# Experiential Learning Using Graphic Information System to Promote Healthy College Eating Habits

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**Abstract**

As young adults transition from secondary education to post-secondary education, they enter a time of life when they are able to independently and potentially for the first time make all of their own food decisions. This shift from childhood to young adulthood and the new-found freedom to make food decisions makes students vulnerable to weight gain. In addition, and of much concern, during this transition health behavioral patterns develop that often persist into later life. Through experiential learning assisted with the use of a geographic information system (GIS) we exposed college freshman to the built environment surrounding a college campus with the objective of promoting healthy eating habits by being cognizant of the food choices they are making and how place affects these choices. The method discussed here provides insight to delivering health education with the assistance of a visual technology.

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**Introduction**

Post-secondary education, i.e. College or University education, is a time in which eating habits change as young adults enter a time of life when they are able to independently and potentially for the first time make all of their own food decisions (Goffman, Policastro, Quick, & Lee, 2006; Sameer, Basil, & Basil, 2009). In a longitudinal health study, Tufts University studied the eating habits of 1,800 college students (Galore, S., C. Walker, A. Chandler, 1999) and found that students often do not meet dietary recommendations for the consumption of nutrients. Sixty-six percent of college freshman do not consume the recommended servings of fruits and vegetables a day and fifty percent do not get enough fiber (Dinger, 1999; Goffman, Policastro, Quick, & Lee, 2006; Liedman, M., Cameron, B., Carson, D., Brown, D. & Meyer, S., 2001). Further, the study found the typical college student diet is high in fat and sodium. Often fast food is a dietary staple which contributes to findings that sixty percent of college students eat too much artery-clogging saturated fat (Grace, 1997; Driskell, Kim, & Goebel, 2005; Goffman, Policastro, Quick, & Lee, 2006; Sameer, Basil, & Basil, 2009). Additional, research found that food high in sugar and fat such as cakes, muffins and potato chips were the most commonly purchased snack foods on college campuses (Horacek et al., 2013; Tam et al., 2017).

As students transition from childhood to young adulthood the new-found freedom to make food decisions makes students vulnerable to weight gain. In addition, and of much concern, health behavioral patterns develop during this transition that often persist into later life (Parcel, Muraskin, & Endert, 1988). Moreover, individuals

that establish poor eating habits as young adults end up not only influencing their own health, but often that of their partners and/or children (Poobalan, Aucott, Clarke, & Smith, 2014).

The purpose of this exercise is to educate post-secondary students (college and university students) through understanding the impact of location on food selection by illustrating the influence of place. Through experiential learning we exposed college freshman to the built environment surrounding a college campus with the objective of being cognizant of the food choices they are making and how place affects these choices.

In addition, this exercise is of value to future health education specialists as it supports professional responsibilities and competencies as identified by the 2015 Health Education Specialist Practice Analysis (HESPA) project (National Commission for Health Education Credentialing, n.d.). In particular, this exercise supports areas VI (Serve as a Health Education/Promotion Resource Person) sub-competencies 6.1 (Obtain and disseminate health-related information) and 6.2 (Train others to use health education/promotion skills) as well as VII (Communicate, Promote, and Advocate for Health, Health Educations/ Promotion, and the Profession) sub-competency 7.1 (Identify, develop, and deliver messages using a variety of communication strategies, methods and techniques). This article provides the methodology to replicate the exercise as well as the results of our experiences using this activity with health education students.

## Background

This exercise took place at a mid-sized public University with an enrollment of more than 20,000 students. The university has 4,850 undergraduate male students between the ages 18 and 24. There are 7,757 undergraduate female students between the ages of 18 and 24. Of these, 23% are Hispanic male, 24% are Hispanic female, 20% are African American male, and 24% are African American female.

The University is located in a rural community in the southern part of the United States. Twenty percent of the University's students live on campus. The University has two full service cafeterias that are open Monday to Thursday, 7 am to 8 pm; Friday, 7 am to 6:30 pm; Saturday, 8am - 9am, 11am - 1pm, 5pm-6:30pm; and Sunday, 11am - 2pm and 5pm - 8pm.

Undergraduate students in the Department of Kinesiology and Department of Population Health are required to take Fundamentals of Health Promotion and Health Careers, HLTH 1360. Fundamentals of Health Promotion and Health Careers is a three credit hour, freshman level course. This course explores the determinants of health, theories of health behavior, the nature and history of health education, and the role of the health educator as a professional in the school, work, clinical, and community settings to promote health and prevent disease.

