THE IMPLEMENTATION AND PROCESS OF BOBCAT BOUNTY: A CAMPUS

FOOD SECURITY INTERVENTION

by

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ACKNOWLEGEMENT

I would like to thank my chair, Dr. Lesli Biediger-Friedman for sticking with me through this long journey to complete my thesis. I am especially grateful for the mentorship and guidance that you have provided since my start as a graduate student at Texas State University. I would also like to thank Ms. Hannah Thornton for allowing me to complete my thesis on Bobcat Bounty, I am so thankful to be given this opportunity to be part of such an important initiative. To my final committee member, Dr. Cassandra Johnson, thank you for providing your advice and insight, all the help was truly appreciated. I would also like to thank the Texas State University Family and Community Science Learning Community and the 4301 students, Kelsey Walling, Alyssa Cavazos, Zoe Lopez, Heather Haig, Travis Luzania, and Nerina Bogdanich. Finally, I would like to thank my friends and fellow nutrition graduate students who have been there for me and helped me get through graduate school.

Finally, I would like to thank my family for always supporting me and being there when I need to talk. I am so thankful to have such an amazing support system from my parents and siblings who have always reminded me to work on my thesis and never give up, even when it was tough. Specifically, thank you to my mom and dad who have supported my education journey and allowed me to vent my struggles and talk though everything.

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I. INTRODUCTION

The United States Department of Agriculture (USDA), defines food security as the ability to obtain safe or nutritious foods through normal means.[1] Categorization of food security is based on the severity of and includes three levels: high food security, low food security, and very low food security.[1] According to the World Health Organization (WHO), for an individual to be classified as food secure, food must be adequate, accessible, and available.[2] Food insecurity, which occurs when a household has low food security or very low food security, is associated with the anxiety of running out of food, the inability to afford nutritionally balanced meals, the decrease in meal size, and the constant feeling of hunger.[3] Food security coincides with the Social Determinants of Health created by Healthy People 2020.[4]

An objective of the social determinants of health is to improve health through both social and physical change, as promoted through Healthy People 2020.[4] The social determinants of health include five domains: 1) neighborhood and built environment, 2) health and health care, 3) social and community context, 4) education, and 5) economic stability.[5] Food insecurity is related to all domains of the social determinants of health.[5,6] The influences of food security have been observed in populations throughout the United States.

Food insecurity remains a major public health issue in the United States. According to the most recent estimates, in 2018, 11.1% of the population in the United States was food insecure, with 6.8% classified as low food secure and 4.3% classified as very low food secure.[8] Populations within the United States may be more at risk for food insecurity compared to the national average. Risk factors include poverty, being a minority head of the household, or residing in urban rural areas.[9] To address food

insecurity, food banks or private parties distribute and provide food to those in need.[8] Research indicates that food banks and other food distribution centers serve over 46.3 million people annually.[10] United States food insecure families receive support through different food assistance programs that may offer subsidized housing and free or reduced school meals, but there are few programs available for food insecure college students.[11] Emerging adults attending college may be at an additional risk for diminished food security due to a lack of budgeting, financial insecurity, and the lack of access to affordable foods.[12,13]

In recent years, food insecurity has emerged as an important issue among college students due to the rising cost of tuition and the increased availability of college for low-income households.[12] Emerging adults attending college may be at an additional risk for diminished food security due to a financial insecurity and the lack of access to affordable foods.[14] College students most at risk include: students who are single parents, from minority backgrounds, younger, and financially independent.[15] An average of 42% of students on United States college campuses are food insecure, which is substantially higher than the national prevalence among households (11.1%).[8,15] College students food security levels have been well assessed over the last five years, however not much research has been done on how to intervene. The college student population represent a unique set of risk factors associated with food insecurity. Risk factors such as living alone for the first time, a lack of experience, new financial responsibilities, and a lack of resources.[14,17–20] Studies have indicated that students who are food insecure experience higher rates of depression, anxiety, and a lack of energy resulting in poor class attendance and academic performance. [14,17–20]

Food insecure college students may also experience stressors due to health, academics, and access to food.[17–19] Research completed on food security in higher education has indicated a decrease in academic performance, ability to focus during class, and an increased dropout rate among food insecure college students.[14,17,18] Food insecure college students have expressed experiencing a lack of energy throughout the day that may contribute to poor class attendance and academic performance.[14,17,18] Stress in food insecure college students may also be contributed to the inability to afford commodities necessary for life, such as nutritious food.

Research has indicated that first year college students also have increased stress due to financial burdens, such as the cost of living and the rising cost of tuition.[11] The cost of four year tuition for a university can vary from $20,000 to $40,000 depending on the university and if the student is in-state or out of state.[21] Due to the increased cost of college tuition, both low socio-economic status (SES) families and middle SES families are struggling to pay the cost.[11] Therefore, many students must rely on student loans to help pay for college. Stress in food insecure college students may also be contributed to the inability to afford food or other life necessities.

Food Security and Determinants of Health

Diet quality is impacted by food security status which may contribute to negative self-reported health status within food insecure college student population.[22] Individuals who are food insecure are at an increased risk for undernutrition and obesity, which the WHO refers to as the double burden of malnutrition.[23] Research has not indicated the mechanism for the co-occurrence between food insecurity and obesity, but instead suggests multiple factors which may impact the health status within the food insecure population.[12,22] Research completed on food security has indicated that adults who are

food insecure are unable to meet the Dietary Guidelines for Americans due to consuming diets high in fat, processed foods, and sugar sweetened beverages.[24] A survey completed on the eating habits of 209 college freshman indicated that those who reported dining out had higher rates of food insecurity than those who prepared meals at home.[12] Consuming food outside of the house is associated with higher calories and lower diet quality compared to home cooked meals.[25] Research on the impacts of food insecurity on college students also shows the impact that it may have on the university.

Food Insecurity and Academic Outcomes

Due to research indicating the negative effect of food insecurity on college students, universities have conducted research on the impact of student food insecurity on classroom performance, drop-out rate, and academic success. Silva et al. (2015),[20] conducted a study with 309 colleges students at the University of Massachusetts, Boston and found that food insecurity negatively affected student's ability to attend class, attention and focus during class, and academic performance. Their results also indicated that food insecure students had a higher risk of dropping out of college due to poor academic success.[20] Similar results have been found that demonstrated a high correlation between low grade point averages (GPA) and food insecurity.[14,26,27] Given the academic consequences of food insecurity for college students and universities, many universities have established food pantries to support food insecure students.[28]

University Food Pantry

Research evaluating the level of food insecurity on college campuses has led to the creation of on-campus food pantries to decrease the burden of food purchases and decrease student hunger. To assist college and universities with implementing on-campus food pantries, the College and University Food Bank Alliance (CUFBA) has created a

toolkit to describe the process of creating, implementing, and running a campus food pantry.[29] Colleges and Universities may join CUFBA if they have an established food pantries or in the process of developing a food pantry.[28] Little research has been completed examining college food pantry operations and impact to students. Research completed on food pantries has examined the demographics of food pantry participants, food security status, coping strategies, and satisfaction with distributed food.[13,30–34]

Food Pantry Support

Many factors have been shown to contribute to a successful food pantry or its sustainability. According to CUFBA report, one key factor to sustainability of an on-campus food pantry is through gaining and maintaining university support.[29] This may be through defining the impact of food insecurity to the university faculty and the administration.[29] Health champions can also support campus food pantries as advocates, such as by donating time or money to food pantry operations.[35] Furthermore, community-based participatory research models have demonstrated that successful community projects involve a feedback loop from community members and community support.[29] Little to no research has been completed on the implementation process, evaluation of operations, and sustainability of a student-led on campus food pantry. The purpose of this study is to evaluate the first year of operations for the Texas State University student led on-campus food pantry, Bobcat Bounty. This unique theory-based intervention integrated research, education, and training activities to support food security for college students.

College Food Security

College food security is a multifactorial issue that has been found to impact non-White Hispanic and female populations at higher rates.[15] Food insecurity in college students has been shown to negatively impact student academic performance and health status.[15] College student food security status may be influenced by multiple factors including: college tuition, housing stability, and food assistance programs.[15] Due to the high rates of food insecurity on college campuses, interventions such as college food pantries have been proposed as an assistive method for food insecurity.

Statistics

The average rate of food insecurity on college campuses is 42%, which is three times greater than the rates of food insecurity in the United States.[15] The USDA has reported that 14% of Texans are food insecurity, which is higher than the national average (11%) and other states, such as California (11%), Colorado (9%), and Washington (10%).[36] Population demographics has also been shown to impact college student food security status.

Food insecurity demographics

Demographics have been shown to be a predictive factor in college food security status.[37] Minority college students have increased rates of food insecurity compared to other ethnic groups on college campuses.[37] Student who are classified or self-identify as multiracial have also been found to have an increased risk of food insecurity.[27] Females, junior and senior level students, and non-Hispanic whites have an increased risk for food insecurity than other populations on college campuses.[14] In addition, food insecurity has been found to be more frequent in college students with: fair or poor self-reported health

status, an annual income of less than $15,000, students participating in food assistance programs, a self-reported lack of time, and non-traditional older-adult students.[14] Research studies have demonstrated that food insecurity may also impact a college students academic standing within the university.

Effects of food insecurity on college students

Food security status has been shown to effect college students' academic success. Students who are food insecure are three times more likely to defer their studies, take fewer courses, or fail academically.[20,38] Food insecure college students have reported high rates of low energy and an inability to focus in class compared to food secure students, which may negatively impact student academic performance.[18] Food insecure students have also been found to have lower rates of class attendance, attention during class, and comprehension of materials, which may result in poor academic perfomance.[14] Poor academic performance has been found to be associated with students at risk for food security and students classified as food insecure.[17] Research has shown that students with a GPA between 2.0-2.49 are at an increased risk for food insecurity.[14,26,27] The mental and physical health of college students may also be impacted by food security status.

Food insecurity may negatively affect mental and physical health, weight status, hypertension, diet, and sleep.[3,14,15,17,18,22,26,37–39] Students who are identified as food insecure are more likely to report fair to poor health status.[14,17,22,26,38–41] Food insecurity in college students is also correlated with a decrease in energy throughout the day.[18] Research has indicated that food insecure students have increased incidence of depression, anxiety, and stress.[14] A research study by Bruening et al. (2016)[12] on 209 college freshman living in the dorms at Arizona State University has shown decreased academic performance in college students who are food insecure. The researchers used a

survey consisting of questions on: demographics, dietary behavior, physical activity, and social-environmental factors related to nutrition, physical activity, and weight.[12] College students food security status was measured via the U.S. Household Food Security Survey Module.[12] The results of the study indicated that food insecure students had significantly higher rates of depression than food secure students.[12] College students who are food insecure also have higher rates of self-report depression than students who are food secure.[12,41] Multiple factors have been associated with contributing to college food insecurity such as: tuition, housing, and food assistance programs.

Contributors to College Student Food Insecurity
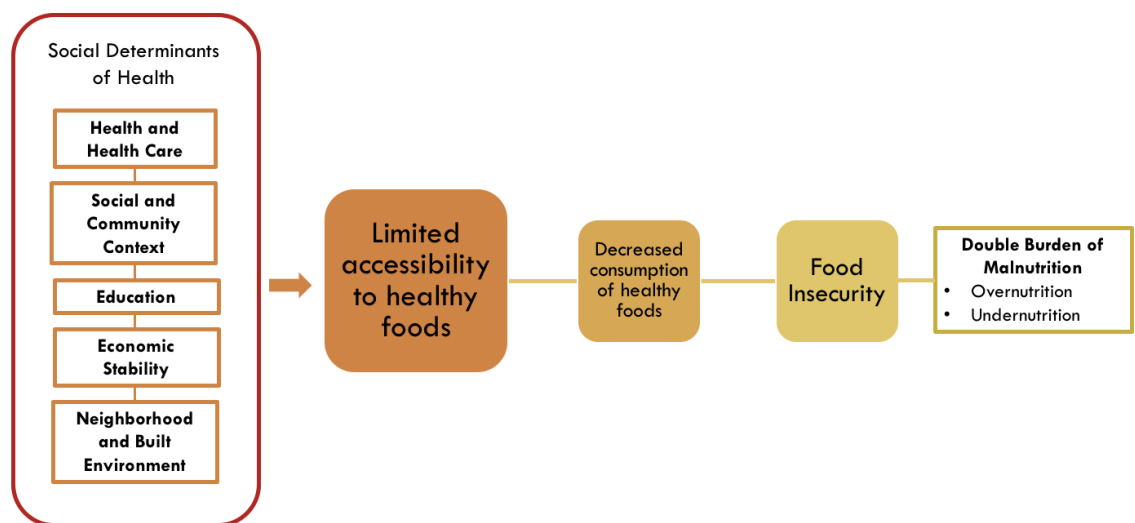
Figure 1. Causal model of food insecurity based on the social determinants of health[42]

The social determinants of health

A college student may experience food insecurity based on; social, physical, or environmental conditions, which are domains associated with the Social Determinants of Health created by Healthy People 2020.[6] The goal of Healthy People 2020 and the Social Determinants of Health is to build environments that will allow populations living within

the environment to live healthy life.[6] The Social Determinants of Health pertaining to college students include access to nutritious foods, financial knowledge and stability, and housing. Evidenced based models and frameworks created by Healthy People 2020 provide resources and examples for a social determinant approach to food insecurity.[6] Food assistance programs are an approach meant to promote Healthy People 2020.[6] As part of the Social Determinants of Health, economic stability has been a main contributor to food security status. Research has indicated that college tuition, housing, and food assistance programs may influence a college students' level of food security demonstrated in Figure 1.[3]

Tuition

Research and statistics has shown that the cost of living, tuition, and housing prices for college has marginally increased over time.[3] As the cost of college has increased, students must now find alternative ways to pay for rent, tuition, and other expenses. Purchasing food is often disregarded by students to afford other expenses deemed necessary for life. A study completed by Chaparro et al. (2009)[43] on food insecurity on college campuses found that a students' ability to manage money may be a key contributor to food insecurity. Previous research has also found that a student's food budget is the first to be decreased when students are struggling with financial burdens and cannot afford housing, health care, and transportation.[3,18] To afford food, a college student may make purchases on a credit card.[9] Gaines et al. (2014)[9] completed a study examining the relationship between finances and level of food security within 577 sophomore to senior level students at the University of Alabama. The social-demographic information was measured via the National Health and Nutrition Examination Survey and food security was measured by the U.S. Household Food Security Module.[9] The results

of the study indicated that the use of credit cards may increase a students' debt due to the inability to pay off all purchases, which then increases the overall debt that a student accumulates throughout their college career.[9] Gaines et al. (2014)[9] also indicated that 22% of college student either obtained a loan or borrowed money as a way to help purchase food. The results also indicated that students had an increased risk of food insecurity if they were lacking the resources available or support to deal with financial struggles.[9] The students who were found to be at a high risk for food insecurity did not have any form of financial support.[9] Loans or financial aid are resources that may provide financial support for tuition.[9]

A research study completed by Meldrum and Willows (2006)[44] on the impact of financial aid on food security status among college students, found that college students with financial aid were unable to afford basic necessities such as food. The research study examined a nutritiously adequate diet for both male and female college students, which was validated using Canada's Food Guide to Healthy Eating.[44] The researchers tested the financial cost of the set diet by purchasing the food from two grocery stores near the campus.[44] The location of one store was closer to campus, while the location of the second store was farther away from campus and required students to have transportation.[44] The results of the study indicated that the store located closer to campus had a higher cost of goods sold, which resulted in a higher cost of food.[44] The lowest price for the cost of goods was $296.44, while financial aid provides $196 for the total cost of food.[44] The results indicate that financial aid may be a contributor to college student food insecurity due to the low amount of financial aid allotted for food.[44] Similar results were found in a study completed by Morris et al. (2016),[45] which indicated that food insecurity was directly related to a lack of funds received from student loans.

Researchers have also hypothesized that students on financial aid may be financially dependent, meaning that they do not receive assistance from family or relatives.[9]

Housing

Students who are financially independent may also be living alone or away from family for the first time. Research has indicated a correlation between student housing/living situation and food security status.[17] A research study completed by Chaparro et al. (2009) on college student housing has indicated that students who live with their parents or other family members have a decreased risk for food insecurity compared to students living alone or with roommates.[43] Similar results were found in a research study completed by Morris, Smith, and Null (2016)[45] examining 1,882 students from four universities in Illinois. The researchers found that college students living off campus without parents or family members were more likely to be food insecure.[45] Similar findings have been found in similar research on college student housing and food security status completed by Gallegos, Ramsey, and Ong (2014).[38] The researchers found that students paying rent for housing were three times more likely to be food insecure.[38] Research on food and housing insecurity in college students has indicated that students with housing instability have higher rates of using food assistance programs.[46]

Food assistance programs

A research study completed by Hanna (2014)[47] measured the level of food security on a college campus and the use of food assistance programs. Food security status was measured by the USDA Community Food Assessment Toolkit.[47] The results of the study indicated that students classified with low food security were more likely to utilize food assistance services such as the Supplemental Nutrition Assistance Program (SNAP) or similar services than students who were food secure.[47] Previous research has

shown that food assistance programs may reduce the risk of food insecurity, but many college students do not meet the program qualification standards.[9] College students are unable to utilize food assistance programs due to not having a permanent residence, a lack of transportation, or a perceived stigma associated with the programs.[3,43] A research survey completed at the City University of New York examined food security on a college campus and college students utilization of food assistance programs.[41] The food security status of 1,086 students from the City University of New York was measured using set questions on the ability to afford food and the ability to consume nutritious foods.[41] The results of the study indicated that 39.2% of participants were food insecure, in that group only 7.2% of the participants reported using a food pantry or other food assistance program.[41] The researchers also found that 6.4% of the participants were receiving food assistance, while 16.6% of the participants had previously applied to the food stamp program with only 18% of the participants believing they would qualify for the program.[41] Of the students who were able to receive food assistance, 64% of them were still food insecure, indicating that the food stamps were unable to fully assist with student hunger.[41] Due to college student being classified as experiencing temporary levels of low income SNAP has specific qualifications a college student must meet.[19] To be eligible for SNAP, the student must be at least a part time college student, either under the age of 18 or over 49 years old, currently taking care of a child under six years old, or have difficulties obtaining child care for a child under 12.[19] A student may also qualify for SNAP if they work at least 20 hours per week, receive work-study funds or Temporary Assistance for Needy Families, are unable to work due to a disability, or are currently in a work related program.[19] Due to the eligibility requirements for SNAP a majority of college students are unable to qualify.[19]

Universities may also offer assistance to students in the form of counseling.[20] Counseling may help with the transition to college for new students.[20] A research study conducted by Silva et al. (2015)[20], examined U-ACCESS; a program at the University of Massachusetts, Boston that offers support to students combined with advocacy services. The psychology department partnered with U-ACCESS to understand and assist college students.[20] The majority of students participating in the research study reported feeling worried due to an inability to afford food, consume a balanced meal, or having to skip meals.[20] The results of the study further indicated the need for partnerships within the university and community.[20] Through partnerships with U-ACCESS, the university was better able to assist homeless students or students struggling with food insecurity.[20] The program was beneficial for identifying the students in need of further assistane.[20] The partnership between the university and U-ACCESS also allowed the university to better assist food insecure students by allowing them to continue their education in a healthy and supportive environment.[20]

