

Breaking Down Barriers Through the “STEAM” College Success Program: Increasing STEM
Bachelor’s Degrees for First-Generation Hispanic Students of the Desert Southwest

by

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ABSTRACT

To remain competitive on local, state, and national levels and to achieve future economic and social goals, Imperial and Yuma County need an educated workforce. The primary industries supporting the desert region are technical, science, technology, engineering and mathematics (STEM)-based, and require a highly skilled and educated workforce. There continue to be vast disparities in terms of numbers of students declared and enrolled in STEM transfer degree programs and the number of students completing STEM bachelor's degrees.

Perceptions regarding post-secondary education start to develop at a young age and can prevent or enable a student's development of post-secondary aspirations. Understanding a student's perceptions of barriers are important because they can prevent students from completing a four-year degree. The pilot research provided in the study are the first steps in helping educators and community leaders understand what drives and form student perceived educational barriers and student perceptions of self, and then provide a better understanding of first-generation Hispanic students' value of higher education.

As part of the study, I designed the science, technology, engineering, *agriculture* and mathematics ("STEAM") College Success Program to help college students overcome the perceived barriers intervening with the completion of a bachelor's degree. The program involved community, industry, and college students in a unique experience of incorporating a one-week camp, academic year of mentorship, STEM education, and college support. Pilot results of the "STEAM" College Success Program indicate the innovation was effective in reducing perceived barriers relating to college success and bachelor's degree completion. and was most effective in the area of self-efficacy and personal achievement.

DEDICATION

I dedicate this research dissertation to all Yuma and Imperial County students, the families and teachers who love, educate, and support them, and the local industries and agencies who will one day hire these students. It is through the combined efforts and dedication of teachers, parents, and community to our students we continue to grow and create our future leaders and industry professionals. In the spirit of understanding and supporting many of our Yuma and Imperial families, I submit this poem:

Don't be sad for my children. You might see them as the children who have to get themselves ready in the morning because my husband and I arrive in the fields before dawn. Instead, see them as eager young minds ready to learn and prepared to soak up all that you offer.

Don't be sad for my children because I rarely make it to parent-teacher conferences. I am working to make sure their bellies are full at night, and they have a place to call home.

Don't be sad for my children because their native language is not English. My children will most likely grow up to be bilingual and multicultural. They will be able to relate to and understand others in a way that many do not truly understand.

Don't be sad for my children. Their life in America offers them so much more opportunity than I was given as a child. Instead, teach them to dream big and encourage them to trust in themselves and give every chance for life and a learning opportunity a try.

Don't be sad for my children, for I am trusting them to you with everything I have. Teach them what I cannot, show them what I cannot, and love and support them so they not only have the ability, but self-confidence and belief in themselves to grasp every opportunity that comes their way. Be happy for my children and have the same faith I do in them.

As educators and dedicated members of our community, it is our responsibility to see every child, every student, and every young adult with the same eyes as their mother and father. It is through education, support, mentorship, and love every person educated in our region will have an opportunity to reach their potential for greatness!

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I want to thank both my committee members and my University of Arizona-Yuma colleagues. Throughout the dissertation process, Dr. Katie Bernstein, Dr. Penny

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DEFINITION OF TERMS

Achievement Gap: Any significant and persistent disparity in academic performance or educational attainment between different groups of students (edglossary).

Associate Degree: A degree usually earned at a two-year institution consisting of approximately 60 completed units that can be used for the transfer to a four-year college or university (CCCCO, 2018).

Awareness Gap: Gaps between what students should know to have a successful undergraduate journey and what they do know (Markowitz, 2017).

College Graduate: A student who has met the requirements to complete a degree.

Educational Barriers: People's beliefs, and perceived benefits or challenges that promote lack of engagement and action in promoting educational behavior (www.educateachild.org).

First-Generation Student: Undergraduates whose parents did not attend post-secondary education (Benmayor, 2002; Saunders & Serna, 2004) and whose parents did not graduate from college (Boden, 2011; Torres, Reiser, LePeau, Davis, & Ruder, 2006).

Hispanic/Latino Student: A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race (U.S. Census Bureau, 2017).

Opportunity Gap: Opportunity Gaps are gaps that contribute to or perpetuate lower educational aspirations, achievement, and attainment for groups of students.

Opportunity Gaps generally begin at birth: i.e., race, ethnicity, social-economic

status, English proficiency, community wealth, familial situations (Carter & Welner, 2013).

Transfer Student: A student who earned college credit after graduating from high school, typically a community college, who intends to transfer to a four-year institution (CCCCO, 2018).

The following acronym is provided to ensure uniformity and understanding of the term throughout the study.

First-Generation College Student: FGCS

CHAPTER I INTRODUCTION

Throughout the United States, high schools, community colleges, and universities are noticing the negative and costly impact on students that decide to drop out of college or university. In Arizona, for every 100 children that begin ninth grade, 73 graduate from high school, 18 enter a postsecondary program, and only 9 complete their bachelor's degrees within six years (American Community Survey, 2014).

Perceptions regarding post-secondary education start developing at a young age. These personal perceptions can prevent or enable students' development of post-secondary aspirations. Understanding students' perceptions of barriers are important because they can prevent students from attending and completing a four-year degree (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001; Brown & Lent, 1996). Identifying individual differences in perceived barriers is especially crucial among students who may encounter difficulties in reaching their post-secondary goals (Brown & Lent, 1996; Brown, Hackett, & Lent, 1994; Luzzo & McWhirter, 2001). One such group is Latinos/Hispanics. Latinos/Hispanics are defined as a person or people of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race (U.S. Census Bureau, 2018).

Latinos/Hispanics are the largest and fastest-growing racial group in the United States; they remain the "least well-educated" population (Villalpando, 2004). Even though there has been steady growth over the last seventy-five years, there are still disparities among groups regarding students' aspirations to attend college and to complete a bachelor's degree (Byun, Hutchins, Irvin, & Meece, 2012; Evans, Illich, &

McCallister, 2010). The disparities among groups tend to be in students from first-generation, Hispanic, and rural lower socioeconomic communities. Fewer than 43% of Latino high school students meet the requirements for admission to enroll in 4-year institutions. Due to this disparity, the Latino population on college campuses is much lower than other racial groups (Camacho, 2011; Saunders & Serna, 2004).

Several studies indicate that both Hispanic youth (Luzzo & McWhirter, 2001; McWhirter, Torres, Salgado, & Valdez, 2007) and rural youth whose parents have less education and come from low socioeconomic backgrounds (Byun, Farmer, Irvin, Hutchins, & Meece, 2012) have an increase of perceived educational barriers. To date, the literature examining perceived barriers have not involved rural Arizona first-generation Hispanic college students (Ali, Chronister, & McWhirter, 2005; Kenny, Bluestein, Chaves, Grossman & Gallagher, 2003; Brown, Hackett, & Lent, 2002; Luzzo & McWhirter, 2001; McWhirter et al., 2007). The lack of research is noteworthy as 44% of all P-12 youth in Arizona are Hispanic, and over 65% of all P-12 youth in the desert border regions of Yuma and Imperial Counties are Hispanic (pewhispanic.org).

The dissertation will detail action research conducted between the author and first-generation Hispanic college students identifying perceived barriers and challenges experienced by students preventing them from completing a bachelor's degree. The action research dissertation will then identify change-action supports that help first-generation Hispanic college students to overcome these barriers, increase educational focus, social capital, and student success in higher education by completing their bachelor's degree.

Background

If you are planning for a year, sow rice; if you are planning for a decade, plant trees; if you are planning for a lifetime, educate people.

-Chinese proverb, *President's Forum*

I began working for the University of Arizona Yuma distance campus ten years ago and tasked with the job of developing a local branch campus partnering with regional community colleges to create four-year bachelor 2+2-degree pipelines leading students from high school, to community college, into university programs and out into the industry. The challenge of guiding and helping students navigate and progress through the educational system to the point of transfer and enrollment in a university upper-division program and then assisting, motivating students in a manner, so they complete their bachelor's degree was more fragmented and complicated than I imagined. I noticed vast disparities in terms of numbers enrolled in a transfer degree program and the numbers of these students that complete the transfer four-year degree. Students that did make a successful transfer into a university degree program struggled to finish and attain the degree.

Local Context of the Research Study

The dissertation study takes place in the southwestern border region of Yuma County, Arizona, and Imperial County, California. Geographically, encompassing approximately 5000+ square miles of desert land accented by green agricultural fields and borders Arizona, California, and Mexico. Due to rapid growth, the area is a cultural center for a highly disadvantaged population in a service region of 400,000+ people (U.S. Census Bureau, 2017). While the local economy struggles against poverty and high

unemployment rates of 12%-25% (Bureau of Labor Statistics, 2018), jobs in STEM fields are plentiful. Forbes.com ranked Yuma, AZ, in the top 10 up-and-coming tech cities in the nation due to the county's strong military presence and steady population growth (Pentland, 2008). At the same time, access to these jobs is thwarted by weaknesses in the educational pipeline of high school through bachelor's completion. Employment around the study revolves around farming, military, border enterprise, and winter tourism. Although these communities offer job opportunities in agriculture, engineering, and other highly technical areas, employers in the service region are finding it increasingly difficult to fill these jobs because they cannot find employees who have the necessary qualifications, technical skills, and education. (Arizona Western College Workforce, 2016; Greater Yuma Economic Development, 2015).

Two extremes exist in Yuma and Imperial Counties, large numbers of unemployed/unskilled workers and the scarcity of skilled workers. Both visible constraints impact the high-tech industry and the basic economy of the region. The median household income for a family of four is just over \$41,000 compared to the national average of \$53,000 (U.S. Census, 2017). The ethnic demographics of the region include; 60+ % Hispanic, 30% Caucasian and 5-10% percent other (www.DATA, USA.com). 25% of the region's population was born in Mexico (American Community Survey, 2014), and less than 14% have a bachelor's degree or higher compared to over 30% of the adult population in the region who have not completed high school (U.S. Census, 2017).

There are fourteen public high schools in the Yuma and Imperial Valley region.

Nine of the fourteen high schools with approximately 2,500 or more students. The other five high schools are 2-A and 3A school with 600 or fewer students and over 20,000 students attending high school from these schools. The desert region has two community colleges; Arizona Western College and Imperial Valley College. Both colleges are Hispanic-Serving Institutions that each serves nearly 12,000 students annually. The students who attend these two colleges have poverty rates that are 43% higher than the national average and the baccalaureate or higher degree completion rates for Hispanic residents 25+ years of age of 7% (American Community Survey, 2014, U.S. Census, 2016). The baccalaureate or higher degree completion rates for all residences 25+ years of age is 13%, compared to 28% nationally (American Community Survey, 2014). Within the setting, the student population is highly disadvantaged, with 47% of these being first-generation Hispanic college students (American Community Survey, 2014). The combination of high Hispanic populations resulting from being a border town, relatively low housing costs, and the large agricultural base, encourage Hispanic families to settle in the southwest border region. Consequently, the socioeconomic statistics are uneven with an increased level of low-income families compared to middle or high-income level families.

Statement of the Problem

Research suggests that first-generation Hispanic students experience challenges in reaching their postsecondary goals. Specifically, first-generation Hispanic students are increasingly aspiring to obtain a college degree, but they are less apt to complete college (Kusmin, 2012; Colman, Gilbertson, Herring, Kewal, & Provasnik, 2007). Two repeated problems continue to emerge among Yuma and Imperial County educators, and

community and business leaders. The first problem is the high number of students who start college and do not complete their degree. Arizona Western College reports that half first-time, degree-seeking Yuma County students have left college without a degree at the end of year one. By the end of year three, 62% of students have left college without finishing their degree program. The number jumps up to 72% for Hispanic students that at year three, have left college without completing their degree (Arizona Western College Standard Report, 2017). To raise bachelor's degree attainment in Yuma and Imperial Counties first-generation Hispanic students, it is essential to address, identify, and understand students' perceptions of barriers that influence bachelor's degree attainment. It is also necessary to know how perceptions might be related to cultural experiences and family histories, influences how degree completion is valued by students and parents. It is also essential to explore if these personal, cultural perceptions and beliefs can change through intervention. Educators and community leaders cannot genuinely understand students' decisions relating to how they decide to continue their education past high school unless an opportunity to sit down and visit directly with students to understand their individual life story. Such an understanding might also allow educators and community leaders to understand what has helped to drive students' perceived educational barriers, students' perceptions of self, and first-generation Hispanic students' value of higher education. Before systems change and new implementations occur, it is imperative to identify and determine what structural social support first-generation Hispanic students feel they need. The research study will identify perceived barriers, supports, or lack of supports influencing student choices to continue their education and a

four-year degree.

The second problem is the low number of people in Yuma County (14% Yuma vs. 28% Arizona) and Imperial County (14% Imperial vs. 33% California) (U.S. Census Bureau, 2016: towncharts.com). To remain competitive on local, state, and national levels and to achieve economic and social goals, Imperial and Yuma County need an educated workforce. Experts estimate that by 2020, six out of ten jobs in the country will require a college degree (Bansal, 2013; Carnevale, Smith & Strohl, 2013). Because of low bachelor's attainment numbers in the desert border region, most people do not have the skills and education necessary to fill the open and available job opportunities. The 2015, "Business, Retention and Expansion Report," generated by Greater Yuma Economic Development Corporation, informed that 82% of businesses informed having trouble in recruiting talent and rated educated/highly skilled workforce availability as "fair to poor" (GYEDC BRER, 2015).

The lack of skills and education directly impacts current and future economic development. Many companies in the region believe the growth and expansion of their business could reach between 25-50% through the hiring of local educated/skilled individuals (GYEDC BRER, 2015). Graduation rates from 4-year institutions are fundamental indicators of socioeconomic stability within its community (Decker, Rice & Moore 1997). Primary industries supporting the desert region are technical, STEM-based, and require a highly skilled and educated workforce (Arizona Workforce Development Plan, 2016; www.greateryuma.org). Despite community support and industry workforce demands for STEM-educated and bachelor's degrees, the numbers of people completing

STEM degrees remain low (National Science Board, 2015). Business, community, and educational sectors are concerned about the problem and what it could imply for future stability and growth of the region if not addressed and improved. The challenge is not just an educational issue but is a community, social, and political issue as it relates to workforce development (National Science Board, 2015). Investigative work is needed to determine and raise the conditions that have developed and impact low bachelor completion graduation rates. The action research study is the first step to increasing bachelor's degree attainment by understanding students' perceptions and challenges relating to continuing their post-secondary education, inspire and support local students so they can graduate from four-year institutions, improve the lives of students and ultimately develop a world-class local workforce that is skilled to meet the increasing job demand from local industry.

The study will examine these two regional problems, and the results of the study will assist in identifying perceived barriers and support to make a change by increasing college success, and completion for Imperial and Yuma County first-generation Hispanic students and has potential to initiate change increasing four-year bachelor's degrees in the region. Imperial and Yuma Counties are not the only rural border community experiencing these concerns. Therefore, results may be replicable in other rural communities with similar demographics.

Early Cycle Research

Three pilot studies were completed that lead up to the research dissertation and development of the innovation; cycle 0 completed Spring 17, cycle one completed Fall 17, and cycle two completed Spring 18. All three of these small mixed methods studies

helped narrow and identified college students' perceived barriers and needed supports so to identify and design an innovation that would intervene with the problems and challenges described and defined by college students living in the southwest border region of Yuma and Imperial Counties. Three repeating themes surfaced throughout the three pilot studies; the impact of achievement, the impact of opportunity, and the lack of awareness or exposure to college-going, college success strategies, and benefits of bachelor's degree completion. Most of the struggles and barriers students perceive or experience is usually not seen as their fault or, most times, not in their control and are in most cases related to the family being low income and or not exposed too many college successes and completing culture experiences. Many families perceive their circumstances as being in a state of survival mode and do not have time, capital, or individual experiences to expand students' exposure and give them experiences that most students are privileged to experience.

Purpose Statement

The purpose of the action research study is to identify and describe perceived educational barriers of an understudied population, of first-generation Hispanic youth in the desert border southwest hindering successful transfer to a four-year university and then develop and implement an innovation which intervenes in these factors promoting successful transfer and completion of a bachelor's degree.

Research Questions

1. What are the barriers to post-secondary success in first-generation Hispanic students in the desert southwest border regions as perceived by college students?

2. How does participation in the “STEAM” College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor’s degree attainment?

Introducing the Innovation

I designed the “STEAM” College Success Program to help college students overcome their perceptions and challenges of college by increasing career, life, and college experiences and knowledge, increasing success in bachelor’s degree attainment. The goals of the innovation were to reduce negative student perceptions and challenges regarding bachelor’s completion. Achievement of success involved the community and industry stakeholders and college students in a unique experience of incorporating both an intensive one-week camp and academic school year of mentorship, STEM education, and college support. The “STEAM” College Success Program supported improved systems thinking, which considers the interactions between students, community, and industry stakeholders. Collaboratively, team academic, industry partners, and community leaders worked together to effect change in the student participants of the program aiming to invoke change in students’ perceptions of college, improving college success and bachelor’s completion rates for the participants. Partnership innovation objective was to build a diverse pipeline of educated talent in the career areas of Science, Technology, Engineering, Agriculture and Math by actively engaging students in activities improving student access and success in higher education opportunities in the areas of agriculture, food, natural resources, science, engineering, health, and other related disciplines.

The USDA funded the expense of the innovation, worked closely with the

researcher to promote the program and identify regional stakeholders for participation in the mentorship program. Additionally, the USDA identified other agency partners to participate in the program and provided information on educational opportunities with USDA. The researcher worked closely with USDA to plan, develop, and implement the program, outreach, and recruitment of completed first-year students to participate in the program, developed the student application, the review process and conducted the student selections and methods of student notifications. The researcher also provided the logistics for the weeklong residential camp, which included hands-on learning with labs exploration, the college supports educational activities, and regional field trips visiting mentors and their business. The design and curriculum alignments with STEAM educational pathways and included practical experiences, leadership, and college success strategies preparing students for careers in the field of agriculture were designed and managed by the researcher. The researcher also provided academic, professional, scientific, and technical aspects of the innovation, collected data, and submitted a written report of the project outcomes and results, with impacts and reflections of the program. The details of the program are provided in Chapter III of this document.

Organization of the Study

The research study is organized into four additional chapters and appendices. Chapter II contains the literature review and the theories the study is based. Chapter III describes the methodology and research design, including the research population and sample. Chapter IV includes the mixed methods findings based on constructs, categories, and subcategories collected from qualitative data analysis. Lastly, Chapter V contains a summary of key findings, conclusions, and recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE

Chapter II contains the literature review for the study. The first section examines the existing research regarding the history of first-generation college students and Hispanic students in higher education. The second section discusses the theoretical framework and foundational framing of the study. The third section introduces the known perceived barriers and supports experienced by first-generation Hispanic students. The fourth section summarizes the early cycle research involved in the study. Finally, the chapter concludes with the introduction of the research innovation.

Introduction

If the ladder of educational opportunity rises high at the doors of some youth and scarcely rises at the doors of others, while at the same time formal education is made the prerequisite to occupational and social advance, then education may become the means, not to eliminating race and class distinctions, but of deepening and solidifying them.

-President Truman, *Education Should be First Priority for New President*

Over 70 years ago, President Truman correctly predicted significant challenges that higher education must solve today. Educational barriers in the form of opportunity gaps, awareness gaps, and achievement gaps have helped increase inequality and decreased access to critical information and often reduce a student's chance of realizing successful outcomes during their post-secondary education and into their personal lives (Bensimon, 2005; Holcomb-McCoy, 2007; PCGorski, 2017; Markowitz, 2017). For Hispanic first-generation students, these gaps are barriers to success. If we don't try to

solve these barriers, upward mobility will become a thing of the past, and the Great Land of Opportunity will cede its place in history to permanent inequality (Markowitz, 2017). These three barriers—opportunity gaps, awareness gaps, and achievement gaps—guide the research questions. There are three theories—social cognitive theory, social capital career theory, and positive deviance theory—guiding the research questions and offer explanations about how these barriers operate to affect behavior.

First-Gen College Student and Hispanic College Student Connections

First-generation college students (FGCS) are defined as undergraduates whose parents did not attend post-secondary education (Benmayor, 2002; Bowers & Griffin, 2011; Saunders & Serna, 2004) and whose parents did not graduate from college (Boden, 2011; Davis, LePeau, Reiser, Ruder, & Torres, 2006). Merely being a first-generation college student is one of the most-cited predictors of higher education failure (FGCS Report, 2014; Moore, 2018). FGCS are significantly disadvantaged because their parents have no experience in post-secondary education, so their parents are unable to offer guidance through college (Markowitz, 2017). One in six or 30% of first-year college students in the U.S. fit the definition of FGCS, but less than 11% will graduate with a bachelor's degree in 6 years (Balemain & Feng, 2013; McElroy & McElroy, 2017). Research studies also demonstrate that FGCS are more likely than non-FGCS to come from low-income families (Hurtado, 2007; Choy, 2001; FGCS Report, 2014; Thayer, 2000). Nearly 30% of FGCS are from families with an annual income of less than \$25,000 (FGCS Report, 2014). Data shows, tragically, that of these FGCS, only 10% complete a bachelor's degree in 6 years, and FGCS from low-income families and ethnic minorities are the least likely of all undergraduates to complete a four-year degree (FGCS Report,

2014; Thayer, 2000). If you add all these variables together, these high-risk students have a 47% chance of dropping out of college before they graduate compared to only 23% drop out rates of their peers that have parents that have completed their bachelor's degree and make over \$25,000/year (pellinstitute.org.).

Factors Affecting FGCS Graduation Rates

Several factors are contributing to low graduation rates. First, FGCS are unfamiliar with the hidden curriculum that determines student success in the first year of college (Gordon & Gallimore, 2005; Hill & Torres, 2010). Hidden curriculum refers to unwritten, unofficial, and unintended lessons that are learned in school but not taught directly in the classroom, such as norms, values, and beliefs conveyed in the classroom or school environment (Berkowitz & Bier, 2005; Crossman, 2018). The hidden curriculum reinforces existing social inequities and unequal distribution of cultural capital and affects students' learning experiences (Berkowitz & Bier, 2005; Crossman, 2018). The hidden curriculum also includes a variety of subtle influences on student learning, including the school environment, teachers' moods, and personalities, and teacher interaction with their students (Berkowitz & Bier, 2005; Crossman, 2018). Substandard school environments, such as cramped classrooms, poorly lit classrooms, and classrooms in need of repair, affect economically challenged areas, and students in these environments learn less than their peers in well-maintained or new schools. FGCS from lower-class families have lower self-esteem or general understanding of the educational system, putting them at a disadvantage (Crossman, 2018; Hill & Torres, 2010; Payne, 2013).

Second, FGCS have lower-income backgrounds meaning that they often must work more than 20 hours per week (Balemian & Feng, 2013; FGCS Report, 2014;

Hashkins, 2016; Zinshteyn, 2016). Part of the decision to enter college involves the question, “How am I going to be able to pay for my tuition?” Most students do not understand how the college financial aid system works. Students then feel the financial pressure from their families. Being short on household income increases the fear of being able to answer the question. Many FGCS come from low economic households and may lack the financial knowledge and resources that students with college-educated parents possess. It is not uncommon for FGCS to work fulltime while going to college due to loans and family dependence on their income (Bers & Schuetz, 2014; Crossman, 2018). Employment tends to interfere with class time and study time, which are both critical to college success. Many college students end up having to leave college before graduation in favor of more working hours to support themselves and their families.

The third factor is college readiness or the level of academic preparation and practical knowledge a student needs to enroll and be successful in college without remediation in a credit-bearing course at a post-secondary institution (Conley, 2007). Since a high percentage of FGCS are from low-income families and attend low-income schools, many low-income schools survive on minimal budgets and are in rural communities. The low pay and rural environments do not attract highly qualified teachers. The combination of minimum budgets and lack of quality teachers influences the quality of education first-generation students receive (Bernacki, Butler, & Winkelmes, 2016; Hutchison, 2007; www.ed.gov). “Data reveal that more than 40% of schools that receive Title 1 money to support and serve disadvantaged students spent less state and local money on teachers and other personnel than schools that don’t receive Title 1 money at

the same grade level in the same district” (www.ed.gov, p 1). Research indicates that FGCS have a lower ACT and SAT scores and less academic preparation than non-first-generation students (Balemian & Feng, 2013). The National Center Education Statistics (NCES) revealed in 2005 that 55% of all FGCS require at least one remedial college course compared to only 27% of those who have parents that completed a bachelor’s degree (NCES Report, 2005). Only 10% of FGCS students graduate from college in 6 years (Haskins, 2016; Zinshteyn, 2016).

Several studies identify FGCS are more likely to be students of color and or nontraditional-aged (Choy, 2001; Hurtado, 2007). The Department of Education data found that 61% of FGCS students are of Hispanic/Latino descent (Balemian & Feng, 2013). On a good note, FGCS see higher education as an opportunity for upward mobility and believe it is important to be well off financially so they can support their children with better opportunities than they had as a child (FGCS Report, 2014; Bugarin, Nunez, & Warburton, 2001). The evolution of higher education has been a long and complicated process for Latinos in the United States. The next section describes the history of this process.

History of Hispanics/Latinos in Higher Education

In 1958, Hispanics made up fewer than 6 percent of first-year college students in the Southwest, where a large population of Hispanic immigrants resided (Botti, Clark, & MacDonald 2007). Beginning with the Higher Education Act of 1965, Hispanics have been battling to gain equal access and opportunity to colleges and universities (Dominguez, 2015). The 1960’s civil rights movement encouraged Hispanics to seek recognition and attention from politicians (MacDonald et al., 2007). During the Great

Society of the Lyndon B. Johnson era, programs were implemented to address the access needs of Latinos, but the government's attempt to reach out did not work because they were dissatisfied with the discrepancy between what was promised, and the lack of attention given to them (Dominguez, 2015). However, the passing of the Serviceman's Readjustment Act (GI Bill) provided new opportunities for Hispanics who served in World War II to attend college (MacDonald et al., 2007).

During the 1960s and 1970s, Hispanics participated in different movements in order to increase diversified student demographics in schools, increase Hispanic teachers in schools to serve as role models, increase Hispanic and Cultural Research Centers, and gain access to higher education (Dominguez, 2015). As a result, a generation of first-time college students began entering the fields of social work, law, and other academic disciplines (MacDonald et al., 2007).

By the 1980s, the Hispanic population regained their optimism, and college attendance rates skyrocketed, while high school dropout rates decreased (Dominguez, 2015). During the 1980s, Hispanic access in higher education reached a plateau, partly caused by changes in financial aid policies and allocations under the Reagan era that disproportionately affected lower-income students (MacDonald et al., 2007). In 1986, the Hispanic Association of Colleges and Universities (HACU) was created, and Hispanics began establishing their own organizations, accommodating to power structures, and finding ways to bring in additional resources (Dominguez, 2015). A mass of professional, financially secure, and politically engaged Hispanics began to form, enabling them to lobby for and create higher education reforms. Through these groups,

scholarships and internships were provided for Hispanic students (MacDonald et al., 2007).

In 1992, with the reauthorization of the Higher Education Act, Hispanic-serving institutions were given their own designation, but by 1997, there was concern and resentment over how historically Black colleges and universities were favored during the allocation-of-funds process (MacDonald et al., 2007). In 1998, the Higher Education Act placed Hispanic Serving Institutions (HSIs) in a separate title, which would focus attention on their specific and unique interests (O'Brien & Zudak, 1998). Since the 1960s, Hispanics have fought hard to gain equal opportunities and access to higher education, and although they have made substantial gains towards obtaining equal rights and will continue to strive and move forward, they may need additional assistance to increase their enrollment on college campuses (Dominguez, 2015).

Hispanic/Latino Students in Higher Education

Population demographics. The Hispanic population within the U.S. has grown from 35.3 million to 50.5 million, composing 16.3 percent of the total U.S. population (Albert, Ennis, & Rios-Vargas, 2011). More than half of the growth in the total population of the U.S. from 2000 to 2010 can be attributed to the increase in the Latino population (Albert et al., 2011; U.S. Census, 2010). Hispanics constitute a vital portion of the U.S. population, but continue to face barriers in the pursuit of postsecondary education.

Hispanic college students, beyond just race and ethnicity, are different. They are more likely to come from low socio-economic backgrounds, to be first-generation college students, and come from academically disadvantaged backgrounds (Merisotis &

McCarthy, 2005; Nuñez & Bowers, 2011; Hurtado, Ngai, & Saenz, 2007). Only 37 percent of Latino high school completers between the ages of 18 and 24 enrolled in college, compared to 40 percent of Black and 49 percent of White high school completers (Santiago, 2011b). Only one in ten Hispanic adults between the ages of 18 and 24 hold a college degree (Biggs, Brindis, Driscoll, & Valderrama, 2002). Approximately 50 percent of Hispanic undergraduates are first-generation, meaning neither of their parents has enrolled and/or completed college (Choy, 2001). This data suggests that any gaps in college attainment for Hispanic students may begin with college access. Most prospective first-generation college students plan to attend and complete four-year colleges (Nora & Crisp, 2009). Hispanic students have lower college-going self-efficacy expectations, a higher number of perceived barriers, less parental and educational support, and lower positive outcome expectations related to college-going than did their student peers (Dominguez, 2015; Gibbons & Borders, 2010; Nora & Crisp, 2009). Additionally, Hispanic students are found to have more negative college-going outcome expectations, and greater perceived barriers to college-going than students from any other racial or ethnic background, and less perceived supports in school by both school administrators, teachers, and parents (Gibbons & Borders, 2010; Hill & Torres, 2010).

These factors all interact with one another as they impact the college-going expectations of Hispanic first-generation college students (Gibbons & Borders, 2010; Hovaguimian, Lundberg, Miller, & Schreiner, 2007). These factors also limit their familiarity with college options, processes, and norms, affecting where and in what types of educational programs they choose to enroll (Bansal, 2013). Hispanic students are often

more likely to enroll in associates-level or non-degree granting programs that are located close to home, which are often more accessible and more accommodating toward the maintenance of family life and responsibilities (Benitez, 1998; Crisp & Cruz, 2009; Hill & Torres, 2010; Alatorre, Longerbeam, & Sedlacek, 2004). Hispanic students are also more likely to be concerned with financial issues while in college, they tend to attend school only part-time, to receive higher levels of federal financial aid, and work long hours while enrolled (Benitez, 1998; Crisp & Cruz, 2009; Longerbeam et al., 2004).

Yuma and Imperial Valley College Hispanic FGCS Completion

Yuma and Imperial Valley Hispanic FGCS experience many, if not all, of the same challenges affecting Hispanic FGCS on a national level. The challenge to get students to the point of transfer and enrollment in a university upper-division program and then getting students to complete their bachelor's degree is more than challenging. The vast disparities in terms of numbers enrolled in a transfer degree program at the local community colleges compared to the numbers of these students that complete a transfer four-year bachelor's degree continues to be astounding. Arizona Western College reports that at the end of the first academic year (freshman), one out of two first-time, degree/certificate-seeking students have left college without a degree/certificate; by year three, 62% of their students have left college without finishing their program of study (Arizona Western College Fall Report, 2016). Students that did make a successful transfer into a university degree program continue to struggle to complete and attain a bachelor's degree. The dissertation action research study undertakes the challenge to identify the factors related to these educational barriers of first-generation Hispanic youth

in the desert southwest of Imperial and Yuma Counties and then develop and implement an innovation which will intervene in these factors.

Theoretical Framework

When looking at why Yuma and Imperial County graduation rates are low, theory encouraged me to think outside of the classrooms and schools and expanded my perspective to include the homes, families, and the deep-rooted cultural history of Yuma and Imperial Counties. Three theories guide the research questions and offer explanations about how these barriers operate to affect behavior, namely, social capital theory, social cognitive career theory, and positive deviance theory.