## Methods

In two sections of Fundamentals of Health Promotion and Health Careers, HLTH 1360, (Summer 2014 and 2015), a total of 60 students were given a class assignment to complete an in class and field learning exercise. Experiential learning was utilized for this assignment. Experiential learning is "the process whereby knowledge is created through the transformation of experiences" (Kolb, Boyatzis, & Mainemelis, 2014). It offers the advantages of learning through connecting classroom concepts to the environment that students come into contact with while they are students and thereby engages them through "cognitive, sensory, emotional, and tactile experiences" (Castillo, Lockhart, Oberne, & Daley, 2017).

The objective of this teaching strategy was for students to learn and experience concepts in Social Determinants of Health (SDOH) and their impact on eating habits and related negative health outcomes. Learning objective for this exercise were:

1. The student will be able to identify

local resources and analyze how food availability may influence food choices.
2. The student will be able to explain SDOH and how build environment may influence food decisions.
3. The student will be able to demonstrate the ability to apply appropriate information to personal decision-making.

This exercise took place during three sessions: two in class session and one out of class session. Each session was approximately 60 minutes. This study, presented as a teaching technique, shares information from lessons learned and information shared through course evaluations and did not entail human subjects.

## Procedures

### Session 1: Class Lecture

The students were presented information on the SDOH in a lecture format using information provided by the Centers for Disease Control and Prevention (CDC) (see figure 1) (Centers for Disease Control and Prevention, 2016). The instructor explained how each determinant could have a positive or a negative influence on both the health of the individual and the health of the community. In addition, the instructor provided a detailed explanation of each determinant with examples of community resources/assets that influence health (see Figure 2). Community assets were separated into resources that can have either a positive or a negative impact on health. For example in Figure 2, Neighborhood and Physical Environment lists "Parks" as an asset. "Parks" were designated as having a positive influence on health as they provide an opportunity for exercise. In addition, Food "Hunger" is listed as a community feature. "Hunger" was given a negative impact as it is an adverse attribute. The lecture took approximately 30 minutes.

### Session 2: Out of Class Assignment (Field Data Collection)

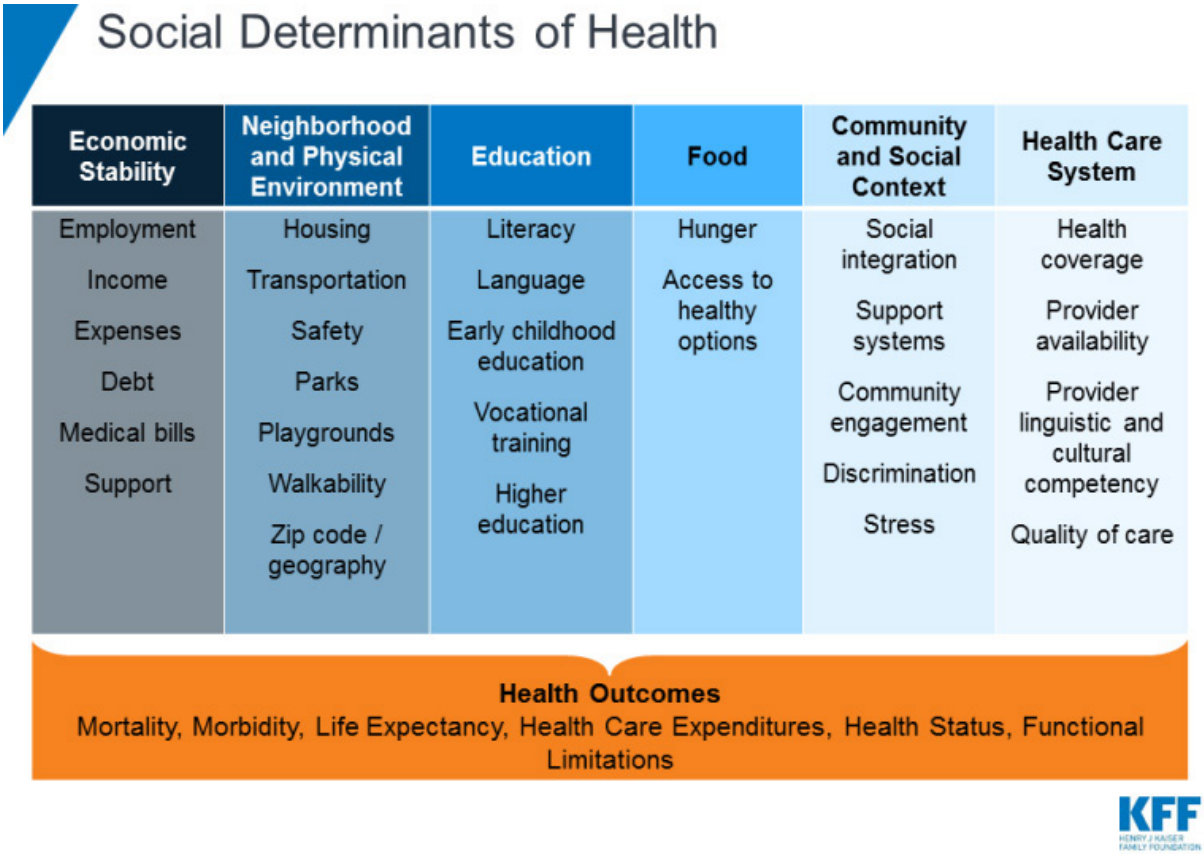
Students were randomly assigned to groups of five. Each group was given an address for an on-campus housing unit to serve as their starting point. Groups were instructed to meet at the starting point, at a designated time, and to walk a mile or 2,000 steps from the starting point. Students were able to monitor their progress through the community using one of many free apps available for recording walking distance. As the students were to explore the community, no predetermined path was given. For students unable to walk, their group was instructed to choose a path that was handicap accessible. The students were given one hour to complete this field work.