College Food Pantries

Establishing a food pantry

As student food insecurity continues to grow across college campuses, colleges are creating campus food pantries to provide food assistance to students. The United States CUFBA has created a campus food pantry tool kit, to assist colleges in building a food pantry.[29] The college food pantry tool kit provides the steps for establishing a food pantry by: indicating a need for a food pantry, building support for the food pantry, and provides a layout for a food pantry distribution and set-up.[29] Food pantries are a valuable way for college campuses to provide assistance to student who are food insecure.[29] To be successful, a college food pantry needs to be supported by the university.[3,29] College food

pantries may also be an educational tool to teach or educate college students on food

insecurity and the roles they may play in assisting with food insecurity.[29]

Student involvement

Universities and higher education may impact hunger in both the community and

on-campus environment.[48] Programs such as the Supplemental Nutrition Assistance

Program (SNAP) and Women Infants and Children (WIC) provide food for families

suffering from hunger, but food assistant programs are not long-term solution, instead the

programs are providing a temporary assistance to hunger.[48] Food insecurity is a

contributor to the growing rate of hunger in the United States.[48] Food insecurity is

associated with diminished nutrition quality and quantity due to the inability to afford

food.[48] Colleges may assist students through opening on-campus food pantries or Food

Banks.[48] Through opening food pantries, universities may assist with both student and

community food insecurity.[48] A research study completed to examine the effects of

student involvement through volunteering with community programs that assist with

hunger.[48] Student volunteers were split up into groups and assigned a community

program that focused on the issues that the student volunteers felt connected to.[48] The

purpose was to promote leadership and problem solving skills for the student volunteers,

while also assisting with food insecurity and hunger.[48] The results of the study indicated

that student volunteers believed participants in the pantry would feel grateful and

appreciative of the services, but after the first month, students began to feel disappointed

when their hard work was not appreciated.[48] Researchers believed these results were due

to the student volunteers participating for personal gain.[48] At the end of the first year trial,

student volunteers were able to understand the impact of volunteering to assist with

hunger.[48] Students reported that through volunteering they were able to see that food insecurity affect individuals in different ways.[48]

Volunteer evaluations

An evaluation study completed by Azurdia, Lecompte, and Sibbald (2011)[49] examined the opinion of the on-campus food pantry stakeholders at the University of Ottawa. A secondary measure of the research study was to evaluate if the outcome goals of the food pantry were being met.[49] The evaluation consisted of both a survey and focus group.[49] The survey was between 25 to 38 questions regarding the food pantry participants' demographics and the food being distributed.[49] The survey also included open-ended questions pertaining to the limitations of the pantry, the goals of the pantry, and the support and training of the volunteers at the pantry.[49] The researchers conducted focus groups to measure the strengths and barriers of the campus food pantry and overall participant satisfaction with the pantry.[49] Volunteers were asked questions pertaining to the reasons for volunteering with the on-campus food pantry.[49] The researchers coded for specific themes which included: contributing to a good cause, being able to help others, wanting to be involved in the campus community, gaining new experiences, and personal beliefs or values.[49] The focus group indicated that volunteers enjoyed educating pantry participants on assistant programs as another way to help the food pantry participants.[49] Volunteers indicated areas of improvement for the on-campus food pantry such as: increasing both community awareness and food distribution amounts.[49] Through the evaluation of the on-campus food pantry participants and volunteers, researchers may improve the food pantries ability to reach their goals while also assisting food insecure students.[49]

Food Pantry Evaluations

There is not a universal system for food pantry evaluations of both the quantity and quality of the foods that are being distributed at food banks in the United States.[10] Researchers assessing pantries utilize the consumer nutrition environment (CNE) for evaluations.[10] The CNE examines the influence of participants choice based on the environment of the food bank and the food being distributed.[10] Researchers have created the nutrition environment food pantry assessment tool (NEFPAT) as a new way to assess food pantries in the United State.[10] The NEFPAT was tested on both urban and rural food pantries in the United States by food security professional evaluators who had to spend at least 50% of their time involved with food pantries.[10] The evaluation tool, NEFPAT, examines 6 objectives: clients choice, marketing, variety in both form of fruits and vegetables and types of fruits and vegetables, additional resource promotions, and food options for all diets.[10] Utilizing NEFPAT as an evaluation tool can indicate the effectiveness of the pantry and may assist in creating baseline data for researchers.[10] Evaluation tools may also assist pantries in creating new modifications for distributed food and the pantry environment which may then benefit the pantry participants.[10]

Demographics

Research studies completed on college food pantries has shown that the majority of food pantry users receive money from either paid jobs, loans, grants, or scholarships.[30–32,34] Previous research completed on college food pantries has shown a lack of correlation in college food pantry demographics.[32] College students who utilized the food pantry are more likely to live alone, be between the ages of 17 to 25, and have a job.[30,50]

Food distribution

A small amount of research has been completed on the evaluation of college food pantries food distribution methods. College pantries may distribute foods through different forms of food distribution methods such as: standardized food boxes and bags that are pre-made bags of groceries or clients choice pantry that allows the client to choose their foods.[51] In a research study completed on a college food pantry distributing pre-made bags, the majority of college students reported enjoying the food that they are given in the pre-made food bag, which contained both perishable and non-perishable foods.[34] The college students receiving a pre-made food bag reported a lack of knowledge on how to cook or prepare the foods that they received.[34,50] The college food pantries may distribute perishable or non-perishable food items to students depending on the source of food or the capacity of the food pantry.[34,50]

Coping strategies

Researchers have examined coping strategies that food insecure college students utilize when struggling with hunger. McArthur et al (2017)[14] measured the coping strategies of 1,093 students with food insecurity at the Appalachian University in North Carolina. The results indicated that students would frequently attend university functions serving free food, had either part time or full time job, and consumed less healthy food options.[14] The results of the study also showed that students who were more food insecure had more instances of utilizing coping strategies more often.[14] Students at the junior and senior level as well as students who lived off campus were more likely to utilize coping skills.[14] Similar results were found in a research study completed by Gaines et al. (2014).[9] The researchers examined different outside factors including students experiencing a sudden shock. The results of the study indicated that students who

experienced shock had an increased risk of being food insecure.[9] The researchers

hypothesized that the increased risk for food insecurity may be due to the students'

inability to handle sudden emergencies or life changes.[9] The results of the study may also

indicate that either colleges do not have the resources available to assist students or

students are not aware of existing resources.[9]

The coping strategies that college food pantry participants utilize to assist with

purchasing food may lead to increased stress and anxiety for the student.[13,34,52] College

students may purchase food and groceries on credit, which increases the amount of debt a

student will owe by the end of their college career.[34,52] Inexpensive food items such as

beans or rice will be purchased by food insecure students as a way to decrease the amount

of money spent on food.[52] To purchase food, college students will forgo purchasing the

necessary school supplies such as required books or notes as a way to save money or

decrease expenses.[34,52] As a way to increase finances to purchase foods, a student may

also find employment.[13,34,52] Research has shown that having a job or working more

hours in college may have a negative effect on school performance.[13] Coping strategies

that food insecure college students utilize may be detrimental to their health and

academic performance.[13,34,52]

Barriers

On-campus food pantry evaluations have shown that there is a lack of food

insecure students not utilizing the on-campus food pantries.[31] A research study completed

by Zein et al. (2018)[31] examined the barriers of college students using on-campus food

pantries. The researchers found that while students may know about the on campus food

pantry: the stigma, lack of information, self-identity, and the hours of operation may

prevent them from using the pantry.[31] College students also reported not wanting to be

associated with the stigma of food insecurity or being embarrassed for using the on campus food pantry.[31] The results of the research study indicated that there was a lack of knowledge among the university students on how the food pantry functioned, the location, and the eligibility requirements for the food pantry.[31] Students also identified feelings of taking away food and resources from other students who may need the pantry more than them.[31]

Investigation of campus food pantries

Previous research conducted on college food security has established that the student food insecurity is an issue across university campuses. To provide assistance to college students, universities have established on-campus food pantries. Previous research conducted on college food pantries has not provided evaluation on the implementation or operations of the on-campus food pantries. Therefore, a research study examining the implementation process and the impact of the first year of a student-led on-campus food pantry may be beneficial in providing insight and guidance for other universities to implement on-campus food pantries.

Health Champion

The CUFBA toolkit has indicated support to the food pantry as an important factor when setting up an on-campus food pantry. Support for the food pantry may be from the university administration, faculty, or students. A health champion is an individual who acts as a facilitator, supports the project, implementation, and acts as an activator.[53] An activator is someone that is a productive part of the project, who encourages participation into the project, raises awareness, encourages changes to work procedures, and helps to strengthen the network and partnerships.[53] The motivation for a health champion to take on the lead role is to make changes to the organization, help others, and to fulfill a job

requirement.[53] The purpose for being a part of a health system change is due to personal

values, belief, identity, and culture.[54] The emerging of a health champion happens

spontaneously and informally within an organization.[54] A health champion may emerge

through learning about an innovation or idea through presentations or others involved

with the inovation.[55] The health champion engaged in the project and also works to get

others around them or from the community involved.[54] The major factors of a health

champion include: advocating for a specific cause beyond what is required of their job,

pulling together diverse groups of professionals as a support mechanism for the project,

and communication within the environment to help advocate for change and encourage

others to voice their support.[54]

Advocate

One of the main roles of the community health champion is to advocate for the

innovation that they are supporting, which may occur through education.[55] The

community health champion educates those around them through presentations,

handouts, and demonstrations.[55] Education through advocacy is a way for people within

the community to accept the innovation.[55] The champion, through advocating, may also

influence others to become involved and implement the innovation.

Support and communication

The community health champion must also build relationships with those in the

community who may one day use the innovation.[55] As a health champion, positive

relationships are beneficial in implementing the innovation.[55] Building relationships

outside of the organization allows for collaborations and assistance during different

phases of the initiation or implementation process.[55] Communication within the

organization separates a health champion from other professionals in the field.[56] Team

work is a main determinant of a health champion, the health champion is able to work with different groups of people within an organization.[56]

Benefits

The health champions is able to benefit from the innovation through improving the community and individual benefits.[35] Individuals who have been identified as health champions have reported an improvement in their personal life and health.[35] Through involvement with innovations, health champions are able to be empowered from helping in their community and working with like-minded individuals.[35] By working with others, the health champion is able to increase their knowledge, skills, and confidence.[35] With support from others in the program or project, health champions are also able to increase self-esteem and confidence.[35] Another form of benefit for the health champion may be

Predisposed knowledge

The health champion may have previous knowledge on the problem based on education or previous experience with the problem. The health champion may work in a similar field that they decide to help or become involved in the intervention being implemented.[57] The health champion may also be motivated to be a part of the intervention by having similar experiences in the past and having the drive or desire to help those who are currently experiencing the problem.[57] Research has shown that those who have experience problems in their past feel motivated to help others who may also be experiencing the problem.[57]

Theory

Various theories, such as the social cognitive theory, health belief model, precede-proceed model, socioecological model, and the RE-AIM framework were explored for the development and implementation of the Texas State food pantry, Bobcat Bounty.

Previous food security intervention research demonstrates that those with a theoretical basis tend to achieve more success with desired social and behavioral change.[58] Applications of the social cognitive theory, health belief model, precede-proceed model, and the social ecological model assisted in organizing the components of Bobcat Bounty that allowed for input-output factors for the design, evaluation, and sustainability of the project.

Social Cognitive Theory

The Social Cognitive Theory (SCT) is used to identify factors that motivate health behavior and create interventions tailored for behavioral change.[59] These factors include: personal cognitive factors, socio-environmental factors, and behavior factors.[59] Personal cognitive factors involve decisions related to health behaviors and personal reflection of those actions.[59] Socio-environmental factors are outside factors that either enable or prevent a health behavior.[59] Behavioral factors are the ability to perform a behavior, the goal of adding new behavior, or the resulting outcomes of a behavior.[59] The SCT also includes collective efficacy or the collective influence on behavior.[59] Collective efficacy is based on group mentality and is enhanced by shared goals, communication, teamwork, and past success.[59]

Health Belief Model

Human behavior is dependent on the value of a specific goal as well as the probability that an action will achieve that goal.[60] The Health Belief Model examines behavior that either prevents or decreases the chance of developing a negative health condition.[59,60] There are four psychological barriers in the Health Belief Model but the present study utilized the perceived benefit and perceived barrier.[60] Perceived benefit is the perceived effectiveness of actions to reduce the chance of developing a negative

health condition.[60] The study will also examine the cues to action and self-efficacy which is also part of the Precede-Proceed Model. [59,60]

Precede-Proceed Model

Phase 3 of the Precede-Proceed Model examines environmental and behavioral factors, the logic model, and assesses various constructs.[59] These constructs include: predisposing factors, reinforcing factors, and enabling factors.[59] Predisposing factors consist of attitudes, beliefs, values, and motivating factors of an individual or program objectives.[61,62] Self-efficacy, support, accessibility, and current policies are enabling factors and examine what facilitates a person or program objectives.[61,62] Reinforcing behaviors investigate how rewards or incentives may encourage repetition of behavior or program objectives.[61,62]

Socioecological Model

The Socioecological Model is based on the key principle of an individual.[62] This model is influenced by environmental factors such as: intrapersonal, interpersonal, community, and society.[62] The interpersonal level includes relationships or the support system of an individual.[62] Community and society levels involve the rules or regulations that must be followed and social norms or standards that exist within a society.[62]

RE-AIM Framework

The RE-AIM Framework was explored as a method of evaluation for the on-campus food pantry operations. The framework is a tool that is used to evaluate health promotion interventions.[63] Reach, effectiveness, adoption, implementation, and maintenance comprise the RE-AIM Framework.[63] Reach can be measured by total number of participants in the program or a sample of a specific population.[63] Efficacy, is measured through both the positive and negative effects of the intervention on the

population.[63] Adoption is the adoptability of the health intervention to be applied in various settings.[63] Maintenance, or the sustainability of the intervention is also measured.[63] The RE-AIM Framework fits into the Texas State University food pantry model. The Bobcat Bounty model was created utilizing a research and theory framework for evaluation and sustainability.

Objectives

Purpose of the study

The purpose of the study is to evaluate the implementation and initial impact of the Texas State University student led on-campus food pantry, Bobcat Bounty food pantry. The research team will examine the key factors necessary to implement and support a college campus food pantry. The specific purpose of the study is to 1) analyze outcome data, 2) analyze evaluation data, and 3) collect and analyze data on support of institutional partners. The information gathered will be used to inform the current process model of pantry implementation, campus support, measure student outcome, and inform future research. All phases of data collection aim to disseminate findings and gather external input. The long-term outcome of this project is to build a sustainable approach to address food security on the Texas State campus.

In carrying out this project, Texas State researchers will: analyze observational data from volunteers, interns, and staff since the launch of Bobcat Bounty (evaluation). Following the process evaluation, we will then engage in (Step 1) measure institutional support and identifying key factors of a health champion through stakeholder and volunteer interviews (community support). Then we will engage in (Step 2) conduct college pantry volunteer interviews (outcome). Following the interviews, researchers will

(Step 3) analyze data and create a report on the findings. All information gathered will be utilized to create a report on the implementation and evaluation of Bobcat Bounty.

Research questions and objectives

1. What were the supportive factors in the implementation, and sustainability of Bobcat Bounty, a student led, on-campus food pantry and what process methodology was essential to success in the Bobcat Bounty model?

   a. Objective 1: Bobcat Bounty participant surveys will indicate the participants' level of food security, satisfaction, and nutrition knowledge. Quantitative and qualitative data will show participant self-efficacy and impact of Bobcat Bounty.

   b. Objective 2: Interviews with Bobcat Bounty stakeholders, which include Texas State faculty, staff, and student volunteers, will identify the key factors for implementation and sustainability of Bobcat Bounty.

   c. Objective 3: Bobcat Bounty volunteer observations and inventory will provide information on implementation, such as the capacity and efficiency of Bobcat Bounty operations.

III. METHODS

Methods of evaluation were imbedded into the framework of the Texas State food pantry, Bobcat Bounty. The evaluation of Bobcat Bounty occurred through: participant intake surveys, end of the semester participant satisfaction surveys, stakeholder and student volunteer interviews, inventory, and volunteer observations. The Nutrition Care Process for community nutrition was the foundation for the model of the on-campus food pantry. The Nutrition Care Process focuses on four distinct steps, which include nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation.[64] The precede-proceed model and the social cognitive theory were used in the process evaluation to measure participant outcomes, operations, and sustainability of the student-led food pantry on the Texas State campus.[62] Interviews with Texas State faculty, staff, and students who have been involved with Bobcat Bounty helped to establish constructs of support as a health champion.

Institutional Review Board

Research study was approved by the Institutional Review Board (IRB) on December 11, 2018. IRB # 6228
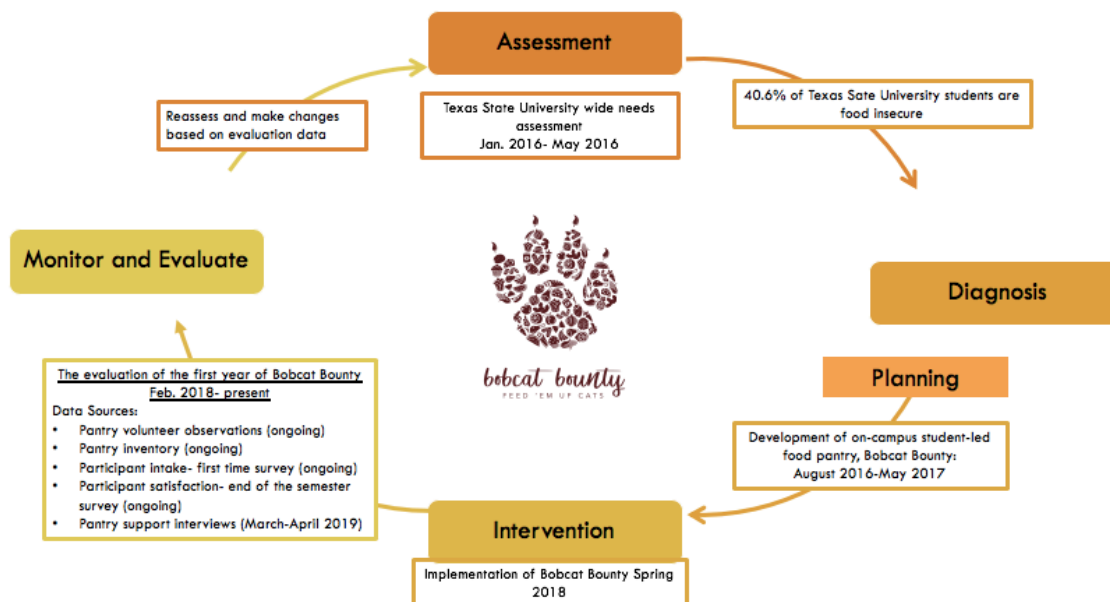
Figure 2. Planning and process model based on the nutrition care process[64]

Design and Implementation of Bobcat Bounty

Assessment and diagnosis

A needs assessment was completed in the spring of 2016 at Texas State

University by faculty within the Family and Consumer Sciences department. The primary

objective of the needs assessment was to assess the level of student food security at Texas

State University.[65] The results of the study indicated that 59.4% of the students

experience high or marginal food security while 20.8% experience low food security and

19.8% of students experienced very low food security.[65] Based on the USDA definition

of food insecurity, 40.6% of Texas State University students were classified as food

insecure.[65] The results of the study also indicated that Texas State University students

were utilizing outside food assistance programs such as WIC and SNAP to help cope

with food insecuriy.[65] Texas State students also reported perceived barriers such as an

inability to qualify for food assistance programs, a lack of money or transportation, and

limited availability of food variety.[65] An outcome measure of the study was to examine

the barriers and facilitators to opening an on-campus food pantry at Texas State through student interviews.[65] The perceived barriers to opening a food pantry included: an abuse of resources, logistics, stigma, inessential, and the quality of the food.[65] While the themes that emerged as facilitators for an on-campus food pantry included the ability to provides opportunities for students and a demand for a food pantry.[65] Based on the results from the needs assessment, researchers concluded that there was a need for an on-campus food pantry at Texas State University.[65]

Planning

The planning of the Texas State on-campus food pantry, Bobcat Bounty, the first on-campus, student-led food pantry was completed between 2016 and 2017. This unique theory-driven intervention model incorporated research, education, and training activities. Throughout this process, faculty and dietetic interns at Texas State University worked with volunteers and stakeholders. In addition, the design and implementation of Bobcat Bounty were facilitated through the creation of a Food Security Learning Community at Texas State University, which is an essential to the research, education, and training activities.