Social Capital Theory

Social Capital Theory refers to connections within and between social networks and uses relationships formed through social networks to produce individuals and common good benefits (Bourdieu, 1986). The word “capital” is a term used to define and increase a person’s wealth (O’Connell, 2019). Pierre Bourdieu expanded this definition by dividing the definition of capital into three fundamental categories; economic capital, which is something that can immediately be converted into money, cultural capital, which is institutionalized in the form of education or educational qualifications, and social capital, which are assets made up of social connections or by having membership in a group (Bourdieu, 1986). Impacts of social capital or lack of social capital, as described by Bourdieu, explain and give insight to students’ situations and perceptions regarding higher education and completion of bachelor’s degrees. Social capital is relational, meaning that social capital will vary depending on the value of a particular kind of capital needed in the field, depending on the market requirement. There are three main

categories of social capital. The first is the identification of social capital with networks which emphasize the social structure in which individuals operate and focus on network characteristics and the position of individuals within networks to understand both the functioning efficiency of the network and the range of benefits potentially available to individuals (Burt, 2000; Granovetter, 2005; Sabatini, 2006). The second refers to characteristics of social relationships that are built on trust and make an implicit assumption that not all relationships are conducive to social capital, but only those characterized by trust (Casieri, Nazzaro, & Roselli, 2010; Miller, 2015). The third category of social capital is any activity that captures the amount and quality of the associational activity, the participation in civil society, and the level of solidarity at the community level (Knack & Keefer, 1997; Gertler, Levine, & Miguel 2006; Narayan & Pritchett 1999). Higher levels of social capital are associated with better health, higher educational achievement, better employment outcomes, and lower crime rates (Berkman, & Kawachi, 2001; Granovetter, 2005; Knack& Keefer 1997).

Social capital theory and student achievement. The concept of social capital is a useful theoretical construct for explaining the disparities in students' educational performance. Social capital theory can help solve the access issues faced by first-generation Hispanic students in comparison to their non-first- generation counterparts. Social capital is measured by the amount of resources that are available to a group of people (Bourdieu, 1986; Saunders & Serna, 2004). Social capital includes the instrumental, productive relationships or networks that provide access and opportunities (Strayhorn, 2010). Related to education, this theory is based on the idea that students with

limited capital benefit from the development of relationships with caring and educated adults (Pascarella, Springer, Terenzini, & Yaeger, 1996; Astin & Oseguera, 2005). Moreover, students benefit from the social connections they establish with teachers, counselors, and other school officials (Saunders & Serna, 2004).

Social capital and perceptions of social capital may be an important underestimated ingredient in the well-being and participation of post-secondary education, which later impacts other groups in the social, political, and economic life of their community (Scruggs & Bryant 2012). Social capital, increasing students' educational opportunities, can be influenced by several social capital forms. At a family level, social capital in the forms of parental expectations, obligations, and social networks that exist in the family, school, and community are important to student success (Hoffman, Hoelscher, & Sorenson, 2006; Jez, 2012, Armstrong, Pearson, & Moore, 2008). Educational expectations, norms, and obligations that exist within a family or community are an important social capital that influences the level of parental involvement and investment, which affect the academic success of their children (Hoffman et al., 2006; Jez, 2012, Moore et al., 2008).

For students to participate fully in post-secondary education goals and career plans, the definition of social capital must be expanded and involve the acquisition of human capital and financial capital. There are direct impacts between family income and children's years of schooling. In effect, students with college-educated parents have a greater social and cultural capital and thus enhanced access to resources through their family relationships and social networks (Coleman, 1988; McDonough, 1997; Hossler,

Schmit, & Vesper, 1999; Dika & Singh, 2002). A lack of social and cultural capital in the form of non-college educated parents, can serve to undermine the access to resources and lead to less informed decisions about critical issues regarding post-secondary education (Coleman, 1988; McDonough, 1997; Hossler et al., 1999; Dika & Singh, 2002).

Social Cognitive Career Theory

Social Cognitive Career Theory (SCCT) derived from Bandura's (1986) social cognitive theory, which emphasized the complex ways in which people's thought processes interact with other individual variables and their environments (Byun et al., 2012). More specifically, SCCT increases the understanding of key factors and processes of college and career choice by studying: 1) Outcome expectations, or how basic academic and career interests develop; 2) Self-efficacy, or how educational and career choices are made by youth; and 3) Personal goals, or how academic and career success is obtained (Lent et al., 1994; Lent et al., 2002). Perceived self-efficacy is posted as a pivotal factor in career choice and plays a significant role in an individual's thought processes and how they shape their academic and career development (Bandura, et al., 2001; Lent et al., 2002). SCCT says that behaviors, contexts, and personal attributes, both physical characteristics and cognitive states, can all affect one another and influence academic and career development (Lent et al., 2002). The relationship between these effects of academic and career development through people's behaviors, which then influence their actions. Therefore, within the SCCT framework, people can be both "products and producers of their own environments (Wood & Bandura, 1989, p.362, as cited in Lent et al., 2002)." Through experiences, learning, social persuasion, and mental states, all of which include, increased self-efficacy, outcome expectation and goals,

individuals can develop confidence and increase expectations or reduce confidence and lower expectations, both of which influence students' futures and establishment of personal goals (Lent et al., 1994; Lent et al., 2002).

Social cognitive career theory (SCCT) is perhaps the most prominent framework delineating the key factors and processes by which individuals develop and pursue post-secondary goals (Lent et al., 1994; Lent et al., 2002). Though in name SCCT may seem to focus on career development only, SCCT was intended to and continues to be applied to academic development (Lent et al., 1994; Irvin et al., 2012). Academic development is inherently related to career development (Byun et al. 2012). The choices made during the formative periods of development shape the course of their lives (Bandura et al., 2001).

SCCT is one of the major theories used to support the study (Lent et al., 1994; Lent et al., 2002). Research that draws on Social Cognitive Career Theory (SCCT) examines perceived barriers that influence academic and college success and students' educational and vocational development. SCCT identifies these perceived barriers as contextual determinants that affect educational and career development via their proximal role in crucial educational and vocational decisions (Lent & Hackett, 2000; Lent et al., 1994). Studying perceived barriers is important, especially for those students who may encounter difficulties reaching their academic and career goals (Irvin et al., 2012; Lent et al., 1994). SCCT integrates concepts from several models of academic career behavior and academic development, which are both inherently related to career development and shapes how the student perceives himself attending college and attaining his career goal (Lent et al., 1994). There are three cognitive variables involved in SCCT; self-efficacy,

outcome expectation, and personal goals (Lent, et al., 1994; Lent, et al., 2002).

In SCCT, student academic and career development could be affected by both real supports and barriers as well as perceived supports and barriers (Lent et al., 1994; Lent et al., 2000). These barriers, real or perceived, can directly negatively impact academic development. The influence of specific objective barriers depends partially on how the individual perceives and responds to the barrier. There are many factors, both positive and negative, that impact student success, but it is how an individual interprets these factors that determine the influence on academic and career development (Bandura et al., 2001). It is not necessarily the absence of a college-going model or lack of finances that determines the post-secondary aspirations, but the students' appraisal of not having a role model or sufficient finances (Ali, McWhirter, and Chronister 2005). Data indicates that gender and racial differences in career outcomes are likely due to perceived barriers (Lent et al., 1994). Students might not be aware that a perceived barrier could potentially be affecting their academic development. How students interpret, perceived barriers influence how students make meaning of these influencing factors ultimately shape, both positively and negatively, students' goals and performance on academic and career development. Understanding perceived barriers and how these barriers impact post-secondary student goals is important because these perceived barriers prevent students from pursuing post-secondary goals and career plans (Irvin et al., 2012).

Positive Deviance

The final theory used in the research dissertation is positive deviance. This theory is used to support the innovation of the research. Positive deviance counter traditional thinking about implementing and disbursing innovation by looking inside the

communities that have the problem or challenge for solutions instead of bringing new ideas and interventions into the community from the outside (Johnson, Nielsen, & Springer, 2016). The approach initiates innovation through behavioral and social change takes advantage of the community's existing assets or strengths. Most innovation initiatives are prescriptive, top-down, or donor-driven and difficult to sustain without ongoing external resources (Dearden, Marsh, Schroeder, & Sternin, 2004). The success of the positive deviance approach rests on its ability to mobilize the community in the challenge, then identify role models within who use uncommon, but demonstrably successful strategies to tackle the problem or challenge (Sparkman, Maulding, and Roberts., 2012). Positive deviance is a powerful method of producing change, by identifying these internal individuals that go against the traditional system and have gone against the communities' norms to deliver better outcomes than their peers (Dearden et al., 2004). Such behaviors are likely to be affordable, acceptable, and sustainable because they are already practiced by the at-risk people within the community and do not conflict with local culture (Sparkman et al., 2012; Swartz, 2012). The benefits of positive deviance are apparent in the study by how the developed intervention serves equity, in that it is informed by the wisdom of healthy behaviors and provides solutions accessible to those with similar constraints (Sparkman et al., 2012). Positive deviance introduces an approach for local problem solving and enhances the local capacity for change in relevant, affordable, sustainable ways (Marsh et al., 2004; Swartz, 2012).

Most importantly, positive deviance interventions can take advantage of some immediate action, can be started quickly, and reveal at least partial solutions dealing with

the problem or challenge immediately rather than waiting for long-term development. All of these factors impact the implementing and dispersing of the new innovation within teaching and learning environments (Candari, 2013; Swartz, 2012; Positive Deviance, 2010). There are members of the Yuma and Imperial Valley communities that, through positive deviance, have graduated with a bachelor's degree and are consequently experiencing better outcomes than many others in the region. Using positive deviance in mentorship programs capitalizes on those within the community to mentor local students and help them experiencing success in attaining bachelor's degrees. This type of local innovation reduces the threat or challenge of outsiders, telling the community what to do and how to do it. The ideas come from members of the local community; thus, students are more likely to adopt the program and want to participate. By focusing on its strengths instead of the challenges, students and community mentors develop their own interpretation regarding college-going culture and best methods for diffusion, which communicates a strategy to teach and share these proven methods to others within the community. The importance of learning from the internal successes of local people is integral in developing and implementing the new behavior of college completion culture in the desert southwest border regions of Yuma and Imperial Counties. Figure 1.

Summarizes the theoretical framework of the study.

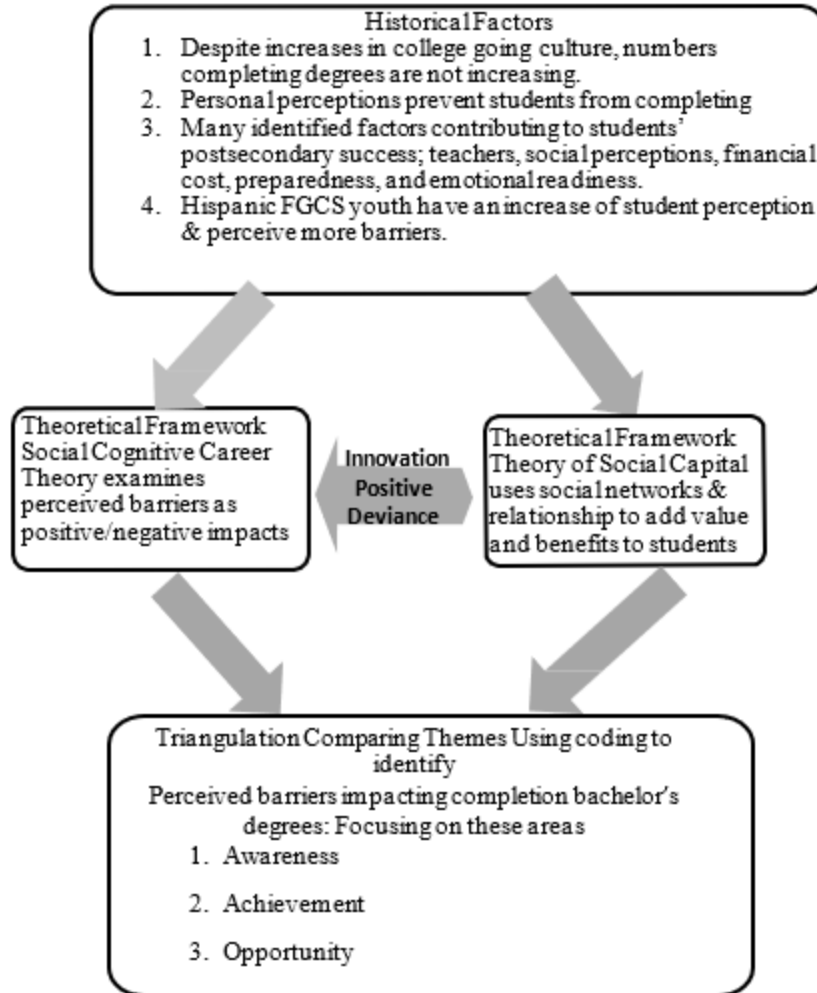


Figure 1. Summary of Theoretical Framework

Perceived Barriers and Supports

Perceived Barriers Faced by First-Generation Hispanic Students

Perceived barriers are central to post-secondary attainment as these prevent youth from pursuing their aspirations and interest (Brown & Lent, 1996; Byun, Irvin, et al., 2012; Lent et al., 1994). Identifying individual differences in perceived barriers is especially important for gender and racial minorities that may encounter difficulties in reaching their post-secondary goals (Lent, et al., 1994; Luzzo & McWhirter, 2001).

Previous research on perceived barriers has examined individual differences to postsecondary attainment and career success since the early 90s and found five main barriers.

Incomplete access to information regarding the higher education system and student support services. Approximately 50 percent of Hispanic undergraduates are first-generation, meaning neither of their parents has enrolled and/or completed college (Choy, 2001). Parental education is a key predictive measure of both college enrollment and degree completion for all racial/ethnic or social-economic background (Astin & Oseguera, 2005; Terezini et al., 1996). Students with more educated parents have an advantage over first-generation Hispanic students in navigating the higher education landscape (Hill & Torres, 2010). “Just figure it out,” is the message that first-generation Hispanic students get countless times during their college careers (McElroy & McElroy, 2017). “Figure it out” moments are a part of higher education. There is a set of unwritten rules that are not directly taught to students but that the school system assumes everyone knows (McElroy & McElroy, 2017). For Hispanic FGCS, navigating through the higher education system and the bureaucracy is burdensome and complicated. Going where no one in their family has gone before adds to the level of uncertainty and could keep these students from reaching out and asking for help (Haskins, 2016). The unfamiliar hidden curriculum includes undefined cultural norms, processes, and assumptions essential to navigating the academic, social, and administrative elements of college life. Consequently, the hidden curriculum greatly determines college success in the first couple of years (Hill & Torres, 2010; McElroy & McElroy, 2017).

In many cases, it is safer to avoid the situation or try to navigate things on their own rather than ask for help (Haskins, 2016). It does not matter how robust an institution's advising and support services are if students feel uncomfortable using them or don't know they exist (Haskins, 2016). A first-generation Hispanic student struggling in class may not realize that faculty are there for student support (Haskins, 2016).

Incomplete access to information regarding college financial resources and affordability. One of the most critical questions to Hispanic FGCS involves answering the question, "How am I going to pay for college?" Many Hispanic FGCS come from low economic households and may lack the financial knowledge and resources that students with college-educated parents have (Choy, 2001; Hill & Torres, 2010; Hurtado & Gauvain, 2007; Thayer, 2000). If a student does not know how the educational, financial system works, this can be a daunting question (Falcom, 2015). Hispanic FGCS juggle more priorities than other students, take on multiple jobs to pay for school, and in many cases, have a family of their own to support as well (Falcom, 2015; Haskins, 2016; Hill & Torres, 2010). These students are likely to attend college close to home, making familial ties even more important to sustain (Haskins, 2016). The awareness gap plays a significant role in this outcome (Markowitz, 2017). U.S. Department of Education demonstrated that 44% of Hispanic FGCS did not seek financial aid because they did not think they were eligible, so they did not apply (NCEC Report, 2015). The awareness gap also negatively impacts Hispanic FGCS's fundamental understanding of what financial aid is and what type of assistance is available to help fund education (Markowitz, 2017). If parents do not have insight into these financial matters, the odds increase that their

children will not either (Markowitz, 2017). June 2017, The Washington Post reported that a single extra year of college costs over \$68,000. What is not so easy to grasp is that college, universities, and federal financial aid programs communicate to students that a full course load is 12 credits or 24 credits per year (Dept. of Ed., 2018; FASFA.gov). Completing only 24 credits per year makes it mathematically impossible to graduate in four years. Hispanic FGCS are less likely to figure this out (Choy, 2001; Markowitz, 2017). Students whose parents have a bachelor's degree have the experience to guide their children toward more successful, less costly learning (Markowitz, 2017).

Missing family and definition of parental roles in education. There is a difference in how the idea of formal education is discussed and conceptualized in Hispanic vs. non-Hispanic homes. Hispanic "education" encompasses social and ethical education in addition to formal education (Gallimore & Gallimore, 1995; Balzano, Gallimore, Goldenberg, & Reese, 1995; Reece, 2001). Hispanic parents view their contributions to education on a holistic approach to their child's learning and personal improvement and believe that social status cannot be achieved without formal and moral education (Reece et al., 1995). Because of the expanded definition, Hispanic parents' perceptions of what constitutes parental involvement in education differ from traditional educational views.

Hispanic parents' perceptions of what it means to be involved in their children's education grouped into two categories, academic involvement, and life participation. Academic involvement activities are associated with homework, educational enrichment, and academic performance. Life participation is characterized by how the parents provide

life education in a way that it is integrated into their children's lives in school as well as out of school (Zarate, 2007). When asked to define parental involvement in their children's education, Latino parents mention life participation more frequent than academic involvement (Goldenberg & Gallimore, 1995; Reese et al., 1995; Reece, 2001; Zarate, 2007). Life involvement in education is described as being aware of their children's lives by, being aware of their children's peer groups and peers' parents, teaching good morals and values, communicating frequently with their children, providing encouragement in school, discuss future plans with their children, provide advice on life issues based on their own experiences, warn their children of possible dangers outside the home (i.e. illegal drugs), getting to know the teachers and the school to assess safety of their children, and encourage siblings and all family members to look out for one another (Reece, 2001; Zarate, 2007).

Latino parents equate involvement in education with involvement in their children's lives. Latino parents believe that by being involved in their children's lives and providing ethical, moral values, there will be a direct result in good classroom behavior which will result in greater academic learning opportunities (Goldenberg & Gallimore, 1995; Reese et al., 1995, Reece, 2001; Zarate, 2007). Latino parents place significant importance on providing emotional and motivational support in their involvement of formal education, not in other academic supports such as volunteering in a school, attending parent-teacher conferences, or actively participating in the parent-teacher association. Latino parents' perceptions of their role in their children's formal education stems from many different factors; parents low education attainment, which

limits the number of homework parents can help with, language barriers, which limits their participation in their children's academics, and lack of time resulting from demanding inflexible work schedules (Fan & Chen, 2001; Zarate, 2007). Because of the difference in the description of academic involvement, many Latino parents are viewed by teachers, counselors, and administrators as being missing or uninvolved in their children's school and learning settings.

Impact on Hispanic/Latino academic student success. Research indicates, and most teachers, counselors, and school administrators believe that parent involvement in their child's education and schools, attribute to children's high academic success (Barnard, 2004; Schwartz et al., 2015; Wilder, 2014). There are many positive effects of parental involvement on students other than academics, including increased motivation, increased self-esteem, and increased self-reliance, all of which lead to greater academic success regardless of a student's economic or cultural backgrounds (Schwartz et al., 2015). Conversely, research also confirms that inadequate parental academic involvement contributes to low student achievement and academic engagement (Bower & Griffin, 2011; Schwartz et al., 2015). Students that have parents, family members, and other significant relatives involved in their academic environments and formal education create rich learning environments that enhance students' academic development and increase long term academic success (Schwartz et al., 2015).

Other barriers in education to first-generation Hispanic students. With minimal assistance and little knowledge of the educational system, it is not surprising that Hispanic FGCS describe personal characteristics and self-efficacy as potential barriers

and motivators. While self-motivation could be listed as a barrier, Hispanic FGCS often describe themselves as hard-working, goal-oriented, and independent (Dulabaun, 2016; Wilkins, 2014). Once students understand the benefits of completing their bachelor's degree and believe they are capable of being academically successful are more likely to engage in learning strategies that lead to better academic performance (Bandalos, Gutkin, & Naumann, 2003).

While parents of Hispanic FGCS have a range of personal opinions about college, many low-income parents view college as a venture for the rich (Korsmo, 2014). Whether they support their children's college aspirations or not, parents without college experiences may not understand the amount of time and academic focus required which can lead to insufficient levels of emotional support or limited understanding of the commitment necessary for a student to thrive in college (Hill & Torres, 2010; Maulding, Roberts, & Sparkman, 2012).

Supports that Improve Outcomes for First-Generation Hispanic Students

In the face of all of these challenges, studies have found that several supports can improve outcomes for Hispanic students. One particular effective support is mentoring.

Mentoring Hispanic FGCS. Mentoring and coaching make a huge difference in outcomes of FGCS Hispanic students who otherwise lack family members who can guide them through (Hill & Torres, 2010; Zinshteyn, 2016). Students who use mentoring services were 10-15% more likely to go on to another year of college (Zinshteyn, 2016). Mentoring minority college students result in those students being twice as likely to persist and complete a bachelor's degree compared to non-mentored minority students, and they have a higher GPA (Crisp & Cruz, 2009). Because mentoring takes place in so

many settings, and because there are so many unique issues that mentorship address, scholars have difficulty developing a standard definition of the term (Crisp & Cruz, 2009). Even though the definition of mentoring is challenging to define, there are several common characteristics of mentorship; 1) A learning partnership between a more experienced and less experienced person (Garvey & Alred, 2003), 2) A process involving emotional connection; friendship, acceptance, advocacy, support, and sponsorship (Jacobi, 1991), and 3) A relationship that becomes more impactful over time (Grossman & Rhodes, 2002). There are several academic studies showing the benefits of mentoring. Mentoring focuses and motivates students toward achieving their goals (Gandara, Larson, Mehan, & Rumberger, 1998). Youth who perceive high-quality relationships with their mentor experience best results (Bruce & Bridgeland, 2014). Discussing college with mentors, especially those that have attended and completed themselves, generate interest in going to college among students whose parents have not gone to college (DuBoise, Holloway, & Valentine, 2002; Mazzotti & Ortiz, 2011). Students that are involved in a mentoring program have improved grades and enrolled in college at significantly higher rates compared with students who were not involved in mentoring programs (Johnson, 1999). Students at a college-level reported that mentoring helped to develop skills and behaviors necessary to succeed professionally (Hill, Knox, Moskovitz, & Schlosser, 2003)

Early Cycle of Research

Three pilot studies were completed that lead up to the research dissertation and development of the innovation; cycle zero completed Spring 17, cycle one completed Fall 17, and cycle two completed Spring 18. (See Table 1 in APPENDIX N.) All three

of the small mixed methods studies helped narrow and identified college students' perceived barriers and supports. The information gained through this process helped in designing an intervention that intervenes with the barriers described and defined by college students living in the southwest border region of Yuma and Imperial Counties. Three repeating themes surfaced throughout each of the three pilot studies; the impact of culture, the impact of access to capital, and the lack of awareness or exposure to college, college success strategies, and benefits to bachelor's degree completion. Students' perceptions of their struggle and barriers are not viewed as a personal fault. Students see their barriers as challenges, not in their control. For example, most cases are in connection with their family being low income, therefore, lacking exposure to college success. Many families function in survival mode and do not have time, capital, or worldliness to expand their students' exposure to provide the experiences that many middle and high social-economic families are privileged. (See Table 1 in APPENDIX N.)

Innovation

“STEAM” College Success Program

I developed the “STEAM” College Success Program for this action research study to support the challenge concerning how students' perceptions and barriers affect postsecondary aspirations, college attendance, and completion of bachelor's degrees in the desert southwest region of Yuma and Imperial Counties. The innovation supports improved systems thinking that considers the interactions between students, industry mentors, and community stakeholders, working together to affect change in students' perceptions of college and improve bachelor's completion rates.

The “STEAM” College Success Program involves community, industry, and educational leaders addressing the challenge of low bachelor’s degree attainment by developing and establishing an organization and organized method for educated community adults to support and influence students in the areas of bachelor’s degree attainment. Through the innovation, internal accountability of sharing and taking on this challenge was a shared responsibility between education, community leaders, and business industry. Regional stakeholders had the opportunity to emphasize the development of their collective capacity and the groups’ personal responsibility to accomplish the goal of inspiring students in the desert southwest border regions to graduate from four-year institutions with the intended purpose to eventually develop a world-class local workforce that is skilled to meet the increasing job demand from local industry. The “STEAM” College Success Program focused on the mentoring of beginning second-year college students.

The innovation fostered change by breaking down barriers, increasing student self-efficacy, and expanding students’ social capital. All of which increased students’ academic success and created greater opportunities for bachelor completion. By combining adults and students, the mentoring program had a tremendous impact on student lives and their perceptions relating to going to college and completing their bachelor’s degree. Good models or examples of specific behaviors are the best way to teach and inspire learning (Bandura et al., 2001). Introducing positive role models into educational classrooms and learning communities facilitates students’ interaction with these models (Jacobi 1991, Kram & Brager 1991). By introducing students to mentors in

positive, non-threatening environments, students feel comfortable to ask questions and get to know these community leaders, which are essential to learning and positive behavior change. It is important to note that behaviors are difficult to model if students don't know what those behaviors look like (Bandura et al., 2001). Students in Yuma and Imperial Counties have limited access and exposure to educated adults. The "STEAM" College Success Program increases student exposure to educated county professionals, leaders, and other college students.

Summary

Historically, research has identified educational barriers for Hispanic FGCS in the forms of opportunity gaps, awareness gaps, and achievement gaps, all of which help increase inequity and decrease access and often reduce students' chances of realizing and achieving successful outcomes in post-secondary education. Perceived barriers may not be the same for all students. Developing a local understanding of perceived barriers for Hispanic first-generation students in Yuma and Imperial Counties is important as these gaps can become barriers to success. Additionally, this study aims to address some of these barriers, as well as students' perceptions of their barriers to success through the "2018 STEAM" College Success Program.

Chapter III will discuss the methodology of the study, which explains the mixed-methods procedures used to collect and generate the data and described the academic basis of choices used in this study.

CHAPTER III

METHODOLOGY

Chapter III discusses the methodology used for the study. In this action research study, I sought to discover the perceptions of community college students' educational barriers hindering successful transfer and completion of a four-year university degree. The chapter begins with the reiteration of the purpose statement and research questions, then describes the research design for this study, as well as the population and study sample. Furthermore, the chapter details the instrumentation used to collect the data and describes how the data was analyzed.

Purpose Statement

The purpose of the action research study was to identify and describe perceived educational barriers of an understudied population, of first-generation Hispanic youth in the desert border southwest hindering successful transfer to a four-year university and then develop and implement an innovation which intervenes in these factors promoting successful transfer and completion of bachelor's degree.

Research Questions

1. What are the barriers to post-secondary success in first-generation Hispanic students in the desert southwest border regions as perceived by college students?
2. How does an Educational/Mentorship Enrichment Program for first-generation Hispanic students affect how students perceive barriers to post-secondary success?

Introduction, Research Design, and Conceptual Framework

“The true measure of any society is not what it knows, but what it does with what it knows.”

-Warren Bennis, *Why Leaders Can't Lead: The Unconscious Conspiracy Continues*

I align myself with Bennis’s words. Scientific inquiry recognizes the importance of research, the knowledge research yields, and, most importantly, how knowledge can promote social justice, improve the human condition, and positively impacting the local, state, and national conditions. This chapter elaborates on the transformative research paradigm by comparing qualitative and quantitative research procedures used to identify perceived barriers that influence college success and bachelor’s degree completion for first-generation Hispanic students living in the desert southwest border region of Imperial and Yuma Counties. The chapter also describes the study’s setting, the participants, the role of the researcher, innovation, data collection sources, and analysis procedures. Finally, it will review efforts to enhance the study’s validity and trustworthiness.

Transformative Research Paradigm

The dissertation uses transformative research to explore the phenomenon of how college students perceive barriers relating to bachelor’s degree completion and success. The transformative paradigm provides a framework for addressing inequality and injustice in society and recognizes that realities are shaped by social, political, cultural, economic, and racial/ethnic values (Mertens, 2007). A transformative-based theoretical framework is a framework used for advancing the needs of underrepresented or marginalized populations (Creswell & Clark, 2011, p. 96) and is used for addressing the complexities of research in culturally complex settings and provide a basis for social

change (Mertens, 2007).

Philosophical assumptions behind the transformative design. The transformative paradigm uses either advocacy or participatory worldviews and provides an umbrella paradigm to the innovation or action, which includes political action, empowerment, collaboration, and change-oriented perspectives (Creswell, 2015). The design of the action research study is classified as a Transformative Action Research Design because it addresses the complex set of social, cultural, economic, and ethnic problems affecting the desert southwest border region of Imperial and Yuma Counties. The research study involves the desert southwest border communities of Imperial and Yuma Counties to participate in the development of the transformative innovation plan in response to the data collected. It is through the innovation; the researcher developed and implemented the strategic intervention so to intervene in the problem under study. The purpose of the action research was to identify perceived barriers and challenges to make a change by implementing an innovation that involves students and community in a ten-month series of enrichment strategies and mentorship increasing student success and increasing bachelor's degree completion in the region of study.

Strengths of a transformative mixed methods design. Using a transformative research paradigm and recognizing the value that mixed methods research brings to research studies, I supported the research using a mixed-methods design which involved combining techniques, processes, and language of both quantitative and qualitative research into a single study (Creswell, 2015; Greene, 2007; Plano, et al., 2017) and used to identify and examine trends and patterns, as well as affording a deeper understanding

of how participants experience the process (Greene, 2007). A mixed-method design captures the complexity of the problem and then allows the researcher to respond to the stakeholder's needs by providing “Multiple ways of making sense of the social world...and actively engages us with difference and diversity in service of both better understanding and greater equity of voice” (Greene, 2008).

One of the greatest advantages of using a transformative design is the researcher can use a collection of methods that produce results that are both useful to the community of practice and are viewed as credible to the community stakeholders (Creswell & Clark, 2011). The transformative design also represents a variety of participants’ perspectives accurately reflecting the voices of college students, which have traditionally been excluded. There are three different variants of the transformational design, which are best described by the diverse theoretical frameworks used by the researcher rather than by different methods decisions: feminist lens, disability lens, and socioeconomic lens (Creswell & Clark, 2011, p. 99). These variants will vary depending on the theoretical lens used in the research study. The study used a transformative socioeconomic lens to frame the study and used socioeconomic class to view and study the research.

The Conceptual Framework Guides the Research Methods

Conceptual Framework Map used Social Cognitive Career Theory to drive the data analysis. The conceptual framework of the study linked and guided all the elements of the research process; researcher interest, identity and positionality, context, setting, formal and informal theory, and collecting, analyzing, describing, and interpreting the data. I mapped and triangulated the design of the study through the research study goals, questions, and context. The conceptual framework used to analyze the research questions

included each of the components outlined by Lent et al. (1994, 2000a, 2000b, 2005), and identifies bachelor's completion embedded into the theory. Shown in figure 2.