In their survey of the community near the campus, students were asked to gather information about any and all community assets/resources they encountered. They were asked to record the physical address and take photos (using a cell phone with an activated GPS) of all the types of businesses, companies and establishments they encountered as they walked the mile. Data and images were sent to the instructor.

*Figure 1. Social Determinants of Health*


Reprinted from "Social Determinants of Health," by Healthy People 2020 [Internet]. Washington, DC: U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion

*Figure 2. Explanation of Social Determinants of Health*



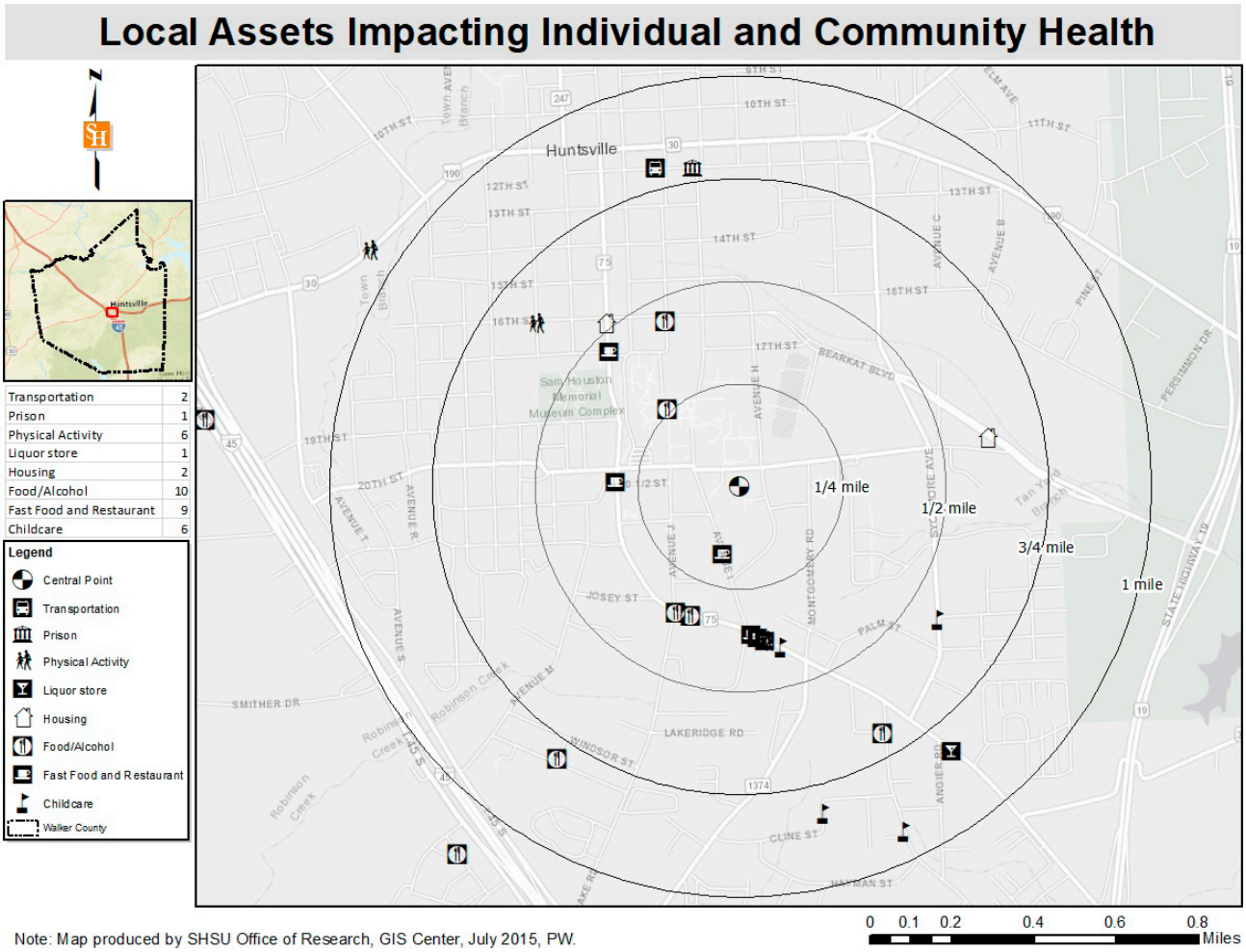

Reprinted from "Beyond Health Care: The Role of Social Determinants in Promoting Health and Health Equity," by Artiga, S.. & Hinton, E., 2018, *Disparities Policy*. Copyright 2020 Kaiser Family Foundation.

**Session 3: Class Discussion (Visual Analysis and Discussion of Data and Maps)**

Data collected by student groups (recorded addresses and geo tagged addresses from photos) were integrated into geographic information system (GIS) software in order to create maps. A geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced data and information. GIS allows one to input, integrate, analyze, model, interpret, and visualize spatial data in ways that reveal relationships, patterns, and trends in the form of maps, reports, and charts. A GIS helps answer questions, solve problems, and even market new research ideas by observing spatial data in a way that is easily understood and shared. While there are proprietary GIS programs, there are many open source GIS software systems that can be used to generate maps. This exercise used proprietary GIS (ESRI ArcGIS), however the activity could be replicated using open access GIS with little to no noticeable difference in the maps produced.

Instructor generated GIS maps were presented to the classes for an active learning discussion (see Figure 3). Class discussion utilized a SDOH framework and led by the instructor. Because social determinants of health proposes that conditions in the environments in which people are born, live, learn, work, play, worship, and age affect a wide range of health, functioning, and quality-of-life outcomes and risks, students were asked to consider and respond to the following questions in an open forum discussion:

*Figure 3. Example of Instructor Generated GIS Map*




- How does physical location affect food choices?
- How does living in a rural community affect food choice?
- How does living on a college campus affect food choice?
- How do the SDOH influence your food choices?

Student responses centered on the stunned realization of the negative influences surrounding the campus. Instructors should anticipate students' lack of awareness of the large number of fast food restaurants, liquor and convenience stores in close proximity to the campus housing units. Further, instructors should expect students not to be aware of the distance needed to travel to find healthy options such as fresh fruits and vegetables and how challenging it could be to access those places with limited public transportation.