The first step in the design was creating a logic model, which was led by Dr. Biediger-Friedman and Ms. Thornton. They collaborated with the 2016-2017 Texas State dietetic interns to create the Texas State University Bobcat Bounty food security logic model (Appendix A.). The logic model outlined pantry inputs, activities, outputs, and expected outcomes for Bobcat Bounty. The design for the on-campus food pantry, Bobcat Bounty was to be similar to a grocery store with a comparable set-up and distribution method. Bobcat Bounty was designed to be a client choice pantry where participants were able to choose food based on a predetermined allotted number of food items. The client

choice method was to allow for participants autonomy and to decrease food waste. The distributed food was set up to be collected from the Hays County Food Bank prior to the opening of the pantry each week. Nutrition education was also established as a key input for Bobcat Bounty. As part of an on-going requirement for the Texas State dietetic interns, nutrition education was to be created and distribute to the Bobcat Bounty participants. Texas State University student volunteers were also included in the planning process as a way to help with pantry operations. The pantry outputs were designed to be evaluated through volunteer observations, surveys, and stakeholder interviews. The surveys included the intake survey that is distributed to all new participants at the beginning of each pantry and the student satisfaction survey that is distributed at the end of the semester.

Learning community

The learning community was established in 2016 to provide student education and experience in community nutrition and community nutrition research. The learning community consists of Texas State University nutrition undergraduate student interns, graduate research assistants, dietetic interns, and faculty from the Family and Consumer Science Human Nutrition department. The learning community is in charge of Bobcat Bounty operations, evaluation research, food pick-up and drop-off to the Hays County Food Bank and analyzing data to implement changes for Bobcat Bounty efficiency and sustainability.

Implementation of Bobcat Bounty

The implementation of Bobcat Bounty started on Thursday February 1, 2018. A dietetic intern and student volunteers were in charge of the pantry set-up and operations. A rotating dietetic intern is in charge of Bobcat Bounty every two weeks as part of the

Texas State dietetic internship competency hours that must be completed. A volunteer and the dietetic intern are in charge of collecting the food from the Hays Country Food Bank two hours prior to the opening of the pantry. The layout of the pantry is an open concept to allow for an easy flow throughout the pantry. The inventory of the food is taken both upon arrival and during the set-up process of Bobcat Bounty. Inventory is completed through a total food count and weighing method. At the end of the pantry, the remaining food is inventoried to track amount of food distributed. The perishable food that is not distributed during Bobcat Bounty operations is sent back to the Hays County Food Bank. The non-perishable food is inventoried and placed into back stock for future pantry use. The back stock is set-up as first-in first-out method to allow for the oldest items to be redistributed first.

Study Design and Approach

The Bobcat Bounty model utilized a convergent mixed method design to evaluate the implementation, operations, and sustainability of Bobcat Bounty. The Bobcat Bounty participants were evaluated via surveys to measure food security, self-efficacy, and nutrition knowledge. The intake survey and the participant satisfaction survey allow for the measurements of the efficiency of pantry operations, food security status, self-efficacy, and nutrition knowledge. Research staff completed training in conducting social and behavioral research with human participants prior to research activities. Participants (including Bobcat Bounty clients, volunteers, and stakeholders) did not receive financial compensation from their participation. The Institutional Review Board at Texas State University approved this research study on December 11, 2018 (IRB # 6228).

Setting

The study took place at Texas State University in the Family and Consumer Science building. The food pantry was set-up every Thursday afternoon during the school year in a food lab within the Family and Consumer Science building. The format and set-up of the food pantry can be found in Appendix B.

Clients

The Bobcat Bounty clients were students, faculty, and staff at Texas State University. All clients were asked to complete the USDA income guidelines provided by the Hays County Food Bank.[66] The income guideline is to assess if the clients were eligible for food pantry assistance.

Volunteers

The Bobcat Bounty volunteers are Texas State University students. The student volunteers are recruited by faculty and administration through emails, social media, and word of mouth. The student volunteers must go through an orientation process which educates the volunteers on Bobcat Bounty's mission statement, goals, pantry operations, proper attire, and protocols. Once the student volunteer completes the orientation, the student may sign-up online to volunteer for a specific time slot. The student volunteer may sign-up to volunteer during set-up, pantry distribution hours, or during clean-up. To assist with evaluation of the food pantry, the student volunteer completes an observation form on pantry operations and set-up. All volunteers are also asked to answer a short set of questions on general observations and anything that they observed before they leave.

Bobcat Bounty stakeholders

The Bobcat Bounty stakeholders were recruited by Texas State faculty within the Family and Consumer Science department during the planning period for Bobcat Bounty.

The Bobcat Bounty stakeholders include individuals from Texas State University community who had the motivation or desire to be a part of Bobcat Bounty. The stakeholders include both administration and faculty around the Texas State University campus. Stakeholders were important contributors for the initiation process, providing ideas, resources, and time to Bobcat Bounty.

Data Collection Procedures

Data were collected between Spring 2018 until the end of spring 2019. Participant intake data and satisfaction data were continuously collected through surveys. Volunteer observations were collected each pantry and were taken as field notes following specific themes. Inventory was weighed and counted at the beginning and end of each pantry. Data on food pantry support and health champions were conducted in March 2019 through survey and interviews.

Theoretical Framework Used for Evaluation

The evaluation of the Bobcat Bounty model was based on the precede-proceed model and the social cognitive theory. Both theoretical designs were used to identify themes from interviews with Texas State faculty, staff, and students who have worked with the pantry.[58,59,61,62] The enabling factor and reinforcing factors, which are themes from the precede-proceed model and constructs from the social cognitive theory such as self-efficacy, knowledge, environmental barriers and facilitators, and behavioral factors helped to uncover health champion constructs and the themes of sustainability for Bobcat Bounty.[56,62] Constructs of a health champion have been well-established in community health literature and were used to measure support within the research study.[54,56]

Outcome Evaluations

Primary and secondary outcomes

To evaluate Bobcat Bounty as an intervention, we included outcomes of: food security status, self-efficacy, and nutrition knowledge. The primary outcome was food security. Secondary outcomes were self-efficacy and nutrition knowledge. We measured outcomes using two data sources: the participant intake survey and the participant satisfaction survey.

Participant evaluations

The recruitment for the intake survey was completed through convenience sampling. All first-time participants of the food pantry were asked to complete a 19-question intake survey (Appendix C.). The intake survey was not a requirement to participant in Bobcat Bounty. All survey participation was voluntary, and no incentives were given. The intake survey was created using both the precede-proceed model and the social cognitive theory.[62] The purpose of the intake survey was to measure the individuals' level of food security, nutrition knowledge, and the environmental determinants for food security such as: money, relationships, and food consumption. All data from the intake survey is saved on a Bobcat Bounty Qualtrics account. The data was then downloaded to an Excel sheet for coding by the learning community research team.

Participant satisfaction

A 40-question participant satisfaction survey was created in the Qualtrics system by the food security learning community (Appendix D.). At the end of each semester of pantry operations, the participant satisfaction survey was distributed to all Bobcat Bounty participants. The Bobcat Bounty participants were offered an incentive to complete the participant satisfaction survey in the form of a cooking package that was raffled to one

participant. The purpose of the participant satisfaction survey was to identify the

following: resiliency, food security status, changes in diet, and self-efficacy.[42,67] After the

survey was closed all responses were downloaded to an Excel sheet for coding and

analysis by the food security learning community researcher team.

Volunteer observation

To monitor and evaluate the food pantry operations, all volunteers were asked to

complete observations for the pantry before leaving. A 30-minute observation form was

provided with specific themes of observation. The themes included: pantry set-up, the

line, flow through the pantry, first foods to go, and any questions or confusion that

participants may have. The observations provide data for modifications that may need to

be made for efficiency of pantry operations. All volunteers were required to complete an

observation sheet before leaving the pantry. The volunteers either completed an

observation for the set-up of the pantry, the first 30 minutes of operations, the last hours

of operations, or clean-up process. All volunteer observations were immediately

transcribed to an Excel document and entered into the NVivo system (Version 11) to be

coded.

Food inventory

Individual food items were inventoried and tracked through different means. The

distributed food for Bobcat Bounty was inventoried by student volunteers through

pictures taken following set-up. The images of the food were uploaded to NVivo and

coded. The food was separated into individual food categories and then divided into

perishable or non-perishable food items. The food categories included: grains, fruits,

vegetables, protein, dairy, and miscellaneous. In spring 2018, Bobcat Bounty food

inventory was collected through writing form by writing individual food items down and

then totaling number of the food item for a final count. Inventory was completed at the beginning and end of each pantry. Following the pantry, the inventory was transcribed onto an excel sheet. Based off of volunteer observations, the method for inventorying food was changed to a new model.

The current process for food inventory, implemented in summer 2018, was completed through weighing the food based on the previously established food categories and then entering the food and weight into a Qualtrics survey. The student volunteer would then select the individual food item on the survey based on what was received from the Hays County Food Bank. Each food item on the survey was separated into previously established food categories. The Qualtrics survey also included the total number of foods received. The inventory is completed at the beginning and end of each pantry. At the end of the semester the Qualtrics survey was closed and all data was downloaded to an Excel sheet for analysis.

Health champion interviews

Health champions included stakeholders and student volunteers, who had already been involved with Bobcat Bounty design and implementation. However, we re-contacted potential health champions via email in spring 2019, to inquire about participating in the health champion interviews. The email included a link to a Qualtrics self-administered survey (Appendix E.), which collected data on demographics (e.g., gender, age, and occupation), engagement with Bobcat Bounty, and ability to participate in an interview.

Once the demographic survey was completed, a follow up email was sent with a consent form and a scheduled time for the interview. A 30-minute interview was conducted via a teleconference video call (Zoom). The interview guide was structured to

facilitate conversation and to pull specific constructs using introductory, specific, and direct questions.[68] The interview guide also included probing questions and prompts to help establish a conversation. The interview was audio recorded and notes were taken during the interview to help establish background information. Immediately following the interview, the notes and interviews were transcribed to a Word document.

Data Analysis

Qualitative analysis

All survey data collected via Quatrics, including participant intake, participant satisfaction, and health champion demographics, were coded and cleaned by trained undergraduate student researchers from the food insecurity learning community. A statistical analysis was completed utilizing the Statistical Packages for Social Sciences (SPSS version 23, IBM Corp.). The Food security status and demographic information was compared using the chi-square test for independence. Continuous variables were analyzed through independent sample t-test to determine significance. Likert-scale categorical variables were analyzed via the chi-square test for goodness of fit. All statistical analysis was completed using SPSS and the level of significance was considered at $p<0.05$.

Qualitative analysis

Analysis included volunteer observations, inventory data, and health champion interviews. All volunteer observations were transcribed after each pantry into an Excel sheet and uploaded into the NVivo (version 11) computer system for coding. The coding process was conducted by two trained learning community undergraduate students. The coding utilized a three-coder system, where two undergraduate coders coded the initial

observation and a third coder served as the final reconciliation for any disagreements.[69] The data was then analyzed using descriptive statistics by the SPSS computer system.

Inventory

Inventory data was collected at the beginning of each pantry through item count and weighing the food based on category. The categories included: grains, non-perishable grains, vegetables, non-perishable vegetables, fruit, non-perishable fruit, protein, non-perishable protein, dairy, non-perishable dairy, sweets, and miscellaneous. All weights, number of items, and specific food items were entered into a Qualtrics survey. Survey data was then exported to a master Excel sheet for analysis. The total pounds of food distributed was analyzed for each food group for every semester of operations. The average food item distributed each semester was also entered into the master Excel sheet and assessed by the food security learning community research team.

Health champion interviews

Health champion interviews with stakeholder and student volunteers were transcribed following each interview. A code list was created utilizing the social cognitive theory, the health belief model, and the precede-proceed model.[58,62] A three-coder system was used to code and themate the interviews for inter-rater reliability.[69–71] Two trained learning community undergraduate researchers were each given the transcribed interviews and a master code list. Then separately, the two undergraduate researchers went through each interview and assigned quotes with codes that correlated to a specific theme. The undergraduate researchers then met to compare codes and came to either an agreement or a disagreement. All disagreements were resolved by the third coder. The number of agreements and disagreements for specific codes were then totaled

and divided by total number of themes chosen. The overall agreement rate for all

interviews was 86.4%.[69–71]

IV. MANUSCRIPT

Article Title

The Implementation and Process of Bobcat Bounty: A Campus Food security

Intervention

Introduction

The United States Department of Agriculture (USDA) defines food insecurity as

changes in quality and quantity of food a household is able to purchase.[1] In 2018, the

USDA reported that 11.1% of households within the United States were food insecure.[8]

Recently, research has been conducted on the rates of food insecurity within college

student populations. A meta-analysis on college food insecurity has shown that 42% of

college students are food insecure.[3] College students most at risk for food insecurity are:

single parents, minority students, first generation college students, and students who are

financially independent.[15] According to Healthy People 2020, food security status may be

influenced by the social determinants of health, such as environment, health system,

social and community context, education, and economic stability.[5,6] College students

food security status may be influenced by their stability within the social, environmental,

and physical domains of the social determinants of health.[5,6]

Previous quantitative research has examined associations between food insecurity

and different outcomes, such as eating behaviors, physical health, mental health, as well

as academic performance, for college students. A research study conducted with 1,093

college students at a university in te Appalachian region of North Carolina examined the

determinants and outcomes related to food insecurity.[14] The researchers found that food

insecure college students consumed more meals outside of the house, were receiving

financial aid, had fair to poor self reported health, were overweight or obese, and reported

low grade point average (GPA).[14] The food insecure students also indicated a decrease in class attendance and an inability to focus on the material during classes.[14] Similar findings have been reported in multiple research studies showing an association between food insecurity, academic success, living-situation, and self-reported poor health.[17,26,38,40]

On-campus food pantries have been created to assist food insecure college students and decrease the burden of food insecurity. Research on college food pantries have examined the level of food security within food pantry participants, participant sociodemographic information, and coping strategies. A research study conducted at the University of Alberta campus food pantry found that 82.8% of the particpants using the food pantry had low or very low food security.[34] The food pantry participants also reported having little knowelgde on how to prepare the food they received and shared the cost of food with others that they lived with.[34] The College and University Food Bank Alliance (CUFBA) released a report in 2018 on 530 college food pantries throughout the nation.[28] The findings indicated support as a major influence in the creation and sustainability of the college food pantry.[28] Pantries with university support had better success in creating the pantry and building a network for food distributions.[28]

Currently, the majority of research conducted on college food insecurity has pertained to the factors impacting food security status and the impact food security has on the university. To date, little research has been completed on the assessment of the implementation and evaluation of a student-run on-campus food pantry. The importance in the evaluation of pantry implementation and operations may allow for researchers to understand the impact a food pantry may have on student academic success, mental and physical health, and recreate the pantry model for future research. The purpose of the study is to evaluate the implementation and initial impact of the Texas State University

student led on-campus food pantry, Bobcat Bounty. The evaluation process was completed in three steps; intake survey and satisfaction survey (spring 2018 to spring 2019), pantry operations (spring 2018 to spring 2019), and pantry support and sustainability (spring 2019).

Materials and Methods
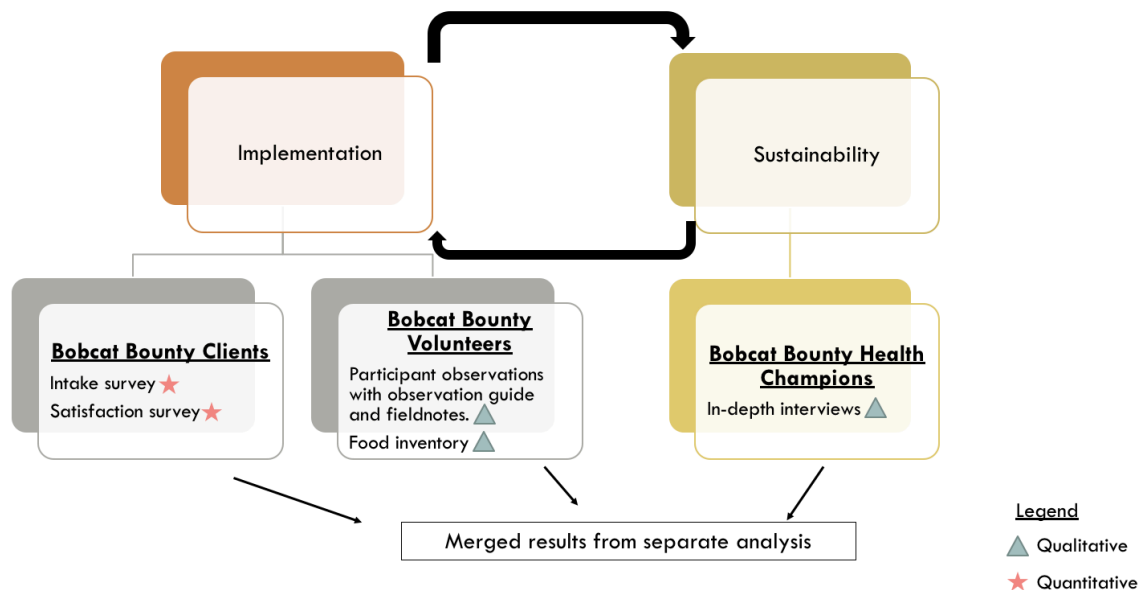
Figure 3. Data collection and analysis used in convergent mixed methods design

Setting

Bobcat Bounty is the first on-campus student-run food pantry at Texas State University. Texas State University is a Hispanic-Serving Institute, with 38.3% identifying as Hispanic and over 50% of total students enrolled overall identify as minority race and ethnicity.[73,74] Bobcat Bounty operations are based out of the Texas State University Family and Consumer Sciences (FCS) food lab. The pantry has a continued partnership with the local Hays County Food Banks for inventory.

Bobcat Bounty intervention

A mixed method feasibility study was implemented to evaluate the participants, operations, support, and sustainability of the first year of the Texas State food pantry, Bobcat Bounty (Figure 3). Bobcat Bounty was created following a needs assessment completed at Texas State University in 2016, which found 59.4% of Texas State student were food insecure.[65] The Bobcat Bounty model is based on the nutrition care process for community nutrition, follows a feedback loop of assessment, diagnosis, intervention, and monitoring and evaluation.[64,72] The planning of Bobcat Bounty was though a combined effort by the Family and Consumer Sciences (FCS) faculty and the 2016-2017 dietetic intern cohort. They established a logic model, which outlined set-up and operations of the student-run pantry to provide autonomy to participants through a client choice pantry. The social cognitive theory and precede-proceed model were the basis for participant surveys.[58,59,61,62] Interviews were created utilizing multiple theoretical frameworks to establish health champion constructs.[53,55,56] Pantry operations were measured and analyzed throughout the year of operations utilizing various evaluation methods.