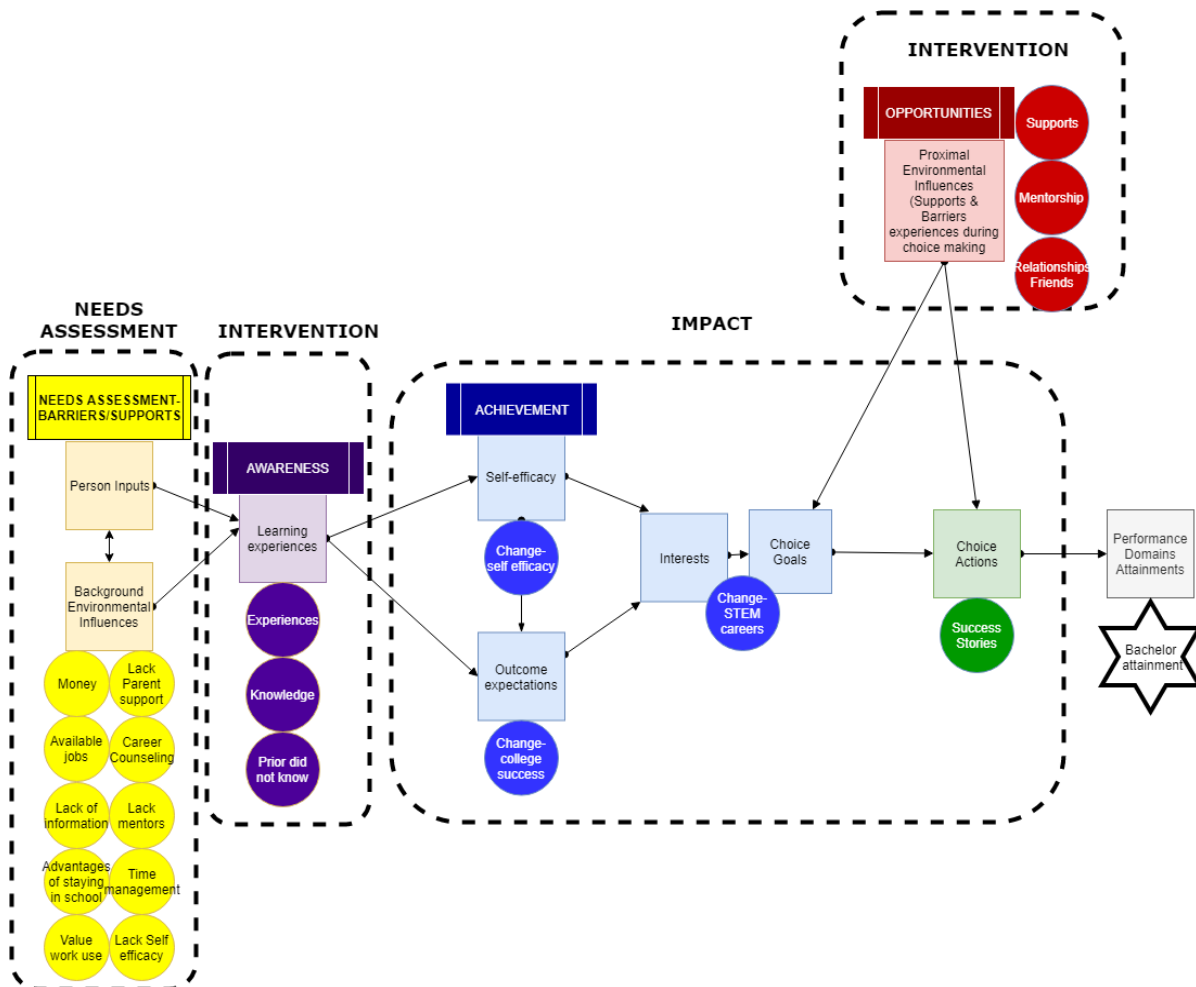


Figure 2. Conceptual Framework Map

The research design of the study is mapped and triangulated through the research study goals, questions, and context. Data collected is the raw material needed to explore the research questions, and an analytic approach allows the researcher to answer those questions effectively.

The Setting of the Study, Population & Selection of Participants

The Setting of the Research

The research took place in the desert southwest border region of Yuma and Imperial Counties. The research took place at the University of Arizona- Yuma campus (UA Yuma), which sits on the Arizona Western College (AWC) campus in Yuma, Arizona, and Imperial Valley College (IVC), which UA Yuma share in 2+2 bachelor's degree programs. IVC offers all the 100/200 level courses, and UA Yuma offers all the 300/400 level courses. The partnership between college and university enables students of the region to complete their bachelor's degree locally. Imperial Valley College (IVC) is one of the 113 campuses of the California Community College System and is in one of the most economically distressed regions in California- El Centro, California. IVC is a Hispanic Serving Institution and has a student body that is unique in that 9 out of 10 students are Hispanic/Latino, making them the California Community College with the highest percentage of Latinos in the state. See Table 2 below.

Table 2

2015-16 IVC Student Enrollment by Ethnicity

African American	0.8%
American Indian	0.01%
Asian	0.40%
Filipino	.20%
Hispanic	90.50%
Multi-Ethnic	.40%
Pac Islander	0.01%
Unknown	4.10%

White	3.6%
Total	100%

Source: California Community Colleges, Datamart, 2017

IVC is a 2-year Associate degree-granting institution with an approximately annual enrollment of 10,245 total students with 5,300 enrolled as full time. Within the setting, the student population is highly disadvantaged, with 85% receiving Pell Grants (compared to 41% nationally). IVC offers 1,156 courses and 64 programs of study supported by a community of over 143 full-time faculty and nearly 136 adjunct instructors. One of the challenges at IVC is the recruitment of students to enter STEM majors. Approximately 12% of IVC students are enrolled in STEM departments. The table below shows declared STEM majors at IVC for fall 2016.

Table 3

STEAM Declared Majors Fall 2016

Major Description	Students	Percent
Ag Business for Transfer	2	0.0%
Agricultural Crop Science	9	0.1%
Agricultural Science	49	0.6%
Agriculture Business Management	30	0.4%
Computer Information Systems	80	1.0%
Computer Science	134	1.7%
General Science	237	3.0%
Kinesiology for Transfer	123	1.6%
Life Science	58	0.7%
Mathematics	33	0.4%
Mathematics for Transfer	83	1.1%
Physical Science	19	0.2%
Pre-Engineering	98	1.2%
Total	955	12.1%

Source: Imperial Valley College SIS, 2017

Sampling Strategies of Student Participants

I used two qualitative sampling strategies in the research: purposeful and homogenous (Creswell, 2015; Patton, 2002). Purposeful sampling focused on a small in-depth sample and used for the identification and selection of information-rich cases relating to the phenomenon of the study (Creswell, 2015; Patton, 2002). Homogeneous sampling strategies will be used to ensure the targeted group is similar (Creswell, 2015). The criteria used for the study are the participants must be first-generation Hispanic students and enrolled as a full-time community college student. Homogeneity is determined by the purpose of the study and is a base of the recruitment of the participants (Creswell, 2015). I used homogeneous sampling to obtain student participants identified as Hispanic FGCS.

Population and Selection Process of Participants

The study targeted a diverse population of Hispanic first-generation community college students from historically underserved communities in the rural area of the Imperial Valley (California) and with college students declaring an interest in an agricultural-related field as an academic major. The participants of the study consisted of local community college students who have completed their first year of college. For this research study, completing the first year of college is defined as a student that has completed a minimum of 24 credits and has not filed for graduation from the community college. All students declared a STEM transfer degree indicating an intent to transfer to a university and complete a bachelor's degree.

The student participants were recruited to participate in a "STEAM" College Success Program through college STEM class presentations, emails, and community

educational outreach events. Before participating in the study, students must have shown proof of enrollment as full time in the school academic semester of fall 2018 (minimum 12 credits). Students applied to participate by completing an application (APPENDIX C, D, E & F). Twenty-four students were selected to participate in the study. The majority of the students applied were from Imperial Valley College.

For this reason, eight IVC students were randomly assigned to participate in the innovation, and eight students as controls. Eight students applied from AWC, so these became the second set of controls. Homogeneous sampling strategies were used to ensure the targeted group is similar. The criteria used for the study are the participants must be a first-generation Hispanic student enrolled as a full-time community college student. See Table 4 and 5 below.

Table 4

Community Colleges Represented by Participants Perceived Barrier Survey

	Participants
Imperial Valley College- STEAM Participants	8
Imperial Valley College Control	8
Arizona Western College Control	8

Note, n=24

Table 5
Demographics of Participants

	Males	Females	Hispanic	1 st Generation
Treatment				
Grp.1	5	3	8	8
Control Grp.2	4	4	8	8
Control Grp.3	5	3	8	8

Industry/Community Mentors

The research study also included the business and agency sectors. Business and community professionals served as industry and community mentors to the student participants. The purpose of the mentors was to support and guide students through college and career success. The mentors were identified through professional industry groups such as California Arizona Pest Control Advisors, University of California Extension Office, Homeland Security and USDA, Arizona Seed Trade, and Farm Bureau.

Innovation- “STEAM” College Success Program

The innovation I designed to use in the study was the “STEAM” College Success Program. I created the innovation to support the challenge concerning how Hispanic first-generation college students’ perceptions of barriers and challenges affect postsecondary aspirations, college attendance, and completion of bachelor's degrees in the desert region of Imperial County. The innovation expense was funded by the United States Department of Agriculture (USDA). The goal of the innovation was to reduce student perceptions of barriers and challenges by involving the various community and industry stakeholders and college students in a unique experience incorporating both an intensive one-week

STEM camp and an academic school year of mentorship and college support.

The “STEAM” College Success Program supports improved systems thinking, which considers the interactions between students, community, and industry stakeholders, so as a team, academia, industry partners, and community leaders worked together to effect change in the student participants of the program and their perceptions of college. Working as a team to make change was ultimately aimed at improving college success and bachelor’s completion rates for the participants. The objective of the partnership innovation was to build a diverse pipeline of educated talent in the career areas of Science, Technology, Engineering, Agriculture and Math by actively engaging college students in career and college success activities to improve student access and success in higher education opportunities in the areas of agriculture, food, natural resources, science, engineering, health, and other related disciplines.

The USDA funded the expense of the innovation (See APPENDIX A), worked closely with the researcher to promote the program and identified regional stakeholders for participation in the mentorship program. They also invited USDA agencies, speakers, exhibitors to participate in the program, and provided information on educational opportunities with the USDA.

I worked closely with the USDA to plan, develop, and implement the program, outreach, and recruitment of the student participants for the program, and developed the student application, the review process, and conducted the student selections and methods of student notifications. I also provided the logistics for the weeklong residential camp, which included hands-on learning with labs exploration, the college supported

educational activities, and regional field trips to visit mentors and their businesses. The logistics included the design and curriculum alignments with STEAM educational pathways and included practical experiences, leadership, and college success strategies preparing students for careers in the field of agriculture. The researcher provided academic, professional, scientific, and technical aspects of the innovation, collection of data, and research report of project outcomes and results, with impacts and reflections of the program.

Innovation Design

“STEAM” College Success Program has two distinct parts: 1) The one-week summer camp enrichment program and 2) The ten-month college student mentorship program.

Part 1: One-week summer enrichment program. The enrichment program engaged eight college students interested in STEAM (Science, Technology, Engineering, Agriculture, and Mathematics) fields of study from Imperial Valley College in a weeklong residential camp at UA-Yuma. There were two goals of program: 1) To have students experience cutting-edge science technologies, research and engage with stimulating learning experiences to encourage community college students to transfer to a university declaring an agricultural-related field as an academic major and focus on a STEAM-related career choice; 2) To prepare and support students for college success through mentorship, leadership activities and college success strategies. As pointed out in Chapter 2, community college students have a high non-completion rate and low transfer rates to a university. University transfer is the only educational pathway to the completion of a bachelor’s degree. The program enhanced the understanding of continuing education

opportunities to the selected community college students, of the importance of transferring to a university by adding college success techniques and by creating awareness that by completing a bachelor's degree in an agriculture major is a path to high-tech/high-wage profession, with educational opportunities for upward mobility and career advancement (See APPENDIX B).

According to the Employment Opportunities for College Graduates in Food, Agriculture, Renewable Natural Resources, and the Environment 2015–2020 Outlook Report by USDA's National Institute of Food and Agriculture, there are nearly 57,900 high-skilled agriculture job opportunities expected annually in the United States, yet there is an average of 35,400 new college graduates with a bachelor's degree or higher in agriculture-related fields, which is 22,500 short of the job opportunities available annually to fill them, showing tremendous demand for new college graduates with interest in agriculture. The expected outcomes of the program are:

1. Increased understanding and appreciation of the varied and wide-ranging career opportunities for people who have their bachelor's degree in agricultural sciences and agribusiness.
2. Enhanced exposure of underrepresented students to college success strategies increasing success in college completion and careers in agricultural sciences and agribusiness.
3. A realization and thoughtfulness of the importance of bachelor's degree completion and the opportunities available to agricultural sciences and agribusiness at the national, regional, and local levels.

4. Increased number of potential transfer students entering the prospective agricultural-related field as an academic major.
5. Increased diversity of students to the disciplines in STEM and its career choices by enhancing their informed-based decision-making process.
6. Work collaboratively to meet the partnership's goals and objectives with the intent of supporting and contributing to a more diverse and multicultural educated workforce.

During the one-week summer enrichment program, the student participants learned through hands-on experiences and direct contact with industry as mentors. The program included site visits to agricultural university research centers, crop/plant, greenhouse site visits, visits to agriculture businesses, and networking opportunities with agricultural professionals and USDA representatives, among other learning experiences. The program provided many activities to keep the active interest of the participating community college students, using demonstrations, workshops/lectures, and interactive field trips (See in APPENDIX B).

The program offered recreation mentoring with a mixture of structured and unrestricted activities, such as touring campus facilities/meet-and-greet, team-building exercises, and leadership development. To fully immerse the participants in a college experience, the participating college students were housed in designated college dormitories in Yuma, AZ by UA-Yuma, and chaperoned at all times by university personnel, student participant support, volunteers, and program coordinator(s). The transportation to the site visits was provided by university vans (See APPENDIX A for

the budget). The student participants documented their educational and career-based learning activities, digital photography, and a short essay and used it as part of data collection.

The participating college students were required to prepare a YouTube video summary at the end of their week-long camp experience outlining their educational histories, their perception of college and benefits of college completion and what they learned at the camp, listing benefits with impacts and reflections all tied to their career of choice and educational pathway to lead them to that career. At the closing ceremony the final day of the STEAM Camp, the student participants presented their video to their parents, community, and educational professionals that attended the event. The closing ceremony program included an essay written by each student participant summarizing their experience.

Part 2: Educational/Mentorship Program. The second part of the innovation took place throughout the 2018-2019 academic school year. The same student participants participated in a college educational/industry mentorship program. The mission of the Educational/Mentorship Program was to foster change in the current college-going culture by supporting students by sharing future career expectations and industry requirements encouraging transfer to a university and bachelor's degree completion, thus enabling a more prosperous community for all its members. The Mentorship Program was accomplished through a focused and shared commitment by local academic institutions, community leaders, industry partners, and agency partners serving as mentors, models, and support to guide students on their educational journeys

through their college and bachelor's completion.

Goals of the Educational/Mentorship Program

1. Provide career and college opportunities for students with limited experiences with college completion by meeting and developing relationships with community leaders and industry professionals in their local community that has completed a four-year degree or higher and have experienced career success.
2. Provide mentees with local role models. Students in the desert southwest border region have limited access and exposure to adults who have completed post-secondary credentials.
3. Through mentorship, increase student exposure to formally educated county leaders and current upper-division college students.
4. Provide students with relevant college-going and completion experiences.

Mentees and mentors discussed educational pathways and college completion benefits, all of which led the student participants, with the help of their mentor, to develop their own college-going educational plan. The focus of the mentorship plan included: mentorship interactions as role models, mentors' own college experience and challenges, college students' own personal, financial and academic challenges, career exploration based on local workforce opportunities, and connections regarding internship, scholarship, and research opportunities available within the region.

Summary of Methods and Data

The mixed-methods action research utilized several different instrumentation tools: survey (quantitative), student essays, digital video, and focus group (qualitative). I collected the data using four different tools that influenced the course of the study. Once I

collected the data, I triangulated the data between college students' survey answers, digital video, essays, and focus group answers. The variety of tools allowed a fuller understanding of the phenomenon related to Hispanic FGCS identified barriers to completing a bachelor's degree and provided insight into the three research questions. This section presents the participants' data answering the study's two research questions.

Data Instrumentation

The mixed-methods action research utilized four different instrumentation tools: survey (quantitative), student essays, digital video, and focus group (qualitative). All data collected influenced the course of the study. The use of mixed-methods enhances the results, especially when these results tend to support similar conclusions (Creswell, 2015). The study used triangulation between college students' survey answers, digital video, essays, and focus group answers. Mixed-method findings were utilized or compared to obtain results from triangulating quantitative and qualitative data (Charmaz, 2014; Creswell, 2015). By comparing the data separately, then combined, it flushed out factors that overlapped and identified both barriers and supports impacting bachelor's degrees in the desert region. The results from the data provided an understanding of the complex and layered educational, social, and cultural issues affecting student perceived barriers on bachelor's degree completion and flushed out nested relationships, themes, and connections between the factors influencing success or failure of post-secondary completion. The variety of tools allowed a fuller understanding of the phenomenon related to the two research questions: Hispanic FGCS identified barriers to bachelor's degree completion and how the "STEAM" College Success Program impacted how students perceive barriers.

Quantitative Perceived Barriers Survey. The action research study used an interval response survey and descriptive statistics to identify perceived barriers in Hispanic first-generation students relating to the perception of success and or failures to complete a bachelor's degree. To understand the population of the survey, the survey first asked demographic, educational, ethnicity, gender, and cultural questions that are poised in multiple-choice or fill in the blank (See APPENDIX I). The content of the survey determines Hispanic (FGCS) perceived barriers to college successes and failures as it relates to bachelor's degree completion. The treatment group and control student participants took the retrospective survey at the end of the Spring 2019 semester.

Innovation Data

The student participants documented their educational and career-based learning activities via digital photography, YouTube videos, and an essay, all of which were used as part of data collection. The participating college students presented their YouTube video summary at the end of the week-long camp experience outlining their educational histories, their perception of college and benefits of college completion and what they learned at the camp, listing benefits with impacts and reflections all tied to their career of choice and educational pathway to lead them to that career. The students were also required to submit a final essay, which was included in the final program of the STEAM Camp experience.

The second part of the innovation was the Educational/Mentorship Program, which took place throughout the 2018-2019 academic school year. Only seven of the

STEAM Camp participants took part in a college educational/mentorship program. One student chose not to participate.

The Educational/Mentorship program included six, three-hour workshops (October, November, January, February, March, April). These workshops included participants and assigned community industry mentors. During the required workshops, the participants were exposed to different topics the students identified on the last day of STEAM Camp as perceived barriers and challenges to bachelor's degree completion. Namely, the workshops were as follows: Workshop 1) October 19th- Meet your Mentor & Benefits of a Bachelor's Degree, 2) November 30th: Mentors & Participants Shared Experiences- Balancing Work, Financial Concerns, and School, 3) January 18th- Building a CV/Resume and Applying for Scholarship, 4) February 15th- Learning How to Network- Creating an Elevator Speech, 5) March 22nd- Imperial Valley Ag Expo- Practice Networking, and 6) April 26th- Mentorship Wrap-up- Keeping the relationships going.

Mentors also met with their students on their own throughout the ten months. The informal get-togethers included job shadowing, casual sharing of mentors' own college experience, and challenges, sharing of the student's own personal, financial and academic challenges, career exploration based on local workforce opportunities, and connections regarding internship, scholarship and research opportunities available within Imperial or Yuma County.

There were two focus group activities involved in the STEAM College Success Program; midsemester Jan 2019 and final April 2019. Discussions were recorded,

transcribed, and used as part of the data.

Qualitative Data Collection

Grounded Theory (GT) Methods are the guidelines used in the qualitative data collection process. GT methods consist of systematic, yet flexible guidelines for collecting and analyzing qualitative data to construct theories from the data themselves (Charmaz, 2014). GT begins with inductive data, invokes iterative strategies of going back and forth between data and analysis, uses comparative methods, and keeps the researcher interactive and involved with the data and emerging analysis (Charmaz, 2014). Instead of theory driving the research, the data forms the foundation of the theory and drives the research (Charmaz, 2014). The idea is to construct the data from within the study. The research study takes place in an extensive 3,500 square miles of rural border community with many variables within the research setting depending on more rural verse's urban cities. Flexibility and open-mindedness are essential and are useful in addressing the research problem. GT uses open coding and categorizing, which quickens the speed of gaining a clear focus of what is happening in the data. The speed involved in open coding is important because of the relatively short timeline available to complete the action research study and because it also allowed me, as the researcher, to change any views and focal points which bring key scenes closer into view (Charmaz, 2014).

Qualitative Data

Essays and Digital Videos.

The open-ended data collection tools were used to inform the two research questions. The YouTube videos, student essays, and focus group questions were open-ended and allow students time to reflect and consider their beliefs, opinions, attitudes,

perceptions, and feelings regarding college and college-going process. All the qualitative data tools qualitatively analyzed using open coding. Open coding is an analytical process through which concepts are identified, and their properties and dimensions are discovered in data (Corbin & Strauss, 1998). Two types of open coding were used. The first method is processed coding. Process coding captures action in the data and is an important analysis tool in action research. Using process coding as much as possible allows researchers to stay close to the data, refraining from assigning static labels to participants' experiences, conceptualizes actions, interactions, and consequences (Charmaz, 2014). "Process coding helps to make sure the researcher is not ignoring, glossing over, or leap beyond participants' meanings and actions" (Charmaz, 2014; p. 121). The second type of open code used is in vivo coding, which uses exact words or phrases found in the data as code itself. In vivo, codes are important when a researcher wants to prioritize and honor participants' voices (Charmaz, 2014).

Focus Group.

The "STEAM" College Success Program had two focus group activities. Single category design focus groups were conducted with both the Treatment group who completed the innovation program and the two control groups of students. A focus group is used to understand better how people feel or think about an issue (Krueger & Casey, 2000). The focus group intended to promote self-disclosure among its participants. By bringing people together that have a common background and by creating a safe, comfortable environment, people are more willing to self-disclose (Krueger & Casey, 2000).

The focus group discussions were recorded, transcribed, and qualitatively analyzed. The same coding procedures were used for the focus group as used in the essay and YouTube video. The focus groups included all seven student participants receiving the innovation and a separate focus group of seven students for both control groups that did not receive the innovation. These focus groups led by the researcher lasted approximately one hour, consisting of the predetermined open-ended questions (APPENDIX J & K; Krueger & Casey, 2000; Patten, 2009). Using a small focus group of seven participants led to a more productive conversation. Focus groups with more than 12 participants are not recommended for most situations due to the potential limiting of participants' responses (Krueger & Casey, 2000). Refer to the table below for an instrumentation summary.

Table 6

*Data Instrumentation
Summary*

RQ's	Data Tools	Methods of Analysis
1. What are the barriers to post-secondary success in first-generation Hispanic students in the desert border regions as perceived by students?	Quantitative	
	1. Perceived Barrier Survey	1. Matched responses by participants 2. Scale Responses 3. Retrospective Perceived Barrier survey-52 items plus demographic questions
	Qualitative	
	2. Videos, Focus group, Essay	1. Matched responses through coding
	Quantitative	
	1. Perceived	

2. How does participation in the “STEAM” College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor’s degree attainment?	Barrier Survey	1. Matched responses by participants 2. Scale responses 3. Retrospective Perceived Barrier survey – 52 items plus demographic questions
	Qualitative 2. Focus group, Essays	1. Matched responses through coding

Role of the Researcher

As an educator reared my entire life in the desert southwest region of Yuma and Imperial counties, I have had substantial time to recognize the disproportionate rate of adults that have completed a bachelor’s degree compared to other locations in the state and nation. To better understand the challenge, the role of the researcher in the transformative action research study is to challenge the status quo to determine what perceived barriers might be influencing bachelor’s degree completion in the region. In addition to challenging the status quo, transformative research requires the researcher to have shared a responsibility to the community that the researcher serves.

Personal responsibility is one that many locally grown leaders in small communities possess. Due to low socioeconomic status and low bachelor’s completion rates, almost all of the community leaders in the region serve in multiple leadership capacities, are members of various committees and boards, and are highly involved in the betterment of the community in which they live. The personal investment of self to the community solidifies one’s dedication to serving the people of Imperial and Yuma

County. I am no exception to the other local leaders and possess a strong sense of responsibility to the desert communities I call home.

Working in higher education has allowed me to interact with college students daily. The daily interaction makes it difficult to imagine and not feel a responsibility to local students, families, and communities. My unique position working for UA Yuma as a university educational practitioner and then working within the local college campuses has many positive consequences for my role as a researcher. Even though I work directly with junior and senior-level university students, I advise and prepare freshman and sophomore college students for transfer, allowing me to develop relationships with students getting to know many of their personal stories and their academic and cultural strengths and personal challenges relating to staying, transferring, and completing college. I also realize having established ties could also be a disadvantage as I attempted to understand and surface student perceptions and barriers to college completion with a fresh and open perspective. This is one of the challenges in which I have remained alert. I believe the outcome of the research study is critical, and it is important to have a better understanding of the goal is to eventually raise bachelor's degree completion in the region. In addition to remaining alert to this challenge, the results of the different methods used in the study will be mitigated by triangulating results.

Chapter IV discusses the findings of the study, which is accomplished through the analysis of both qualitative and quantitative data.

CHAPTER IV RESEARCH, DATA COLLECTION, AND FINDINGS

Chapter IV discusses the research, data collection, and findings of the study. It begins with a restatement of the purpose statement and research questions and then explains the alignment of how the student survey, focus groups, student videos, and essays answer the research questions and describe the population and sample used in the study. Lastly, is a presentation and analysis of the data, organized by research questions, and a summary of the chapter. Both qualitative and quantitative data include assertions that are presented and reinforced with themes, theme-related components, and quotes from the participants in the study.

Purpose Statement

The purpose of the action research study was to identify and describe perceived educational barriers of an understudied population, of first-generation Hispanic youth in the desert border southwest hindering successful transfer to a four-year university and then develop and implement an innovation which intervenes in these factors promoting successful transfer and completion of bachelor's degree.

Research Questions

1. What are the barriers to post-secondary success in first-generation Hispanic students in the desert southwest border regions as perceived by college students?
2. How does participation in the "STEAM" College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor's degree attainment?

Introduction

“The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them.”

-Sir William Bragg, A Short History of Science

The words above remind me of the importance of thinking about how new knowledge is produced by data collected in the research. Data has the ability to create new limitless possibilities of new information, which can benefit both small rural communities like my own and make big changes in man-kind. In Chapter IV, I will share new knowledge from the small part of the world this research was conducted, the southwest border of Yuma County, Arizona, and Imperial County, California. Presented in the chapter are mixed-methods findings and results that describe factors influencing students’ perceived barriers that influence bachelor’s degree completion. I will then describe how the innovation, 2018 “STEAM” College Success Program helped students overcome their perceptions and challenges of college completion so to experience success, increasing their desire to complete a bachelor’s degree.

Presentation and Analysis of Data

The data are presented, answering the study’s two research questions and present mixed-methods findings and results. The findings describe students’ perceived barriers impacting bachelor’s degree completion and demonstrate if the innovation, 2018 “STEAM” College Success Program changed students’ perceptions of barriers to college completion.

Social Cognitive Career Theory Drives Data Analysis

Social Cognitive Career Theory emphasizes cognitive-person variables that

influence career development as well as extra person contextual variables that enhance or constrain personal agency (SCCT; R.W. Lent, S.D. Brown, and G.Hackett, 1994) and used as the framework for displaying the analysis of the data. The conceptual framework used to analyze the research questions included each of the components outlined by Lent et al. (1994, 2000a, 2000b, 2005), and identifies bachelor's completion embedded into the theory shown below in Figure 3.

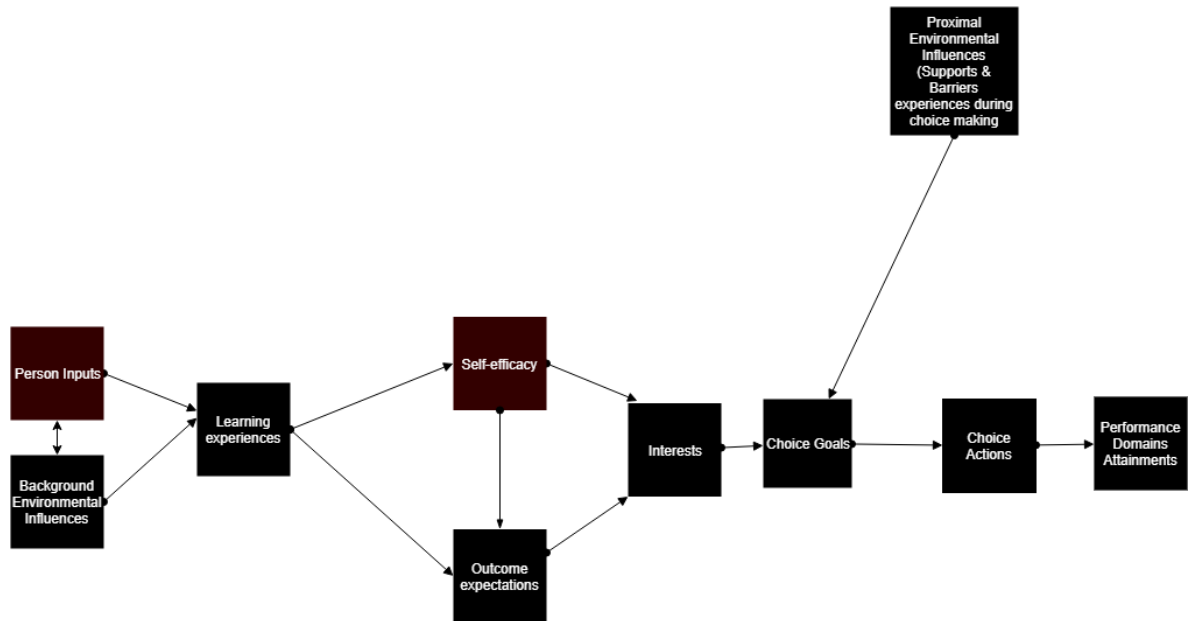


Figure 3. SCCT Model of Career Choice and Progression Based on models developed and presented by Lent et al., 1994; Lent & Brown,2006; Brown, Lent, Telander, & Tramayne, 2011.

The Population of the Study

Homogeneous sampling strategies were used to ensure the targeted group is similar. The criteria used for the study are that the participants must be first-generation Hispanic students enrolled as a full-time community college student. See Table 7 and 8 for population details.

Table 7

Community College Representation by Participants

College Representation	Number of Participants
Treatment group 1- Participants IVC	8
Control group 2 IVC	7
Control group 3 AWC	7

Note, n=22 (Tx. 1 student did not complete)

Table 8

Demographics of Participants

	Males	Females	Hispanic	1st in family graduate with bachelor's degree
Treatment group 1- Participants	5	3	8	8
Control group 2-IVC	4	3	7	7
Control group 3-AWC	5	2	7	7

Note, n=22 (Tx. group 1 student did not complete 10 mo. mentorship)

Findings for Research Question One: Identifying Barriers to Success

Research question one was *What are the barriers to post-secondary success in first-generation Hispanic students in the desert southwest border regions as perceived by college students?* The research question addresses the area of person's imputes and background environmental influences in the SCCT model. See Figure 4.