**Assessment**

Assessment of the student centered on progress towards established objectives including student identification of resources through primary data collection and analysis through class discussion of how food availability, the SDOH and build environment may influence food decisions. No formal rubric was used to assess class discussion however, each student was required to participate. Those students who did not openly share were called on for their thoughts.

**Adaptations**

The utilization of GIS in the classroom has additional potential for student engagement and learning. This activity could be modified beyond access to food to include other SDOH such as access to healthcare providers, safe housing, transportation, exposure to toxic substances and other physical hazards.

## Discussion

Eating habits that develop during post-secondary education, i.e. College or University education, often follows young adults well into their 20's and 30's. These habits have the potential to influence not only individual health but often that of their partners and/or children. For young adults entering a time of life when they may be autonomously making all of their own food decisions, understanding the relationship between "place" and the impact that "place" has on choices is fundamental to understanding well-being (Crosling, G., Heagney, M., Thomas, L., 2009).

By combining experiential learning outside of the classroom with visual GIS mapping presented in class, students were able to make cognitive connections between food choices. Students recognized the connection between healthy and unhealthy food choices and the environment in which they live. GIS helped students understand these complex concepts in social determinants of health by simplifying data and presenting them in a recognizable and recallable way (Pacheco & Velez, 2009).

Additionally, this experiential learning exercise supports Health Education Specialists' development of skills and competencies in the area of obtaining and disseminating health-related information and training others to use health education/promotion skills. Further, this exercise prepares Health Education Specialists to identify, develop, and deliver health related messages to vulnerable populations by training them on the importance of utilizing a variety of strategies and methods to communicate with a target population.

## Conclusion

Post-secondary education is an influential time when young adults adopt lifetime habits that may have prolonged impact on their lifestyle and health. Through experiential learning assisted with the use of a geographic information system (GIS) we exposed college freshman to the built environment surrounding a college campus with the objective of being cognizant of the food choices they are making and how place affects these choices. Ultimately, college campuses maintain responsibility for ensuring students have access to healthy food choices. This access eventually provides young adults with resources that can positively influence eating behaviors into adulthood. Future research is needed at the faculty level on opportunities in the classroom setting to better understand the interaction between young adults, eating habits and awareness of location.

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