Bobcat Bounty assessment

All new participants were asked to complete a 19-question intake survey before shopping through the pantry, the survey was not required to participate in the pantry. Participants had an option to not participate in the study and there was no incentive for completing the survey. The survey measured participant food security level, nutrition knowledge, and demographic information. The purpose of the survey was to establish a description of the Bobcat Bounty participants. All survey data was downloaded to an Excel file and coded to be analyzed using the Statistical Packages for Social Sciences (SPSS version 23, IBM Corp.).

At the end of each semester, an email was distributed to all pantry participants to complete a 40-question participant satisfaction survey. The survey was voluntary, and completion of the survey entered participants into a raffle for a cooking package. The survey measured the level of food security, the satisfaction of pantry operations and food, and experiences from utilizing the pantry. The purpose of the satisfaction survey was to establish outcomes associated with utilization of the pantry. All survey data was uploaded to an Excel file for coding and statistical analysis in SPSS.

The student volunteers were asked to participate in pantry observations during set-up, the first 30 minutes of pantry operations, final pantry operations, and clean-up. The volunteers completed a 30-minute observation on set themes: pantry set-up, the line, flow through the pantry, first foods to go, and any questions or confusion that participants may have. The volunteers were also asked to write one to two sentences on what they observed while volunteering with the pantry. The purpose of the observations was to allow for an understanding of Bobcat Bounty operations. All observations were than transcribed and entered into NVivo (version 11) for theming.

The food inventory was collected from Hays County Food Bank and delivered to the FCS food lab. Inventory was completed during the set-up of each pantry and during the clean-up at the end. The inventory for spring 2018 was completed through categorical food counts but based on observations food inventory changed to total weight of each food category. Food was weighed based on the set food categories: perishable and non-perishable grains, proteins, fruits, vegetables, dairy, and miscellaneous. All food was identified and entered into a Qualtrics survey. The weight was entered into the Qualtrics survey and downloaded to an Excel file for evaluation.

Health champion interviews

During spring 2019, Texas State faculty, staff, and students working with Bobcat Bounty and college food insecurity were sent an email to be recruited to participate in 15 to 30-minute video conference interviews via ZOOM. The email contained an 8-question demographic survey including dates and times for interviews. Once completed, participants were sent a confirmation email containing the scheduled interview time and a participation consent form. The consent form was returned to researcher and interviews were conducted. In-depth interviews were used to explore the constructs of a health champion and the sustainability of Bobcat Bounty. Following the interview, researcher transcribed all interviews and created themes based on responses.

Data Analysis

Data processing and coding

Survey data was downloaded onto an Excel file and cleaned by trained undergraduate researchers. Volunteer observations and 30-minute observations were transcribed an entered into the NVivo system for themation. Two undergraduate researchers each reviewed the observations and assigned pre-established themes. Researchers then met and resolved any disagreements. Interviews were transcribed verbatim based off of audio recording. The themation of the interviews were based off a three-person coder model to determine inter-rater reliability.[69,71] The inter-rater reliability of the interviews were calculated through dividing the total number of agreements for all codes and dividing it by the total number of codes.[70] The overall inter-rater reliability score following the reconciliation of coding discrepancies was 86.4%.

Food security status was determined based on the U.S Household Food Security Module six-item short form.[75] The Food security status and demographic information was compared using the chi-square test for independence. Continuous variables were analyzed through independent sample t-test to determine significance. Likert-scale categorical variables were analyzed via the chi-square test for goodness of fit. All statistical analysis was completed using SPSS and the level of significance was considered at p<0.05.

Results

Bobcat Bounty participant surveys

The intake surveys described the participants that visited Bobcat Bounty in the first year of operations. A total of 947 first-time Bobcat Bounty participants (72.8%) of 1,300 participants completed the intake survey. Based on the U.S. Household Food Security Survey Module six-item short form (2012),[75] 328 (34.6%) of the participants who completed the survey were food secure and 619 (65.4%) were food insecure. The demographic results for first time Bobcat Bounty participants who completed the intake survey can be found in Table 1. Of the clients that completed the intake survey, food insecurity was high among female students (74%), Hispanic students (46.1%), students living off campus (63.5%), full-time students (89.9%), and junior (28%) and senior level students (34.2%). The GPA among food insecure students (2.44) was significantly different than food secure students (1.90) who completed the survey.

The majority of food insecure participants (38.4%) reported getting food for the pantry for themselves. Within the food insecure participants, 25.7% came to the pantry because of hunger, while 17.5% came for healthy food. Among participants who

completed the intake survey, 238 were unable to indicate how much starch should be in the diet. Participants nutrition knowledge on fiber showed that 471 had at least one correct answer for amount of fiber in certain foods. When questioned on the amount of sodium in food, 148 participants chose the wrong answer, while 627 had the right answers. The final nutrition question on added sugar found that 730 participants had one or more correct answers.

Table 1. First time Bobcat Bounty participant sociodemographic information

Characteristics	Food secure 328 (34.6%)	Food insecure 619 (65.4%)	p-score
	mean (standard error)		
Age	21.68 (3.706)	21.61 (3.737)	0.81
GPA	1.9 (1.639)	2.44 (1.451)	<0.001*
	n (%)		
Sex			0.018*
female	158 (64.2)	449 (74)	
male	85 (34.6)	149 (24.6)	
prefer not to answer/gender non-conforming	3 (1.2)	7 (1.2)	
Race/ethnicity			0.440
White non-Hispanic	77 (32.4)	162 (27.9)	
Black or African American	37 (15.5)	81 (13.9)	
Hispanic	102 (42.9)	268 (46.1)	
Asian and Pacific Islander	5 (2.1)	23 (4)	
two or more	17 (7.1)	47 (8.1)	
Living			0.843
off campus apartment	146 (61.3)	379 (63.5)	
campus residence hall	45 (18.9)	107 (17.9)	
campus apartment	15 (6.3)	40 (6.7)	
parent/relative house	11 (4.6)	29 (4.9)	
no permanent housing	2 (0.8)	7 (0.4)	
Student status			0.971
full-time student	216 (90)	535 (89.9)	
part-time student	24 (10)	60 (10.1)	
Year in School			0.806
freshman	24 (10)	76 (12.7)	
sophomore	44 (18.4)	102 (17)	
junior	74 (31)	168 (28)	
senior	81 (33.9)	205 (34.2)	
4+ years	8 (3.3)	22 (3.7)	
graduate student	8 (3.3)	27 (4.5)	

Table 1. Continued. First time Bobcat Bounty participant sociodemographic information

First Generation Student			0.366
yes	114 (49.6)	310 (53.1)	
no	116 (50.4)	274 (46.9)	
Income			0.112
part-time employment	57 (23.8)	156 (26)	
family	59 (24.6)	107 (17.8)	
federal financial aid	16 (6.7)	35 (5.8)	
two or more	88 (36.7)	239 (39.8)	
Obtain Food			0.108
self-only	105 (43.9)	230 (38.4)	
parents/relatives	45 (18.8)	123 (20.5)	
two or more	55 (23)	192 (32.1)	
Purpose of visit			0.167
hunger	46 (18.8)	155 (25.7)	
healthy food	52 (21.2)	106 (17.5)	
curious	47 (19.2)	109 (18)	
came with friend	31 (12.7)	68 (11.3)	
two or more	60 (24.5)	155 (25.7)	
Learn about Bobcat Bounty			0.062*
friend	132 (54.8)	287 (47.7)	
flyer	18 (7.5)	71 (11.8)	
professor	31 (12.9)	70 (11.6)	
two or more	45 (18.7)	114 (18.9)	
* significant p-value, p< 0.05			

The participant satisfaction survey demographic information can be found in Appendix F. A total of 267 (20.5%) Bobcat Bounty participants completed the student satisfaction survey. Based on the U.S. Household Food Security Survey Module six-item short form (2012),[75] 194 (78.9%) satisfaction survey participants were food insecure and 52 (21.1%) were food secure. The average age for satisfaction survey participants was 22 years old. The majority of food insecure students who completed the survey were Hispanic (39.3%), female (79.5%), senior (36.3%), receiving financial aid (76.2%), and living off campus in San Marcos (85.3%).

Bobcat Bounty participants reported level of satisfaction with different aspects of operations. Positive satisfaction and agreement scores were reported by Bobcat Bounty

participants are provided in Appendix G. Positive scores and level of agreement reported

by participants consisted of agree, strongly agree, increased, satisfied, and very satisfied.

The majority of Bobcat Bounty participants reported being able to put money towards

other necessities (79.4%), feeling less financial strain, and having less stress and anxiety

(81.6%) as a result of using the pantry. Among the participants who completed the

satisfaction survey, 63.9% were also able to eat a diet containing more varieties of food

after visiting the pantry. The participants reported a high level of satisfaction with the

level of services they received (81.6%), which increased from fall 2018 to spring 2019,

the healthfulness of the food that was offered (75.7%), and the variety of food that was

offered (76.8%). A high percentage of participants reported feeling confidant in their

ability to use the food received (79.7%) and having the resources available to use the

food they received (77.5%). The majority of Bobcat Bounty participants also indicated

feeling comfortable with being at the pantry (77%) and interacting with volunteer and

staff (72.3%).

Level of satisfaction and demographic information was also compared among the

Bobcat Bounty participants who completed the survey. The different demographic

categories that were examined were the participants race/ethnicity, gender, year in school,

and living arrangement. There was a significant between race/ethnicity and ability to use

the food received from Bobcat Bounty (p= 0.056), the resources (p= 0.025) and support

(p= 0.019) to use the food, and the level of comfort at Bobcat Bounty (p=0.017). Among

the participants that completed the satisfaction survey there was a significant difference

between race/ethnicity and academic performance. A high percentage of Hispanic

participants had improvement in grades (54.5%), improvement in classroom attendance

(50%), and ability to concentrate in classes (46.2%). There was also a significant difference between race/ethnicity and frequency of meals eaten at home (p= 0.033).

There was a significant difference between gender of participants that completed the satisfaction survey and ability to use food (p< 0.001), having the resources and support (p< 0.001), and level of comfort (p< 0.001). The majority of female participants that completed the survey reported feeling healthier with the food received from Bobcat Bounty (81.2%), consume meals with more variety (79.6%), and were able to concentrate in their classes (79.7%). A significant difference was found among participants that completed the survey and years in school. A high percentage of senior participants that completed the survey reported an increase in an ability to afford other essentials after using the pantry (38.2%), a change in how often they skip meals (44.4%), and the amount of time they spent cooking (41.2%). There was also a significant difference among the particpants living arrangement and the changes in diet for each food group (p< 0.001), cooking (p< 0.001), and eating meals at home (p< 0.001). Participants that completed the satisfaction survey living off campus in San Marcos reported higher rates of eating meals at home (83.2%) and amount of time spent cooking (84.6%), while participants living on campus reported low rate of eating meals at home (6.8%) and time cooking at home (5.9%).

Bobcat Bounty volunteer observations

Observations made by Bobcat Bounty volunteers during set up, pantry operations, final clean-up, and food count can be grouped into seven major themes, including perceived participant experience, observed participant food satisfaction, pantry layout, participant nutrition knowledge, observed social factors, pantry suggestions, and overall volunteer experience. Results of the Bobcat Bounty volunteer observations can be found

in Table 2. The majority of volunteers (n=27, 22.3%) reported observing participants

having positive experiences at Bobcat Bounty.

"One girl told us how excited she was to see a pantry on campus. She explained she had gone to student services requesting an organization like ours. She received an email recently about Bobcat Bounty and was super excited about it and very grateful.

Table 2. Bobcat Bounty volunteer observations

	Themes	Quotes
Perceived Participant Experience	Positive	"one girl told us how excited she was to see a pantry on campus...She received an email recently about Bobcat Bounty and was super excited about it and very grateful."
Food Satisfaction	Amount - Negative	"The clients go to protein in the ice boxes first and then the sweets section or fruit. Protein is the first thing that is taken and finished when there is not a lot."
	Amount - Positive	"Loved how much food we had today! It's nice to have enough for those that come in later."
	Quality - Negative	"One (client) mentioned we had too many pastries. Another that she didn't have a fridge, but luckily many of our foods do not require refrigeration."
	Quality - Positive	"Had a lot of people return and the new clients were very happy with the food."
Layout	Layout	"I thought that the vegetables could have been placed before the snacks and sodas. The snacks are a good edition since we're serving young snack loving adults."
	Accessible	--
	Layout - Positive	--
	Organized	--
Participant Nutrition Knowledge	Desire for more education	--
	Improved knowledge	--
Observed Social Factors	Appreciative	"Greeted today and it was nice getting to talk with customers before they shopped! Everyone was calm and people seemed appreciative."
	Inviting	"The clients seemed a little anxious at first, but then at ease. I don't think anyone felt ashamed or embarrassed."

Table 2. Continued. Bobcat Bounty Volunteer Observations

Pantry Suggestions	Directions - Negative	--
	Flow - Negative	"I don't think the clients knew which way to walk, as there were people going in multiple directions."
	Flow - Positive	--
Overall Volunteer Experiences	Busy	"Everything ran very well and even when it was busy everyone had a smile on their face and were helpful and friendly."
	Need more	"Helping with food pick up is pretty tricky with so much food. It may worth asking for more volunteers at 3 pm. Also securing another vehicle for transport just for reliability."
	Positive Experience	"All the students are working hard every Thursday to make this pantry successful and making a difference."

The theme of food running out quickly emerged during fall 2018 semester. Multiple volunteer observations reported that perishable proteins, fresh fruits, and fresh vegetables were the first foods to be taken.

"The protein goes too fast. Perhaps limiting the amount of protein so others can get some as well."

A 30-minute volunteer observation was created to measure the implementation of the limited items policy and overall first 30-minutes of pantry operations. Results from the first 30-minute observations can be found in Appendix H. Seven major themes for the 30-minute observations include pantry set-up, customer line, first foods to go, flow through the pantry, other observations, questions and confusion, and participant sign-in. Volunteer observations and first 30-minute reporting indicated an efficient set-up of the pantry to allow for a smooth flow through the pantry.

"I think set up is well organized. The team thought about the flow of the items and ease of clients. I am sure clients will be able to see everything and decide what they need easily and quickly."

Other observations from volunteers included information on the customer line. Volunteers reported seeing repeat participants and socialization throughout the pantry line.

"Clients are socializing with each other, happy to be here. Very crowded room for first 30 min."

The volunteers reported a sense of confusion for participants for the total number of items that they were allotted.

"Clients not knowing whether they can take the entire package if it contains multiple items (such as strawberries, pastries, cupcakes)"

Bobcat Bounty inventory

Weighted inventory was collected and analyzed for summer 2018 to spring 2019 in Table 3. Inventory in spring 2018 was conducted through item counts, which was switched to weights for summer 2018. The Hays County Food Bank provided inventory for Bobcat Bounty and provided food based on requested amounts by the FCS learning community. The main grains distributed for all three semesters were non-perishable pasta and a variety of breads. The majority of protein that was distributed was non-perishable protein such as various canned beans, peanut butter, and tuna. Chicken was the main perishable protein that was distributed each semester. During the summer semester, strawberries were the main fresh fruit distributed, fall 2018 was apples, and spring 2019 was both apples and bananas. The fresh vegetable that was mainly distributed during summer 2018 and fall 2018 was potatoes and carrots, while spring 2019 main distributed fresh vegetable was tomatoes. The main non-perishable vegetable distributed was canned corn, while the peach slices and cranberry jelly were the main non-perishable fruit distributed.

Table 3. Pounds of food distributed at Bobcat Bounty each semester

Food groups	Summer 2018	Fall 2018	Spring 2019	Total
Grains	2,050 lbs.	2,233 lbs.	2,141 lbs.	6,424 lbs.
Protein	1,000 lbs.	765 lbs.	892 lbs.	2,594 lbs.
Non-perishable protein	1,229 lbs.	1,183 lbs.	1,923 lbs.	4,335 lbs.
Fruit	1,375 lbs.	1,163 lbs.	2,643 lbs.	5,181 lbs.
Non-perishable fruit	573 lbs.	365 lbs.	192 lbs.	1,130 lbs.

Table 3. Continued. Pounds of food distributed at Bobcat Bounty each semester

Vegetable	1,524 lbs.	2,706 lbs.	2,974 lbs.	7,204 lbs.
Non-perishable vegetable	904 lbs.	862 lbs.	1,219 lbs.	2,985 lbs.
Dairy	65 lbs.	22 lbs.	--	87 lbs.
Non-perishable dairy	35 lbs.	18 lbs.	28 lbs.	81 lbs.
Sweets	858 lbs.	475 lbs.	752 lbs.	2,085 lbs.
Miscellaneous	283 lbs.	246 lbs.	380 lbs.	909 lbs.
Total	9,896 lbs.	10,038 lbs.	13,081 lbs.	33,015 lbs.
lbs.= pounds of food Weight taken at the beginning of each pantry				

Health champion interviews

Sixteen participants were interviewed including faculty, staff, and students who have worked with Bobcat Bounty. Of the faculty, staff, and students who were interviewed, 11 (69%) are female, 5 (31%) are male, 44% are White (n=7), 44% are Hispanic (n=7), and 12% are Black (n=2). The majority of the participants (69%) reported working with Bobcat Bounty through the steering committee (n=5) or as Bobcat Bounty staff (n=6). Of the Texas State faculty and staff, 50% have a Doctoral degree (n=4), while 63% of the students (n=5) have a bachelor's degree.

The findings from the health champion interviews are in Table 4. The themes from the interviews were organized into six different categories including: perceived impression of student hunger, call to action, health champion, observed university support, pantry sustainability, and college students' knowledge of Bobcat Bounty. The majority of interviewees perceived student hunger as students having an inadequate or unhealthy diet. A faculty member described their experience with seeing students struggle with making healthy food purchases due to a lack of budget and nutrition knowledge.

"A lot of them are eating poorly, lots of them are making bad choices in respect to their own health and even with respect to their own food insecurity, making food choices that actually increase their food insecurity because their buying expensive, yet nutritionally unsatisfying foods or non-nutritionally dense food and they could be educated about that."

Interviewee responses aligned with previously established health champion

constructs. Faculty, staff, and students showed motivation to help students at Texas State

and described reinforcement of continued work with Bobcat Bounty. One student

described their experience as a sense of belonging at the University as the reason to

continue working with Bobcat Bounty.

"I started grad school at Texas State and I just felt very inadequate, but overwhelmed like I thought I was just gonna fail all of my classes and literally was not going to make it through and just having, I guess just having Bobcat Bounty and having the community that I showed up every Thursday to the food security learning community meeting and just having, I guess a group of people at Texas State to belong to and to check in with."

The interviewees perceived students' inability to access Bobcat Bounty due to the

distance of the current location of Bobcat Bounty as a barrier for the sustainability of the

pantry. Many interviewees expressed hearing Bobcat Bounty clients discuss the

limitations of participating at the pantry due to the time and location of Bobcat Bounty.

"*Although it is on campus, a lot of people talk about, oh well it's on the end of campus or it's all the way up hill, or you know, xyz. And maybe even offering it on more days than just Thursdays because maybe some people may not be able to attend on Thursdays."*

Multiple interviewees indicated word of mouth as the means by which most college

students learn about Bobcat Bounty. Some faculty and students who were interviewed

also included themselves as facilitators for Bobcat Bounty because they promoted to the

panty to students and other faculty around the Texas State campus.