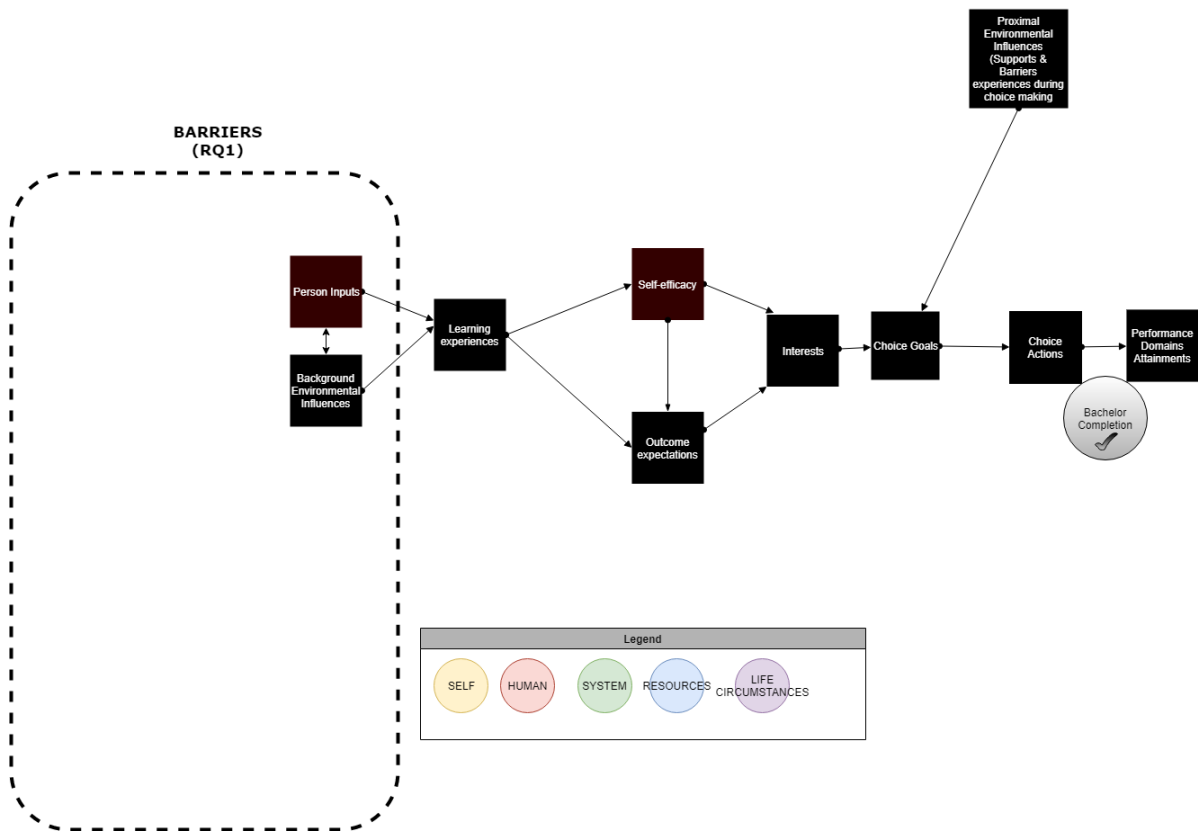


Figure 4. SCCT Model RQ1

To answer the research question, I collected qualitative data to analyze the focus group data, survey data, essays, and student presentation data. Below I created a table to show details regarding qualitative perceived barriers data collection. (See Table 9 below.)

Table 9
RQ 1 Summary of Qualitative Data Collection Events

Group	Event	<i>n</i>	Data collected
Test Group 1	video	8	8/30/2019
Test Group 1	essay	8	8/20/2018
Test Group 1	focus group mid	7	1/19/2019
Test Group 1	focus group- final	7	4/26/2019
Test Group 1	Survey- open ended questions	7	4/26/2019
Control Group 2 IVC	Survey- open ended questions	7	5/7/2019
Control Group 3 AWC	Survey- open ended questions	7	5/7/2019

The coding from the data I collected identified students' identified barriers, which were organized into the three themes based on the three constructs: *Achievement*, *Awareness*, and *Opportunity*. Within each of these three themes, five categories and eight subcategories emerged. I placed the three themes, categories, and subcategories in ascending order of highest frequency and calculated the frequency using (1) the number of codes identified in each theme and (2) the number of times a theme was identified or referenced by participants. Table 10 in APPENDIX O details the three themes and the related categories and subthemes.

Theme 1: Opportunity Barriers

Based on the literature, the first theme was opportunity barriers. The opportunity theme encompasses any barriers which usually begin at birth, *i.e.*, race, ethnicity, social-economic status, English proficiency, community wealth, and family situations experienced by students, which contribute to or perpetuate a lower education aspiration contributing to reduced bachelor's degree attainment. I identified four specific barrier

categories, (*human, system, resource, and life circumstance*) and nine subcategories identified by the participants in the category including lack of school support (n=22); lack of money availability (n=20); lack of school system structure and consistency (n=17); lack of mentors that have completed a bachelor's degree (n=15); lack of teacher subject knowledge and school resources (n=10); lack of transportation/distance to school (n=10); lack of parent /family support (n=10); lack of teacher knowledge (n=10); lack of preparation for college (n=7); and lack of parent education (n=3). The section summarizes all frequency responses mentioned ten times or above (See Table 10 in APPENDIX O.)

Opportunity barrier a: Humans.

Human opportunity barrier i: Lack of school support.

Twenty-two times, participants reported the lack of school support influencing their educational success. More specifically, participants identified the lack of or poor-quality college academic counseling. The lack of or poor-quality college counseling/advising was a significant issue, as noted by one respondent who stated, "Counselors don't help you. You have to know what to ask and tell them what you need." Another respondent shared:

When you want to see a counselor, you need a legitimate reason. I remember I asked to see a counselor to talk about transferring and what college I should apply to, I was told to research online and take a brochure over there. Our counselors are so busy they don't have time to help with transfer details. Isn't that why

counselors are there? And not just direct me to a website and brochure table.

(Focus group, January 2019).

Participants shared a couple of common messages, 1) Academic counselors want to keep students from transferring and instead of helping them, recommended more college classes instead, and 2) Academic counselors provided inconsistent information regarding classes students needed to take for their career major.

Unnecessary classes stem from the academic counselor's advisement to take classes that do not count towards the degree. One participant shared, "I have over 120 credits, and no one asked me why I have not graduated. Every time I see a counselor, they say I need more classes." (Focus group, January 2019).

Though some students sought guidance from an academic counselor, the advice given was not necessarily helpful and sometimes incorrect. Another respondent commented:

I think the counseling center is a failure. You just go over there, and it is like a quick doctor's visit. They don't really listen to you. You are there to get some transfer and degree advice, and they just want to give you more classes to take. They don't put them in order by semester, they just make a list and give it to you. Then you have to figure it out all by yourself or with your classmates. (Focus group, January 2019).

It was reported that different academic counselors would give contradictory advice, as one respondent shared:

I met with my counselor to see if I was almost finished with my prerequisites and ready to transfer. She was like, "Oh yeah, you are almost finished." I was like

cool; then I can focus on transfer. I went in again to discuss my transfer and university plan, and she was like, "No way are you even close to finishing." I was like, "That is not what you told me the last time I saw you." He did not remember saying that to me. I always hear different things from the counselors. (Focus group, January 2019).

Another participant said, "I see different counselors each time, and different counselors tell me different things." (Focus group, January 2019).

Participants described counselors who only had training or background knowledge in a few career areas. If students came in for advising in other areas, the academic counselors advised the student to consider changing their career goals. One participant shared, "I feel like the whole environment at the counseling center only knows about nursing and criminal justice. If you mention another degree, they have no clue about the type of career you are going to have or the work you would be doing." (Focus group, January 2019). Another respondent shared, "I remember speaking to my counselors about majoring in ag and being pushed the other way." (Focus group, April 2019). Another student said, "I remember telling my counselor I was interested in working in the seed business and them telling me they did not think there was a future in that business and to pick another career." (Focus group, April 2019).

Opportunity barrier human ii: Lack of mentors with a bachelor's degree. The second human opportunity barrier that students faced was the absence of mentors. Fifteen times participants discussed and gave examples of how the lack of educated mentors influences their educational success. The participants shared one common message;

educated mentors were essential to their school success and bachelor's completion but challenging to come by. This sentiment was noted by one participant who explained, "I think it is easier to learn from someone's past experiences. Knowing others' past experiences would help when someone wants to quit and make you think I am not going to quit either." (Focus group, April 2019).

Another described how a student might find an industry mentor,

I was thinking, that we are mostly in a school environment and it is hard to meet mentors, so if we could get in an environment that is not a school environment, for example, meeting at Starbucks or a restaurant, it is easy going and you get more comfortable getting to know them. I think it would break the ice and make it easier to network and find industry mentors. (Focus group, April 2019).

Another participant agreed, "We could have a networking event to introduce us to mentors and see if any natural relationships form between mentor and students." (Focus group, January 2019).

Another described how these two issues related,

Finding and working with a mentor is hard. Our mentors have their own work schedules, and we have our own work schedules and school schedules. I think it is always going to be hard just trying to synchronize. (Focus group, April 2019).

In the quantitative survey open-ended question six, participants listed a lack of bachelor's degree mentors as *one of their top three greatest challenges to completing a degree*. In question seven, students were asked to list their *top 3 supports, which have helped them get closer to completing a bachelor's degree*. Students listed forms of

mentorship support six times, and in question eight, they listed educated/industry mentors nine times as *support they wished they had*. See the tables below.

Table 11

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
Lack of Mentors	Lack of experience doesn't know many with a bachelor's degree

n=21

Table 12

Question 7

What are the top three supports help you towards completing a bachelor's degree?

Theme	Student Answers
Mentorship Supports	STEAM mentorship program Industry Guidance from others with a degree STEAM mentorship program STEAM mentorship program and mentors Communication with others in the industry

n=21

Table 131

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
Mentor Related Supports	<p>More industry connections</p> <p>Wish I knew more people completed a degree</p> <p>Know more industry professionals</p> <p>Knew more people with a bachelor's degree</p> <p>More time spent with degree completers</p> <p>Wish I knew more people in the ag industry</p> <p>More experiences with people that have a degree</p> <p>Connection with industry</p> <p>Knew more industry professionals</p>

n=21

Opportunity barrier b: Systems

In addition to the human opportunity barriers, students also identified several systemic opportunity barriers. See Barriers to College Completion Table.

System opportunity barrier i: Lack of school system structure/consistency. The first of these system opportunity barriers was the lack of or consistency of school systems. Seventeen times participants discussed and gave examples of how the lack of or consistency of school systems influenced their educational success. There were four common messages that the participants shared, 1) the constant changing of educational

systems and reorganization interfered with the quality of education the students received in high school; 2) lack of consistent upper-level college classes and not many sections or seats available when they are offered; 3) students struggle trying to identify how the college system works; and 4) lack of tutoring available for upper-level science and math classes.

Many of the participants shared how they believed the constant changes in educational systems which took place while they were in high school impacted their education and ultimately impacted their ability to complete a bachelor's degree. Several participants shared the impact of constant systems changes throughout high school, "We had so much change while I was in high school. They changed systems and how they taught all the time." (Focus group, January 2019). Another student said, "I was in advanced classes moving right along just great, and then sometimes they pulled you back, and they reorganized. Then you have to find your bearings again. This happened quite frequently." (Focus group, January 2019).

Participants identified these constant re-organizations and system changes which happened in high school, and created habits impacting their ability to complete a bachelor's degree. One respondent said, "One minute I was being challenged in school, and the next minute you were back doing things you already knew how to do. When this happened, it made me slack off and become lazy." (Focus group, January 2019).

Another student pointed out how the limited amount of time available between high school classes restricted the amount of time available to ask questions and planted the seed that teachers do not have time for their students:

In high school, I wanted to ask for help, but since there are only 5 minutes between classes, most of the time you don't have time to ask for help, and you don't have time at the end of the day because the teacher wants to leave, and they don't have time for you. They want to get home as fast as they can. Now I find it difficult to ask my professor questions when I don't understand. (Focus group, January 2019).

Another school system structures the participants identified as a barrier comprised of issues experienced internally within the college. Students emphasized how the lack of upper-level class offerings and a limited number of seats available, when the course was offered, as a barrier to college completion. One participant said, "In my experience, it is hard to get classes required by major for transfer because they are either not available, or they are full." (Focus group, January 2019). Another student said, "I was planning to take calculus and chemistry this coming semester. Both only have one section. So, 8000 students are fighting for 24 seats in a class." (Focus group, 2019).

Participants believe the college focus more on offering remedial courses instead of upper-level science and math courses.

One of the issues for opening more sections is that certain professors that can teach higher-level math, the school puts them teaching lower level math. There are a lot of class sections in lower-level classes, but not many in the higher-level courses. These lower-level classes are not even transferable. Yet there is only one section of chemistry, one of physics and one of calculus. This makes no sense. For example, chem 100 has five sections, chem 200 two sections and chem 202

one section. For us that want careers in science, it is difficult to get into those classes. (Focus group, January 2019).

Students want to understand why upper-level sciences and math classes are not offered and are asking their professors to try to get answers. One student said:

I asked my physics professor why they don't add another section when there are 20-30 more students that need the class, and he said, "Well, the school is having me teach other lower-level math classes, so I can't teach another physics." They say they want and need more scientists, but the current system does not support or encourage these career areas. (Focus group, January 2019).

Students believe the lack of course availability and the number of seats is a barrier to college completion. One participant said, "That is the problem I have right now. Certain classes are not available certain semesters, even when they say they will be offered, which messes up your plan." (Focus group, January 2019). Another respondent shared:

Maybe this is another reason students attend college but do not complete, and they feel they are not moving at a pace that the school promises them they should be going. Getting an associate degree takes too long. Almost 3-4 years because the classes you need are not offered. (Focus group, April 2019).

Participants also believe the college focus more on offering remedial tutoring instead of upper-level science and math tutoring. In the quantitative survey, the participants identified increased upper-level tutoring for science and math classes four times as support they wished they had.

The final common message the participants shared regarding lack of school system structure was the understanding of the structure by students. Students said they want to attend college but were challenged by the college system because of the lack of information a new student process or a lack of information they receive during advising. One participant said:

Many of my friends say, "I don't know what I am doing." I say, "Why don't you just look at the catalog and website?" Then they say, "I don't know how to do that, I don't understand and know how to use the website." I tell them, "Ask an academic counselor." They said they did, but I did not understand (Focus group, January 2019).

Systems opportunity barrier ii: Lack of teacher knowledge, teacher support, and school resources. The second system opportunity barrier identified by students were those influenced by their teachers. Participants shared ten different responses and gave examples of how a lack of teacher content knowledge influenced their educational success. There were three common messages the participants shared; 1) lack of teacher content and career knowledge; 2) results of the student learning experience when teachers lack content knowledge; 3) student ideas regarding possible special programs to get teachers content knowledge educated.

Student participants believe their teachers are teaching subjects they were not trained to teach. One participant shared:

I think college and high school teachers are teaching subjects that they did not go to school for. For example, teacher majors in business and has to take math as part

of their studies, and so they end up teaching math instead of business. The school administrators think, well business has a lot of math, so you should be able to teach math. (Focus group, April 2019).

Another student said:

My personal experience is with engineers. Since an engineer takes a lot of math, they assume he will be a good math teacher, and most of the time, they are not. I need help with my math, not in engineering class. (Focus group, April 2019).

Students described poor learning experiences from teachers who lacked content knowledge. One respondent described his experiences as:

Teachers always want you to work and study in a group. But the issue with that is when we all don't understand something as a group, we ask the teacher for help, and the teacher says, "Well, there are four of you; you should be able to figure it out." There seems always to be a lot of "should have" language," from the teachers. When we say we really can't figure it out and need you to explain, there is a lack of explanation. Sometimes they justify it by saying, "Oh well. I am preparing you for university because the professors there are really busy and are not going to be able to help you. You need to figure things out on your own." (Focus group, January 2019).

Another student described his poor learning experience:

Teachers should have a lot of knowledge in the subjects they are teaching, but I have had professors that when I ask a question, they reply, "Oh, I don't really know." Later I find out they don't know because they got their degrees in

something else other than the class they were teaching. This is not helping us as students. We need the teachers to help us to learn, and if we ask questions, they need to know the correct answers and how to get the correct answers. (Focus group, January 2019).

Another student commented, “When my classes were too easy because my teachers did not know the content, I slacked off. When the quality of my education went down, my value for the education went down.” (Focus group, January 2019).

Some of the participants took it upon themselves to provide some options to improve teachers content/career knowledge areas, such as this one who shared:

Maybe there needs to be a school or a special program for counselors and teachers. This program could show them different career areas and what they would be doing once they graduated with their degree because I think most do not know this themselves. (Focus group, April 2019).

Another student suggested:

I think there needs to be a culture shift. Instead of only students getting to learn about careers and the required content knowledge, teachers and counselors should attend a special program similar to the STEAM camp we attended, exposing them to all the different areas you exposed us to. (Focus group, April 2019).

In the quantitative survey open-ended question six, participants listed a lack of teacher knowledge, teacher support as *one of their top three greatest challenges to completing a degree*. In question seven, list the *top 3 supports, which have helped them get closer to completing a bachelor’s degree*, students listed forms of teacher support

nine times. In question eight, students identified increased teacher support as the *support they wished they had*. See the tables below.

Table 14

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
Lack of Teacher Knowledge/Support	Professors and college teachers
<i>n=21</i>	

Table 25

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
Teacher Knowledge and Supports	Professors Inspirational professors Relationships with professors Professors Professors Professors Support college professors Professors
<i>n=21</i>	

Table 36

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
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Opportunity barrier c: Resources. In addition to the human opportunity barriers and system opportunity barriers, students also identified several resource opportunity barriers. See Barriers to College Completion Table.

Resources opportunity barrier i: Lack of money availability/financial. The first set of barriers involved the issues with or lack of financial aid and the inability to afford college. Twenty times participants reported examples of how a lack of money influenced their educational success. There were two common messages that the participants shared: 1) Just the thought of not having money was a barrier; 2) Parents' lack of income forces students to be on their own financially after they graduate from high school, and because of family income many students do not qualify for financial aid or special college programs which award interest free monies or grants, so students do not have the money to pay for their school tuition.

Participants' responses indicated just the thought of not having enough money to pay for school was a barrier. For example, one respondent commented, "Students think, financially they don't have enough money to live and pay for school, so they settle for working and don't pursue education." (Focus group, January 2019).

Participants indicated total family income was also a barrier. Participants shared that due to lack of family income, many young people must start supporting themselves as soon as they turn 18 and are finished with high school. One student said, "Many times, the parents kick their kids out after high school, so they now have no income and can't

qualify for financial aid, and they need to work to survive.” (Focus group, January 2019). Another respondent said, “If you are not eligible for certain aid or programs, you have to pay for college yourself, which is hard if not impossible for a young person with limited personal income.” (Focus group, January 2019).

In the quantitative open-ended statement questions six, money availability was listed six times when asked students to *identify their top 3 challenges to completing a bachelor’s degree*, and two times for question nine, when asked *the greatest challenge experienced this semester*.

In the quantitative open-ended statement question seven, money came up six times when asked to *identify their top 3 supports helping to complete a bachelor’s degree* and eight times when students answered the question eight, *what supports do you wish you had to make bachelor’s degree completion easier*.

Table 17

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
Lack of Money	<ul style="list-style-type: none"> Money to afford a university Money not qualifying for enough financial aid or grants to pay for college Money to support the family and live Money to pay for college Money to pay for tuition Money to pay for tuition

n=21

Table 48

Question 9

What are the greatest challenges you have experienced this semester?

Theme	Student Answers
Lack of Money	Money
	Money

n=21

Table 19

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
Money Related Supports	Student loans
	Government help
	Financial aid
	Scholarships
	Money support from parents
	Scholarships

n=21

Table 205

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
Money Related Supports	Money to pay for tuition
	Money
	More financial help
	More money to pay for school

Money
Money
Money
More money

n=21

Resources opportunity barrier ii: Lack of transportation/distance. The second set of barriers identified in the resource opportunity theme involved the college student's responsibility to find transportation to campus. Transportation was not explicitly mentioned as a barrier to college completion in any of the qualitative data, but issues relating to transportation did surface ten times in the quantitative survey, so I felt it was important to note as a barrier.

In the quantitative survey open-ended question six, participants listed three times, lack of transportation as one of their *top three greatest challenges to completing a degree*. The topic of transportation surfaced again in questions seven, eight, and nine of the quantitative survey. In question seven, the *three greatest supports in completing a degree*, students listed transportation. In question eight of the quantitative survey, participants listed either increased transportation or decreased distance to campus seven times as *the support they wished they had*. Student participants identified their *greatest challenge of the semester* in question nine, and transportation issues were named three times as one of their greatest challenges.

Table 21

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
-------	-----------------

Transportation Issues	Transportation Transportation driving from work to school Transportation to and from school
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n=21

Table 22

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
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Transportation	Have my own car
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n=21

Table 236

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
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Increased Transportation	Decreased distance to school Lived closer Lived closer to school Lived close to campus Transportation so I could intern Lived close to campus Closer to campus
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n=21

Table 24

Question 9

What are the greatest challenges you have experienced this semester?

Theme	Student Answers
Transportation	Driving from home to school Transportation Transportation distance home to school
<i>n=21</i>	

Opportunity barrier d: Life circumstances. In addition to the human opportunity barriers and system opportunity barriers and resource opportunity barriers, students also identified several life-circumstance opportunity barriers (See Barriers to College Completion Table).

Life circumstances opportunity barrier i: Lack of parent /family support. The first set of barriers students identified in the theme are barriers experienced by students influenced by their parents and families. Participants shared ten different responses and gave examples of how the lack of support by parents and the student’s family influenced their educational success. There were two common messages the participants shared: 1) how families put pressure on the students to know; and 2) families don’t like to see their loved one struggle, so they give them excuses and encourage them to quit college.

Some families set expectations and general pressure to perform at a certain level, which created added pressure and a barrier. Many participants discussed how parents or family turn students off to school by pressing too hard. One student explained this by stating, “I feel some of my friends were missing support when I went to their houses. If they got something wrong in school, their parents would say something like, "You are dumb or why can't you do that?" (Focus group, April 2019).

Another participant agreed by saying:

Maybe at home parents should be more honest with themselves and us. If they don't remember or don't know how to do something, which they expect the student to do, then when students ask their parents for help, the parents should explain why they don't know how to do it and talk about their education or lack of education. (Focus group, April 2019).

Another participant added:

Instead, parents tell their kids, but you just learned it today in school, why can't you remember how to do it? You need to pay attention. (Focus group, April 2019).

Participants also noted that some cultures think they are showing support when, in fact, the parent /family response is a lack of support. As one respondent noted:

I notice a big thing for our culture here, we are very embracing, and we don't like to see others struggle. We are like, "if it is hard, come home and quit what you are doing, and it will somehow be ok. We will somehow fix it". But really, it should be, "toughen it up, push through, and go through with it." (Focus group, April 2019).

Other participants noted a similar behavior from parents and family:

A lot of parents think their kids are struggling, and they don't like to see them like that, so a lot of them say come back and live with us and quit school. It will be ok. I feel like we don't hear very often, "It is okay to struggle, you can push through and finish." We hear more, "If it is hard, just quit and come back home." (Focus group, April 2019).

In the quantitative survey open-ended question seven, *three greatest supports in completing a degree*, students listed parents, family, and friends. In question eight of the quantitative survey, participants listed increase family and friends seven times as *the support they wished they had*. See the tables below.

Table 25

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
Family & Friends Support	Supportive Family Family Family support Family Family Classmates Family Family Coworkers Colleagues Friends Friends Friends Friends Parents

n=21

Table 267

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
	Increased Parent, Family, Friend Support Classmates More support from my family More friends wanting to attend university and completed a bachelor's degree
<i>n=21</i>	

Summary: Opportunity Barriers Theme

Based on the number of responses from the participants involved in the study, there were four subcategories which had 15 or more number of responses: lack of school support (n=22), lack of money (n=20), lack of school system structure (n=17), and lack of mentors (n=15).

Theme 2: Achievement Barrier

The second theme of barriers to college completion success was achievement barriers. Based on the literature, achievement theme encompassed barriers of any significant and persistent disparity in academic performance, self-efficacy, or educational attainment experienced by students, which contribute to or perpetuate lower education aspiration contributing to reduced bachelor's degree attainment. There were three specific barrier categories identified (*human, resource, self, and life circumstance*) and nine subcategories identified by the participants include: time management (n=37); low self-efficacy/lack of initiative (n=16); high anxiety/ stress/ lack of resiliency (n=10); and uncomfortable asking for help (n=7). Responses mentioned two times or less included feeling pressure from parents and society, limited understanding of advantages of having a bachelor's degree, the value of work over school, and the time students perceive it takes

to complete a degree. This section will summarize all frequency responses mentioned ten times or above.

Achievement barriers a: Self

In addition to the Resource Achievement barriers, students also identified several Self-Achievement barriers. See Barriers to College Completion Table.

Self-achievement barrier i: Low self-efficacy/lack of initiative. The first set of barriers students identified in the Self-Achievement theme are barriers to how students viewed themselves. Participants in the study mentioned items demonstrating the low self-efficacy and lack of personal initiative sixteen times, and shared examples of how the personal perception influenced their educational success. There were two common messages the participants shared: 1) their own personal perception and confidence relating to being able to complete a bachelor's degree; 2) how the lack of initiative impact school success.

An introspective look showed a lack of confidence that negatively affected participants' educational success. The lack of confidence was highlighted by one respondent who said, "Students including me, feel like they are in over their heads and wonder to ourselves, do we have what it takes?" (Focus group, January 2019).

Another student agreed by saying:

A lot of students must accept the fact that they are no longer getting "A's" but are getting "C's." Because in high school, they were used to getting "A's." Because they are no longer the smartest in their class, they feel like they are inadequate to be in college, so start having self- doubt, so they quit college. (Focus group, January 2019).

Where some participants lacked confidence, others did not have a strong vision or drive to complete their program. This was the case for one participant who said:

I don't know if this has happened to anyone else, I sometimes I get frustrated thinking I won't be able to get the degree. I think some people realize they are not moving forward or getting the requirements they stop caring and don't attend class anymore. (Focus group, January 2019).

One participant shared his struggles with lack of self-confidence leading to the temptation to quit:

I have faced failure and the option to quit. I can show people what happens when you quit because I have been there, and it is not pretty. It might feel good and be a relief at the second, but it is not, later you hate your decision. (Focus group, January 2019).

In the quantitative survey open-ended question six, participants listed answers relating to low self-efficacy or lack of initiative six times as *one of their top three greatest challenges to completing a degree*. For question seven, students' top three supports, participants listed self-motivation as *one of their top three greatest supports*. In question eight of the quantitative survey, participants listed increased personal motivation two times as *the support they wished they had*. Student participants identified their *greatest challenge of the semester* in question nine, and self-motivation was named twice one of their greatest challenges.

Table 278

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
Low Self-Efficacy/Lack of Initiative	<ul style="list-style-type: none"> Self-motivation Communicating with my professors Stay focused on school and homework Stay focused on career goal Procrastination Stay focused on career goal

n = 21

Table 289

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
Increased Self-Motivation	<ul style="list-style-type: none"> Self-motivation Self-motivation Personal motivation

n=21

Table 109

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
Increased Self-Motivation	<ul style="list-style-type: none"> Pushing myself Personal motivation

n=21

Table 30

Question 9

What are the greatest challenges you have experienced this semester?

Theme	Student Answers
Low Self-Efficacy/Lack of Initiative	Fighting my own self-doubt Self-motivation

n=21

Self-achievement barrier ii: High anxiety/stress/lack of resiliency. The second set of barriers students identified in the Self-Achievement theme are barriers students experience in college, specific to expectations, and pressures to perform create anxiety and added stress. Many of the participants found challenges in learning how to handle anxiety and stress associated with college success. Participants in the study mentioned items demonstrating their fear and lack of resiliency ten times and shared examples of how stress influences their educational success. There was two common message the participants shared: 1) many college students experience anxiety due to added pressures involved in school; 2) students are not used to being challenged or uncomfortable. One participant described his perspective on how anxiety affects college students:

I have a lot of friends that have anxiety, and it interferes with their school. Each level gets harder, and we are not trained in the next level, so it feels awkward, you know? You feel like you not in the right place in the world, which increases student stress. (Focus group, January 2019).

While agreeing that attending college increases college stress, student participants shared how anxiety and stress lead to a lack of student resiliency, ultimately creating a barrier to bachelor's degree completion. One student shared:

I think a lot of people drop out of college because they are afraid to fail and dropping out before they fail is easier and less stressful and makes them feel like they are in control. (Focus group, 2019).

Another student stated:

Many people want to go to college but once they see that school is difficult and they struggle they don't like that feeling of stress and uncertainty and want always to be comfortable and in a relaxed state of mind so they would rather drop the class or drop out of school than feel uncomfortable and struggle. (Focus group, January 2019).

The lack of not having experience with feeling uncomfortable leading to stress and anxiety was demonstrated in how the students handled the stresses of STEAM Camp.

One participant shared,

Our exposure to the demands of the one-week camp program was very intense. We all felt like we were not prepared, and everyone scrambled to get the final project done. There was even some crying and drama because we were so uncomfortable. (Focus group, April 2019).

Another participant agreed by adding:

The camp and the projects were very stressful. There were time tables we had to stick to and work assignment deadlines to accomplish. We had not experienced this pressure before. (Focus group, April 2019).

In the quantitative survey open-ended question six, participants listed, fear and anxiety four times as one of their *top three greatest challenges to completing a degree*. In question nine, participants named learning how to handle stress better as one of their *greatest challenges of the semester*.

Table 3111

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
High Anxiety/ Low Resiliency	Fear and self-doubt worry about my future and ability to complete a degree Fear of failure self-doubt can I do it Fear of public speaking Feeling overwhelmed
<i>n=21</i>	

Table 32

Question 9

What are the greatest challenges you have experienced this semester?

Theme	Student Answers
Handling Stress	Learn how to handle stress better
<i>n=21</i>	

Achievement Barriers d: Life Circumstances

In addition to the resource achievement barriers and self-achievement barriers, students also identified several life circumstances achievement barriers. See Barriers to College Completion Table.

Life circumstances achievement barrier i: Time management-balancing work/school/family. The first set of life circumstances barriers identified by students was the challenge of finding time to balance school, family, and work commitments. Participants in the study mentioned a lack of time management and extra work that goes into balancing work, school, and family thirty-six times and gave examples of how the additional responsibility influenced their educational success. There were two common messages the participants shared: 1) the extra demands of life make finding time for school challenges; 2) additional personal activities move to the bottom.

One participant explained how the added burden of life affects students, “Students are too busy juggling life, it stops them and their motivation to complete school. The effort vs. time put into school becomes too much.” (Focus group, January 2019). The added responsibility of raising and supporting their own family and or siblings adds an extra burden to bachelor’s completion, as described by a participant, “Some college students might be parents, or they are working.” (Focus group, January 2019). Another participant who was the oldest sibling reported the extra responsibility of raising her siblings, “I am the parent to my siblings, so I have a lot of extra responsibility taking care of and raising them. This comes first, and school comes second.” (Focus group, January 2019).

For some students, the need to work and extra responsibilities kept them from engaging fully in the college experience. This challenge affected participation in events like student clubs, career mentoring, and extracurricular activities. The sentiment was noted by a participant who explained:

I disconnect with anything extra. I have to balance school, work, family, and any special program, so I guess it is difficult to find time to plan on my part. I am just trying to get the grade, you know? (Focus group, April 2019).

The absence of extra time due to added responsibilities, participants shared how difficult it was to find time to work with their mentor, “It was kind of hard you know, for us to find time to get together. With school and family, it was tough.” (Focus group, April 2019).

Another said:

We could have used more time. I had my mentor, and I am grateful for that, but I guess I felt like I underutilized my mentor because I did not make them a priority related to my time. Looking back, I wish I had used my time better, spending time with my mentor, and getting more experience in industry. I did not know the value of making time for my mentor. (Focus group, April 2019).

In the quantitative survey open-ended question six, participants listed, time management 26 times as *one of their top three greatest challenges to completing a degree*. In question eight of the quantitative survey, participants listed better time management skills two times as the support they wished they had. Student participants

listed in question nine, the greatest challenges of the semester, items relating to time management, and balance ten times. See the tables below.

Table 123

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
Time-Managements/Balance	<ul style="list-style-type: none"> Time for homework Time management Time management working full time and school Time management Time management Lack of time Trying to maintain high grades need time to study Balancing work and school Time management Time management Time management Working for balancing school and Work Life gets in the way of school Balancing work and school Setting priorities to school and studying Balancing work and school Time management Balancing school and social life Responsibilities outside of school Balancing family and school More time The time it takes to get a BS degree Balancing works and school Time management Time- days off did nothing but get caught up in school work Time management

n=21

Table 13

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
Time Management Supports	Better time management Time to complete scholarships

n=21

Table 35

Question 9

What are the greatest challenges you have experienced this semester?

