, baked goods, beverages (soda/juice), whole grain bread, and baked chips" (Glanz, 2007). NEMS rates stores based on the availability and price of healthy options versus less healthy alternatives. NEMS has shown reliable when tested, having 84-100% inter-rater reliability and 73-100% test-retest reliability (Glanz, 2007). The high level of consistency shows

that NEMS allows for an accurate summary of the current state of a grocery store. This makes it a useful tool for tracing the status of a grocery store over time and estimating how it will affect the community through what the store has to offer. While a store cannot encourage healthy purchasing practices if it does not have healthy options for the consumer to buy, store owners will not stock what their customers will not purchase. Therefore, methods used must leave the same, or possibly even increase, store profits. Increasing demand for healthy options in grocery stores has the opportunity to benefit both customers and owners.

When it comes to increasing demand for healthier options, many studies have shown the benefit in providing information for customers regarding nutrition while simultaneously making healthy options more available (Adam, 2016). While price incentives have a significant effect on the purchasing decisions of consumers (Adam, 2016), store owners may hesitate to make decisions that might decrease their profit. A 2014 study posted in *Rural and Remote Health* analyzed the effect of grocery vouchers which promote foods that decrease cardiovascular disease risk. The community in which this study was conducted shared healthy recipes in the local paper, along with the benefits they have on the body, over four weeks. Members of the community then received $5 vouchers they could use at the local grocery and a guide which indicated heart healthy foods (Hardin-Fanning, 2014). This study proved useful for showing that women and older adults showed the greatest response to education on the nutritional benefit of different foods. However, even though the study increased the overall demand for healthy foods, providing $5 vouchers to all customers is not a sustainable practice for grocery stores.

While Hardin-Fanning's showed a method for increasing demand by older adults, a study by Ashley Holmes in the *Journal of the Academy of Nutrition and Dietetics* targeted a younger audience. This study sought for a method of teaching healthy eating practices to children through

the median of a grocery store. Kiosks were set up in grocery stores, containing recipes with foods that demonstrated all the different areas of the MyPyramid illustration (Holmes, 2012). During the study, "100% whole-wheat mini bagels, baked tortilla chips, sunflower seeds, almond butter, honey, bananas, and fresh radishes " (Holmes, 2012) showed an almost 25% increase in sales. Also, 27.2% of customers who interacted with the kiosks purchased at least one of the items featured in the healthy recipe (Holmes, 2012). This study shows a beneficial method store owners can use to increase sales of healthier items at little cost to them. Even though this study was intended to target children, it had benefits for all age ranges. Highlighting healthy foods through recipes allowed visitors of the kiosk to see practical ways they could use ingredients they had possibly never used before.

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A 2015 study in *Preventive Medicine Reports* further tested the effect of healthy reminders on the grocery store shopping choices customers make. In a study of two stores in El Paso, Texas messages were placed in the grocery carts of the intervention store to positively

inform shoppers of the amount and type of produce typically purchased by other shoppers in that store. The store with the messages about produce on grocery carts saw a 16% increase in produce purchases while there was not significant change in the total amount customers spent (Payne, 2015). This shows the customers spent more money buying fruits and vegetables, while decreasing the amount they spent on other less healthy options. The study was repeated in two stores in New Mexico and similar results were obtained. Produce purchases increased by 12.4% in one store and 7.5% in the other store while the overall amount spent by the customer did not increase significantly (Payne, 2015). The high level of success seen in increasing the sale of produce through messages on shopping carts raises interest in whether promoting other healthy options in this way would have a similar result.

Grocery stores have the opportunity to greatly impact the health of the community. Even simply the presence of a grocery store can improve the choices made by consumers versus the choices made when in a food desert. NEMS allows the possibly impact on the community's health by a grocery store to be determined through assessing availability and price of healthier options in comparison to their less healthy alternative. Additional steps grocery stores can take such as providing prompts in the form of healthy recipes, demonstrations, and messages to customers have shown positive and significant impacts on the purchasing decisions of shoppers.

Grocery Store Layout

Effect of Grocery Stores

The great effect grocery stores can have on the health of the surrounding population has gained increasing recognition. Whether or not this effect is beneficial depends on the products located at the store and how the products are promoted. A 2011 study conducted in Pittsburgh, PA found that regular shoppers at stores that promote unhealthier choices have a higher risk for an increased BMI (Cohen, 2015). Where grocery stores place products and which they promote have large effects on what the consumers buy. Products placed on end-aisle displays make up 30% of grocery store sales, and have shown to increase sale of products more than 50% (Cohen, 2015). Products residing in special floor displays or at cash register displays also have increased sales. Grocery stores also use special price reductions to boost sales of certain products. The influence of product placement on sales led to an increased use of slotting contracts. A slotting contract is where stores are paid by manufacturers to place their product in a prominent location (Cohen, 2015). These slotting contracts can make changing which products are promoted through placement difficult.

Typical Layout

There are many psychological decisions that go into determining a grocery store's layout. Many grocery stores appeal to the senses to encourage customers to make more purchases. Bakery, floral, and produce departments are typically located near the entrance of a store as they all stimulate the senses (Learning, 2014). The smells from the bakery stimulate hunger leading to more impulse purchases. The colorful flowers and produce make the store more visually appealing creating a more positive environment. Grocery stores also typically place staples in the back of the store forcing customers to walk through a large portion of the store to reach products

they will most likely need (Learning, 2014). The goal is to encourage customers to walk past as many products as possible, hopefully leading to many impulse purchases. Another variable is where products are located on shelfs. Expensive products are typically located on the top of shelves while generic and bulk receive placement on the bottom. Name brand products that are top sellers are placed in the middle. Products meant to appeal to children are placed at their eye level (Learning, 2014). Through these techniques owners can maximize sales, however the promoted items typically are not healthy.

Proposed Layout

The typical layout has proven effective, so decisions for the layout of a healthier grocery store should draw from it. Placing the flower and produce departments at the entrance are great ideas. The colors will create a welcoming environment and increase impulse purchases of fruits and vegetables. Stores benefit from promoting produce. Produce goes bad much more quickly than most other products. There is much motivation for store owners to encourage sales of produce over processed foods. If there is no contract dictating where certain products are placed, placing healthier options in the middle of shelfs could increase sales. For example, whole wheat breads could receive the more prominent location in the center of shelves to increase sales without even decreasing the amount of white breads offered. Hopefully this would make healthier options the easier option for consumers without decreasing store sales through taking away the less healthy products.

Wegmans, a grocery store in the mid-Atlantic region has already taken steps to promote healthier purchases. One technique they use is lighting directed onto the produce (Fulton, 2010). Another feature is recipes containing the produce along with free samples in the produce department. The smell of prepared foods can also encourage sales, so cooking these recipes at

the grocery store could be beneficial. When it comes to the recipes, the naming of them can have a great effect. Making the name appealing through descriptive titles will increase the appeal of healthy recipes.

When it comes to designing a layout, the key is to make it appeal to both the customers and the grocery store owners. It should encourage the sale of healthy products without decreasing the store's sales. Slight alterations to layouts typically used can place products beneficial to the community's health in the spotlight, increasing customer desire and sales.

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