"Right now, I think that it's a lot of word of mouth, I think that is the biggest thing in teaching promotional strategy is that it's like word of mouth is your best friend in your pocket or your worst enemy. As long as we continue to do really good stuff than word of mouth is a great thing. As long as everyone feels supported and uplifted in the process then it will continue to be great."

Table 4. Themes and quotes of health champions for Bobcat Bounty support demonstrated by faculty, staff and student interview results

Theme	Quote
Perceived Impression of Student Hunger	
Student hunger perceived as inadequate or unhealthy diet	"[A student] over time started to look very tired and lost a lot of weight and he did not have weight to lose…I realized that he seemed to not have funding for consistent grocery shopping."

Table 4. Continued. Themes and quotes of health champions for Bobcat Bounty support demonstrated by faculty, staff and student interview results

Students are private about their struggles with food insecurity	"You never really know what anybody is going through until you actually first hand see it or they directly tell you about it, and usually food security isn't something that a lot of people talk about."
Call to Action	
Faculty and staff seeing students firsthand struggling with hunger	"hearing from my student staff about students that they work directly with who are food insecure…hearing those stories and trying to find ways to get students connected to a basic need has really motivated me to participate more"
Students personal experience with food insecurity and hunger	"There was a point in my time like when I first started college where I [didn't] think I [could] finish school, I can't even afford food."
Community Health Champion	
Caring about student's wellbeing	"I just feel like food is something that no one should ever really have to worry about. I just think that it's something that everyone should come across easily."
Positive reinforcement of continued assistance	"I really enjoyed volunteering for [BCB], and I think that a lot of people even when they do volunteer for places, they do it more for their resume and not for the feeling of satisfaction and feeling good…every time I volunteer…I leave in a really good mood and I know that I did a really good thing for the day."
Self-efficacy	"I organized a donation to Bobcat Bounty on behalf of student nutrition organization because we wanted to make a charitable donation."
Observed University Support	
A lack of support from the university	"I reached out to the dean of students group because that was the avenue that I felt was necessary to take to maybe get this ball rolling and the email I got back was [that] we don't have the funds for this, we don't have the man power, we don't have the resources, so good luck, and I was taken back from that because I thought okay who doesn't want to feed student[s] in need."
Lack of communication to students on available campus resources	"I really don't think a lot of people are aware of Bobcat Bounty as like I think they should be, because whenever I try to explain it to people, they have no idea that it existed."
Sustainability	
Integrate Bobcat Bounty into Texas State culture	"I think just making it part of our culture too...there has been some positive feedback that the community has had on Bobcat Bounty, so creating traction and momentum through that to help bring awareness and then...make it [a] more sustainable part of the infrastructure of our campus community."
Increase access and availability of Bobcat Bounty to students	"providing a central location…[which] can protect the privacy of the student…[and] will help better, be proximity to a lot more classes, a lot more parking."
Permanent space and location	"I definitely believe Bobcat Bounty needs a permanent space whether it's in LBJ student center or closer to campus…maybe by the bus stop…I think that that's one of the biggest problems that the pantry has."
College Students Knowledge of Bobcat Bounty	
Word of mouth	"I think word of mouth is another big way I think students find out about it. It's like they build their own community within this group for this population of students."
Themes based on Health Champion constructs and established themes of university pantry support.	

Discussion

  This mixed-method feasibility study revealed the factors of participant food insecurity, sustainability, and participation outcomes, to be key to the efficacy of the pantry model (as demonstrated in Figure 4). The present study utilizing qualitative and quantitative methods was able to measure the implementation process and first year of operations of the Texas State student-run on-campus food pantry, Bobcat Bounty. This study provides a unique contribution to college food security literature as this evaluation details the process of evaluation of a student-led food pantry at an HSI university. The evidence-based theoretical model and evaluation techniques of Bobcat Bounty create an opportunity to provide implementation guidance to facilitate and sustain a student-led pantry. This unique study included predisposing pantry participant information from the 2016 needs assessment, Bobcat Bounty enabling factors, reinforcing factors of support and sustainability, and the Bobcat Bounty participant outcomes.
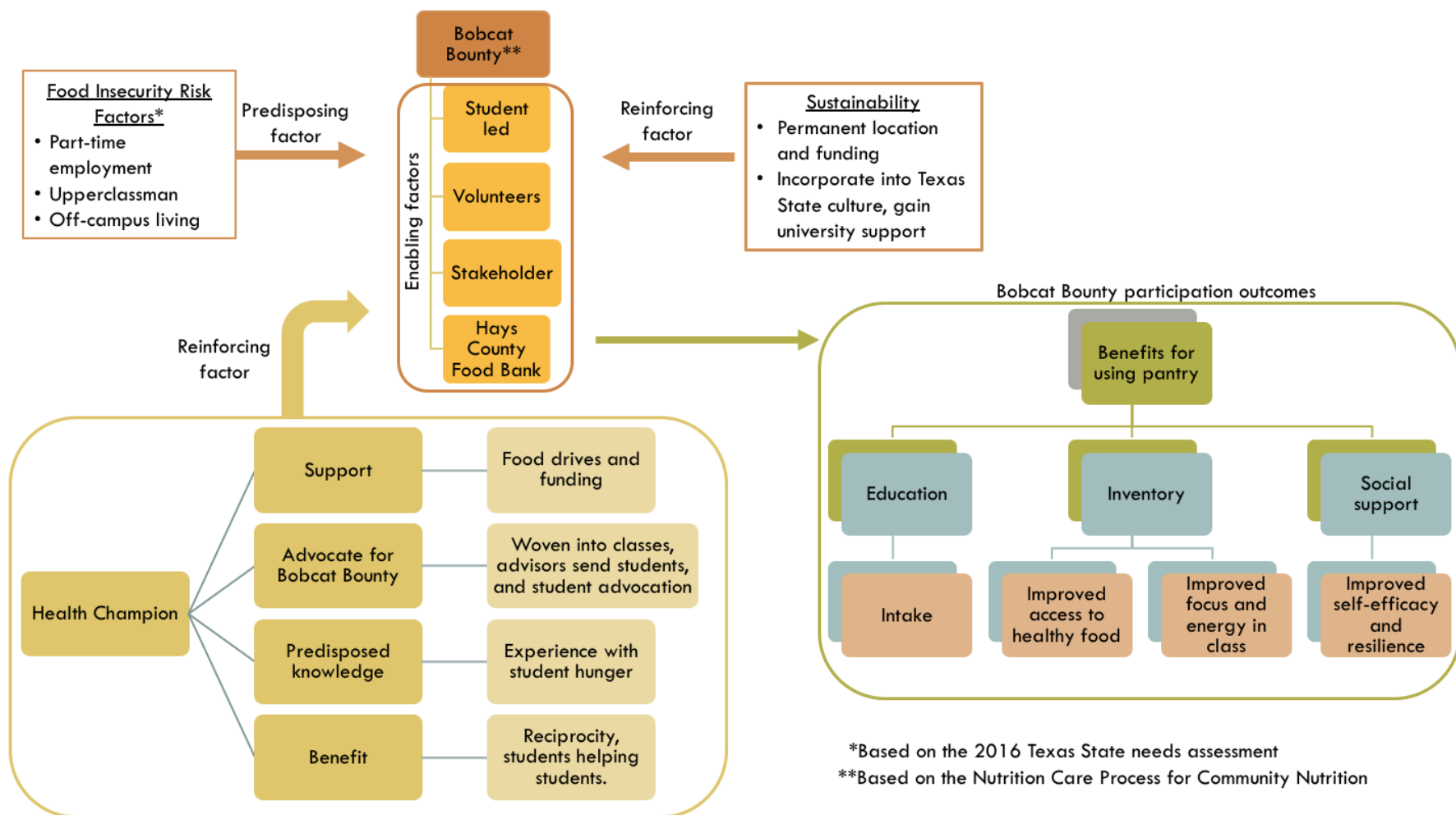
Figure 4. Logical process of key findings from results

Participant food insecurity and Bobcat Bounty

Overall, the utilization of food received by Bobcat Bounty participants was similar to previous research, which demonstrated students using the college food pantry to subsidize some or all of their food needs.[31] The demographics characteristics of Bobcat Bounty participant compare similarly to other college university pantry participants, with regard to most characteristics. One 2017 meta-analysis demonstrated that food insecurity was high among college pantry participants with part-time jobs, living off-campus, and upperclassman.[15] The 2016 Texas State needs assessment results demonstrate distinctive predisposing risk factors for food insecurity, such as students requiring financial aid, students who identified as Hispanic, and students on nutrition assistance programs.[65] The Texas State University needs assessment provides a unique opportunity to reach a diverse demographic of food insecure students.[65] Based on the Bobcat Bounty participants that completed the intake survey, students who were found to be most at risk for food insecurity were found to utilize the pantry. The Bobcat Bounty model is unique in that it provided pre- and post intervention data based on the needs assessment and the continued evaluation of the Bobcat Bounty participants.

Following the Nutrition Care Process for community nutrition, the assessment for the creation of Bobcat Bounty builds upon previous research, which demonstrates that student volunteers are a vital component in implementation of the on-campus pantry utilization. The results of the present study show that volunteers enable the pantry through continuous work with Bobcat Bounty, which follows results of previous research on student volunteers. The Bobcat Bounty volunteers act as an enabling factor for the continuation of Bobcat Bounty through a continuous pool of volunteers by nutrition students and students around campus who want to be involved. The present study also

expands on previous research, which demonstrates the importance of volunteers in enabling participation through environmental change. Research conducted by Rombach, Kang, and Bitsch (2018),[76] found that volunteers of the food bank played a role in creating a positive environment for participants. Similar to the results by Rombach, Kang, and Bitsch (2018),[76] Bobcat Bounty clients reported feelings of comfort at the pantry, which may be due to the student-led initiative and student volunteers. Volunteers expressed gratefulness and positivity with being a part of Bobcat Bounty operations through observation notes. The ability of Bobcat Bounty to utilize student volunteers helps to reinforce the sustainability of the pantry demonstrated through previously established health champions constructs.

Reinforcing factors of sustainability

The health champion reinforced the continuation of Bobcat Bounty in a similar manner as demonstrated in previous research by advocating for continued food pantry operations.[28,34] Faculty, staff, and student health champions advocated for Bobcat Bounty through promoting the pantry to students by class discussion, telling students about available resources, and participating in the Bobcat Bounty drives. The results of the current study support previously established constructs for continued support of Bobcat Bounty by health champions, such as motivation for involvement, personal benefits gained, and forms of support. This knowledge may be beneficial to other universities attempting to establish a sustainable on-campus pantry. Previous research by Azurdia, Lecompte, and Sibbald (2011)[49] at the University of Ottawa had similar results for the continuation of college pantry support. Azurdia, Lecompte, and Sibbald (2011)[49] found that volunteers donated their time to work with the pantry to become more involved in the campus community and to help other students.[49] The construct of experiencing or

seeing students struggle with hunger as a call to action has not been researched in past studies on pantry support. The call to action that faculty and staff at Texas State experienced may be a key contributor in establishing university support for attempting to establish campus pantries. Through support of Bobcat Bounty, health champions, help to reinforce the sustainability and continuation of operations, which may also be demonstrated within the campus environment.

Factors necessary to create a sustainable food pantry such as a permanent central location and support from the college community through awareness are well-established.[29] The present study demonstrates that a permanent central location and incorporation into the campus community are reinforcing factors of a sustainable Bobcat Bounty model. Bobcat Bounty health champions described the importance of making Bobcat Bounty a normal resource for students to know about for the reinforcement of continued use and sustainability of the pantry.

Results of programmatic sustainability of Bobcat Bounty builds upon previous literature. Key environmental barriers, such as a lack of funding and permanent space, coincide with established recommendations for creating an on-campus food pantry.[29] The CUFBA guide also describes the importance of monetary donations and funds to provide autonomy for running and sustaining food pantry.[29] The reinforcement of sustainability for the pantry model may better serve the Bobcat Bounty participants and increase the success of the pantry.

Success of Bobcat Bounty

The Bobcat Bounty participant outcomes provide understanding of the perceived benefits that participants experience from visiting the pantry. Overall levels of perceived benefits from using Bobcat Bounty differ to previous research completed on college food

pantries. Frequently college food pantries are unable to meet the nutritional needs of college students due to lack of healthy options and the students lack of knowledge on how to use food.[77] However, Bobcat Bounty participants report a perception of improved diet healthfulness and an increase in variety of food as a result of visiting the pantry. Bobcat Bounty is unique from other studies due to the high level of food and pantry operations satisfaction reported by participants, which may be due to the theoretical based model, which outlined the importance of inventory, nutrition education, and social support. The inventory, nutrition education, and social support may have contributed to the increased access to healthy food, perceived change in diet, and self-efficacy. The inventory from the Hays County Food Bank increased participants access to healthy food which then led to a change in participants diet. The nutrition education provided at the pantry may have also contributed to a change in participants diet through education on food preparation and storage. Social support through peers, faculty and staff, and the Bobcat Bounty volunteers may have improved participant self-efficacy and ability to utilize food they received.

Strengths and limitations

A major strength of this research was its mixed-method theory-based design. The theoretical framework based on the social cognitive theory and the precede-proceed model used for the Bobcat Bounty model allowed for all aspects of the pantry to be evaluated. Results from the evaluation of the pantry demonstrated the efficacy of the pantry model. Researcher were able to establish barriers and facilitators to pantry success and sustainability to allow for modifications and changes that may improve the pantry model.

The study presented some limitations. A limitation of the current study was the sample size of satisfaction survey, which may be attributed to the lack of availability of students at the end of the semester. For example, the participant satisfaction survey was distributed at the end of each semester of school, before the final exam week. Some students may not check their email or not have the time to complete the survey. There may also be participant bias when completing the surveys. Students may not answer questions truthfully due to a fear that they may not "qualify" for services. Since there has been no research on evaluating multiple aspects of running and sustaining a college food pantry more research is needed to better understand best practice evaluation methods for pantry success and sustainability.

Conclusion

The present study demonstrates the values of a theory-driven intervention model, grounded in an on-campus learning community, for addressing food insecurity on-campus and one approach to comprehensive evaluation that may be utilized for other on-campus, student-led food pantry. The findings from the study also provide guidance for sustainability of the Bobcat Bounty model through pantry operations, inventory, and support. Health champions were a major component in support for Bobcat Bounty and through leadership and innovation towards sustainability of the campus food pantry. The Bobcat Bounty model serves as a guideline for future Bobcat Bounty research and process model modifications. Furthermore, this model may be used to inform future Bobcat Bounty research for participant nutrition education to improve health outcomes.

Acknowledgements

Authors would like to thank the Texas State University College of Applied Arts, the Family and Consumer Sciences (FCS) department, the FCS learning community

graduate students and undergraduate students, and Texas State University dietetic interns, and the Bobcat Bounty Steering Committee for their assistance and continued support of Bobcat Bounty.

V. EXTENDED CONCLUSION

The Bobcat Bounty theory-based intervention model demonstrated the efficacy of the first on-campus, student-led food pantry at Texas State University. Previous research completed on campus food pantries has examined the participant demographics, food security status, coping skills, and health outcomes.[13,30–34] A comprehensive outcome and process evaluation of this unique food pantry model provide greater understanding of what makes for a successful food pantry. In addition, evaluation findings identified limitation within the Bobcat Bounty model, which can be modified and used to improve Bobcat Bounty. Following the Nutrition Care Process, pantry operation observations allowed for researchers to monitor and evaluate ways to create a more efficient pantry that may better meet the needs of participants. Surveys of first-time participants and participant satisfaction surveys allowed for researchers to understand the reach of Bobcat Bounty, the participants demographics, and the level of satisfaction with pantry operations. The results indicated the effectiveness of the pantry in improving participants diet. The inventory played an important role in increasing participants fruit and vegetable consumption. When fresh fruit and vegetables were available participants would choose those foods, which resulted in a perceived change to participants diet. The results also demonstrated pantry support and the importance of support for the sustainability of the pantry.

The results of the current study allowed for researchers to understand the emerging of college pantry support from faculty, staff, and students. It is important to understand the reasons for faculty, staff, and student support of a college pantry to allow for other universities creating an on-campus pantry to understand the importance of gaining support. Pantry volunteers were found to be a key component in pantry support

and creating a welcoming environment for participants. The study demonstrated that student volunteers are a continuous form of support for the pantry due to students wanting to help other students. The results of the interviews demonstrated that students volunteered for the pantry due to past experiences with food insecurity or a need to help other students who are struggling. Due to this need to help students, student volunteers will always be a sustainable component for a campus food pantry.

Another key component of sustainability was the importance for a college pantry to be ingrained into the campus community to be able to reach those in need. The results of the study indicated the ability of Bobcat Bounty to become sustainable in the future. Additional funding and a permanent central location were identified as key components for sustainability and have been documented in previous research. Due to Bobcat Bounty being located in a food lab, meant for classes and the location on campus, it is believed that the pantry is unable to reach all students in need. The present study demonstrated a lack of adoption of Bobcat Bounty within the Texas State community. More research is needed to understand how incorporating Bobcat Bounty into the Texas State community may help meet the needs of the food insecure students at Texas State University.

The theoretical-based model allowed for a clear understanding of future research for Bobcat Bounty and the application to other HSI universities. The results indicate a need for permanent space and location to allow for a further reach within the Texas State community. The present study also demonstrated the ability of Bobcat Bounty to reach a greater underserved population through measuring food insecure student participation, satisfaction, and knowledge of pantry operations. The evaluation of the theoretical-based pantry model may be replicated at other universities creating a student-run on campus food pantry.