Theme	Student Answers
Time Management and Balance of Life	Balancing school/work schedule Taking care of my mom, she is home all the time because of surgery and needs my help Self-time management Having a new baby this semester Finding time to study Time management Time management Working and school at the same time Worked over 40 hrs. a week Time management

n=21

Summary: Achievement Barriers Theme

Based on the number of responses from the participants involved in the study, there were two subcategories which had 15 or more number of responses; time management (n=37), and low self-efficacy (n=16).

Theme 3: Awareness Barrier

Based on the literature, the awareness theme encompasses gaps between what students should know to have a successful undergraduate journey. There were three specific barrier categories identified (*system, life circumstance, and self*), and five subcategories identified by the participants in the category included lack of knowledge, lack of life and career experiences, lack of major or career information, and uncomfortable learning and experiencing new knowledge. Specific barrier subcategories identified by the participants in this category include lack of life and career experience (n=36), lack of career knowledge (n=25), lack of information about college and transfer (n=10), uncomfortable with new experiences increasing knowledge (n=6). There was one response regarding how a lack of knowledge from parents passed down was mentioned only three times. This section will summarize all frequency responses mentioned ten times or above.

Awareness Barrier a: Life Circumstances

See Barriers to College Completion Table.

Life circumstances awareness barrier i: Lack of life/career experiences. The first barrier identified by the researcher in the theme was the majority of the students said they do not have significant career learning experiences and identified these challenges as a major barrier to degree completion and career success. Participants in the study mentioned 36 times how the lack of life and career experiences impacting the ability to successfully choose a major and follow it to degree completion. Participants shared three common messages: 1) lack of experience make it difficult for students to select an area of study; 2) just because students are surrounded by local industry does not mean they

understand what the industry does and what the career might entail, and 3) students want more opportunities to gain life/career experiences.

Without significant career/learning experiences, students felt that it took one or more semesters of college before they felt ready to choose an area of study. As one participant explained:

You know, I am trying to figure out who I am and realize that mostly I am just this teenager that is confused. The decisions I have to make are life-changing, and I do not feel prepared to make those decisions. What should I do, what should I study, and what career should I go after? Everyone I ask says, "Oh, well, you will figure it out," and I still haven't figured it out. It is not easy because I lack experience to help me make these decisions. (Focus group, January 2019).

Another participant added:

As a freshman, I wanted to take classes that interest me. I wanted to do certain activities that I always wanted to do and increase my life experience. It is like, oh, I have all these things I want to do and learn about, and I don't want to let go of any of them to focus on one subject. I feel like I don't have enough life and career experiences. (Focus group, January 2019).

The lack of experiences in career areas students was surrounded by in their communities was a larger issue as noted by a respondent, "Throughout my life, I had been exposed to agriculture, yet I honestly had no clue how it worked or what was involved." (Focus group, April 2019). Another participant added, "Coming from an agrarian community, I think it is ironic to not know of the industry that makes up the

majority of the local economy. I lacked exposure to and experience with ag careers outside of farmers and field workers.” (Focus group, April 2019).

Students want more opportunities to gain life and career experiences. This was cited as a barrier by students. One participant explained, “We need someone to teach and work with us and be available to help us through the stress of on how to become an adult, how to transition to a career, and do all the things adults need to do.” (Focus group, January 2019). Another participant said, “In terms of the ag industry, I agree we need more experience in how to network and get more career experiences. It would be good for students in so many ways and force them to see what is out there, which would help to make decisions.” (Focus group, January 2019).

In the quantitative survey open-ended question six, participants listed answers relating to lack of life and career experience as *one of their top three greatest challenges to completing a degree*. For question seven, students' top three supports, participants listed increased experiences three times as *one of their top three greatest supports*. In question eight of the quantitative survey, participants listed increased experiences three times as *the support they wished they had*. Student participants identified their *greatest challenge of the semester* in question nine, and lack of career and industry experience was named as one of their greatest challenges.

Table 36

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
-------	-----------------

Lack of Life & Career Experiences

Lack of experience doesn't know many with a bachelor's degree
Being able to get internships

n=21

Table 37

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
-------	-----------------

Increased Experiences

Internship
Internship
Hands-on experience

n=21

Table 38

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
-------	-----------------

Increased Experience

Access to internships at 200 level
Fun school activities and clubs related to my career goals
More laboratory experience

n=21

Table 39

Question 9

What are the greatest challenges you have experienced this semester?

Theme	Student Answers
-------	-----------------

Lack of Experiences

Lack of exposure to social and industry events

n=21

Awareness Barrier b: Systems

See Barriers to College Completion Table.

Systems awareness barrier i: Lack of career knowledge. Participants identified a lack of high-quality significant learning opportunities to gain hands-on career knowledge as a system barrier. Participants in the study mentioned a lack of career knowledge, 25 times as a barrier impacting their ability to complete a degree. There were two common messages the participants shared: 1) the importance of foundational knowledge for degree and career selection; 2) knowledge does not just happen in the classroom.

The participants discussed the importance of life and career experiences and how it tied to the lack of fundamental knowledge required in STEM careers. One participant shared, “Most young people don't know what agriculture knowledge is needed as a career and how the learning would look like even though they experience it every day.” (Focus group, April 2019). Another respondent said, “In terms of work experience, most of my friends and I don't have any, so knowing how school subjects tied to ag careers and to understand how things worked in the actual industry would help.” (Focus group, April 2019).

Student participants recognized learning does not just happen in the college classroom. One participant explained, “Students sometimes don't know which way to go relating to career and major, adding career advising would help.” (Focus group, January 2019). Another participant shared:

In terms of the ag industry, I think there needs to be more emphasis on networking and learning from those currently in their career area. It would be good for students to meet people and learn firsthand what is happening in their career area. (Focus group, April 2019).

Another student shared how the STEM camp experienced increased his knowledge, “Our hands-on learning experience and knowledge gained during the one-week program was very intense. I learned so much in the week.” (Focus group, April 2019).

In the quantitative survey open-ended question eight, the *top three supports you wished you had*, participants listed increased career advising, five times as the support they wished they had.

Table 40

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
Increased Career Support	<ul style="list-style-type: none"> Counselors better understood my career area Better career counseling More career counseling Counselor better understood my career area Career counseling

n=21

Systems awareness barrier ii: Lack of information about college and transfer. The second system barrier students identified was understanding how to choose classes transfer and apply toward a specific career based major and understanding

the transfer process, including when to transfer and how to transfer can be confusing. Participants in the study identified the lack of information barrier ten times and explained how a lack of transfer knowledge impacts their ability to complete a degree. There were two common messages the participants shared: 1) students take classes they don't need; 2) students don't understand the transfer process.

Participants reported that not all classes taken counted toward transfer. Enrollment in these unnecessary classes stemmed from the need to take required prerequisites, failing to obtain proper advisement, misunderstanding the transfer course requirement, or retaking courses due to poor performance. Failing to get appropriate advisement was the more significant issue, as noted by one participant who stated, "Many students take too many classes in college, thinking that the class is important for the major without asking anyone. Or they take the class because it is fun." (Focus group, January 2019). Another participant said, "Many students before they start college don't investigate thoroughly what degrees the college offers in majors, classes, and even tutoring." (Focus group, January 2019).

Some participants took responsibility for not seeking advisement guidance, such as one who shared, "That happened to me. I have like 120 credits from Imperial Valley College." (Focus group, January 2019).

Academic requirements are different for each university, and then knowing when to transfer varies depending on university and degree program requirements. One participant reflected:

I keep going to school. I keep taking classes. I keep thinking I am going to graduate soon, and I am going to be able to transfer. But if nobody opens the gates and helps you to move to the next level, you can't get out. You keep spinning inside the system. (Focus group, January 2019).

Another respondent shared:

I am going to say; there are a lot of academic counselors that don't know what they are doing and don't explain how different universities need different courses that have us staying longer or not knowing when to transfer. (Focus group, April 2019).

In the quantitative survey open-ended question six, participants listed answers relating to a lack of knowledge as *one of their top three greatest challenges to completing a degree*. For question seven, participants listed increased knowledge three times as *one of their top three greatest supports*. In question eight of the quantitative survey, participants listed increased knowledge as *the support they wished they had*.

Table 41

Question 6

What are the top three challenges you face as you work towards completing a bachelor's degree?

Theme	Student Answers
Lack of Knowledge	Not having a clear knowledge of the university process and culture Lack of knowledge about university systems and processes

n = 21

Table 142

Question 7

What are the top three supports helping you towards completing a bachelor's degree?

Theme	Student Answers
Increased Knowledge	Student support transfer specialist Student services transfer services Counseling and college support systems

n = 21

Table 43

Question 8

What are the top three supports you wish you had to help towards completing a bachelor's degree?

Theme	Student Answers
Increased Knowledge	More access to university transfer specialist

n = 21

Awareness barrier: Self

See Barriers to College Completion Table.

Self-awareness barrier i: Uncomfortable with new experiences contributing to increased knowledge. For several of the participants, the feeling of being uncomfortable with new experiences overlapped with the students' lack of knowledge, and so it became clear the theme was a barrier for students. Participants in the study

identified feeling uncomfortable with new experiences barrier six times and explained how the dislike for being uncomfortable impacts their ability to complete a degree. There were two common messages the participants shared: 1) students struggle with being put into a new environment and do not adapt well, and; 2) students struggle with meeting and trusting any new people who are a part of the new knowledge experience.

Participants discussed the theme regarding how they felt being exposed to new experiences. One participant said:

Camp was uncomfortable because you are in a new environment, learning about a new area and new materials, and doing things we have not done or even talked or thought about before. (Focus group, April 2019).

Another said:

Having the camp in college and learning so many new things was a shock to us because we haven't been exposed or trained for anything like this, so it felt awkward, you know. We felt out of our own world. (Focus group, April 2019).

For some of the participants, the process of meeting and trusting new professors or industry leaders was a challenge. One respondent said:

In the beginning, it was hard because we did not know you and what you wanted from us. We really did not know you, and we thought, "girl, what do you want from us?" I felt like at the beginning, you were invading our space. In the beginning, it felt really strange talking and meeting you and our mentors. I thought about not coming to some of our meetings because it was uncomfortable. (Focus group, April 2019).

Another participant shared:

My lack of not talking and communicating with my mentor at the beginning wasn't because I did not have any questions, it was because I felt like I could not speak to him like a regular person like, "How are you?" I felt like everything was so formal. It felt weird. I did not feel like we could talk like, "What did you have for dinner?" And my mentor being like, "Why do you care?" So, I felt like I was imposing on my mentor and acting too friendly or invading his privacy. I did not understand this feeling was ok and how it was supposed to be. (Focus group, April 2019).

Summary of Greatest Awareness Barriers

Based on the number of responses from the participants involved in the study, two subcategories had 15 or more number of responses; lack of life and career experiences (n=36) and lack of career knowledge (n=25).

Summary of Data Analysis Research Question 1

Research Question One was: *What are the barriers to post-secondary success in first-generation Hispanic students in the desert southwest border regions as perceived by college students?*

Student participants identified their top five greatest perceived barriers to bachelor's degree completion as 1) lack of life and career experiences, 2) time management balancing school, work, and family, 3) lack of career knowledge, 4) lack of school support and 5) lack of money.

1) Lack of life, school, and career experiences: Due to the lack of life, school, and career experiences, student participants indicated several barriers to bachelor's degree completion. The taking of unneeded extra classes, not fully understanding the transfer requirements, not understanding the differences in degree types or the specific degree they needed to transfer, and not truly understanding the benefits of seeing an academic advisor early in their first year of college was referenced as a significant barrier to bachelor's degree completion. The lack of experiences also referred to as "The lack of not knowing," is at the root of the problem. The lack of life experiences also contributes to a lack of vocabulary. Students admit to being confused by college acronyms and jargon often used in college outreach presentations or by advisors. The lack of understanding makes the completion and navigation of educational systems and processes more difficult and increases students' feelings of insecurity. In turn, becomes a barrier to bachelor's degree completion.

Due to the lack of career knowledge and experience, students do not understand that completion of foundational science and math classes helps to understand work involved in the day to day life of STEM careers and how science and math classes are foundational platforms to their career goals. Students many times are not adequately prepared to commit to a STEM major because they did not take foundational science or math high school level courses needed by the major, or students wait to take the higher level of science and math classes towards the end of their second year of college. Students do not understand that science and math course prerequisites are dependent on each other. Furthermore, students do not understand science and math prerequisite

requirements limit students' enrollment to only a couple of classes per semester, delaying the transfer to a university. In many cases, the student gives up before completing the science and math sequences and do not make it to the transfer institution.

The limited opportunity for students to travel outside of the 100-mile area considered home is due to both lacking resources (money and transportation) and personal time. Student participants indicated they believe the lack of life experiences, compared to many other college students, impacts how well they perform in school, career, and life decisions. Not having significant career and life experiences entering college, students feel they need an additional semester or two before they are ready to choose a major. Describing themselves as "Inexperienced teenagers", they expressed the importance of taking classes that expanded their personal experiences rather than choosing courses leading them toward a career major. The addition of exploratory classes adding to a student's plan of study, adds extra semesters and time at the freshman/sophomore level.

Students are interested in opportunities gaining more life and career experiences and are interested in programs helping them transition from childhood to adulthood. Currently, these opportunities are difficult to find. Students acknowledge the lack of student experiences, and low vocabulary contributes to low self-efficacy impacting the perceptions of their ability to complete a bachelor's degree. Low perception of oneself increases students' anxiety, lack of vision, and low motivational drive, all impacting bachelor's degree completion.

2) Time management and balancing of school, work, and family. Based on the perception of the study's sample, the second most identified barrier or challenge to bachelor's degree completion was time management and the continuous challenge of balancing school, work, and family. Because of the lack of capital resources, many of the participants have a job or work for the family raising siblings or children. Having to balance life circumstances, challenges the student's ability to be present on campus and affects their ability to seek advisement, stay after class to ask for professors for help, and participate in student clubs or other extracurricular activities. Balancing life and work can take up most of the day, making it tough for students to find time to work in the extra time needed to attend school and study. The attempt to balance work, school, and family challenges students' ability to be present on campus, attend extracurricular events, seek advisement, and at times, interfered with classroom attendance.

The requirement to work interferes with being able to take the required classes. Due to limited sections of specific math or science course offerings, some of the only offered courses are in the mornings or middle of the day. Many times, upper-level science and math courses are rotated and not offered every semester leaving students to choose between taking the class they need to advance in their academic plan or work. In many cases, the upper-level science and math courses are only offered once a semester or once every other year, so if the student is not able to enroll and complete the class, the students must wait two or more semesters before the course is offered again all of which become barriers to bachelor's degree completion.

Because students are so involved in their family problem solving and used to navigating life on their own, students are reluctant and uncomfortable asking advisors, professors, or student services for help. Asking for help is seen as a sign of weakness. Because students are not comfortable asking for help, extra navigation time is added to find the answers. Students get stuck or are delayed in the academic system, leaving students to give up or miss deadlines making it a barrier to bachelor's degree completion.

3) Lack of career knowledge. Students find it challenging to choose a major because they do not understand or have direct knowledge relating to the career area of their choice. Students recognize that learning does not just happen in the classroom and welcome industry experiences, field trips, and networking opportunities. Limited opportunities to receive information and learn about the requirements needed to help students learn about the world of work combined with students' limited schedule increases the challenge for students to gain career knowledge. Other factors contributing to the lack of career knowledge, is their parents' lack of higher education, limiting students' ability to having access to adult industry mentors having a bachelor's degree. The extra demands to work or support the family also limit student opportunities to participate in career shadowing or internships. Having limited opportunities to increase career knowledge affected students' self-efficacy leading to personal questioning of their career goals and ability to complete a bachelor's degree.

4) Lack of school support. The first barrier identified in the area of lack of school support was inadequate advising. Barriers associated with academic advisors who provided incorrect information regarding transfer requirements or specific courses.

Academic advisors give different and even conflicting information leaving it up to the student to determine which set of information is correct. Students feel frustrated when advisors do not show support and encouragement regarding students' decisions in their degree choice or transfer institution, limiting advisement to help the student achieve their career goals.

Academic advisors not truly understanding a students' long-term career goal leads to the lack of sharing early of the course plan and other required information with students regarding degree and transfer requirements. Many times, academic advisors direct students to take extra classes not needed or miss specific prerequisites of the program interfering with bachelor's degree completion. Students are not 100% convinced that academic advisors want them to graduate and to transfer to the university. Students perceive advisors as wanting to keep them at the community college instead of helping them complete transfer coursework and transfer. Not understanding the general education courses required, or major coursework prerequisite, students perceive academic advisors as either continuing to add more classes to students' academic plan or think advisors ignore the transfer questions a student might have. The lack of support shown by academic advisors leads students to question their decisions regarding career and college goals, reducing self-efficacy and adding extra barriers to bachelor's degree completion.

Students described academic advisors only to have career advising skills in a few select career areas, i.e., nursing, criminal justice, and social work. Students believe most academic advisors know very little about technical, applied STEM degrees, and the local career opportunities available in the areas of agriculture, engineering, computer science,

and nutritional sciences were explicitly named. The lack of career advising experience leads advisors to misinform students about the courses and degrees needed to transfer and the many career opportunities available as a young bachelor's completed graduate.

The second lack of school support identified as a barrier to bachelor's degree completion was the student perception that the colleges focus more on offering remedial courses instead of upper-level classes, described more prominent in the areas of science and math. By providing limited sections or courses in the upper-level courses, students have a limited selection of course times available, reducing the opportunity of advancing through the required coursework. The closer a student gets through the upper-level community college science and math classes required as prerequisites advancing to 300/400 level, a smaller number of courses are offered and the fewer sections and times available to take the class. Therefore, increasing the time it takes to complete the classes which become a barrier to post-secondary completion.

5) Lack of money. Because of the lack of capital resources, many of the participants must work to provide for or contribute to their total family income, becoming a barrier to bachelor's completion. The majority of the student participants are Pell-eligible, indicating their family income is at or below poverty levels. Family commitments to help support the family, being pushed out of the parents' home at 18 years old due to monetary stress of the family and lack of money and impacting students' ability to get to and from campus were all identified as barriers to bachelor's degree completion. For some participants, the commitment of supporting their family from a monetary level superseded the goal of attending and completing a degree. Though the

support from family is instrumental for college success, the financial pressure the family adds to students is a barrier to the bachelor's degree attainment. Young men are expected to work. Families value having a job and working. Work is being productive and contributing; going to school is perceived by family members as being lazy by not providing to the household income. Most students shared the concern of becoming a financial burden on their families, adding to the pressure for students to work.

To summarize the overall data analysis of RQ1, the researcher provided three figures below. The first is a chart which depicts the frequency of the subcategory themes by three major construct themes. See figure 5 below.

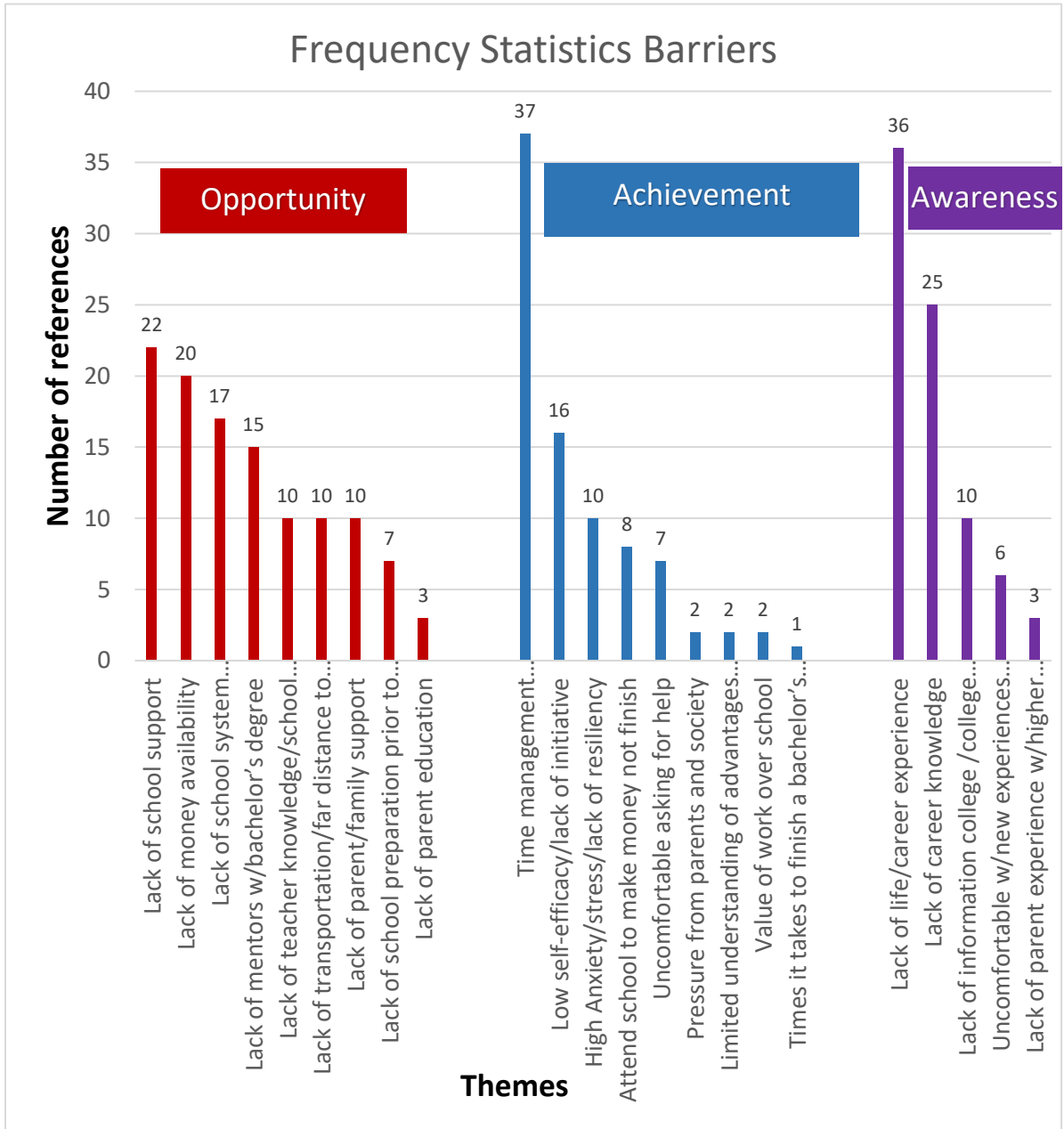


Figure 5. Frequency Statistics Barriers

The second figure is a table with a summary of the category barriers (*human, system, resource, life circumstance, and self*) and organized in ascending order of the highest frequency. I calculated the frequency using (1) the number of codes identified in each category, and (2) the number of times a category was identified or referenced by participants. Refer to the table below.

Table 44

Frequency Summary Barriers by Category

Category	Number of References
Life Circumstances Barriers	92
Systems Barriers	69
Self-Barriers	41
Resource Barriers	40
Human Barriers	39

n=24

The third and final figure is a summary of the data collected for RQ1, including the most commonly referenced barriers (including themes, categories, and subcategories) and summarized on the SCCT model figure 6. below. The dark ringed circles identify the subcategories with response rates above 15.

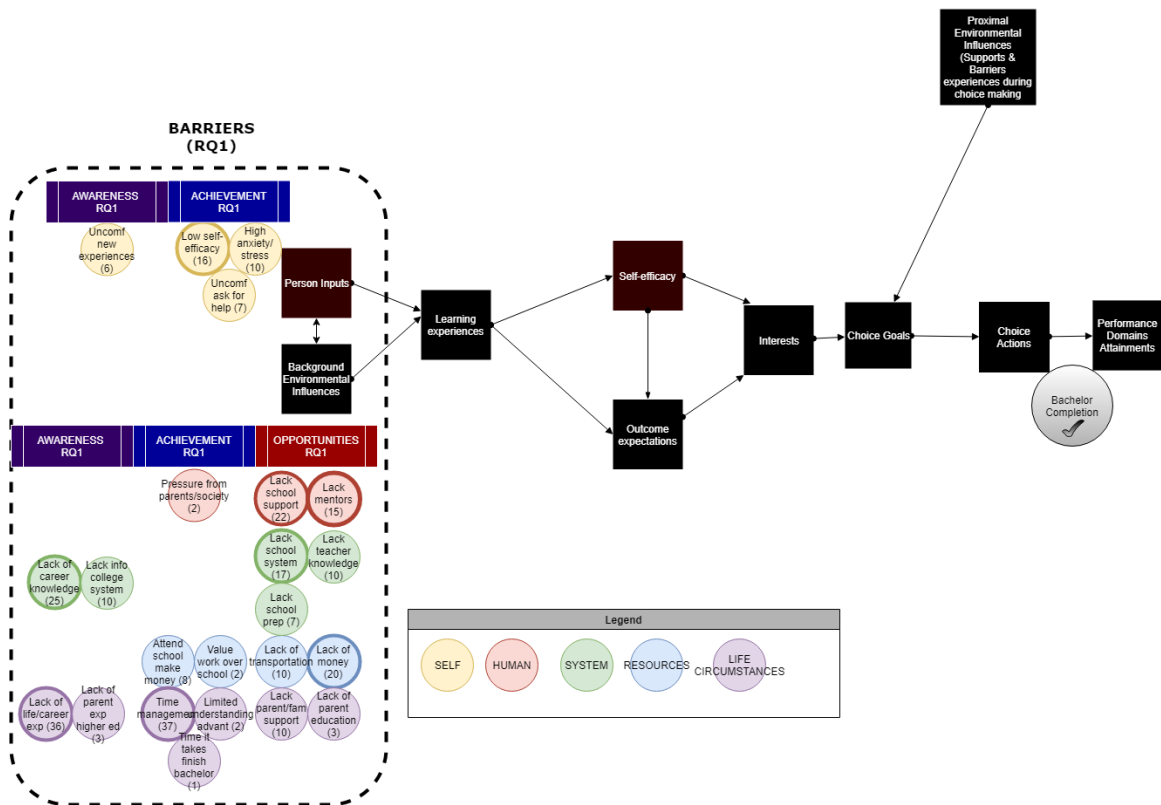


Figure 6. SCCT model Summary of data RQ1.

Findings for Research Question 2: Breaking Down Barriers to Success

Research Question 2 was: *How does participation in the “STEAM” College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor’s degree attainment?* To answer the research question RQ2, I split it into RQ2A and RQ2B. RQ2A uses qualitative coding to identify and define specific actions of *how* and *what* students learned through participation in the “STEAM” College Success Program as perceived by student experiences at camp and the mentorship program. RQ2B uses inferential statistics collected from the Perceived Barrier Survey to measure how the actions and experiences learned at the “STEAM”

College Success Program affect how students perceive barriers to post-secondary success.

RQ2A: Using Qualitative Coding to Define Student Experiences and Learning Leading to Breaking Down Barriers

I collected and analyzed qualitative coding data to answer RQ2A. The data included focus group data, survey data, essays, and student presentation data. The below SCCT model identifies where the intervention student experiences fit within the SCCT model: learning experiences, self-efficacy, outcome expectations, interest, and proximal environmental supports.

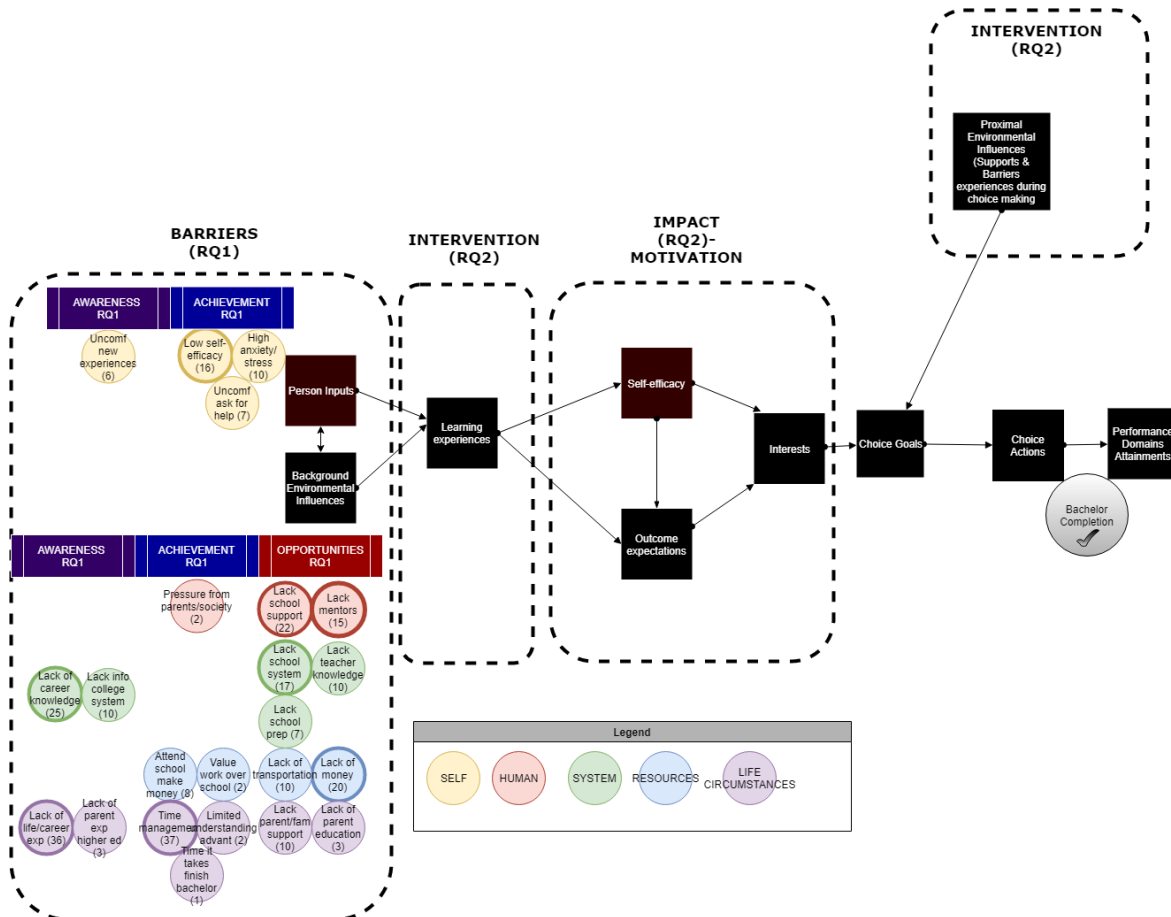


Figure 7. SCCT Model RQ2

The table below identifies the sources of qualitative data and dates collected by the researcher used to answer RQ2A.

Table 45

RQ 2 Summary of Qualitative Data Collection Events

Group	Event	<i>N</i>	Data collected
Treatment Group 1	Video	8	8/30/2019
Treatment Group 1	Essay	8	8/20/2018
Treatment Group 1	Focus group mid	7	1/19/2019
Treatment Group 1	Focus group- final	7	4/26/2019
Treatment Group 1	Survey- open ended questions	7	4/26/2019
Control Group 2 IVC	Survey- open ended questions	7	5/7/2019
Control Group 3 AWC	Survey- open ended questions	7	5/7/2019

I organized the commonly referenced points and organized into three major themes based on the three constructs: Achievement, Awareness, and Opportunity. The coded themes were then separated into nine subcategories of high impact experiences or student learning identified by participants as impactful to human, resource, self, life circumstance, or system. Once qualitatively coded, of those listed, the codes fell into only the system, humans, and self-category. I identified the categories through the coding and further separated the codes into nine subthemes. I then placed the commonly referenced themes, categories, and subcategories in ascending order of highest frequency. I calculated the frequency using (1) the number of codes identified in each category/subcategory, and (2) the number of times a category/subcategory was identified or referenced by participants. Table 46 details the themes, category, subthemes, in each category.