APPENDIX SECTION

APPENDIX A: LOGIC MODEL

Logic model created by Ms. Thornton and Dr. Biediger-Friedman.
Program: Bobcat Bounty, the Texas State University On-Campus Food Pantry

Inputs	Activities	Outputs	Outcomes		
			Initial (spring semester 2018)	**Intermediate (1-3 years)**	**Long-term (3+ years)**

Funding:
● Vendor fair - vendors paid $100 for a table (7 participants + 1 donor) - $850 raised
● $5000 grant from Dean
  o $500 for supplies and education materials
  o $1000 for marketing
  o $1000 for research incentives
  o $3000 research assistant
● Apply for additional academic grants through TX State
Marketing:
● University Star
● Tabling equipment- table, flyers, volunteers
● Social media (@txstatedietetics Instagram),
● Snapchat, Facebook, & SNO Meetings
● In-class faculty promotions
	Provide food to students:
	● Client choice model: number of items system
	  o Each client will be allotted a certain number of items to choose from
	  o Shelf-stable and perishable foods provided by Hays Co Food Bank
	● Operate on Thursdays from 5-7pm
	Food drive in support of Hays County Food Bank (Spring semester):
	● Competitions or points awarded to campus orgs. (ex. SNO, honor societies, fraternities, sports teams, colleges)
	● More points for nutritious foods
	Education:
	● Create age- and culturally-appropriate educational handouts
	● MyPlate
		Food:
		● Greater food distribution → 20 students served/week
		Education:
		● Educational handouts, flyers, quick tips (ex. recipes, meal ideas)
		Marketing:
		● Quad booth in 1st week of class in the Spring
		● Story in University Star/ Website
		● Flyers and printed materials (community boards, tables for fairs)
		● Digital marketing (social media, blog post, advertising in FCS
			Goal Opening Date: February 1, 2018
			Marketing:
			● Publicize food pantry around campus (promotional materials)
			● Develop educational materials (nutrition knowledge, recipes/info, how to eat healthy on a budget etc.)
			Goods:
			● Provide perishable foods to clients 1 day per week in client choice format
			● Number of items system
			Goals:
			● Students served (20/week) spend fewer days hungry and food security outcomes
				Reach:
				● Serve a diverse student population
				● Students served increased to 50/week
				● Hours of operation are increased to serve more students
				Funding & Awareness:
				● Establish university support: space provided and funding
				● ncreased awareness of pantry services by staff and students
					● Mobile capability (ex. a truck or trailer for distributing food) - on campus (*Bobcat Bounty Bus*)
					● Client choice method: Point System- food is given points, clients have number of points to "spend"- teaches money mgt. and value.
					● Operate 3 days/wk for 2 hours to serve food items to all with valid Texas State ID
					● Distribute non-perishable and perishable foods

Goods:
● Perishable food from Hays County Food Bank
● Bread donations from Panera Bread
● Operational supplies (see below) plus ice and tablets (provided by Texas State community nutrition)
Supplies/Program Assessment Tools
● Intake survey
● Nutrition knowledge questions
● End of semester evaluation
  ○ Volunteers
  ○ Interns
● End of semester survey
  ○ Pantry users
● iPads used for all assessments performed in pantry
People/partners:
● Dietetic Interns (2016-17 & 2017-18)
● Undergraduate 4301 students (approx. 10 hrs/wk)
● Part-time graduate assistant
● Faculty collaborators
	● How to read food labels and portion sizes
	● Individual nutrients of focus:
	  ○ Added sugars, sodium, fiber
	● Tip cards:
	  ○ Recipes using food pantry ingredients
	  ○ Health shopping on a budget
	Staffing:
	● 5 volunteers + 1 intern will staff food pantry
	● On-going volunteer communication
	● Volunteer orientation/training January 22, 2018 5:00-7:00
		Survey:
		● **Intake survey:** Analyze nutrition knowledge of students before receiving education
		● **Evaluation plan:** Evaluate client satisfaction, nutrition education, marketing and resources, logistics, demographics and stigma, food security, and rate of complications associated with food insecurity.
			Funding:
			● Acquire initial funds for food pantry via vendor fair (Nov. 16, 2017)
			Campus Community Input/Involvement:
			● Establish relationship with Hays Co FB and Panera Bread
			● Develop partnerships with others around campus - faculty, etc. in other departments
			● Word-of-mouth student/faculty referrals
			● Establish relationship with VP of student services office (for University support)
			● Collaborate with SNO officers to establish volunteers
			● Create steering committee
			Client Satisfaction:
			● Clients are satisfied with the goods/services the pantry offers
			● Clients return
				● Finding long-term or short-term funding source (dry
				● goods storage)
				Expansion:
				● Create policies on food and nutrient quality
				● Create partnership with Ag & Engineering to get vegetables raised through their storage container project
					● Full length-campus wide survey shows improved results from 2017 survey
					● Improve awareness of low food security on campus
					● Normalize the use of food pantry
					● Increase food security on campus
					● Improve outcomes related to complications of low food security (attendance, illness, GPA)

● University collaborators (University health services/counseling center; Marketing dept; College of Applied Arts; Business School; ● Environmental Health, Safety, and Risk Management) ● SNO members/ Nutrition majors **Location:** ● Storage of perishable food in FCS Building somewhere ● Distribution: Food Science Lab				

APPENDIX B: BOBCAT BOUNTY PANTRY LAYOUT

Extra Tables and Chairs

Restock Area for Grains & Baked Goods

*Protein/dairy usually goes in coolers

*Set up coolers on shorter plastic table

Extra boxes

NP Vegetables

Bakery Items

Cooler

Cooler

Vegetables

Canned Goods

*Tables for np vegetables, coolers and bags/handouts go diagonal ("crooked")

*Tables in "L" formation for accessibility

Pasta, Misc.

Restock Area for Fruits

Grains

Fresh Fruits

Bags, Handouts

Survey Tablets Set Up(Tablets)

Dietetic Intern: Client/Volunteer Check-in

Check-in

Door

FCS Food Science Lab Room 187

70

APPENDIX C. BOBCAT BOUNTY INTAKE SURVEY

Survey created by Dr. Biediger-Friedman, Ms. Thornton, and the Learning Community

Q30 Please take a moment to answer all questions so that we may serve you better. We are required to obtain the following information from our clients for funding and reporting purposes; however, we will serve anyone in need regardless of ethnicity, race, color, national origin, sex, age, disability or political beliefs. This information is confidential and will not have a negative effect on services provided to you.

Q84 Hello!   You are being asked to participate in a research study created to help us better understand the food environment at Texas State University through the eyes of a Bobcat. This form gives you information about this evaluation research of the food pantry. Please read this form and ask questions about anything you do not understand. Please ask questions before deciding if you would like to help in this research study. You will get a copy of this form.

   Why are we doing this research study?   The purpose of this study is to reduce the level of food insecurity that is currently being experienced on our campus. All students, faculty, and staff with a valid Texas State Identification Card are eligible to participate in this study. We are asking you to help in a research study because: You represent the Texas State University student body.   Your experience and thoughts while participating in the food pantry can help us to understand the student experience   Extent of Participation: If you agree to participate, we will ask you to take a short survey at the beginning and end of the semester. This will involve 19 questions that are broken down into six categories: Demographics, Income and Expenses, Food Security, Living Arrangements, Purchasing Behaviors, and Potential of an On-Campus Food Pantry. As part of the study, you will also be asked to complete short satisfaction surveys at each pantry visit. These surveys will take you 5-10 minutes to complete, and could have a substantial effect on future Bobcats' access to food!   If you have any questions about this study, please contact the following Texas State University Researchers:

   Dr. Lesli Biediger-Friedman, PhD, MPH, RDN

512-245-7059

lb47@txstate.edu Ms. Hannah Thornton, MS, RDN

Phone: 512.245.7055

Email: hannahthornton@txstate.edu

   This study has been exempt by the Texas State University IRB If you have any questions about this study or your rights: Contact: Dr. Jon Lasser, Institutional Review Board chair at 512.245.3413 or lasser@txstate.edu or Ms. Becky Northcutt, Compliance Specialist at 512.245.2102.   Will the researchers get anything from your help in this study? The researchers will not benefit from the study except to publish or present the results.

   Data Security and Privacy. All of the information you give us will be kept confidential. If you choose to include any identifiable information (e.g. name, email) it will not

be associated with your survey answers. While we will need your Texas State ID, this information will not be associated with your information. Participant will complete surveys via electronic tablets, to ensure that data is immediately de-identified, to maintain participant anonymity. No pictures or visual footage will be allowed during hours of operation. All records will be kept in a locked file and only the researchers will have access to it. All hardcopy records will be destroyed following digital conversion, and will be housed on secure university servers, and encrypted with password protection.   What do you get if you take this survey? If you finish the survey, you will be enrolled in the evaluation portion of Bobcat Bounty What if you don't want to continue in the study?   If you decide to help in this study, it is on a volunteer basis.   You have the right to refuse to be in this study.   You can stop at any time, even after giving your consent.   The study investigators may stop you from taking part in this study at any time if they decide it is in your best interest, or if you do not follow study instructions. You may still receive food from the Bobcat Bounty food pantry without being enrolled in the study.

o   Yes, I agree to participate (1)

o   No, I do not agree to participate (2)

Skip To: End of Survey If Hello!   You are being asked to participate in a research study created to help us better under... = No, I do not agree to participate

Q29 Are you Texas State faculty/staff?

o   Yes (1)

o   No (2)

End of Block: Block 2

Start of Block: Student Questions

Q1 What is your Bobcat Bounty Client ID number?

_____

Q35 How did you hear about Bobcat Bounty? (Check all that apply)

☐   Friend (1)

☐   Professor (2)

☐   Instagram (3)

☐   Facebook (4)

☐   Texas State website (5)

☐　　　Event on campus (quad booth, welcome reception) (6)

☐　　　KTSW Texas State student radio station (7)

☐　　　University Star (student paper) (8)

☐　　　Flyer (9)

☐　　　Co-worker (10)

☐　　　Other (11) _____

Q36 What was your purpose for coming to Bobcat Bounty today?

☐　　　Hunger (1)

☐　　　Healthy Food (2)

☐　　　Curious (3)

☐　　　Came with a friend (4)

☐　　　Other (5) _____

Q37 These next questions are meant to help us better understand the clients of Bobcat Bounty.

Q4 Age - fill in the blank

_____

Q5 Gender

o　　　Male (1)

o　　　Female (2)

o　　　Gender non-conforming (3)

o　　　Not listed (please specify) (4)]

o　　　Prefer not to answer (5)

Q6 Based on credits, what year are you?

o　　　Freshman (1)

o　　　Sophomore (2)

o　　　Junior (3)

o　　　Senior (4)

o　　　4+ years (5)

o　　　Graduate Student (6)

Q8 What is your student status?

o   Full-time student (1)

o   Part-time student (2)

Q9 Are you a first generation college student?

o   Yes (1)

o   No (2)

Q10 What is your cumulative grade point average (GPA) based on 0-4.0 scale? (If you don't know, please leave this question blank.) – fill in the blank

Q11 Are you of Hispanic, Latino, or Spanish origin?

o   No, not of Hispanic, Latino, or Spanish origin (1)

o   Yes, Mexican American (2)

o   Yes, Puerto Rican (3)

o   Yes, Cuban (4)

o   Yes, another Hispanic, Latino, or Spanish origin (please specify) (5)

o   Prefer not to answer (6)

Q59 What is your race? (Check all that apply)

☐   White (1)

☐   Black or African American (2)

☐   American Indian or Alaska Native (3)

☐   Asian (Far East, Southeast Asia, or India for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, Philippine Islands, Thailand, and Vietnam) (4)

☐   Native Hawaiian or Pacific Islander (5)

☐   Other (fill in the blank) (6)

☐   Prefer not to answer (7)

Q60 In what zip code do you currently reside? (Fill in the blank)

_____

Q12 What is your living arrangement? (Check all that apply)

☐   Campus residence hall (1)

☐   Campus apartment (2)

☐   Off-campus apartment (3)

☐   Parent's/Relative's house (4)

☐   No permanent housing (5)

☐   Other (fill in the blank) (6)

☐   Prefer not to answer (7)

Q13 Including yourself, how many people in your household will benefit from this visit to Bobcat Bounty (consider roommates, family members, dependents, etc.)? (fill in the blank)

_____

Q14 What are your sources of income or resources to buy food? (Check all that apply)

☐   Family (1)

☐   Employment (Full-time) (2)

☐   Employment (Part-time) (3)

☐   Federal financial aid (Student Loans/Federal Work Study) (4)

☐   Private Loans (5)

☐   Scholarship/Grants (6)

☐   Hazelwood Act/GI Bill (7)

☐   WIC (8)

☐   SNAP (food stamps) (9)

☐   TANF (Temporary Assistance for Needy Families) (10)

☐   Other (please specify) (11)

☐   Prefer not to answer (12)

Q15 Other than food you purchase for yourself, how else do you obtain your food? (Check all that apply)

☐   Self only (1)

☐   Parents/Relatives (2)

☐   Friends (3)

☐   Food provided at work (4)

☐   Extra-curricular activities/School functions (5)

☐   Food Bank/Food Pantries (6)

☐   Church (7)

☐   Prefer not to answer (8)

Q16 Is any portion of your tuition paid out of pocket by you or someone else?

o   Yes, my entire tuition is paid out of pocket. (1)

o   Yes, a portion of my tuition is paid out of pocket. (2)

o   No (3)

o   Prefer not to answer (4)

Page Break

Q32 These next questions are about the foods eaten in your household in the last 30 days.

Q17 The food that I/we bought just didn't last, and I/we didn't have money to get more.

o   Often true (1)

o   Sometimes true (2)

o   Never true (3)

o   Prefer not to answer (4)

Q18 I/we couldn't afford to eat balanced meals.

o   Often true (1)

o   Sometimes true (2)

o   Never true (3)

o   Prefer not to answer (4)

Q19 In the last 30 days, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

o   Yes (1)

o   No (2)

o   Prefer not to answer (3)

Skip To: Q21 If In the last 30 days, did (you/you or other adults in your household) ever cut the size of your me... = No

Skip To: Q21 If In the last 30 days, did (you/you or other adults in your household) ever cut the size of your me... = Prefer not to answer

76

Q20 If you answered yes to the previous question, how often did this happen—almost every week, some weeks but not every week, or only once or twice during the month?

o   Almost every week (1)

o   Some weeks but not every week (2)

o   Only once or twice during the month (3)

o   Prefer not to answer (4)

Q21 In the last 30 days, did you ever eat less than you felt you should because there wasn't enough money for food?

o   Yes (1)

o   No (2)

o   Prefer not to answer (3)

Q22 In the last 30 days, were you ever hungry but didn't eat because there wasn't enough money for food?

o   Yes (1)

o   No (2)

o   Prefer not to answer (3)

Page Break

Q33 Nutrition Knowledge Questions

Q23 About how much of a person's diet should be made up of starchy foods? (Choose one)

o   One quarter (1)

o   One third (2)

o   Half (3)

o   Not sure (4)

Q24 Which of the following foods are typically high in fiber? (Check all that apply)

☐   Oats (1)

☐   Bananas (2)

☐   White rice (3)

☐   Chicken (4)

☐   Potatoes with skin (5)

☐   Pasta (6)

Q25 Which food item is most likely to contain the greatest amount of sodium? (Choose one)

o   Sliced bread (1)

o   Apple (2)

o   Deli ham (3)

o   Not sure (4)

Q26 Which of the following foods typically contain added sugar? (Check all that apply)

☐   Ketchup (1)

☐   Bread (2)

☐   Banana (3)

☐   Pasta Sauce (4)

Q27 Please provide your email address if you would like to talk with us further about this topic or participate in future research.

_____

Q28 Do you have any additional comments that you would like to share about your experience today?

_____

End of Block: Student Questions

Start of Block: Block 3

Q85 Thank you!

Your responses have been recorded.

APPENDIX D: BOBCAT BOUNTY PARTICIPANT SATISFACTION SURVEY

Survey created by Dr. Biediger-Friedman, Ms. Thornton, and the Learning Community

Q1 Please take a moment to answer all questions so that we may better serve you. We are required to obtain the following information from our clients for funding and reporting purposes; however, we will serve anyone in need regardless of ethnicity, race, color, national origin, sex, age, disability or political beliefs. This information is confidential and will not have a negative effect on services provided to you.

 Everyone who completes the survey will automatically be entered into a raffle to win a "Stove-less Cooking Package" worth over $150! The Package includes an Instant Pot multi-cooker (all-in-one pressure cooker, slow cooker, rice maker, steamer, and sauté/browning), measuring cups, measuring spoons, a spatula, a spoon, **and a cutting board!**

Q43 Tell us about yourself.

- -

Q3 Please enter your Texas State Net ID.

_____

- -

Q4 What is your gender?

○ Male (1)

○ Female (2)

○ Other (3) _____

- -

Q5 What is your race/ethnicity (check all that apply)?

☐ White (1)

☐ Hispanic/Latina/Latino (2)

☐ Black or African American (3)

☐ American Indian or Alaska Native (4)

☐ Asian (5)

☐ Native Hawaiian or Pacific Islander (6)

☐ Other (7) _____

☐ Prefer not to answer (8)

- -

Q7 What is your age?

_____

Q8 How many time have you visited Bobcat Bounty?

_____

Q9 Have you referred any friends to Bobcat Bounty?

○ Yes (1)

○ No (2)

○ Why or why not? (3) _____

Q10 Which of the following best describe you?

○ Texas State student (1)

○ Texas State faculty (2)

○ Texas State staff (3)

○ Not affiliated with Texas State (4)

○ Prefer not to answer (5)

Skip To: Q15 If Which of the following best describe you? != Texas State student

Q12 What is your major?

_____

Q13 Based on credits, what year are you?

○ Freshman (1)

○ Sophomore (2)

○ Junior (3)

○ Senior (4)

○ Super Senior (5)

○ Graduate Student (6)

Q14 Where do you live?

○ On campus (1)

○ Off campus in San Marcos (2)

○ Off campus outside of San Marcos (3)

Q15 What is your title at Texas State? (optional- leave blank if prefer not to answer)

_____

Q41 The next set of questions will be on how Bobcat Bounty has impacted you.

Q16 For each of the following statements, please rate your level of agreement:

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
By getting food from Bobcat Bounty, I was able to put money towards other necessities such as rent, utilities, car maintenance, medicine, etc. (1)	◯	◯	◯	◯	◯
By getting food from Bobcat Bounty, I was able to focus more of my time and energy on class-related activities. (2)	◯	◯	◯	◯	◯
My class attendance improved because I got food from Bobcat Bounty. (3)	◯	◯	◯	◯	◯
I was able to concentrate more during class because I got food from Bobcat Bounty. (4)	◯	◯	◯	◯	◯
My grades improved because I got food from Bobcat Bounty. (5)	◯	◯	◯	◯	◯

Getting food from Bobcat Bounty helped me stay enrolled this semester. (6)	○	○	○	○	○
I have felt less financial strain because I got food from Bobcat Bounty. (7)	○	○	○	○	○
I have felt less stress and anxiety because of the food I received from Bobcat Bounty. (8)	○	○	○	○	○
I have felt physically healthier because I got food from Bobcat Bounty. (9)	○	○	○	○	○
Since attending Bobcat Bounty, I have been eating meals with more variety. (10)	○	○	○	○	○

| The food that I received from Bobcat Bounty helped me get through the week without skipping meals. (11) | ○ | ○ | ○ | ○ | ○ |

Q17 Comments:

_____

_____

_____

_____

_____

Q18 Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty:

	Decreased (1)	No Change (2)	Increased (3)
The variety of food you eat (1)	○	○	○
The amount of vegetables you eat (2)	○	○	○
The amount of fruit you eat (3)	○	○	○
The amount of whole grains you eat (4)	○	○	○
The amount of protein you eat (5)	○	○	○
The amount of sweets/desserts you eat (6)	○	○	○
The amount of time you spend cooking (7)	○	○	○
How often you eat meals at home (8)	○	○	○

- -

Q19 Comments:

_____

_____

_____

_____

_____

X→ X→

Q20 For each of the following items, please indicate your level of satisfaction:

	Very Unsatisfied (1)	Unsatisfied (2)	Neutral (3)	Satisfied (4)	Very Satisfied (5)
The nutritional value of the foods offered at Bobcat Bounty. (1)	○	○	○	○	○
The variety of foods offered at Bobcat Bounty. (2)	○	○	○	○	○
The quality of the foods offered at Bobcat Bounty. (3)	○	○	○	○	○
The check-in process at Bobcat Bounty. (4)	○	○	○	○	○
The overall set services you received/experiences at Bobcat Bounty. (5)	○	○	○	○	○
Bobcat Bounty's hours of operation. (6)	○	○	○	○	○
Bobcat Bounty's location (7)	○	○	○	○	○

Q21 Comments:

_____

_____

_____

_____

_____

X→ X→

Q22 For the following statements, please rate your level agreement:

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
I have the knowledge to use the food I receive from Bobcat Bounty. (1)	○	○	○	○	○
I have the resources I need to use the food I receive from Bobcat Bounty. (2)	○	○	○	○	○
I have the support I need to use the food I receive from Bobcat Bounty (3)	○	○	○	○	○
Each week, I feel confident that I can use the food I receive from Bobcat Bounty. (4)	○	○	○	○	○

Q23 Comments: _____

Q25 For each of the following questions, please select the most appropriate percentage

:	None (1)	Some (2)	A lot (3)	All (4)
How much of the total food you received from Bobcat Bounty did you eat yourself? (1)	○	○	○	○
How much of the total food you received from Bobcat Bounty did you share with others? (2)	○	○	○	○
How much of the total food you received was not consumed (thrown away)? (3)	○	○	○	○
How much of the vegetables you received from Bobcat Bounty was thrown away? (4)	○	○	○	○
How much of the fruit you received from Bobcat Bounty was thrown away? (5)	○	○	○	○
How much of the meats you received from Bobcat Bounty was thrown away? (6)	○	○	○	○

How much of the breads you received from Bobcat Bounty was thrown away? (7)	○	○	○	○
How much of the sweets you received from Bobcat Bounty was thrown away? (8)	○	○	○	○
How much of the canned or boxed goods you received from Bobcat Bounty was thrown away? (9)	○	○	○	○

Q26 Comments:

_____

_____

_____

_____

_____

Q45 These next questions are about the foods eaten in your household in the last semester.

Q27 The food that I/we bought just didn't last, and I/we didn't have money to get more.

○ Often true (1)

○ Sometimes true (2)

○ Never true (3)

○ Prefer not to answer (4)

Q28 I/we couldn't afford to eat balanced meals.

○ Often true (1)

○ Sometimes true (2)

○ Never true (3)

○ Prefer not to answer (4)

Q29 In the last semester, did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for foods?

○ Yes (1)

○ No (2)

○ Prefer not to answer (3)

Skip To: Q31 If In the last semester, did (you/you or other adults in your household) ever cut the size of your m... = No

Skip To: Q31 If In the last semester, did (you/you or other adults in your household) ever cut the size of your m... = Prefer not to answer

Q30 How often did you/you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for foods?

○ Almost every month (1)

○ Some months, but not every month (2)

○ Only 1 or 2 months (3)

○ Prefer not to answer (4)

Q31 In the last semester, did you ever eat less than you felt you should because there wasn't enough money for food?

○ Yes (1)

○ No (2)

○ Prefer not to answer (3)

Q32 In the last semester, were you every hungry, but didn't eat because there wasn't enough money for food?

○ Yes (1)

○ No (2)

○ Prefer not to answer (3)

End of Block: Foods eaten in your household in the last semester.

Start of Block: Nutrition Education Preferences

Q33 Part of our mission at Bobcat Bounty is to provide nutrition and foods education to our clients. Please answer the following questions about our current offerings and tell us what we can do differently.

Q34 Were you aware that Bobcat Bounty offered nutrition education?

○ Yes (1)

○ No (2)

Q35 Which of the following, if any, have you seen or received while at Bobcat Bounty (select all that apply)?

☐   Posters (1)

☐   Nutrition education handouts (2)

☐   Recipe handouts (3)

☐   Cooking demos/food samples (4)

Q36 Which of the following forms of nutrition and foods education would be most helpful to you? (Check all that apply)

☐ In-person classes (1)

☐ Link sent in email (2)

☐ Videos (3)

☐ Blog posts (4)

☐ TRACS site (5)

☐ Facebook posts (6)

☐ Instagram posts (7)

☐ Twitter (8)

☐ Printed material (9)

☐ On-site demonstrations (10)

- -

Q37 What education topics would you be most interested in?

_____

_____

_____

_____

_____

Q47 Final thoughts

Q38 We are considering holding summer hours for Bobcat Bounty. Would you participate in summer distributions?

○ Yes (1)

○ No (2)

Q39 What timing would you prefer for summer distributions (select all that apply)?

☐　　Morning (9 am-11 am) (1)

☐　　Midday (11 am-1 pm) (2)

☐　　Afternoon (2 pm-4 pm) (3)

☐　　Evening (4 pm-6 pm) (4)

Q40 Please provide any additional comments about any topic in the box below.

_____

_____

_____

_____

_____

✱

Q46 If you would like to be entered into the raffle to win the Stove-less Cooking Package, please enter your email in the space provided.

_____

APPENDIX E: BOBCAT BOUNTY HEALTH CHAMPION SURVEY AND INTERVIEW GUIDE

Demographics survey

Marissa Buckley, a graduate student at Texas State University, is conducting a research study to get your input or opinion on the on the Texas State University food pantry, Bobcat Bounty and to gage campus support of the pantry. You are being asked to complete this survey because you are a student at Texas State University.

Participation is voluntary. The survey will take approximately 30 minutes or less to complete. You must be at least 18 years old to take this survey.

This study involves no foreseeable serious risks. We ask that you try to answer all questions; however, if there are any items that make you uncomfortable or that you would prefer to skip, please leave the answer blank. Your responses are confidential.

Possible benefits:
- This research study may assist with helping better sustain the college food pantry, allowing it to assist more students on the Texas State University campus.
- The results in the study may also assist in creating college food pantries at other college Universities.

Reasonable efforts will be made to keep the personal information in your research record private and confidential. Any identifiable information obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law. The members of the research team, the funding agency (remove funding agency if study is not funded), and the Texas State University Office of Research Compliance (ORC) may access the data. The ORC monitors research studies to protect the rights and welfare of research participants.

Your name will not be used in any written reports or publications which result from this research, (remove this sentence if not applicable to your study). Data will be kept for three years (per federal regulations) after the study is completed and then destroyed.

The incentive for completing the interview will be an annotated bibliography on college food security research.

If you have any questions or concerns feel free to contact Marissa Buckley or her faculty advisor:
Texas State University – School of Family & Consumer Sciences
- Lesli Biediger-Friedman, PHD, MPH, RD, Assistant Professor
  Phone: 512.245.7059 Email: lbfnutrition@txstate.edu
- Marissa Buckley, BS Graduate Student
  Phone: 925-917-0057 Email: m_b635@txstate.edu

This project #6228 was approved by the Texas State IRB on December 11, 2018. Pertinent questions or concerns about the research, research participants' rights, and/or research-related injuries to participants should be directed to the IRB chair, Dr. Denise

Gobert 512-716-2652 – (dgobert@txstate.edu) or to Monica Gonzales, IRB Regulatory Manager 512-245-2334 - (meg201@txstate.edu).

If you decide to help in this study, it is on a volunteer basis. You have the right to refuse to be in this study. You can stop at any time, even after giving your consent.

Yes, I agree to participate

No, I do not wish to participate.
(Participants will be sent to end of survey with no data recorded.)

_____

Questions:

1. What is your Texas State email? (fill in the blank) _____

2. What is your age?

      a. 20-27

      b. 28-35

      c. 36-50

      d. >50

3. What is your gender?

      a. Female

      b. Male

      c. Not-specified

4. What is your ethnicity?

      a. White

      b. Hispanic or Latino/a

      c. Black or African American

      d. Native American or American Indian

      e. Asian / Pacific Islander

      f. Other

5. What is the highest degree or level of school you have completed?

      a. High school graduate, diploma or the equivalent

      b. Some college credit, no degree

      c. Associate degree

      d. Bachelor's degree

      e. Master's degree

      f. Doctorate degree

6. What is your current occupation?

    a. How long have you worked there?

7. How long have you been associated with Texas State University?

    a. What has your involvement been with Texas State University?

    b. Have you done other work with or for Texas State University?

8. Thank you for completing this survey, please indicate a time and date you are available for an interview. (Provided set dates and times for interviews)

Interview Guide

Hello, my name is Marissa Buckley, I am a graduate research assistant with BCB. Thank you for taking the time today to allow me to interview you.

Background Information:

To get started I wanted to get some background information on your experience with food security.

1. When did you first encounter food security?

    a. How did you first hear about or learn about food security?

2. Why are you interested in food security? (Ask for a specific example)

    a. What first made you interested in food security?

        i. Did an event or experience in your personal life or professional life occur?

3. How did you first know food security was an issue on college campuses?

    a. Can you give me an example or a story of a time you saw a student struggling with food security?

4. What do you think about the way colleges address food insecurity?

    a. Has working with Bobcat Bounty changed that?

        i. How?

Health Champion

Next, I would like to discuss your role with Bobcat Bounty.

1. Why do you work with Bobcat Bounty?

      a. What is your motivation for working with Bobcat Bounty?

            i. Both personally and professionally (example for both)

2. How does being a part of the Bobcat Bounty steering committee relate to your current job?

      a. How is it similar?

      b. In what ways does it relate?

      c. Are you gaining new experiences? If, so what does that look like?

            i. Please provide an example.

3. In what capacity do you work with Bobcat Bounty?

      a. Donated money food or time to the pantry.

      b. New ideas to better the pantry.

      c. Advocate for the pantry (put up fliers or tell students about BCB).

4. Have you participated or worked with student hunger or food insecurity in the past?

      a. If answered yes: In what capacity?

      b. How has your previous experience with working with students with hunger or food insecurity shaped what you bring to being a part of Bobcat Bounty?

5. How have you been able to contribute to the college food pantry?

      a. Have your ideas or input been utilized by the college food pantry?

      b. In your experience with Bobcat Bounty, is the steering committee able to work together and share new ideas?

      c. Do you believe that working as a team has helped food insecurity at Texas State University?

            i. Why?

Sustainability

We are now going to discuss the ability of Bobcat Bounty to be sustainable.

1. How, if at all, does Texas State University support Bobcat Bounty?

     a. In what ways?

2. How could the University better support the growth and sustainability of Bobcat Bounty?

3. In your opinion, how do Texas State students hear about Bobcat Bounty?

     a. Fliers

     b. Word of mouth

     c. Faculty and Staff

4. How do you advocate for Bobcat Bounty either in the community or on the Texas State campus?

     a. What does it look like?

     b. Do you speak with students, faculty, or staff

Thank you for spending the time completing this interview with me today. Your information is important for the ongoing efforts of Bobcat Bounty.

APPENDIX F: BOBCAT BOUNTY PARTICIPANT SATISFACTION SURVEY DEMOGRAPHICS

Characteristics	Food secure 328 (34.6%)	Food insecure 619 (65.4%)	p-score
	mean (standard error)		
Age	23.4 (4.99)	23.1 (3.71)	0.614
Number of visits	7.31 (8.40)	6.32 (4.81)	0.374
	n (%)		
Sex			0.703
female	40 (76.9)	155 (79.9)	
male	11 (21.2)	34 (17.5)	
Race/ethnicity			0.228
White	18 (35.3)	54 (28.3)	
Black or African American	7 (13.7)	38 (19.9)	
Hispanic	18 (35.3)	75 (39.3)	
Asian and Pacific Islander	1 (2)	9 (4.7)	
two or more	7 (13.7)	11 (5.8)	
Living			0.018
on campus	7 (13.7)	15 (7.9)	
off campus in San Marcos	35 (68.6)	162 (85.3)	
off campus outside of San Marcos	9 (17.6)	13 (6.8)	
Year in School			0.911
freshman	1 (2)	4 (2.1)	
sophomore	7 (13.7)	23 (12.1)	
junior	11 (21.6)	48 (25.3)	
senior	21 (41.2)	69 (36.3)	
super senior	4 (7.8)	24 (12.6)	
graduate student	7 (13.7)	22 (11.6)	
Financial Aid			0.85
yes	11 (78.6)	61 (76.2)	
no	3 (21.4)	19 (23.7)	
Occupation			0.562
student	37 (100)	110 (99.1)	
faculty	0 (0)	1 (0.9)	

APPENDIX G: BOBCAT BOUNTY PARTICIPANT SATISFACTION SURVEY LIKERT-SCALE RESULTS

		Spring 2018	Summer 2018	Fall 2018	Spring 2019	Combined	p-score
N		**119**	**22**	**28**	**98**	**267**	
By getting food from Bobcat Bounty*…… **…**							
	I was able to put money towards other necessities	(n=97), 81.5%	(n=12), 54.5%	(n=21), 75%	(n=82), 83.7%	(n=212), 79.4%	$p \leq$ 0.001
	I was able to focus more time and energy on class	(n=84), 70.6%	(n=9), 40.9%	(n=20), 71.4%	(n=82), 83.7%	(n=195), 73%	$p \leq$ 0.001
	Class attendance improved	(n=38), 31.9%	(n=11), 50%	(n=7), 25%	(n=37), 37.8%	(n=85), 31.8%	$p \leq$ 0.001
	Concentration improved	(n=70), 58.8%	(n=7), 31.8%	(n=12), 42.9%	(n=59), 60.2%	(n=148), 55.4%	$p \leq$ 0.001
	Grades improved	(n=44), 37%	(n=6), 27.3%	(n=5), 17.9%	(n=34), 34.7%	(n=89), 33.3%	$p \leq$ 0.001
	Helped me to stay enrolled this semester	(n=47), 39.5%	(n=11), 50%	(n=11), 39.3%	(n=42), 42.9%	(n=104), 39%	$p \leq$ 0.001
	Felt less financial strain	(n=96), 80.7%	(n=12), 54.5%	(n=22), 78.6%	(n=88), 89.8%	(n=218), 81.6%	$p \leq$ 0.001
	Felt less stress and anxiety	(n=89), 74.8%	(n=11), 50%	(n=20), 71.4%	(n=73), 74.5%	(n=193), 72.3%	$p \leq$ 0.001
	Felt physically healthier	(n=70), 58.8%	(n=10), 45.5%	(n=15), 53.6%	(n=59), 60.2%	(n=154), 57.7%	$p \leq$ 0.001
	Eat meals with more variety	(n=79), 66.4%	(n=11), 50%	(n=18), 64.3%	NA	(n=108), 63.9%	$p \leq$ 0.001
	Helped me get through the week. (without skipping meals)	(n=89), 74.8%	(n=10), 45.5%	(n=20), 71.4%	NA	(n=119), 70.4%	$p \leq$ 0.001
Changed as a result of the food received from BCB**							
	how healthy diet is	NA	NA	(n=13), 46.4%	(n=49), 50%	(n=62), 42%	$p \leq$ 0.001

	variety of food eaten	(n=73), 61.3%	(n=12), 54.5%	(n=16), 57.1%	(n=68), 69.4%	(n=166), 62.2%	p ≤ 0.001
	amount of vegetables eaten	(n=78), 65.5%	(n=12), 54.5%	(n=16), 57.1%	(n=63), 64.3%	(n=164), 61.4%	p ≤ 0.001
	amount of fruit eaten	(n=69), 58%	(n=12), 54.5%	(n=18), 64.3%	(n=69), 70.4%	(n=161), 60.3%	p ≤ 0.001
	amount of whole grains eaten	(n=50), 42%	(n=11), 50%	(n=9), 32.1%	(n=52), 53.1%	(n=120), 44.9%	p ≤ 0.001
	amount of meat eaten	(n=45), 37.8%	(n=12), 54.5%	(n=2), 7.1%	(n=21%), 21.4)	(n=73), 27.3%	p ≤ 0.001
	amount of plant-based protein	NA	(n=0)	(n=11), 39.3%	(n=46), 46.9%	(n=57), 40%	p ≤ 0.001
	amount of sweets/desserts eaten	(n=29), 24.4%	(n=9), 40.9%	(n=6), 21.4%	(n=20), 20.4%	(n=58), 21.7%	p ≤ 0.001
	amount of time spent cooking	(n=58), 48.7%	(n=11), 50%	(n=13), 46.4%	(n=55), 56.1%	(n=136), 50.9%	p ≤ 0.001
	amount of meals eaten at home	(n=88), 73.9%	(n=12), 54.5%	(n=18), 64.3%	(n=74), 75.5%	(n=190), 71.2%	p ≤ 0.001
	amount of skipped meals	NA	NA	NA	(n=9), 9.2%	(n=9), 9.2%	p ≤ 0.001
Overall satisfaction with*							
	the healthfulness of the food offered	NA	(n=11), 50%	(n=15), 53.6%	(n=86), 87.8%	(n=112), 75.7%	p ≤ 0.001
	the variety of food offered	NA	(n=12), 54.5%	(n=18), 64.3%	(n=82), 83.7%	(n=205), 76.8%	p ≤ 0.001
	the quality of food offered	NA	(n=8), 36.4%	(n=15), 53.6%	(n=81), 82.7%	(n=187), 70%	p ≤ 0.001
	the check-in process	NA	(n=11), 50%	(n=21), 75%	(n=85), 86.7%	(n=201), 75.3%	p ≤ 0.001
	the overall services received	NA	(n=12), 54.5%	(n=22), 78.6%	(n=90), 91.8%	(n=218), 81.6%	p ≤ 0.001
	the hours of operation	NA	(n=8), 36.4%	(n=20), 71.4%	(n=76), 77.6%	(n=182), 68.2%	p ≤ 0.001
	the location	NA	(n=9), 40.9%	(n=19), 67.9%	(n=83), 84.7%	(n=189), 70.8%	p ≤ 0.001

Ability to utilize food and resources*							
	I know how to use food	(n=92), 77.3%	(n=11), 50%	(n=21), 75%	(n=88), 89.8%	(n=212), 79.4%	p ≤ 0.001
	resources available to use food	(n=92), 77.3%	(n=11), 50%	(n=20), 71.4%	(n=84), 85.7%	(n=207), 77.5%	p ≤ 0.001
	support to use food	(n=93), 78.2%	(n=12), 54.5%	(n=18), 64.3%	(n=82), 83.7%	(n=205), 76.8%	p ≤ 0.001
	confidence in ability to use food	(n=89), 74.8%	(n=12), 54.5%	(n=21), 75%	(n=85), 86.7%	(n=118), 79.7%	p ≤ 0.001
	I feel comfortable at BCB.	NA	(n=0)	(n=21), 75%	(n=86), 87.8%	(n=114), 77%	p ≤ 0.001
	positive interaction with BCB staff and volunteers	NA	(n=0)	(n=23), 82.1%	(n=91), 92.9%	(n=107), 72.3%	p ≤ 0.001

*Positive scores reported (4-agree and 5-strongly agree)
**High level of change reported (3-increased)
***Positive scores reported (4-satisfied and 5-very satisfied)

Likert Results Compared

Race/ethnicity

	White 72	Hispanic 93	Asian 10	African American 45	Other 4	Two or more 18	p-score
I know how to use the food I receive from Bobcat Bounty.	n=65 31.0%	n=81 38.6%	n=8 3.8%	n=37 17.6%	n=3 1.4%	n=16 7.6%	0.056*
I have the resources I need to use the food I receive from BCB	n=60 29.3%	n=80 39.0%	n=8 3.9%	n=37 18.0%	n=4 2.0%	n=16 7.8%	0.025*
I have support that makes it easy for me to use the food I receive from BCB	n=65 32.0%	n=75 36.9%	n=8 3.9%	n=35 17.2%	n=3 1.5%	n=17 8.4%	0.019*
Each week I feel confident that I can use the food I receive from BCB	n=29 25.2%	n=49 42.6%	n=5 4.3%	n=18 15.7%	n=3 2.6%	n=11 9.6%	0.121

My interactions with BCB staff and volunteers are positive	n=30	n=47	n=4	n=18	n=3	n=9	0.002*
	27.0%	42.3%	3.6%	16.2%	2.7%	8.1%	
I feel comfortable at BCB	n=29	n=44	n=3	n=18	n=2	n=10	0.017*
	27.4%	41.5%	2.8%	17.0%	1.9%	9.4%	