Table 46

Breaking Down Barriers to College Completion Success

Themes, Categories, and Subcategories	Total References
(1) Awareness Supports	147
(a) System	
(i) Increase career knowledge	107
(ii) Association school to career	2
(b) Human	
(i) Increased life/career experiences	38
(2) Opportunity Supports	110
(a) Human	
(i) Increased feeling of support	49
(ii) Increased mentorship experience	42
(iii) Increased Relationships/Friendships	19
(3) Achievement Supports	56
(a) Self	
(i) Increase self-efficacy and initiative	27
(ii) Increase interest in STEM careers	22
(iii) Increase interest in personal college success	7

n=21

Theme 1: awareness supports. The first theme is awareness. Based on the literature, the theme encompasses methods of closing gaps between what students should know to have a successful undergraduate journey. Supports included the increase of career knowledge and an increase in life and career experiences. There were two specific support categories identified, (*human and system*) and three subcategories identified by the participants in the category; an increase of career knowledge (n=107); an increase of life and career experience (n=38). There was one response mentioned two times, which I

did not include in the awareness description, which was to increase understanding of subjects learned in school to application in career. This section will summarize all frequency responses mentioned ten times or above.

Awareness supports a: Systems. See Breaking Down Barriers to College Completion Success Table.

Self-awareness support i: Increase of career knowledge. Study participants had the opportunity to experience hands-on learning during the STEAM College Success Program. Every student highlighted some of their most impactful learning experiences. A couple of the student's responses were:

“I learned about many different types of bugs, plants, and jobs we could one day apply” (Video, student 1).

“I learned about native insect species and their critical role in farming” (Essay, student 5).

“I learned about the growing practices for greenhouse plants and their maintenance” (Essay, student 5).

“I learned the Imperial Valley Irrigation District has various engineering projects relating to irrigation and water sustainability” (Video, student 6).

“I took pictures and learned about cotton that became rotten because of fungus” (Video, student 3).

“I learned about native insect species and their critical role in farming” (Essay, student 5).

“I learned the ways farmers can receive loans and how the economic systems affect the west” (Essay, student 5).

“We took samples of surfaces such as shoe soles and underarms and determined the number of bacteria present in each” (Video, student 5).

“We identified insects, collected them, and properly pinned them” (Video, student 5).

“We saw microbiology at work in UA labs” (Video, student 1).

Participants noted how these experiences impacted their ability to understand the interconnectedness of science and application to industry, and then how all are tied together to improve the world. Here are some thoughts participants shared, “Not only have I learned about agriculture in Yuma but have discovered the inner workings behind agriculture science” (Video, student 5). Another student said, “We collected and researched insects and learned about their significance whether they are invasive species that pose a threat or an indicator species that indicate the health of the ecosystem” (Essay, student 1). Another student explained:

Most importantly, we learned how each branch of agriculture worked together and how each needs each other to work together, or it would all collapse. I can now see how plant production and plant safety could change the world by saving people from diseases, producing better clothing, and improving the environment (Essay, student 4).

Students shared how hands-on learning about the application of STEAM-based sciences has helped them identify with career options. A student said:

I learned agriculture is interdisciplinary because there are different career routes you can take in agriculture. It is not just the production of crops. There is also technology involved, business, lab sciences where you work in a lab, or you can

work as a soil analyst. There are so many different things you can do in agriculture. (Focus group, April).

Another student shared, “The future of agriculture is rooted in technology and us as young people need to use our knowledge to optimize farming.” (Essay, student 6) “I believe the STEAM program is a great opportunity to gain insight into many agriculture careers” (Essay, student 4). “The STEAM summer program has been a lot of help when it comes to informing us about careers” (Video, student 4).

Awareness support b: human. See Breaking Down Barriers to College Completion Success Table.

Human awareness support i: increase of life and career experiences. A sentiment shared across most of the participants was how the STEAM College Success Program was a life-changing experience. As one participant shared, “This has been the experience of a lifetime and one I am sure I will not forget” (Video, student 7). Another student said, “This program has been by far the best experience I have had met new people, making new friends, and learning how to truly have a passion for a career and a love for agriculture” (Video, student 8). Another respondent said, “The summer STEAM program has opened my eyes to a lot of information and experiences” (Essay, student 2).

Exposure to a multitude of different career and life experiences helped students to see all the various STEAM career opportunities available to them locally. For example, one student expressed, “My experience gained through the STEAM program has given me a new perspective of agriculture and the various STEM areas that it encompasses” (Essay, student 5). Another shared, “This experience has given me an insight into how

robust the ag industry is, and how diverse the career paths are in it. If there was ever any doubt about what it takes to succeed in today's agriculture industry, this program has successfully cleared it up” (Video, student 7).

The STEAM College Success program experiences were not always easy. In many instances, students expressed personal challenges through these new experiences. One participant shared:

When I first got to camp, I thought I was making the biggest mistake of my life. What am I doing here? I don't know anything. And then, just going on the first day of field trips made me feel more at ease because I realized it was not as hard as I first made it out to be. (Focus group, April 2019).

Another student felt very similar:

At first, it was like, I don't know anything, so it is going to be hard. And then I went camping, and I learned a lot, and I continue to bring all of that with me. I think about it a lot, just basically thinking, it is good to have more exposure to things because whatever fears I might have about choosing a wrong career because I did not know about it, how it changes things, and makes me feel better. Now I know. (Focus group, April 2019).

One student shared how he felt the challenges experienced during STEAM College Success Program were worth the experience, “The STEAM camp came with many challenges and provided me with many experiences which created an excellent learning environment. Overall, I enjoyed the experience, challenge, and getting out of my comfort zone” (Essay, student 2).

Participants shared some of their favorite career and life experiences from STEAM Camp, “We made many friends and tried many new experiences” (Video, student 6). “Seeing the work being done was an interesting experience” (Video, student 3). “It was a good time staying up finishing projects or just taking a break in the lounge” (Video, student 4). “I learned that agriculture is everywhere” (Video, student 6). “What surprised me the most during the week experience was how little I knew about my own community and the career opportunities and the issues it faced” (Video, student 6). “Yes, it was only a week, but my friends and I can attest to the fact we squeezed every drop out of camp. There was nothing more we could have done” (Video, student 7).

Summary of greatest awareness supports. Based on the number of responses from the study participants, two subcategories had 15 or more responses: increase of career knowledge (n=107) and increase of career and life experiences (n=38).

Theme 2: opportunity support. Based on the literature, the opportunity theme encompasses any supports which closes the barriers and usually begin at birth, *i.e.*, race, ethnicity, social-economic status, English proficiency, community wealth, and family situations experienced by students which contribute to or perpetuate a lower education aspiration contributing to reduced bachelor’s degree attainment. There was one specific support category identified (*human*) and three subcategories identified by the participants in the category included increased feelings of support (n=49), increased mentorship experiences with those completed a bachelor’s degree (n=42), and increased opportunity to make new friendships with people interested in same interests (n=19). This section will summarize all frequency responses mentioned ten times or above.

Opportunity supports a: human. See Breaking Down Barriers to College Completion Success Table.

Human opportunity support i: increase in feelings of support. A sentiment shared across most of the student respondents was the benefit gained from more individualized help. Participants expressed their positive feelings of support through statements of gratitude. Some examples shared by student participants were, “Thank you to all involved in the camp who worked long hours to help serve and provide opportunities for those less fortunate” (Video, student 7). “I just want to thank the special group of people that worked day and night beside us to make it all possible” (Video, student 7). “We could not have done it without you” (Video, student 6). “Thank you for encouraging us to consider agriculture” (Video, student 3) .“I want to thank all the experts, interns, and mentors. More specifically, I want to thank the USDA for funding this program and the university for organizing. This has been the best experience” (Video, student 8). “I am thankful for all of the hard work that everyone has put into making this experience possible” (Essay, student 7). “I would like to thank all for allowing us to attend the STEAM program” (Video, student 3).

As some of the participants expressed their feelings of support through statements of “Thank you” and gratitude, others expressed the benefits of support through examples. One respondent described the support, “Often the instructors encouraged us to look for opportunities everywhere we went and motivated us to think about the future and how what we do today may affect tomorrow” (Essay, student 3). Another shared, “She pushed

me to set a bigger goal for myself that is special and pushed me academically” (Video, student 8).

The participant also shared how the STEAM Camp helped her to recognize all the external support she had. “Camp made me realize how many people want to help me reach my goals. The passion and support that emanates from them are proving to be a strong motivator for my peers and me” (Essay, student 4).

Human opportunity support ii: increase of mentorship experiences. The participants viewed the mentors as not only leaders in their profession, but as someone, they wanted to resemble and follow. This was expressed by a student participant who said:

I have been afforded the chance to stand next to giants in the land of agriculture. After hearing each describe their respective crafts, it is no surprise. What they do is more of an art than a set of rules. This camp has helped me learn how to stand on the backs of those that have come before me benefitting from their stories and the traditions they have passed down. Each ag leader seemed to have a natural instinct for implementing unorthodox methods and continue to raise the standards for each generation past (Essay, student 7).

Another participant shared, “Dr. Discua opened my eyes to not only new information but ideas and how those ideas can be applied to many aspects of my own life” (Video, student 8).

The majority of the study participants shared how the mentorship experience increased their feelings towards learning and motivated them to focus on their degree and

college success. This was highlighted by one student who shared, “The experience and educational journeys shared by local young professionals in agriculture have encouraged me to continue with my education” (Essay, student 6). Another participant echoed this remark by sharing, “Meeting with the mentors helped to create an idea of just how big a career opportunity in agriculture there was and the importance of a degree” (Video, student 8).

A sentiment shared across most of the participants was how they could not believe they had the opportunity to work and share experiences with the industry mentors. The disbelief was highlighted by a participant who shared:

I can’t believe I am riding in a bus full of students from throughout the region, touring, and getting one-on-one time with some of the most influential people and organizations in US agriculture (Essay, student 7).

Student participants enjoyed getting to hear the mentor’s personal stories, which lead them into their careers. This was expressed by one student who described the experience,

The guest mentor speakers told us of the lessons they learned, and all the trials they endured that led them to the success they’ve achieved in their careers (Essay, student 3).

Another student spoke more specifically about individual mentors and how their personal story impacted them directly. “We met a man named Gary Ray, the owner of a transplant company. He shared stories with us about how he built the company from the ground up and genuinely loved his job” (Video, student 1).

Human opportunity support iii: increase in new friendships and relationships. Though students each had childhood friends and contacts, respondents saw a benefit for meeting new friends who share a common interest in STEM careers. For example, one participant expressed, “I enjoyed learning about agriculture sciences alongside the other students sharing the same interest as I do” (Video, student 8). Another said, “From first starting, we were strangers, but with every van ride and lesson, we grew closer and closer and built friendships along the way” (Video, student 4). Another participant commented, “Within a few hours and a meal or two, you could hear the life in the conversations we were having discussing our newly shared interest” (Essay, student 6).

Creating new individualized relationships with camp leaders, new friends, and industry professionals inspired students to be successful in college. As one respondent expressed,

The camp experience taught me how interconnected we all are and how relationships with others can increase my chances for bachelor's degree completion and career success (Essay, student 7).

Another student shared, “This program has been by far the best experience, meeting new people, making new friends has inspired me to succeed” (Video, student 8). Students described their experiences regarding friendships and The STEAM College Success Program, they said, “We made so many friends” (Video, student 5). “My friends and I squeezed every last drop out of camp” (Video, student 7). “As a part of the USDA STEAM program, my friends and I had a blast” (Essay, student 4).

Summary of greatest opportunity support. Based on the number of responses from the study participants, three subcategories had 15 or more responses: increase feelings of support (n=49), increased mentorship (n= 42), and increased relationships/friends (n=19).

Theme 3: achievement support. Based on the literature, the theme encompassed supports which close the gaps for any significant and persistent disparity in academic performance, self-efficacy, or educational attainment experienced by students and contributing to or perpetuating lower education aspiration contributing to reduced bachelor's degree attainment. Specific educational support themes identified by the participants in this category include positive self -efficacy/personal motivation (n=27), declare a STEM major and complete degree (n=22), and students' personal identification to college success (n=15). The following section will summarize all frequency responses mentioned ten times or above.

Achievement supports a: self. See Breaking Down Barriers to College Completion Success Table.

Self-achievement support i: an increase in self-efficacy and personal motivation. Study participants perceived that the STEAM College Success Program increased their personal motivation by helping them to confirm their career goals. The increased motivation was highlighted by one student who shared, "During the STEAM camp experience, it confirmed my interest and passion for agriculture and science." (Focus group, April 2019). Another participant echoed the position by stating, "I am

positive that agriculture is the right path for me and will allow me to achieve success and happiness in my life.” (Focus group, April 2019).

Participants of the STEAM College Success Program also shared their vision of a more proactive approach in actively moving toward their own bachelor’s degree attainment and career success, noting:

I learned it is not enough to just pass the class, but rather it is important to apply ourselves in a manner that develops a go-getter attitude in work ethic and cultivate relationships with connections in industry and workplace. This is one aspect that we are now miles ahead of the pack (Video, student 7).

Another participant shared:

Not only did it test us, but it caused us to draw a line in the sand and prove to ourselves what lengths we are willing to go in the pursuit of our goals. Forever this trip will serve as a milestone to look back on (Essay, student 7).

Participants viewed the STEAM College experience as one that helped them identify the career, they pictured themselves successfully pursuing. For example, one participant said:

After collecting insects at the Colorado River, I felt as though something I did not know was missing from my life had been found and placed back in the proper position. I was truly able to envision myself as a scientist, working alongside other "weird girls" that simply loved what they were doing (Essay, student 1).

Another participant shared their perspective:

Gary made an impact on me with his passion and made me want to have the same passion for my career. I feel I truly have a passion and a love for agriculture and can see myself working in it (Video, student 8).

A participant realized the importance of keeping momentum and the continued movement toward their goal of graduating with a bachelor's degree and shared:

Though the collective process may feel endless and impossible at times, it is important that I do not solely focus on the whole, but rather concentrate on one part at a time to avoid feeling overwhelmed (Essay, student 1).

Another student explained:

The principle of momentum, however simple, can have great beneficial impacts on a person's life. This is precisely what I feel about this year's STEAM Summer Residential program. This program gave me the tools to achieve my goals (Essay, student 4).

Students expressed the importance of seeing themselves working in their chosen career area. The mentors helped the students understand the importance of keeping the momentum going regarding the movement in their academics toward their career goals.

Achievement supports a: self. See Breaking Down Barriers to College Completion Success Table.

Self-achievement support ii: Increase in personal determination to declare a STEM major and complete a bachelor's degree. Identifying a career goal and corresponding major is not an easy thing for a college student, yet many of the participants expressed how the STEAM College Experience helped them increase their

determination to declare a STEM major and complete a bachelor's degree. For example, one participant said:

As the week went by and I experienced the many agriculture career options and the importance of feeding the US and world, I decided I am determined to pursue an environmental science degree with an emphasis on entomology and conservation biology (Video, student 5).

Another student shared:

I see agriculture as not just growing plants but as a movement for a big cause that can improve the environment of the earth and for all living beings. I am determined to complete my degree and become part of this movement (Essay, student 8).

Many of the student participants of the STEAM College Success Program, made statements regarding the certainty of selecting their career plan. Students said, "Before camp, I had no ag background and was majoring in languages now I see how a career in agriculture is for me" (Video, student 3). Another said, "Because of this camp, I figured out the career I want to pursue and science major I needed" (Video, student 3). These two students shared, "I see myself entering the nursery business in my future, and I can see it as a future career" (Video, student 4). "A plant grower and a farm manager are two fields I could see myself working after I complete my degree. I am positive that agriculture is the right path for me and will allow me to achieve success and happiness in my life" (Video, student 3).

One of the student participants pointed out being successful is not only about learning about careers but learning how to use the college system and understand the importance internships play in helping to accomplish postsecondary goals:

I also learned how to develop an academic plan on how to achieve these types of careers, complete an associate degree in Agriculture Technology & Management, complete a bachelor's degree in Agronomy, while interning at a greenhouse, farm, or the UC extension service (Essay, student 4). (The University of California serves every county in California working with farmers to implement more efficient growing methods and solve pest problems. The office the student is referring to is in Holtville, California.)

Another said, "During the camp experience, we learned how to make an actual job resume, and learned how to apply for federal jobs. I feel so much more confident" (Essay, student 4).

Summary of major finding qualitative data analysis research question 2-A.

Research Question Two was: How does participation in the "STEAM" College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor's degree attainment?

Based on the number of responses from the study participants, three subcategories had 15 or more number of responses: increased self-efficacy (n=27), increased interest in STEM careers (n= 22), and an increase in the personal interest of college success (n=15).

Major findings for RQ2-A include 1) Student experiences increasing career knowledge. The innovation of the study provided students with information designed to

help them learn about specific activities and science involved in the world of work. Students want to learn about the details required in the day-to-day career activities. Students recognize that learning does not just happen in the classroom and welcomed industry experiences, field trips, and networking opportunities. The innovation increased the treatment group's opportunities to receive information, learn about the requirements needed to help students learn about the world of work, and gave the students examples of practical applications involved in their selected STEM career.

Experiential learning helped students to assess the ease or difficulty they might expect when learning about what would be required to work in their STEM chosen field. The study indicated early college level students need and welcome opportunities to investigate their skills and abilities and assess what is required for their chosen area of work. By providing hands-on learning and opportunities to practice, students were involved and active in exploring their commitment to their career goals, ultimately increasing their desire to complete their bachelor's degree. By exploring details of their future occupation, students were better able to view themselves working in their chosen STEM field, make better and more detailed career choices relating to their college completion, and in course planning and increase their commitment and dedication to pursue a STEM degree.

2) Based on the perception of the studies sample, it is crucial to provide students with information, college and career support, industry mentors, and easy access to other students interested in the same career field. The extra support students want, helps to counteract inaccurate beliefs of barriers and provides students the support they may not

be able to get from their parents or other adults who do not possess the career and college experience. Students want to be surrounded by people who can fill their knowledge gap relating to specific career choices and assist in the decision-making processes of college, leading students to degree completion. The innovation provided ten months of small group guidance and offered many opportunities for both industry professionals and students to support each other through the process of career formation and college completion toward upper-division major requirements and transfer.

3) Students want to be connected to adults and industry professionals who have similar backgrounds, stories, and challenges as they do. The intervention emphasized the importance of work by introducing students to many industry speakers, mentors, and facilitators allowing students to develop personal relationships and models. Students indicated the importance of networking and having mentors work side by side with them to set goals and prepare for the workforce. Students expressed how they enjoyed seeing and hearing their mentor's passion regarding work. It was the mentor's passion and support motivating students to follow in their footsteps in both the career area and degree completion.

4) Increasing the students' experiences expand the students' views on life and career. Students have a preconceived idea of the career areas they want to pursue based on the things they have read about, seen, or heard from others. Based on the perceptions of the study, students need more than exploration through books, lectures, or computers. Students expressed excitement and motivation in the opportunity to increase their experiences regarding career and life. New experiences reduced students' speculation

regarding professional adult life, work requirements, and working conditions. The camp provided an opportunity for students to live on their own, manage their own money, investigate the nature of the work they want to pursue, and better understand the qualifications and educational requirements or special skills required. Increasing students' exposure to the vast amount of potential job opportunities provided a real career exploration experience exposing students to a glimpse of what their life might look like as an educated adult. It also helped students to begin focusing on their aspirations for later in life and to design a plan of how they are going to get there. The experiences of the innovation also helped reduce students' anxiety and self-doubt they had regarding their ability to reach and work in their career selected area.

5) The intervention increased self-efficacy and personal initiative. The “STEAM” College Success Program increased how students perceive themselves in selecting career goals, in their ability to complete a STEM degree, and how they see themselves as professionals in the industry. Students gave examples of how the innovation increased their confidence by reaffirming their love and passion for their selected area of work. Students were able to provide examples of how the innovation impacted their personal growth through experiential learning and accomplishments including: enduring long and hot 117+ degree Fahrenheit days in the field, public speaking, meeting and networking with new people, creating a YouTube video summarizing their experiences, and setting aside valuable time to meet regularly and shadow their mentor over the academic school year.

Completing the “STEAM” College Success Program was not easy and challenged

the students in many ways. The results indicated there was not one item alone, which contributed to the increase in self-efficacy, but the entire ten-month experience of the innovation showed students their potential for both career success and bachelor's degree completion. Hope is associated with self-efficacy. Through successful participation in the many activities involved in the innovation, the student's vision and hope for their future increased their motivation to reach the goals they set for themselves.

To summarize the qualitative overall data analysis of RQ2, I have provided three figures below. The first is a chart which depicts the frequency of the subcategory themes by three major construct themes.

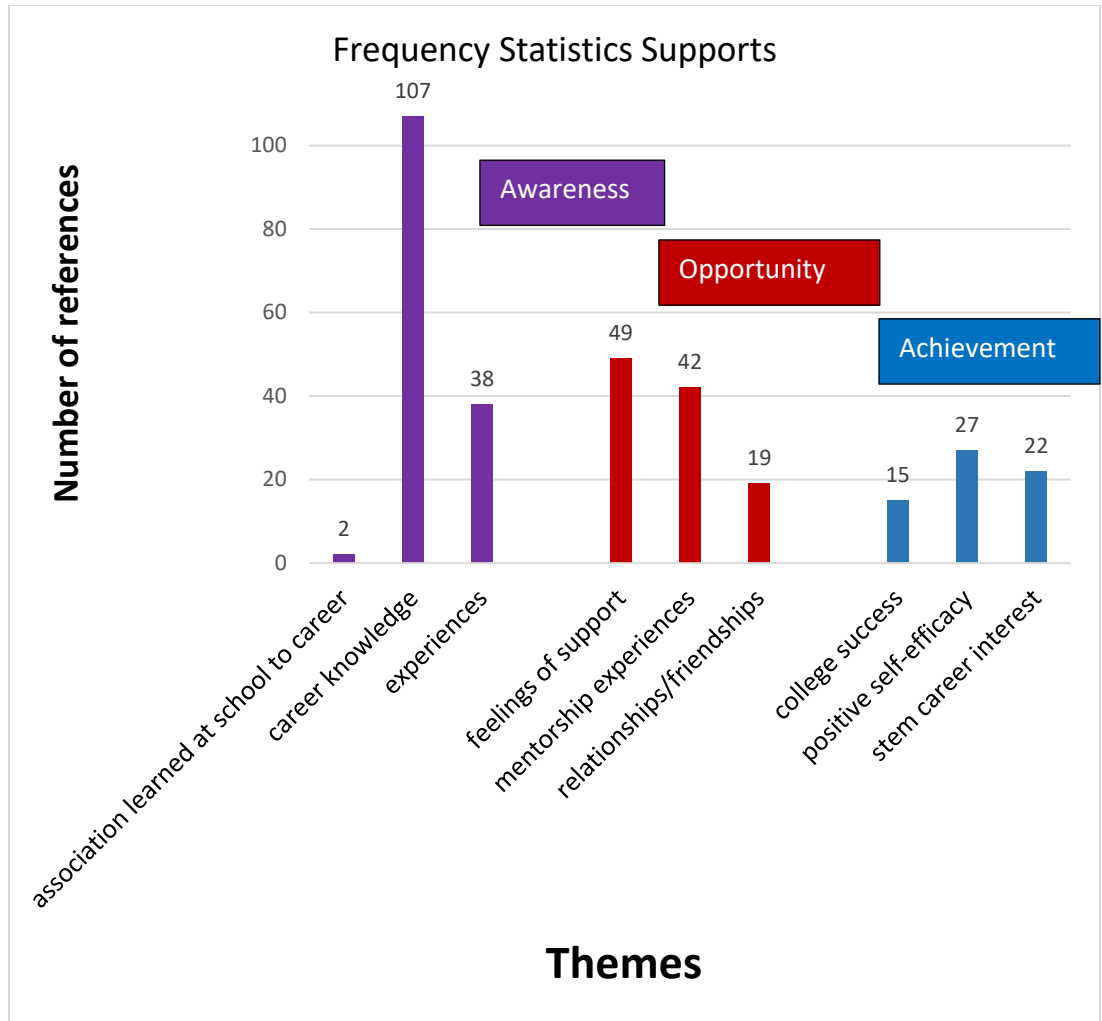


Figure 8. Frequency Statistics Supports.

The second figure is a table that summarizes the category supports (*human, system, and self.*) All were organized and placed in ascending order of the highest frequency. I calculated the frequency using (1) the number of codes identified in each category, and (2) the number of times a category was identified or referenced by participants. Details of the findings are below.

Table 47

Summary Supports Reducing Perceived Barriers by Category

Category	Number of References
Human Supports	148
Systems Supports	109
Self Supports	56

n=21

The summary are the commonly referenced supports for RQ2A, (including themes, categories, and subthemes) on SCCT model below. The dark ringed circles identify the subcategories with response rates above 15.

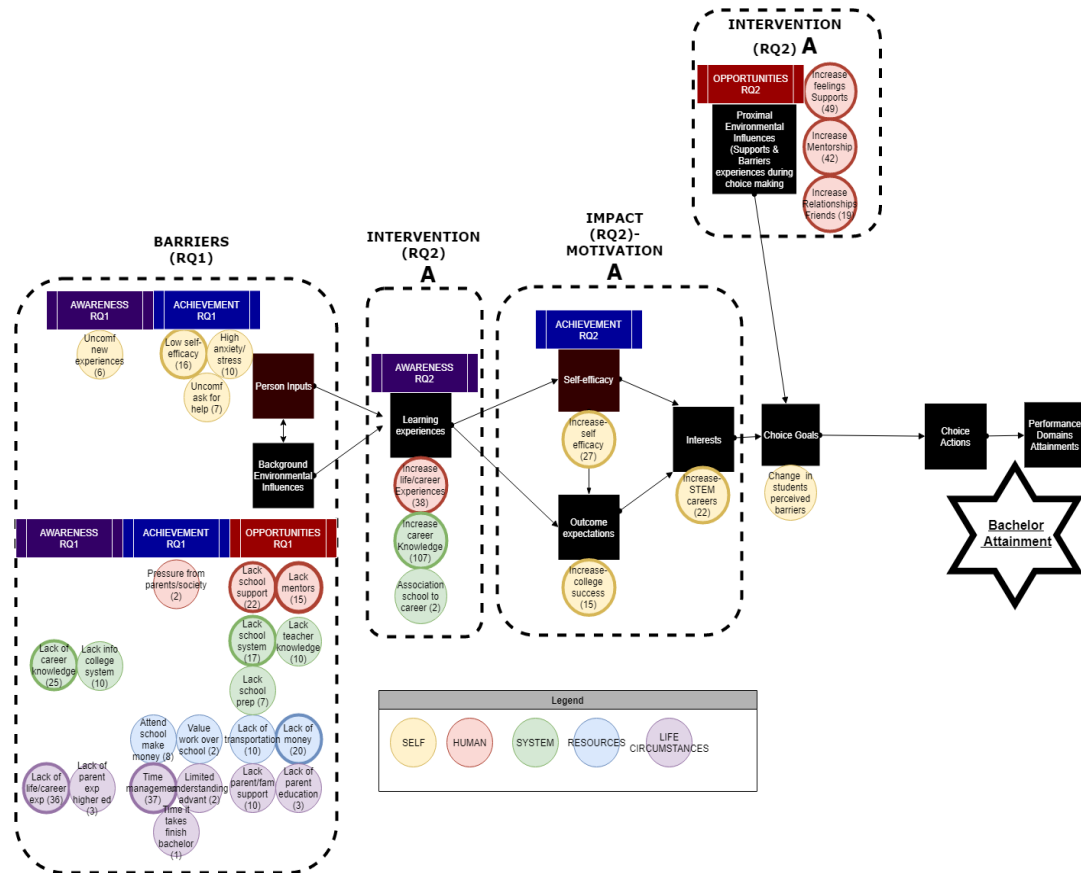


Figure 9. SCCT model Summary of Qualitative Data RQ2A.

Major Findings for RQ 2 B. Perceived Barriers to Success Quantitative Results

Research Question Two was: *How does participation in the “STEAM” College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor’s degree attainment?*

RQ2B uses inferential statistics collected from the Perceived Barrier Survey to measure how the actions and experiences learned at the “STEAM” College Success Program affect how students perceive barriers to post-secondary success. The research question addresses the student’s choice of goals in the SCCT model below.

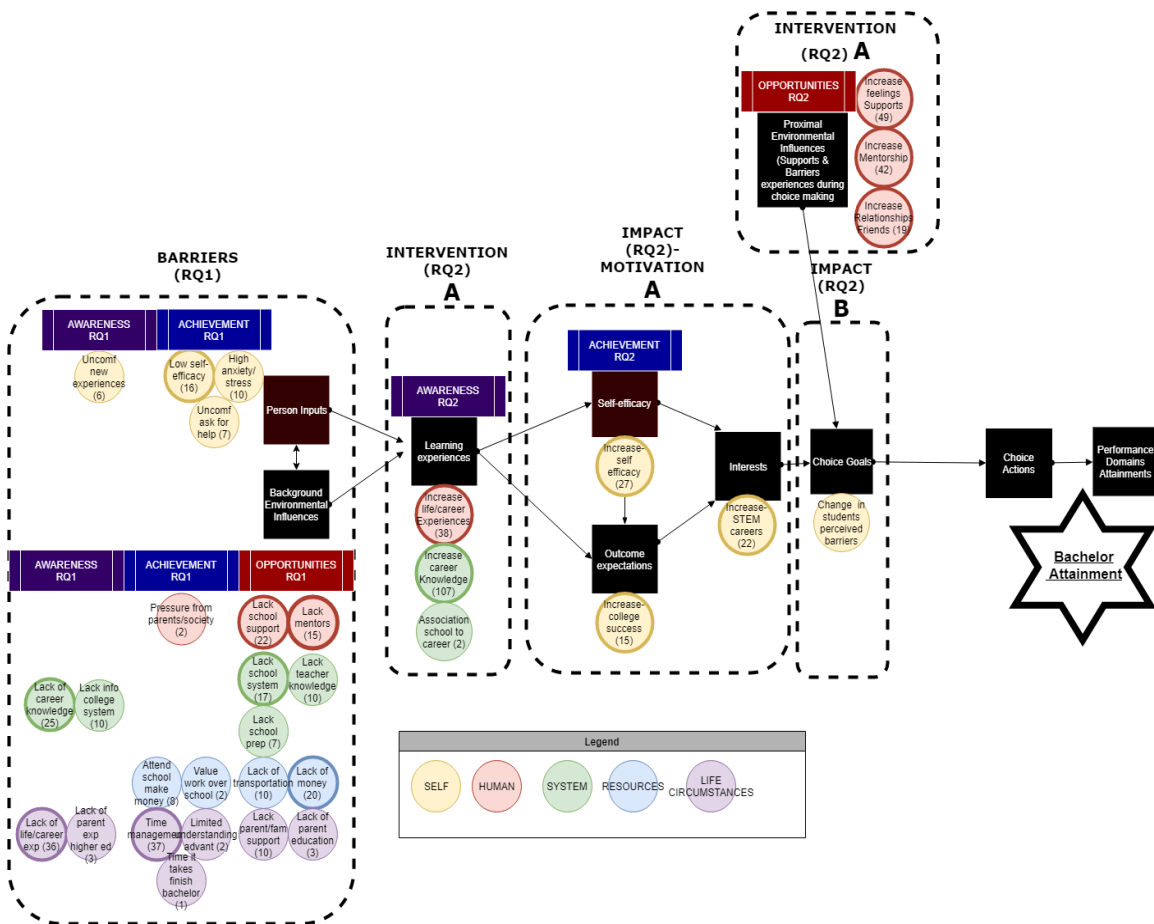


Figure 10. SCCT Model RQ2B

RQ2B is answered using descriptive statistics from the results of the

retrospective- pre, and post- perceived barriers survey and includes survey results from the seven participants of the innovation (treatment group 1) and two sets of controls: Imperial Valley College (control group 2) and Arizona Western College (control group 3). I collected the survey data using a handout paper-based survey. Once collected, I entered the data into an Excel spreadsheet and then transferred it into the Statistical Package for Social Science (SPSS) for analysis. The survey measured perceived barriers, and the questions divided into three different constructs: Q2. (1-22) *Achievement*, Q3 (1-10) & Q4.(1-10) *Opportunity*, and Q5.(1-20) *Awareness*.