* significant p-value, p< 0.05

	White 72	Hispanic 93	Asian 10	African American 45	Other 4	Two or more 18	p-score
By getting food from Bobcat Bounty, I was able to put money towards other necessities such as rent, utilities, car maintenance, medicine, etc.	n=65	n=82	n=9	n=35	n=3	n=15	0.472
	31.1%	39.2%	4.3%	16.7%	1.4%	7.2%	
By getting food from Bobcat Bounty, I was able to focus more of my time and energy on class-related activities.	n=62	n=77	n=7	n=32	n=2	n=12	0.507
	32.3%	40.1%	3.6%	16.7%	1.0%	6.3%	
My class attendance improved because I got food from Bobcat Bounty.	n=24	n=41	n=1	n=12	n=1	n=3	0.005*
	29.3%	50.0%	1.2%	14.6%	1.2%	3.7%	
I was able to concentrate more during class because I got food from Bobcat Bounty.	n=47	n=67	n=4	n=21	n=1	n=5	0.003*
	32.4%	46.2%	2.8%	14.5%	.7%	3.4%	
My grades improved because I got food from Bobcat Bounty.	n=25	n=48	n=1	n=10	n=1	n=3	<0.001*
	28.4%	54.5%	1.1%	11.4%	1.1%	3.4%	
Getting food from Bobcat Bounty helped me stay enrolled this semester.	n=32	n=47	n=2	n=17	n=1	n=3	0.245
	31.4%	46.1%	2.0%	16.7%	1.0%	2.9%	
I have felt less financial strain because I got	n=65	n=88	n=8	n=38	n=2	n=14	0.002*
	30.2%	40.9%	3.7%	17.7%	.9%	6.5%	

	White 72	Hispanic 93	Asian 10	African American 45	Other 4	Two or more 18	p-score
food from Bobcat Bounty.							
I have felt less stress and anxiety because of the food I received from Bobcat Bounty.	n=57 30.0%	n=81 42.6%	n=7 3.7%	n=32 16.8%	n=2 1.1%	n=11 5.8%	0.002*
I have felt physically healthier because I got food from Bobcat Bounty.	n=47 30.9%	n=65 42.8%	n=6 3.9%	n=25 16.4%	n=3 2.0%	n=6 3.9%	0.002*
Since attending Bobcat Bounty, I have been eating meals with more variety.	n=38 35.5%	n=41 38.3%	n=4 3.7%	n=20 18.7%	n=2 1.9%	n=2 1.9%	0.409
The food that I received from Bobcat Bounty helped me get through the week without skipping meals.	n=37 31.4%	n=46 39.0%	n=2 1.7%	n=24 20.3%	n=2 1.7%	n=7 5.9%	0.498

* significant p-value, p< 0.05

	White 72	Hispanic 93	Asian 10	African American 45	Other 4	Two or more 18	p-score
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: - How healthy your diet is	n=18 30.5%	n=25 42.4%	n=4 6.8%	n=7 11.9%	n=2 3.4%	n=3 5.1%	0.643
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: The variety of food you eat	n=46 28.2%	n=69 42.3%	n=8 4.9%	n=27 16.6%	n=3 1.8%	n=10 6.1%	0.677
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty:	n=51 31.7%	n=62 38.5%	n=5 3.1%	n=29 18.0%	n=3 1.9%	n=11 6.8%	0.686

The amount of vegetables you eat							
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of fruit you eat	n=40 25.3%	n=68 43.0%	n=6 3.8%	n=29 18.4%	n=3 1.9%	n=12 7.6%	0.782
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of whole grains you eat	n=27 22.9%	n=51 43.2%	n=4 3.4%	n=25 21.2%	n=1 .8%	n=10 8.5%	0.598
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of meat you eat	n=15 20.5%	n=31 42.5%	n=5 6.8%	n=17 23.3%	n=2 2.7%	n=3 4.1%	0.417
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of beans, nuts, and other pant-based proteins you eat	n=13 24.1%	n=22 40.7%	n=4 7.4%	n=10 18.5%	n=0 0.0%	n=5 9.3%	0.963
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of sweets/desserts you eat	n=18 31.0%	n=23 39.7%	n=3 5.2%	n=9 15.5%	n=1 1.7%	n=4 6.9%	0.274

Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of time you spend cooking	n=42	n=54	n=5	n=24	n=0	n=8	0.755
	31.6%	40.6%	3.8%	18.0%	0.0%	6.0%	
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: how often you eat meals at home	n=54	n=80	n=8	n=33	n=1	n=11	0.033*
	28.9%	42.8%	4.3%	17.6%	.5%	5.9%	
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: how often you skip meals	n=0	n=7	n=0	n=2	n=0	n=0	0.102
	0.0%	77.8%	0.0%	22.2%	0.0%	0.0%	

* significant p-value, p< 0.05

Gender

	Female 195	Male 45	Other 3	Gender Non-Binary 3	p-score
I know how to use the food I receive from Bobcat Bounty.	n=169	n=37	n=3	n=3	<0.001*
	79.7%	17.5%	1.4%	1.4%	
I have the resources I need to use the food I receive from BCB	n=163	n=38	n=3	n=3	<0.001*
	78.7%	18.4%	1.4%	1.4%	
I have support that makes it easy for me to use the food I receive from BCB	n=161	n=38	n=3	n=3	<0.001*
	78.5%	18.5%	1.5%	1.5%	
Each week I feel confident that I can use the food I receive from BCB	n=97	n=16	n=2	n=3	<0.001*
	82.2%	13.6%	1.7%	2.5%	
	n=93	n=16	n=2	n=3	<0.001*

My interactions with BCB staff and volunteers are positive	81.6%	14.0%	1.8%	2.6%	
I feel comfortable at BCB	n=86 80.4%	n=16 15.0%	n=2 1.9%	n=3 2.8%	<0.001*

* significant p-value, p< 0.05

	Female 195	Male 45	Other 3	Gender Non-Binary 3	p-score
By getting food from Bobcat Bounty, I was able to put money towards other necessities such as rent, utilities, car maintenance, medicine, etc.	n=167 78.8%	n=39 18.4%	n=3 1.4%	n=3 1.4%	<0.001*
By getting food from Bobcat Bounty, I was able to focus more of my time and energy on class-related activities.	n=154 79.0%	n=37 19.0%	n=1 .5%	n=3 1.5%	<0.001*
My class attendance improved because I got food from Bobcat Bounty.	n=64 75.3%	n=19 22.4%	n=1 1.2%	n=1 1.2%	<0.001*
I was able to concentrate more during class because I got food from Bobcat Bounty.	n=118 79.7%	n=27 18.2%	n=2 1.4%	n=1 .7%	<0.001*
My grades improved because I got food from Bobcat Bounty.	n=65 73.0%	n=20 22.5%	n=2 2.2%	n=2 2.2%	<0.001*
Getting food from Bobcat Bounty helped me stay enrolled this semester.	n=78 75.0%	n=21 20.2%	n=3 2.9%	n=2 1.9%	<0.001*
I have felt less financial strain because I got food from Bobcat Bounty.	n=173 79.4%	n=39 17.9%	n=3 1.4%	n=3 1.4%	<0.001*
	n=153	n=34	n=3	n=3	<0.001*

I have felt less stress and anxiety because of the food I received from Bobcat Bounty.	79.3%	17.6%	1.6%	1.6%	
I have felt physically healthier because I got food from Bobcat Bounty.	n=125 81.2%	n=24 15.6%	n=3 1.9%	n=2 1.3%	<0.001*
Since attending Bobcat Bounty, I have been eating meals with more variety.	n=86 79.6%	n=21 19.4%	n=1 .9%	n=108 100.0%	<0.001*
The food that I received from Bobcat Bounty helped me get through the week without skipping meals.	n=92 77.3%	n=24 20.2%	n=3 2.5%	--	<0.001*

* significant p-value, p< 0.05

	Female 195	Male 45	Other 3	Gender Non-Binary 3	p-score
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: - How healthy your diet is	n=49 79.0%	n=10 16.1%	n=2 3.2%	n=1 1.6%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: The variety of food you eat	n=130 78.3%	n=32 19.3%	n=1 .6%	n=3 1.8%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: The amount of vegetables you eat	n=132 80.5%	n=28 17.1%	n=2 1.2%	n=2 1.2%	<0.001*

Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of fruit you eat	n=127	n=31	n=2	n=1	<0.001*
	78.9%	19.3%	1.2%	.6%	
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of whole grains you eat	n=91	n=27	n=1	n=1	<0.001*
	75.8%	22.5%	.8%	.8%	
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of meat you eat	n=51	n=22	n=0	n=0	<0.001*
	69.9%	30.1%	0.0%	0.0%	
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of beans, nuts, and other pant-based proteins you eat	n=42	n=10	n=2	n=3	<0.001*
	73.7%	17.5%	3.5%	5.3%	
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of sweets/desserts you eat	n=41	n=16	n=1	n=0	<0.001*
	70.7%	27.6%	1.7%	0.0%	
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of time you spend cooking	n=111	n=22	n=1	n=2	<0.001*
	81.6%	16.2%	.7%	1.5%	

Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: how often you eat meals at home	n=149 78.4%	n=36 18.9%	n=2 1.1%	n=3 1.6%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: how often you skip meals	n=7 77.8%	n=2 22.2%	--	n=0 0.0%	<0.001*

* significant p-value, p< 0.05

Year in School

	Freshman 5	Sophomore 30	Junior 59	Senior 90	Super Senior 28	Graduate Student 29	p-score
I know how to use the food I receive from Bobcat Bounty.	n=4 1.9%	n=27 12.7%	n=48 22.6%	n=79 37.3%	n=26 12.3%	n=25 11.8%	<0.001*
I have the resources I need to use the food I receive from BCB	n=4 1.9%	n=21 10.1%	n=49 23.7%	n=78 37.7%	n=26 12.6%	n=26 12.6%	<0.001*
I have support that makes it easy for me to use the food I receive from BCB	n=4 2.0%	n=25 12.2%	n=44 21.5%	n=82 40.0%	n=25 12.2%	n=22 10.7%	<0.001*
Each week I feel confident that I can use the food I receive from BCB	n=3 2.5%	n=15 12.7%	n=24 20.3%	n=47 39.8%	n=14 11.9%	n=13 11.0%	<0.001*
My interactions with BCB	n=3 2.6%	n=15 13.2%	n=24 21.1%	n=42 36.8%	n=15 13.2%	n=12 10.5%	<0.001*

staff and volunteers are positive							
I feel comfortable at BCB	n=3 2.8%	n=14 13.1%	n=23 21.5%	n=40 37.4%	n=15 14.0%	n=9 8.4%	<0.001*

* significant p-value, p< 0.05

	Freshman 5	Sophomore 30	Junior 59	Senior 90	Super Senior 28	Graduate Student 29	p-score
By getting food from Bobcat Bounty, I was able to put money towards other necessities such as rent, utilities, car maintenance, medicine, etc.	n=4 1.9%	n=24 11.3%	n=49 23.1%	n=81 38.2%	n=27 12.7%	n=26 12.3%	<0.001*
By getting food from Bobcat Bounty, I was able to focus more of my time and energy on class-related activities.	n=3 1.5%	n=25 12.8%	n=47 24.1%	n=68 34.9%	n=26 13.3%	n=25 12.8%	<0.001*
My class attendance improved because I got food from Bobcat Bounty.	n=2 2.4%	n=11 12.9%	n=20 23.5%	n=32 37.6%	n=10 11.8%	n=9 10.6%	<0.001*
I was able to concentrate more during class because I got food from Bobcat Bounty.	n=2 1.4%	n=18 12.2%	n=40 27.0%	n=53 35.8%	n=17 11.5%	n=17 11.5%	<0.001*
My grades improved because I got food from Bobcat Bounty.	n=0 0.0%	n=10 11.2%	n=26 29.2%	n=34 38.2%	n=10 11.2%	n=8 9.0%	<0.001*

Getting food from Bobcat Bounty helped me stay enrolled this semester.	n=2 1.9%	n=14 13.5%	n=30 28.8%	n=33 31.7%	n=12 11.5%	n=12 11.5%	<0.001*
I have felt less financial strain because I got food from Bobcat Bounty.	n=4 1.8%	n=25 11.5%	n=53 24.3%	n=83 38.1%	n=25 11.5%	n=26 11.9%	<0.001*
I have felt less stress and anxiety because of the food I received from Bobcat Bounty.	n=4 2.1%	n=21 10.9%	n=48 24.9%	n=68 35.2%	n=25 13.0%	n=25 13.0%	<0.001*
I have felt physically healthier because I got food from Bobcat Bounty.	n=2 1.3%	n=20 13.0%	n=33 21.4%	n=57 37.0%	n=20 13.0%	n=20 13.0%	<0.001*
Since attending Bobcat Bounty, I have been eating meals with more variety.	n=0 0.0%	n=17 15.7%	n=25 23.1%	n=39 36.1%	n=12 11.1%	n=14 13.0%	<0.001*
The food that I received from Bobcat Bounty helped me get through the week without skipping meals.	n=0 0.0%	n=19 16.0%	n=31 26.1%	n=40 33.6%	n=14 11.8%	n=14 11.8%	<0.001*

* significant p-value, p< 0.05

	Freshman 5	Sophomore 30	Junior 59	Senior 90	Super Senior 28	Graduate Student 29	p-score
Please indicate how each of the following have or have not changed as a result of the	n=3 4.8%	n=7 11.3%	n=11 17.7%	n=25 40.3%	n=7 11.3%	n=6 9.7%	<0.001*

food you got from Bobcat Bounty: - How healthy your diet is							
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: The variety of food you eat	n=3 1.8%	n=16 9.6%	n=40 24.1%	n=65 39.2%	n=20 12.0%	n=18 10.8%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: The amount of vegetables you eat	n=3 1.8%	n=22 13.4%	n=38 23.2%	n=65 39.6%	n=17 10.4%	n=17 10.4%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of fruit you eat	n=4 2.5%	n=21 13.0%	n=39 24.2%	n=64 39.8%	n=14 8.7%	n=16 9.9%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of whole grains you eat	n=4 3.3%	n=19 15.8%	n=32 26.7%	n=39 32.5%	n=13 10.8%	n=10 8.3%	<0.001*

Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of meat you eat	n=1 1.4%	n=8 11.0%	n=22 30.1%	n=25 34.2%	n=7 9.6%	n=8 11.0%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of beans, nuts, and other pant-based proteins you eat	n=1 1.8%	n=9 15.8%	n=11 19.3%	n=22 38.6%	n=7 12.3%	n=5 8.8%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of sweets/desserts you eat	n=1 1.7%	n=9 15.5%	n=13 22.4%	n=21 36.2%	n=6 10.3%	n=6 10.3%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of time you spend cooking	n=2 1.5%	n=14 10.3%	n=34 25.0%	n=56 41.2%	n=13 9.6%	n=14 10.3%	<0.001*
Please indicate how each of the following have or have not changed as a result of the	n=4 2.1%	n=23 12.1%	n=47 24.7%	n=72 37.9%	n=22 11.6%	n=19 10.0%	<0.001*

food you got from Bobcat Bounty: how often you eat meals at home							
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: how often you skip meals	n=0 0.0%	n=1 11.1%	n=3 33.3%	n=4 44.4%	n=1 11.1%	n=0 0.0%	0.318

* significant p-value, p< 0.05

Living Situation

	Off Campus Outside of SM 22	Off Campus in SM 197	On Campus 22	p-score
I know how to use the food I receive from Bobcat Bounty.	n=18 8.5%	n=173 81.6%	n=18 8.5%	<0.001*
I have the resources I need to use the food I receive from BCB	n=18 8.7%	n=172 83.1%	n=14 6.8%	<0.001*
I have support that makes it easy for me to use the food I receive from BCB	n=16 7.8%	n=167 81.5%	n=19 9.3%	<0.001*
Each week I feel confident that I can use the food I receive from BCB	n=8 6.8%	n=96 81.4%	n=12 10.2%	<0.001*
My interactions with BCB staff and volunteers are positive	n=6 5.3%	n=93 81.6%	n=12 10.5%	<0.001*
I feel comfortable at BCB	n=5 4.7%	n=87 81.3%	n=12 11.2%	<0.001*

* significant p-value, p< 0.05

	Off Campus Outside of SM 22	Off Campus in SM 197	On Campus 22	p-score
By getting food from Bobcat Bounty, I was able to put money towards other necessities such as rent, utilities, car	n=19 9.0%	n=176 83.0%	n=16 7.5%	<0.001*

maintenance, medicine, etc.				
By getting food from Bobcat Bounty, I was able to focus more of my time and energy on class-related activities.	n=18 9.2%	n=157 80.5%	n=19 9.7%	<0.001*
My class attendance improved because I got food from Bobcat Bounty.	n=9 10.6%	n=69 81.2%	n=6 7.1%	<0.001*
I was able to concentrate more during class because I got food from Bobcat Bounty.	n=14 9.5%	n=126 85.1%	n=7 4.7%	<0.001*
My grades improved because I got food from Bobcat Bounty.	n=8 9.0%	n=76 85.4%	n=4 4.5%	<0.001*
Getting food from Bobcat Bounty helped me stay enrolled this semester.	n=10 9.6%	n=88 84.6%	n=5 4.8%	<0.001*
I have felt less financial strain because I got food from Bobcat Bounty.	n=19 8.7%	n=178 81.7%	n=19 8.7%	<0.001*
I have felt less stress and anxiety because of the food I received from Bobcat Bounty.	n=18 9.3%	n=159 82.4%	n=14 7.3%	<0.001*
I have felt physically healthier because I got food from Bobcat Bounty.	n=14 9.1%	n=123 79.9%	n=15 9.7%	<0.001*
Since attending Bobcat Bounty, I have been eating meals with more variety.	n=13 12.0%	n=87 80.6%	n=7 6.5%	<0.001*
The food that I received from Bobcat Bounty helped me get through the week without skipping meals.	n=14 11.8%	n=96 80.7%	n=8 6.7%	<0.001*

* significant p-value, p< 0.05

	Off Campus Outside of SM 22	Off Campus in SM 197	On Campus 22	p-score

Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: - How healthy your diet is	n=3 4.8%	n=50 80.6%	n=6 9.7%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: The variety of food you eat	n=12 7.2%	n=136 81.9%	n=14 8.4%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: The amount of vegetables you eat	n=17 10.4%	n=131 79.9%	n=14 8.5%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of fruit you eat	n=14 8.7%	n=125 77.6%	n=19 11.8%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of whole grains you eat	n=10 8.3%	n=101 84.2%	n=6 5.0%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of meat you eat	n=7 9.6%	n=61 83.6%	n=3 4.1%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of beans, nuts, and other pant-based proteins you eat	n=1 1.8%	n=51 89.5%	n=3 5.3%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of sweets/desserts you eat	n=3 5.2%	n=48 82.8%	n=5 8.6%	<0.001*

Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: the amount of time you spend cooking	n=10 7.4%	n=115 84.6%	n=8 5.9%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: how often you eat meals at home	n=16 8.4%	n=158 83.2%	n=13 6.8%	<0.001*
Please indicate how each of the following have or have not changed as a result of the food you got from Bobcat Bounty: how often you skip meals	n=0 0.0%	n=9 100.0%	n=0 0.0%	0.011*

* significant p-value, p< 0.05

APPENDIX H: BOBCAT BOUNTY PANTRY OPERATIONS THEMES

	Themes	Total volunteer observations	Number of mentions
Customer line	Lack of customers in life after opening	7	24
	Large number of clients in line	9	40
	Socializing	6	20
First foods to go	Fruits	10	49
	Proteins	12	49
	Vegetables	11	35
Flow Through Pantry	Accessible	5	14
	Steady	11	25
	Traffic in certain areas	9	38
Other observations	Clients bringing own reusable bags	4	11
	Clients brought friends	6	8
	Clients switched out items	3	4
	Clients were grateful and thanked volunteers	4	10
Questions or Confusion	Amount of food equals one item	8	34
	Client ID	3	10
	Total number of items	11	37
	Type of food	3	10
Pantry set up	Finished early	5	16
	Needed more time	2	16
	Organized	7	23
	Rushed	4	18
	Smooth	13	47
Participant sign-in	Organized	11	38
	Slow	6	19
	Steady	12	42

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