Table 48
Instrument Details by Construct

Construct	Total number of questions	Instrument Questions
Achievement	22	Q2 (1-22)
Opportunity	10	Q3 (1-10)
	10	Q4 (1-10)
Awareness	10	Q5 (1-10)

Questions with negative wording within the perceived barriers survey were reverse coded (1-5 to 5-1) to increase the values of consistency. See APPENDIX L.

I presented the results from the quantitative analysis in two portions: RQ2B-1 comparing individual survey questions pre- and post- by construct and group and RQ2B-2, comparing each of the three construct means (*Achievement, Opportunity, Awareness,*) pre-post-, by the group.

RQ2B-1 comparing of perceived barrier survey questions pre-post using paired sample t-test and *r*². RQ2B-1 uses paired sample t-tests to determine if, for each

question, the mean difference score (post-intervention score minus pre-intervention score) for all participants in the study is statistically different from zero using the null hypothesis $H_0: \mu_{diff} = 0$. If the intervention (treatment) is not effective, some participants may have difference scores that are positive, others may have difference scores that are negative, and some may have difference scores that are zero. When averaged over all individuals, the mean difference score will be close to zero, and H_0 cannot be rejected. On the other hand, if the treatment is effective, then most difference scores will be greater than zero, and when averaged over all individuals, the mean difference score will be statistically greater than zero. In this case, H_0 will be rejected in favor of the alternative hypothesis, $H_1: \mu_{diff} \neq 0$ or $H_1: \mu_{diff} > 0$. Once I compared each question and the questions with significant results identified, an r^2 was calculated to measure the effect size; that is, the proportion of the variability in the data attributable to the treatment.

A paired sample t-test was used to compare the retrospective difference in the pre-test scores with the corresponding post-test scores of Perceived Barrier Survey and used to evaluate how students perceived barriers influences and support impact bachelor's degree completion. A paired sample t-test assumes a random selection of two numerical values measuring the same characteristic on the individual, under the null hypothesis, $H_0: \mu_{diff} = 0$, with μ_{diff} representing the mean difference of the Post-intervention score minus the Pre-intervention score for all individuals for each question. All t-tests were two-tailed, leading to the alternative hypothesis $H_1: \mu_{diff} \neq 0$. The questions on the Perceived Barrier Survey were divided into the three constructs: Achievement = Q2(1-22), Opportunity = Q3(1-10) & Q4(1-10), and Awareness = Q5(1-10). Additionally, to further assess the

effect of group membership (Treatment, IVC control, and AWC control) for each construct, Analysis of Variance (ANOVAs) were performed using the difference scores as the dependent variable and the group membership as the independent variable. Results that significant at the $p < 0.01$ level represent 99% certainty and those that are significant at the $p < 0.05$ level represent 95% certainty the innovation did make a difference indicating (resulting in rejection of the null hypothesis of no difference group means corresponding to difference scores, or $H_0: \mu_{\text{diff treatment}} = \mu_{\text{diff control IVC}} = \mu_{\text{diff control AWC}}$)

To measure the effect size of the treatment for each question, r^2 , (or the coefficient of determination), was calculated by:

$$r^2 = \frac{t^2}{t^2 + d.f.}$$

In the case of statistical measure, r^2 is the proportion of variability in the data to the treatment (based on the difference scores) and is often explained as a percent. If there is no treatment effect, as expected in the control group, the r^2 should be low, near 0. If there is a significant treatment effect, the r^2 should be high, close to 1.0 or 100%. Stronger treatment effects will yield a higher r^2 .

In the case of an ANOVA, the statistical measure, η^2 , is the proportion of variability in the data attributable to the treatment (based on the difference scores) and is often expressed as a percent. If there is no treatment effect, as expected in the control group, the η^2 should be low, near 0. If there is a significant treatment effect, the η^2 should be high, close to 1.0, or 100%. Stronger treatment effects will yield a higher η^2 .

η^2 is calculated by $\eta^2 = \frac{SS_{between}}{SS_{total}}$ where SS= Sum of the Squares of the

difference scores from the ANOVA table.

***r*² and η^2 Tables**

0.01 < r^2 < 0.09 → small treatment effect

0.09 < r^2 < 0.25 → medium treatment effect

0.25 < r^2 → large treatment effect

* Note: the same table corresponds to η^2 (Eta-squared)

Results of RQ2B-1 construct achievement comparisons. By group, the innovation effects were measured by comparing the mean of the different scores (difference scores=Post scores- Pre scores) to zero for all individuals providing answers to each *Achievement* question Q2(1-22). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected (p<0.05).

Treatment group 1 achievement. After the intervention, pre-posttest comparisons indicate improvements in the Treatment group 1 *Achievement* construct, as well as a significant improvement on 16 of the 22 *Achievement* construct questions, which are indicated by significant levels (p<0.05). There are 11 of the 22 total achievement construct questions having significance levels (p<0.01) indicating there is a less than 1% chance of obtaining a mean difference score observed in our sample for each question if the null hypothesis were true.

For Treatment group 1 *Achievement* r^2 values, all 16 questions demonstrated a large treatment effect size r^2 =above .25 large. (See Table 49 in APPENDIX P.)

Major findings 1. Achievement construct questions Q2(1-22).

Treatment group 1. After the innovation pre-post-test, comparisons indicate improvements in Test group 1 *Achievement* construct, as well as a significant improvement on 16 of the 22 *Achievement* questions, having significance levels ($p < 0.05$) indicating there is a less than 5% chance of obtaining a mean difference score observed in our sample for each question if the null hypothesis were true. Hence the intervention, or treatment, was successful in the “STEAM” College Success Program.

For Treatment group 1 *Achievement*, r^2 for all 16 questions demonstrated a large treatment effect size ($r^2 > .25$).

Treatment group 1 reported a significant change in feeling comfortable living on their own and their ability to complete a university admissions application. They also reported a significant increase in their ability to apply for transfer scholarships. In contrast, in the comparison of the mean difference pre-posttest, Treatment group 1 student showed no significant improvement in understanding the importance of bachelor’s degree completion and indicated their motivation to complete a bachelor’s degree did not have a significant change pre-test to post-test.

Another examination of Treatment group 1, is mean difference pre-post-test and effect sizes using r^2 . Students reported a significant change in feeling more comfortable speaking in public, reported a significant change in the number of connections they have within local industry, and showed a significant change in understanding the importance

of exposing themselves to as many educational and industry experiences as they can. All three of these were significantly correlated with each other comparing Treatment group 1 retrospective scores for Q2(4) ($p=.000$ & $r^2=.89$), Q2(14) ($p=.000$ & $r^2=.89$), and Q2(15) ($p=.000$ & $r^2=.89$). However, the same Treatment group 1 students reported they did not experience a significant change in feeling prepared to apply for a college internship. The feelings of not being prepared might be due to a student's lack of experience and knowledge. Though the innovation increased student experiences and knowledge regarding the world of work, it also pulled back the curtain regarding internship requirements in both content knowledge and the amount of time needed to be dedicated to the internship, leaving students to question their readiness.

Treatment group 1 also showed a significant change in their ability to handle change, their resourcefulness, and their innovativeness. All three of the items significantly correlated with the Test group 1 retrospective scores for questions Q2(01) ($p=.018$ & $r^2=.64$), Q2(20) ($p=.018$ & $r^2=.64$), and Q2(21) ($p=.018$ & $r^2=.64$). However, I found no significant improvement in Treatment group 1 students' self-motivation or resiliency.

Treatment group 1 students showed a significant change in knowing what they wanted as a career, the steps they needed to complete to get there, and meeting with an academic advisor. All three questions related were significantly correlated with the group 1 retrospective scores of Q2(10) ($p=.002$ & $r^2=.82$), Q2(11) ($p=.002$ & $r^2=.82$), and Q2(19) ($p=.002$ & $r^2=.82$).

Treatment group 1 students also showed a significant change in their ability to seek help and in their ability to manage time. Both questions related significantly correlated with the Test group 1 retrospective scores of Q2(06) ($p=.004$ & $r^2=.78$) and Q2(12) ($p=.005$ & $r^2=.75$).

Control group 2 IVC achievement. Control group 2 IVC innovation effects were measured by comparing the mean of the difference scores (difference scores=Post scores- Pre scores) to zero for all individuals providing answers to each Achievement question Q2(1-22). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p<0.05$).

Pre-post-test comparisons indicate no significant improvements in the Control group 2 IVC *Achievement* construct. None of the pre-post- questions showed significant improvement on *Achievement* Construct questions indicated by significant levels above ($p<0.05$).

Control group 3 AWC achievement. Control group 3 AWC innovation effects were measured by comparing the mean of the difference scores (difference scores=Post scores- Pre scores) to zero for all individuals providing answers to each Achievement question Q2(1-22). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p<0.05$).

Pre-post-test comparisons indicate 2 of the 22 questions, (Q2.12 and Q2.14) shows significant improvements in Control group 3 AWC *Achievement* construct

indicated by significant levels above ($p < 0.05$). Effect size, r^2 for two questions, demonstrated a large treatment effect size ($r^2 > .25$).

Table 50

*Control Group 3 AWC Differences for Achievement Q2(1-22) Questions
Pretest and Posttest Scores*

Characteristic	Pre		Post		<i>t</i> (6)	<i>diff</i>	<i>p</i>	r^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Q2.12 I seek help quickly	3.28	.95	4.43	.79	2.83	1.14	.030*	.57
Q2.14 I feel comfortable speaking in front of others	3.28	1.11	4.43	.53	3.36	1.14	.015*	.65

Note. * $p = < 0.05$ $df = 6$

The evidence of the survey test data by question suggests that the “STEAM” College Success Program had a highly significant impact on the *Achievement* construct questions.

Results RQ2B-1 construct opportunity questions comparisons. By group, the innovation effects were measured by comparing the mean of the different scores (difference scores = Post scores - Pre scores) to zero for all individuals providing answers to each *Opportunity* question, Q3(1-10), and Q4(1-10). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p < 0.05$).

Treatment group 1 Opportunity. Treatment group 1 innovation effects were measured by comparing the difference in mean scores between pre- and post- answers to each *Opportunity* question, Q3(1-10) & Q4(1-10). After the innovation, pre-posttest

comparisons indicate some significant changes in the Treatment group 1 *Opportunity* construct. Of the 20 questions, three showed significant improvements between the pre-post- scores. *Opportunity* construct questions indicated by significant levels ($p < 0.05$) are questions Q3.2, Q3.4, and Q4.10. All three are ($p < 0.05$) range indicating the effectiveness of the treatment intervention. For Treatment group 1 *Opportunity* effect size r^2 values, all three of the questions with significance also had an $r^2 =$ above .25 a large effect size, which indicates the means of the pre-post- question scores are very different. (See Table 51 in APPENDIX Q.)

Major findings 2. Opportunity construct questions Q3(1-10) & Q4(1-10).

Treatment group 1. After the innovation, pre-posttest comparisons indicate some significant changes in the Test group 1 *Opportunity* construct. Of the 20 questions, three questions showed significant improvement levels ($p < 0.05$), Q3(2), Q3(4), and Q4(10). For Treatment group 1 *Opportunity* effect size r^2 values, all three of the questions with significance also had an $r^2 > .25$, a large effect size which indicates the effectiveness of the treatment.

As an examination of Treatment group 1, *Opportunity* construct questions, I found there were three significant changes the students attending the “STEAM” College Success Programs made. The first was the students’ increase in their understanding regarding the benefits of completing college. The second was the improvement in understanding how to complete the online FASFA application. The third significant change caused by the innovation was an increase in understanding regarding what is

expected in college. All three of these improvements impacts perceptions regarding bachelor's degree completion.

Control group 2 IVC opportunity. Control group 2 IVC innovation effects were measured by comparing the mean of the *Opportunity* different scores (difference scores=Post scores- Pre scores) to zero for all individuals providing answers to each question Q3(1-10) and Q4(1-10). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p < 0.05$).

Pre-post- test comparisons indicate no significant improvements in Control group 2 IVC *Opportunity* construct questions indicated by significant levels above ($p < 0.05$).

Control group 3 AWC opportunity. Control group 3 AWC innovation effects were measured by comparing the mean of the *Opportunity* different scores (difference scores = Post scores- Pre scores) to zero for all individuals providing answers to each question Q3(1-10) and. Q4(1-10). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p < 0.05$).

Pre-posttest comparisons indicate no significant improvements in Control group 3 AWC *Opportunity* construct questions indicated by p-values above the level of significance ($\alpha < 0.05$).

The evidence of the survey test data by question suggests that the “STEAM” College Success Program had some significant impacts on the *Opportunity* construct questions

Results RQ2B-1 construct awareness questions comparisons. By group, innovation effects were measured by comparing the mean of the different *Awareness* scores (difference scores=Post scores- Pre scores) to zero for all individuals providing answers to each question Q5(1-10). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p < 0.05$).

Treatment group 1 awareness. Treatment group 1 innovation effects were measured by comparing the difference in mean scores between pre- and post- answers to each *Awareness* question Q5(1-10). After the innovation, pre-post-test comparisons indicate some improvement in the Treatment group 1 *Awareness* construct. Of the ten questions, 2 showed significant improvements between the pre-post- scores. *Awareness* construct questions indicated by significant levels ($p < 0.05$) are questions Q5.6 and Q5.7. Both have significance p scores ($p < .05$) range, indicating there is a 95% certainty the correlations between each pre-post question scores are due to the treatment of the innovation. For Treatment group 1, *Awareness effect size* r^2 values, both questions with significance also had an r^2 =above .25 a large effect size, indicating the means of the pre-post- question scores are very different. (See Table 52 in APPENDIX R.)

Major findings 3. Awareness construct questions Q5(1-10).

Treatment group 1. After the innovation, pre-posttest comparisons indicate some improvement in the Treatment group 1 *Awareness* construct. Of the ten questions, 2 showed significant improvements ($p < 0.05$) between the pre-post- scores, Q5(6), and Q5(7). For Treatment group 1, *Awareness effect size* r^2 values, both questions with

significance also had an r^2 =above .25 a large effect size indicating the effectiveness of the treatment.

As an examination of Treatment group 1, *Awareness* construct questions, students reported a significant change in understanding the importance of increasing their personal experiences, increasing their college success. Treatment group 1 also indicated a significant change in how they viewed internship experiences and the importance of being involved in clubs, school groups, and activities and how increasing these experiences increases success to bachelor's completion. Due to the "STEAM" College Success Program, students better understand how increasing experiences increases success to bachelor's completion.

Control group 2 IVC awareness. Control group 2 IVC innovation effects were measured by comparing the mean of the difference scores (difference scores=Post scores-Pre scores) to zero for all individuals providing answers to each *Awareness* question Q5(1-10). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p < 0.05$).

Pre-post-test comparisons indicate no significant change in Control group 2 IVC or Control group 3 AWC in the *Awareness* construct questions indicated by significant levels above ($p < 0.05$).

Control group 3 AWC awareness. Control group 3 AWC innovation effects were measured by comparing the mean of the difference scores (difference scores = Post scores-Pre scores) to zero for all individuals providing answers to each *Awareness* question

Q5(1-10). Under the null hypothesis $H_0: \mu_{Diff} = 0$. When a treatment is significant, the mean of the difference scores, μ_{Diff} , is expected to be significantly different than 0, and hence the null hypothesis would be rejected ($p < 0.05$).

Pre-posttest comparisons indicate no significant change in Control group 3 AWC in the *Awareness* construct questions indicated by significant levels above ($p < 0.05$).

The evidence of the survey test data by question suggests that the “STEAM” College Success Program had a significant impact on some of the *Awareness* construct questions.

Conclusions RQ2B-1. In summary, the evidence of the survey test data by question suggests that the “STEAM” College Success Program had a highly significant impact on the *Achievement* construct, followed by *Opportunity*, and then *Awareness*

Part RQ2B-2. Comparing constructs (achievement, opportunity, and awareness), mean difference using ANOVA. In this piece of the study, I tested the hypothesis comparing the Perceived Barrier survey pre-post results by comparing mean difference of combined pre-and post-score results by construct; *Achievement*, *Opportunity*, and *Awareness* and by group, *Treatment group 1*, *Control group 2 IVC*, and *Control group 3 AWC* to determine whether there is a statistically significant difference in participants pre-and-post- scores by construct.

Construct achievement. To achieve the purpose, I examined the following question:

Are different groups (such as Treatment group 1, Control group 2 IVC, and Control group 3 AWC) associated with higher combined *Achievement* construct scores?

In addition, the report will determine if the hypothesis about the population is likely to be true. In this case ($\alpha=.05$) as follows:

H_0 : $\mu_{diffx.1} = \mu_{diffgp.2} = \mu_{diffgp.3}$. There is no significant difference in *Achievement* construct scores when comparing different pre-test post-test groups (Treatment group 1, Control group 2 IVC, and Control group 3 AWC). ($\mu_{Diff} = 0$)

H_1 : There is at least one significant difference in *Achievement* construct scores when comparing different pre-test post-test groups (Treatment group 1, Control group 2 IVC, and Control group 3 AWC). ($\mu_{Diff} \neq 0$)

A total of 21 ($n=21$) college students participated in the study. The independent variable for the sample data is the group in which each college student belonged: Treatment group 1, Control group 2 IVC, and Control group 3 AWC. The dependent variable *Achievement* scores Q2(1-22) on a scale from 1(low impact) to 5 (high impact).

Summary Construct 1 Achievement. I performed an ANOVA analysis was investigating differences among group means for different scores (pre-post-survey). ANOVAs showed scores differed for all groups when *Achievement* construct retrospective scores were compared.

Table 53

Characteristic	M	SD	CI-95%		
			SD error	Min.	Max.
Achievement	1.58	.618	.234	.73	2.73
Trx. Gp.1					
Achievement	.259	.247	.093	.00	.68
Control Gp.2					
IVC	.207	.634	.239	-.68	1.09

To test the hypothesis, I used a combination of descriptive and inferential statistics to analyze the data. I performed a one-way ANOVA analysis involving a within subject factor (pre-post- survey) and a between-subject factor (Treatment group 1, Control group 2 IVC, and Control group 3 AWC) for construct *Achievement* which allowed a better understanding on the amount of variance explained among the groups and between constructs. See the below table.

Table 54
ANOVA Construct Achievement

Group	<i>Sum of Square</i>	df	<i>Mean Sq.</i>	F	p
Between	8.523	2	4.26	15.134	0.00
Within	5.066	18	0.281		
Total	13.6	20			

The ANOVA analysis of the construct *Achievement* indicates at least one of the three groups is significantly different from the others. I compared the *Achievement* construct retrospective scores, and the scores differed for all groups. The assumption of homogeneity of variance was tested using Levene's test. The homogeneity of variance Pre-test was not significant (Levene statistic=2.130 p=.148), which is a requirement for the validity of the ANOVA, so the assumption was not violated.

Post hoc tests were conducted using Tukey's method to explore differences

between group means. Post hoc analysis provided specific information on which means are significantly different from each other. From Tukey’s HSD post-test, see the table below.

Table 55
Results of Tukey’s HSD Post-test Construct 1 Achievement

Group	N	1	2
3	7	.207785	
2	7	.260366	
1	7		1.58
Sig.		.981	1.00

Note: Homogeneous subset using Harmonic Means Sample Size n=7, subset for alpha=0.05

Findings construct 1 achievement. Based on the results of the ANOVA test, the null hypothesis is rejected, and we can conclude that there is at least one significant difference in *Achievement* construct among the different groups. The results are statistically significant, ($F(2,18) = 15.134, p = 0.00, \eta^2 = 8.519/13.585 = 0.627$ or 62.7%. (62.7% of the variability in difference scores can be attributed to different groups.)) On average Control group 3 AWC had the lowest mean difference scores ($M = .21, SD = .63$), and Treatment group 1 had the highest mean difference ($M = 1.58, SD = .62$). The mean group differences are showing that Treatment Group 1 demonstrates a significantly higher mean difference score (1.584) than the other two groups (Control group 2 $IVC = 0.260$, Control group 3 $AWC = 0.208$) which are statistically equivalent. The Tukey

method revealed that the Treatment group 1 resulted in significantly higher *Achievement* in comparison to mean difference Control group 2 IVC, $p=.001$, and Control group 2 AWC, $p=.000$. Results indicate there is a significant difference in groups at the $p<.05$ level. However, given the small sample size in each group, these findings should be interpreted with caution when it comes to the generalizing of the study.

Construct Opportunity. In this piece of the study, I tested the hypothesis comparing Perceived Barrier survey pre-post results by comparing mean difference of combined pre-and post-score results by construct; *Achievement, Opportunity, and Awareness* and by group, *Treatment group 1, Control group 2 IVC, and Control group 3 AWC* to determine whether there is a statistically significant difference in participants pre-and-post- scores by construct.

To achieve the purpose, I examined the following question:

Are different groups (such as Treatment group 1, Control group 2 IVC, and Control group 3 AWC) associated with higher combined *Opportunity* construct scores?

In addition, the report will determine if the hypothesis about the population is likely to be true. In this case ($\alpha=.05$) as follows:

$H_0: \mu_{diffx.1} = \mu_{diffgp.2} = \mu_{diffgp.3}$. There is no significant difference in *Opportunity* construct scores when comparing different pre-test post-test groups (Treatment group 1, Control group 2 IVC, and Control group 3 AWC). ($\mu_{Diff} = 0$)

H_1 : There is at least one significant difference in *Opportunity* construct scores when comparing different pre-test post-test groups (Treatment group 1, Control group 2

IVC, and Control group 3 AWC). ($\mu \text{ Diff} \neq 0$)

Participants. A total of 21 ($n=21$) college students participated in the study.

Measures. The independent variable for the sample data is the group in which each college student belonged: Treatment group 1, Control group 2 IVC, and Control group 3 AWC. The dependent variable Opportunity scores Q3(1-10) and Q4(1-10) on a scale from 1(low impact) to 5 (high impact).

Summary Construct 2 Opportunity: I performed an ANOVA analysis to investigate differences among group means for different scores (pre-post-survey). When comparing the *Opportunity* construct retrospective scores, the ANOVA analysis showed scores differed for all groups.

Table 56

Characteristic	<i>M</i>	<i>SD</i>	CI-95%		
			<i>SD error</i>	<i>Min.</i>	<i>Max.</i>
Opportunity Treatment Gp.1	.279	.136	.051	.05	.476
Opportunity Control Gp.2 IVC	.204	.076	.029	.10	.333
Opportunity Control Gp.3 AWC	.517	.061	.023	-.05	.095

To test the hypothesis, I analyzed the data using a combination of descriptive and inferential statistics. Performing an ANOVA one-way analysis involving a with-in subject factor (pre-post- survey) and a between-subject factor (Treatment group 1, Control group 2 IVC, and Control group 3 AWC) for construct *Opportunity* which

allowed a better understanding on the amount of variance explained among the groups and between constructs.

Table 57

ANOVA Construct Opportunity

Group	<i>Sum of Square</i>	df	<i>Mean Sq.</i>	F	p
Between	0.188	2	0.094	10.04	0.001
Within	0.168	18	0.009		
Total	0.356	20			

For construct *Opportunity*, the ANOVA analysis indicates at least one of the three groups is significantly different from the others. I compared *Opportunity* construct retrospective scores, and the scores differed for all groups. I used eta-squared ($\eta^2 =$) to estimate the percentage of variance in the data due to the treatment effect. I conducted a preliminary analysis testing for homogeneity of variance. I then tested the assumption of homogeneity of variance using Levene’s test. The homogeneity of variance pre-posttest was not significant (Levene statistic=1.95 p=.171), which is a requirement for the validity of the ANOVA, so the assumption was not violated.

Post hoc tests were conducted using Tukey’s method to explore differences between group means. Post hoc analysis provided specific information on which means are significantly different from each other. From Tukey’s HSD post-test, see the table below.

Table 58

Results of Turkey's HSD Post-test Construct Opportunity

Group	N	1	2
3	7	.051700	
2	7		.20407
1	7		.27890
Sig.		1.0	.339

Note: Homogeneous subset using Harmonic Means Sample Size n=7, subset for alpha=0.05

Findings construct 2 Opportunity. Based on the ANOVA, the results are statistically significant, $(F(2,18) = 10.04, p = 0.001, \eta^2 = 0.188/0.356 = 0.528$ or 52.8%. (52.8% of the variability in different scores can be attributed to different groups.))

Control group 3 AWC differ significantly from the other two groups (Treatment group 1 and Control group 2 IVC), while Treatment group 1 and Control group 2 IVC are not significantly different. This is demonstrated in Tukey's HSD. Control group 3 AWC had a significantly lower mean difference score (0.052) than the other two groups (Treatment group 1=0.278, Control group 2 IVC=0.204), which are statistically equivalent. On average, Control group 3 AWC had the lowest mean difference scores ($M = .05, SD = .061$), and Treatment group 1 had the highest mean difference ($M = .28, SD = .136$).

Additionally, $\eta^2 = 52.8\%$, suggesting approximately 52.8% of the variance in opportunity scores can be explained by the group. The remaining 47.2% may be accounted for by other factors. Results indicate that there is a significant difference in groups at the $p < .05$ level. However, given the small sample size in each group, these findings should be

interpreted with caution when it comes to the generalizing of the study.

Construct Awareness. In this piece of the study, I tested the hypothesis comparing Perceived Barrier survey pre-post test results by comparing mean difference of combined pre-and post-score results by construct themes; *Achievement, Opportunity, and Awareness* and by group, *Treatment group 1, Control group 2 IVC, and Control group 3 AWC* to determine whether there is a statistically significant difference in participants pre-and-post- scores by construct.

To achieve the purpose, I examined the following question:

Are different groups (such as Treatment group 1, Control group 2 IVC, and Control group 3 AWC) associated with higher combined *Awareness* construct scores?

In addition, the report determines if the hypothesis about the population is likely to be true. In this case ($\alpha=.05$) as follows:

$H_0: \mu_{diffx.1} = \mu_{diffgp.2} = \mu_{diffgp.3}$. There is no significant difference in *Awareness* construct scores when comparing different pre-test post-test groups (Treatment group 1, Control group 2 IVC, and Control group 3 AWC). ($\mu_{Diff} = 0$)

H_1 : There is at least one significant difference in *Awareness* construct scores when comparing different pre-test post-test groups (Treatment group 1, Control group 2 IVC, and Control group 3 AWC). ($\mu_{Diff} \neq 0$)

A total of 21 ($n=21$) college students participated in the study. The independent variable for the sample data is the group in which each college student belonged: Treatment group 1, Control group 2 IVC, and Control group 3 AWC. The dependent variable *Awareness* scores Q5(1-10) on a scale from 1(low impact) to 5 (high impact).

Summary construct 3 Awareness. I performed an ANOVA analysis to investigate differences among group means for the different construct scores. The ANOVA results in the table below showed scores differing for all groups in the *Awareness* construct.

Table 5915

Mean Differences by Construct Awareness Descriptive
CI-

Characteristic	<i>M</i>	<i>SD</i>	95% <i>SD error</i>	<i>Min.</i>	<i>Max.</i>
Awareness Treatment Gp.1	.313	.373	.141	-.03	.70
Awareness Control Gp.2 IVC	.000	.058	.022	-.10	.10
Awareness Control Gp.3 AWC	.029	.125	.047	-.20	.20

I analyzed the data using a combination of descriptive and inferential statistics to test the hypothesis. I performed an ANOVA one-way analysis involving a with-in subject factor (pre-post- survey) and a between-subject factor (Treatment group 1, Control group 2 IVC, and Control group 3 AWC) for construct *Awareness* which allowed a better understanding on the amount of variance explained among the groups and between constructs.

Table 6016

ANOVA Construct Awareness

Group	<i>Sum of</i> <i>Square</i>	df	<i>Mean</i> <i>Sq.</i>	F	p
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Between	0.419	2	0.209	3.97	0.037
Within	0.949	18	0.053		
Total	1.368	20			

I used eta-squared ($\eta^2 =$) to estimate the percentage of variance in the data due to the treatment effect. I conducted a preliminary analysis to test for assumption of homogeneity of variance using Levene's test.

Findings construct 3 awareness. For the *Awareness* construct, the ANOVA analysis indicates at least one of the three mean difference groups, (Treatment group 1, Control group 2 IVC, and Control group 3 AWC) is significantly different than the others, ($F(2,18)=3.971$, $p=0.037$, $\eta^2 = 0.419/1.368=0.30$ or 30.6% (30.6% of the variability in difference scores, a large effect size, can be attributed to the treatment.)).

However, there are three issues with the analysis:

1. The result of the Homogeneity of Variance Pre-test is significant (Levene's statistic: $F(2,18) = 9.836$, $p=0.001$). The test is run to determine if the assumption that population variances for the different groups are approximately equal. Therefore, the null hypothesis of homogeneity of variance is rejected, and the ANOVA, along with its implications, may not be valid.
2. Tukey's HSD Post-test indicated that the three groups are not significantly different, which contradicted the ANOVA result that at least one of the three groups are significantly different than the others. The contradiction may be a result of the lack of homogeneity of variance among the three groups, especially

given the small sample sizes, and p-value (0.037) close to the level of significance.

3. Small sample size.

To further explore the origin of the violation, and the relationship among groups for the *Awareness* construct, I ran Independent Samples T-Tests on difference scores for all two-group combinations of the three groups, as well as descriptive statistics.

Examination of the Descriptive Statistic table below shows that the mean of the difference scores for the Treatment group 1 is considerably larger than the other Control group 2 IVC, and Control group 3 AWC. The Treatment 1 group’s mean is positive, indicating a greater improvement in *Awareness* after the treatment. But is it significantly greater than the other two Control groups? The “shapes or profiles” of the distributions play an important role in the determination of significance and variance and are an important determinant under the assumption of normality. The Treatment 1 group’s variance (0.1392) is larger than the other two groups, and it should be if the treatment intervention is effective (effectiveness implies a great difference score). However, the treatment group’s variance exceeds the other two groups by a factor of 42 for the Control 2 group IVC and nine for the Control group 3 AWC. Generally speaking, homogeneity of variance becomes a concern when the factor is about 5 or 6.

Table 61

Descriptive Statistics Variance Differences- Awareness

Mean of Diff. Scores	St. Dev. Of Diff. Scores	Variance of Diff. Scores
----------------------------	-----------------------------------	-----------------------------

Treatment group 1	0.313	0.373	0.1392
Control group 2 IVC	0.00	0.0577	0.0033
Control group 3AWC	0.029	0.1254	0.0157

Observing the variance, and specifically, the standard deviation, the profiles for Control group 2 IVC and Control group 3 AWC is considerably narrower than that of the Treatment group 1, which is more spread out. The standard deviation indicates the distance of the inflection points of the normal probability distribution to the left and right of the mean, for each respective distribution. For a valid ANOVA, all profiles should be about the same. When one profile spreads out more than the others, it can intercept the other distributions' tails, and indicate an erroneous result of no significant difference because of the overlap.

As noted below, Tukey's HSD Post-test indicated that the three groups are not significantly different, which contradicted the ANOVA result that at least one of the three groups are significantly different than the others.

Table 6217

Results of Turkey's HSD Post-test Construct Awareness

Group	<i>n</i>	1
2	7	0.00
3	7	.0286
1	7	.3129
Sig.		.050

Note: Homogeneous subset using Harmonic Means Sample Size n=7, subset for alpha=0.05

With the violation of homogeneity of variance and the contradictions of the ANOVA and homogeneous subsets analyses, to better understand the relationship among

groups for the *Awareness* construct, Independent Samples T-Tests were run on difference scores for all two-group combinations of the groups. I summarized in the Independent-Samples T-Test in the table below.

Table 6318

Independent-Sample T-Test Summary- Awareness

	Levene's Test (Homogeneity of Variance): p-value	T-test- equal variances not assumed: adjusted df.	T-test- equal variances not assumed: p-value	T-test- equal variances assumed: df.	T-test- equal variances assumed: p-value
Test grp 1 vs.Con.grp.2 IVC	0.003	6.287	0.069	N/A	N/A
Test grp.1 vs.Con. grp. 3 AWC	0.018	7.338	0.096	N/A	N/A
Controls: grp. 2 IVC vs.grp. 3 AWC	0.108	N/A	N/A	12	0.594

The first column (Levene's test) shows homogeneity of variance was violated in the first two analyses (Treatment 1 group versus Control group 2 IVC, and Treatment 1 group versus Control group 3 AWC), but not the third analysis (Control group 2 IVC versus Control group 3 AWC). I adjusted degrees of freedom (for the first two analyses) to accommodate the violation and noted in the second column with the corresponding p-value in the third column. For the Control group 2 IVC versus Control group 3 AWC analysis, there was no violation, and the unadjusted degrees of freedom are shown in the fourth column with the corresponding p-value in the fifth column. In two-group comparison analyses, the difference among groups was not significant, supporting (with more detail) the Tukey's homogenous subsets results.

Potentially, the real issue with the analyses may be sample size, which consisted of seven individuals per group. Note, the sample size is small because I developed the “STEAM” College Success Program as an exploratory research tool to determine the effectiveness of the treatment.

Conclusions RQ2B-2. To summarize, the first two constructs lead to some interesting results. Construct 1 *Achievement* showed a very significant result ($p=0.00$) with Treatment group 1, having a superior score to the other two. Construct 2 *Opportunity* showed a very significant result ($p=0.001$) with Treatment group 1 and Control group 2 IVC being statistically equivalent and having a superior score to Control group 3 AWC. Larger sample size may have separated Treatment group 1 from Control group 2 IVC. Construct 3 *Awareness* showed a “weakly” significant ($p=0.037$ close to $\alpha = 0.05$). The result of the Homogeneity of Variance for *Awareness* Pre-test is significant (Levene’s statistic: $F(2,18) = 9.836, p=0.001$). The test was run to determine if the assumption that population variances for the different groups are approximately equal is met. Therefore, the null hypothesis of homogeneity of variance is rejected, and the ANOVA, along with its implications, may not be valid. To better understand the relationship among groups for the *Awareness* construct, I ran Independent Samples T-Tests on difference scores for all the two-group combinations of the groups. In the two-group comparison analyses, the difference among groups was not significant, supporting (with more detail) the Tukey’s homogenous subsets results.

Note, the sample sizes for each group are small, and may affect significant results, especially when p-values are close to the level of significance (0.05). However,

the analysis merits discussion and may provide a future strategy for investigations outlined in the dissertation, especially with larger samples.

In summary, the evidence comparing constructs of each group pre-posttest results suggests the intervention had a highly significant impact on the *Achievement* construct, followed by *Opportunity*, and then *Awareness* construct, which is the least conclusive.

To summarize the RQ2 data, I have provided the figure below. The figure summarizes the data of RQ2-B-1 & RQ2B-2. The commonly referenced supports are summarized in the SCCT model below.

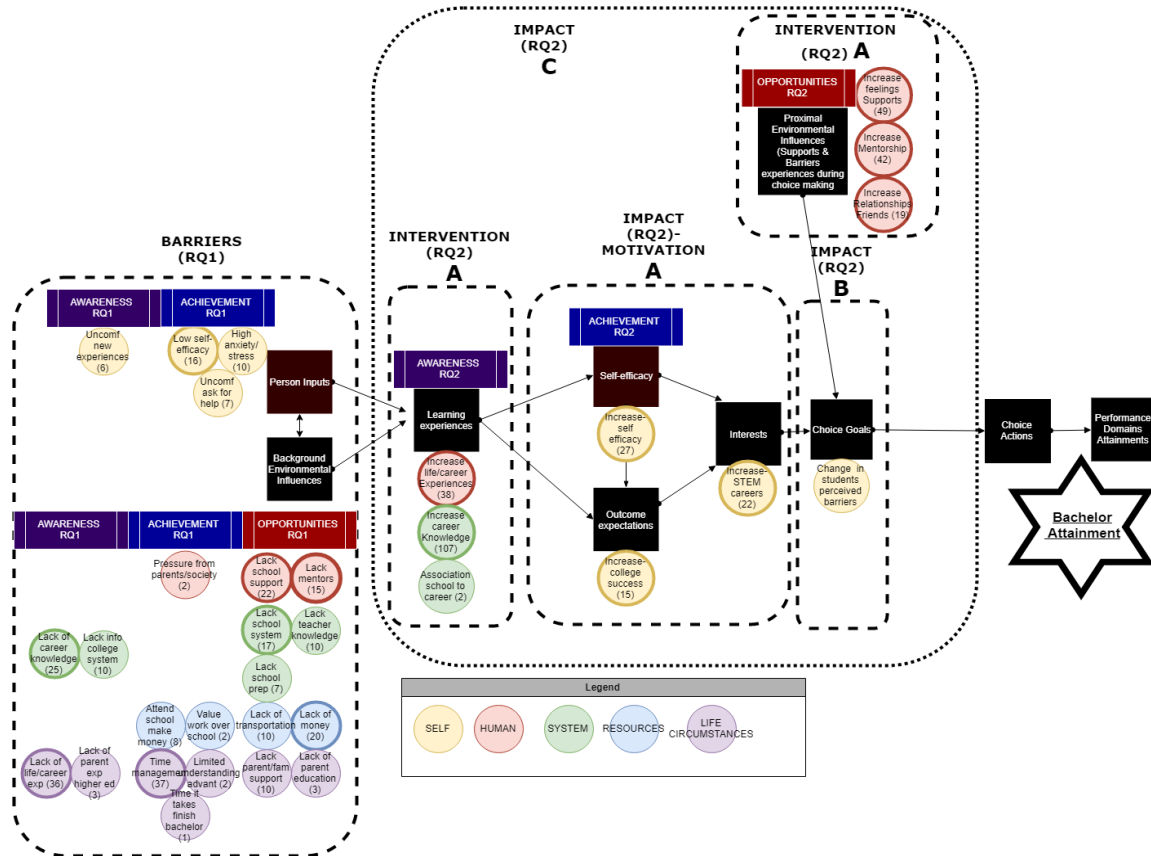


Figure 11. RQ2B

Summarizing Findings Research Question Two Using Convergence

Research question two was: *How does participation in the “STEAM” College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor’s degree attainment?*

RQ2A qualitative and RQ2B quantitative convergence. The above sections detailed qualitative and quantitative results by reporting results from student videos, student essays, focus group data, and surveys. I report the Qualitative and quantitative data convergence in this section. Convergence allowed the comparison of individual findings of each data source to combine into integrated results helping to identify the common areas of overlap between qualitative and quantitative data. I created an Intervention Impact visual chart to display and provide an overview of both quantitative and qualitative coding comparing three constructs: Achievement, Opportunity, and Awareness and the five categories: Human, System, Self, Life Circumstance, and Resource.

Intervention Impact Quantitative & Qualitative Comparison

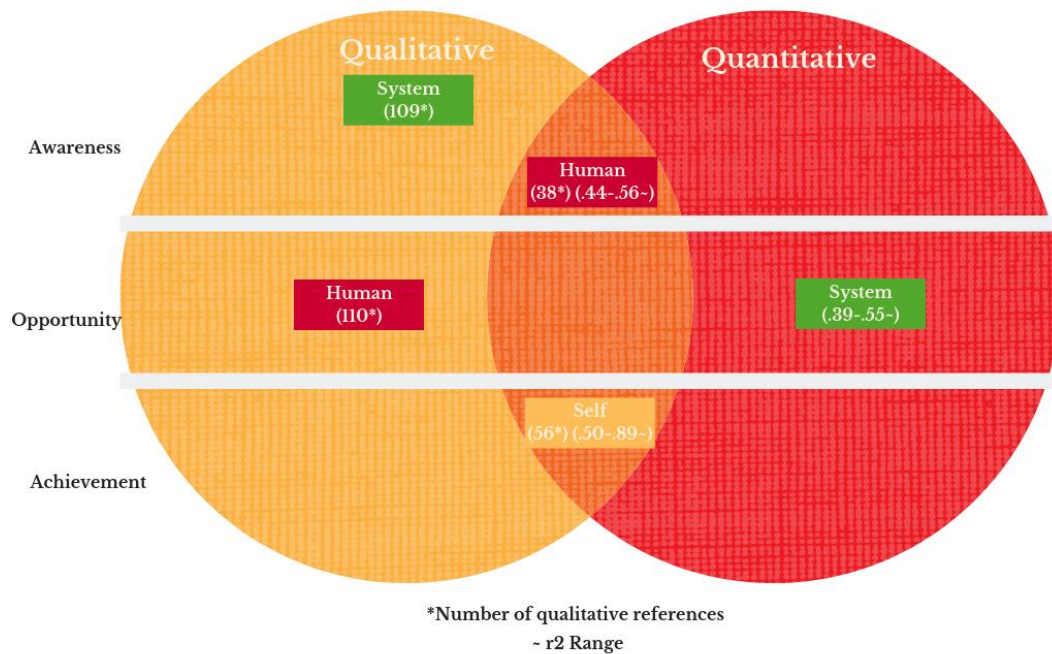


Figure 12. Intervention Impact Conversion, Quantitative & Qualitative Comparison.

When comparing quantitative data effect size r^2 and qualitative data response frequency to each of the three constructs of *Achievement*, *Opportunity*, and *Awareness*, two of the constructs had areas of high effect size and high frequency. *Achievement* had overlap in the category of *Self*, having 56 references and $r^2 = 0.05-0.89$. *Self*-category reflects the “STEAM” College Success Program experiences the student participants identified as impacting change, which happened within and directly influencing themselves and their perceptions of bachelor’s degree completion. *Awareness* had overlap in the category of *Human*, which had 36 references and $r^2 = 0.44-0.56$. *Human* category reflects the “STEAM” College Success Program experiences the student

participants identified as a personal change caused by others impacting their perceptions of bachelor's degree completion. *Opportunity* construct had no overlap in qualitative frequency and quantitative r^2 effect size.

Major findings 1. Awareness convergence comparison. To examine the convergence with a little more detail. It is important to break the findings down by construct, category, and subtheme. Figure 13. provides an overview of both quantitative and qualitative coding comparing construct *Awareness* and the five categories; Human, System, Self, Life Circumstances, and Resource.

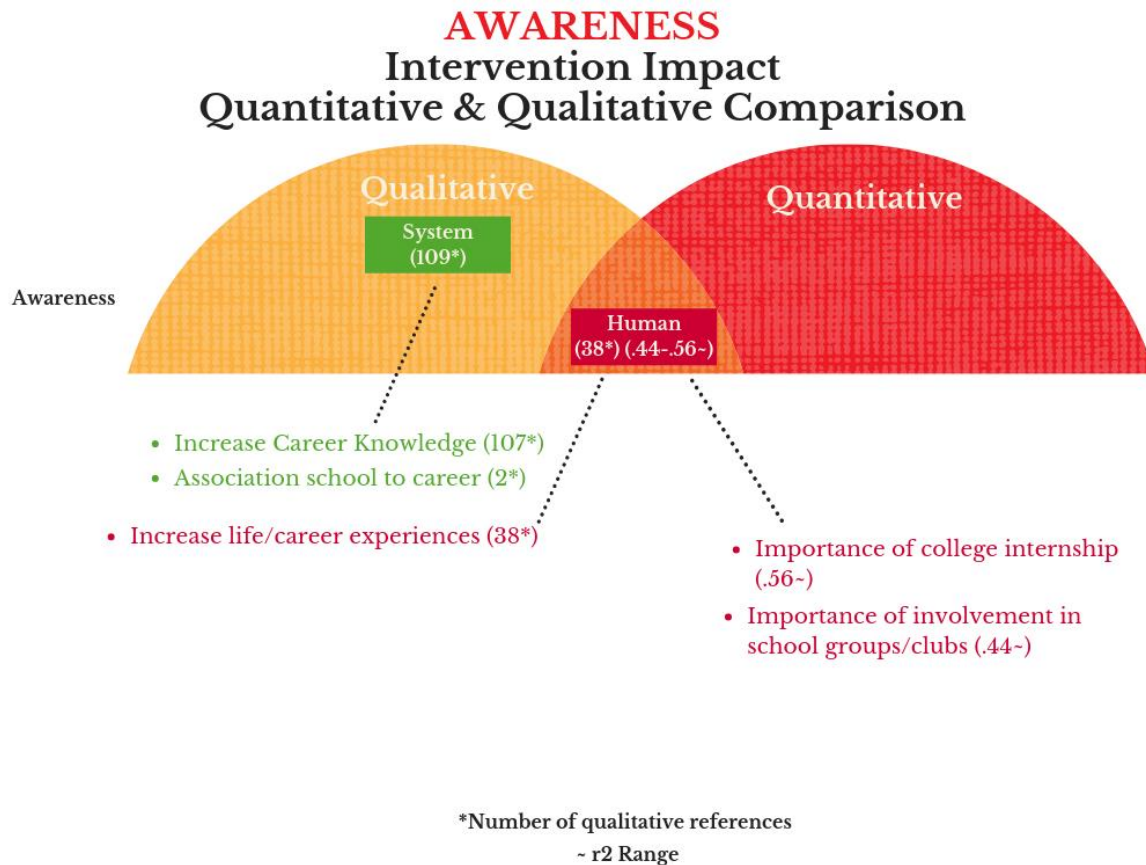


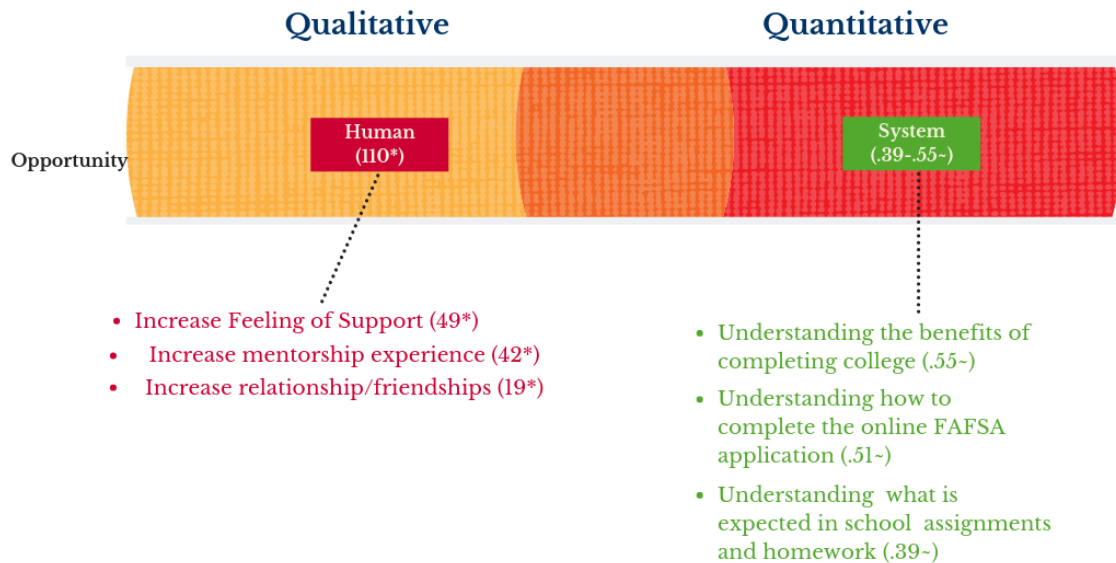
Figure 5. Awareness Intervention Impact, Quantitative & Qualitative Comparison.

The *Awareness* construct overlapped in both qualitative and quantitative findings in the category of *Human*. The ‘STEAM’ College Success Program made measurable change in Awareness by, 1) increasing students life and career experiences which impact both bachelor’s degree completion and career success, 2) increasing the students’ understanding regarding the importance of college internships and how internships are tied to their success in bachelor’s completion and career success, and 3) increasing students’ perception of involvement and how being involved impacts both bachelor’s degree completion and career success. Interestingly, two of the three shared measurable changes include other people, but the decision to get involved or apply and complete an internship is the student’s choice and personal commitment they must individually decide.

Another interesting finding worth noting is that even though the *Awareness* construct quantitatively had little to no measurable, significant change, qualitatively change was pointed out by the student participants. Increased knowledge was the most cited experience of change in student responses. I speculate the conflicting conclusions, lie in the survey. Very few if any questions were asked in the survey about STEM knowledge relating to skills and information applied to careers.

Major findings 2. Opportunity convergence comparison. To examine the convergence in more detail, Figure 14. is provided as an overview of both quantitative and qualitative analysis comparing construct *Opportunity* and the five categories: Human, System, Self, Life Circumstances, and Resource and subthemes.

OPPORTUNITY Intervention Impact Quantitative & Qualitative Comparison



*Number of qualitative references
- r2 Range

Figure 6. Opportunity Intervention Impact, Quantitative & Qualitative Comparison

The *Opportunity* construct has no overlap in qualitative and quantitative findings. The qualitative data identified an increase in *Opportunity* experiences, causing the greatest change in student perceptions of barriers, was in the *Human* category. The “STEAM” College Success Program provided student participants with 1) increased feelings of support, 2) increase in a professional mentorship, and 3) an increase in friendship supports. All of which were identified as decreasing barriers and increasing positive perceptions of bachelor’s degree completion.

The findings of the qualitative data measured significant improvements in awareness of college systems. The subcategory of system improvement was in, 1)

understanding the benefits of completing college, 2) understanding how to complete the online FASFA application, and 3) understanding what is expected in school, school assignments, and homework. All of which students identified as decreasing barriers and increasing the students' positive perceptions of bachelor's degree completion.

Major findings 3. Achievement convergence comparison. To examine the convergence in more detail, Figure 15 provides an overview of both quantitative and qualitative coding comparing construct *Achievement*, the five categories; Human, System, Self, Life Circumstances, and Resource, and subthemes.

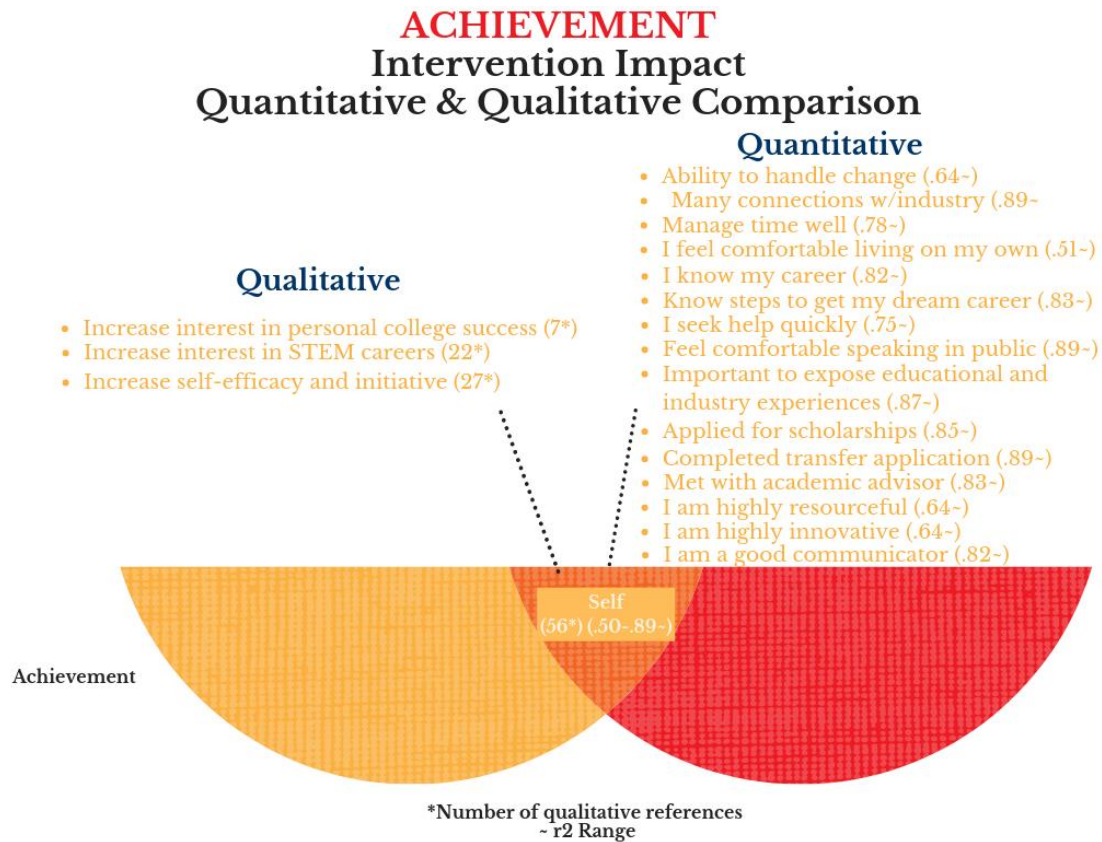


Figure 7. Achievement Intervention Impact, Quantitative & Qualitative Impact.

The *Achievement* construct has overlap in both qualitative and quantitative findings, all measured in the category of *Self*. The “STEAM” College Success Program caused the most significant measurable change in *Achievement* when comparing all three of the constructs, both quantitatively and qualitatively. The areas of significant qualitative change experiences overlap, 1) increase of self-efficacy, 2) increase interest in a STEM career, and 3) increase in personal college success. These overlapped with 16 quantitative areas of overlap. Of the 16 significant quantitative change pre-posttest, it is with a high degree of certainty; the “STEAM” College Success Program made a difference in how students perceive barriers to the area of *Achievement*.

Chapter IV Summary

In summary, the evidence comparing both RQ2 quantitative and qualitative data, suggests the “STEAM” College Success Program had a highly significant impact on the *Achievement* construct, followed by the other two constructs. Though not as significant, change by the innovation did occur in Opportunity and Awareness constructs.

Chapter V includes a summary of the study, including a brief overview of the purpose statement and research questions. It will then discuss the unexpected findings, and the conclusions drawn from the study. Chapter V also describes the implications for practice and recommendations for further study and concludes with closing remarks from the researcher.

CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

Introduction

Chapter V begins with a summary of the study and includes a brief overview of the purpose statement and research questions. It then discusses the significant and unexpected findings, and the conclusions drawn from the study. The chapter describes the implications for practice and recommendations for further investigation. It concludes with closing remarks from the researcher.

Purpose Statement

The purpose of the action research study was to identify and describe perceived educational barriers of an understudied population, of first-generation Hispanic youth in the desert border southwest hindering successful transfer to a four-year university, and then develop and implement an innovation which intervenes in these factors promoting successful transfer and completion of bachelor's degree.

Research Questions

1. What are the barriers to post-secondary success in first-generation Hispanic students in the desert southwest border regions as perceived by college students?
2. How does participation in the "STEAM" College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor's degree attainment?

Discussion of the Findings Research Question One

Research Question One was: *What are the barriers to post-secondary success in first-generation Hispanic students in the desert southwest border regions as perceived by college students?*

Importance of Identifying Students Perceived Barriers

In Social Cognitive Career Theory (SCCT), barriers real or perceived, can directly and negatively impact academic development. The influence of specific barriers depends partially on how the individual perceives and responds to the barrier. How students interpret perceived barriers influences how students make meaning of the influencing factors, which ultimately shape students' goals and performances on academic and career development.

This study adds to the public body of knowledge, identifying perceived barriers to bachelor's degree completion. Student participants in the study named their top five most significant perceived barriers to bachelor's degree completion as: 1) lack of life and career experiences, 2) time management balancing school, work, and family, 3) lack of career knowledge, 4) lack of school support and 5) lack of money. Though these findings were substantial, the researcher also discovered some unexpected findings either not previously identified in prior research or findings specific to the community of study.

Unexpected Findings RQ1

There were two unexpected findings relating to parents as barriers. The first was how unprepared students were when their parents could not help them anymore in school. Participants described a time somewhere around 6th and 8th grade when parents could no longer help with student homework and assignments. The students described this as a

time of confusion. Parents went from being very hands-on in school to hands-off, telling their children they had to figure it out on their own. The adjustment to a sudden lack of help was particularly rough for the firstborn child. Parents do not share that it is their lack of education, preventing the parent from helping. Instead of sharing why they were no longer able to help, parents became angry or showed frustration at their children and lashed out when asked questions.

The students shared how the experience was very hard on them and impacted their self-efficacy, relating to how they see themselves being successful as a student. The help parents can provide is advice to stay in school and get good grades. Trying to please their parents, many students followed their parents' recommendations. They continued in school, but lacked direction, not knowing exactly how to get to their end goal, including the transfer steps and planning to get to a university. Many students at the community college have completed over 80 credits, yet do not transfer and continue enrolling and completing classes until their financial aid runs out. There are other students who once they realize their parents' lack of education, decided education is not needed to be a success; thus, diminishing the priority of continuing and completing school.

The second unexpected finding relating to parents and barriers to college completion is how parents react when college gets difficult. Many parents of college-age students are not prepared to see their young adults struggle with the academic challenges and increased expectations that come with going and being successful in college. For most students, high school was not overly burdensome. Students complete high school with manageable effort. Once a student starts college, parents see or hear of their child's

struggle in school, and the new effort students must put into balancing life.

Not knowing many bachelor's degree completers and having experience with the typical college student struggles that accompany bachelor's degree completion, the parent tries to help. The help turns into an "out" or an approval to quit. When the demands of college get high, and student stresses are shared, the parents and family members responses echo along the lines of, "If it is too hard quit," "Go get a job," "Move back with us until you figure it out," "I hate to see you are working so hard and being so frustrated; it's ok to quit if you need to." The study revealed that even though parents think they are helping, the students want their parents to show compassion and listen to their complaints about the demands of school instead of giving them a reason to quit. Students want their parents, and family members' support and encouragement to continue. By providing the student an "out" and an okay to leave, the students of the study recognize what the parent is implying is the parents' own doubts in their child's ability to finish a bachelor's degree. Students want increased positive coaching from their parents and family regarding college completion.

College students having moments of struggle with their academics is not new, but because most college students in the community of study live at home and with family while attending school, there is little separation or personal life. In turn, the family is involved in the daily struggles and challenges associated with college. With this type of support, parents think they are helping their children; nonetheless, it ultimately becomes a barrier to bachelor's completion within the studied community.

Another unexpected finding was the students lack of resiliency and the anxiety

that is associated. During the study, the students shared and demonstrated how uncomfortable they were with new experiences and new environments. New learning situations or new environments challenge the students and sends students into a fight-or-flight mode, causing an increase in their anxiety. When students experience tough or new experiences, many shared how they feel out of control and immediately wanted to remove themselves from the experience or situation. Students described examples of college situations that add stress. These include experiencing new and challenging ways of learning, new challenging expectations or having to solve other college challenges like arranging transportation or finding money to pay for school.

New uncomfortable experiences lead many students to drop their classes or quitting school. Students described other experiences, also contributing to their feelings of being uncomfortable. These included meeting new people, being introduced to a set of students who are different or unfamiliar, and meeting and trusting new adults. Meeting new people includes meeting industry professionals and new professors outside of the classroom environment. Students struggle with being put into new learning environments and situations, challenging the students to stay and complete. During the study, there were times students demonstrated low resiliency due to change or difficulty. Some student participants displayed high-stress emotions caused by pressures of the innovation. During stressful times, some students completely shut down, did, and said nothing, and no longer wanted to participate in the activity. Others started crying and yelling. Others walked out, removing themselves from the room or situation. The lack of resiliency demonstrated by students' behaviors might be related to the lack of students' life

experiences. The lack of students' opportunity to experience new people, new environments, and new challenges in educational learning does not provide students a chance to learn how to cope with change and new situations, resulting in a barrier to bachelor's degree completion.

The last unexpected finding is the students' self-confidence becomes a barrier. Participants in the study identified many barriers to bachelor's degree completion, but all discussed how a student's perception of self or lack of confidence was a barrier to post-secondary success. Students took responsibility for their own delays in transfer and mentioned ways in which they lacked personal initiative, including late registration for classes, lack of study designated time, and admitted some of their challenges were due to not wanting to ask for help. Even though their life circumstances or other sources added barriers to bachelor's degree completion, participants willingly looked introspectively to identify challenges and find potential solutions.

Discussion and Findings Research Question Two: Innovation

The Innovation: "STEAM" College Success Program

Research Question Two was: *How does participation in the "STEAM" College Success Program affect how first-generation Hispanic students perceive barriers to post-secondary success leading to bachelor's degree attainment?*

I designed the "STEAM" College Success Program to help college students overcome their perceptions and challenges of college by increasing career, life, and college through experiences and increased knowledge with the intent of improving student post-secondary success and bachelor's degree attainment. The goals of the innovation were to reduce negatively described student perceptions and challenges.

Attainment of success involved the community and industry stakeholders and college students in a unique experience of incorporating both an intensive one-week camp and academic school year of mentorship, STEM education, and college support.

The data demonstrate students can mitigate the negatives of perceived barriers by participation in the “STEAM” College Success Program. The study adds to the public body of knowledge, identifying experiences supporting students toward completing a bachelor’s degree. The student participants of the innovation identified their top five greatest experiences gained from “Steam” College Success program impacting them positively toward bachelor’s degree completion: 1) experiences increasing career knowledge, 2) experiences increasing feeling of being supported, 3) mentorship experiences, 4) increase of experiences expanding their views on life and career, and 5) experiences increasing self-efficacy and personal initiative.

The evidence of the survey test data by question suggests that the “STEAM” College Success Program had a highly significant impact on the *Achievement* construct, followed by *Opportunity*, and then *Awareness*. The evidence comparing constructs of each group pre-posttest results suggests that the intervention had a highly significant impact on the *Achievement* construct, followed by *Opportunity*, and the *Awareness* construct is the least conclusive.

Though these findings were substantial, the researcher discovered some unexpected findings either not previously identified in prior research or findings specific to the community of study.

Unexpected Findings RQ2

One of the main goals of the “STEAM” College Success program was to decrease

barriers relating to bachelor's degree completion. One of the barriers is the students' perception of the importance of completing a bachelor's degree. The Perceived Barriers survey addressed the student's perception regarding the importance of completing a bachelor's degree three times:

Section Q2- question 9. Completing a bachelor's degree is important,

Section Q2- question 16. I am motivated to complete a bachelor's degree

Section Q3- question 3. I understand the benefits of completing a college degree.

Two of these questions showed no significant improvement from the innovation. The "STEAM" College Success Program exposed students to motivated bachelor completed adults who shared their stories regarding college experiences and reasons why degree completion was important to them. Through the sharing and teaching experiences of the innovation, the students heard many other successful community leaders' stories as well. I hypothesize the student participants did not link the stories they heard to their own current or future stories.

For students to make the final step of personal commitment to degree completion, students must create their own version of the story leading to a bachelor's degree completion. Ten months might not be enough time for a student to formulate their own story, personal motivation, and reasons degree completion is important and life-changing for them. Making a change in a person's thoughts of how they view themselves takes time. For that reason, the earlier career and college counseling begins, the better.

The second unexpected finding was the one I gained through experience, enduring the research process. I have realized the vital role of the change agent. A change agent is

an individual who influences others to adopt the new ideas presented by the innovation (Rogers, 2003). The change agent operates the interventions to bring about behavior change and produce identifiable outcomes (Rogers, 2003). As the change agent for the research study, I realize the critical role the change agent played in the development of cohesion and consistency of implementing and maintenance of the innovation. I also understand the critical role the change agent plays in the building of coherence and consistency among those participating in the study, both students and mentors. Helping to keep all involved dedicated to the commitment of the ten-month innovation included not missing meetings and setting a high level of internal accountability. Keeping all dedicated and involved in the innovation was not an easy task. The student participants did not understand the concept of camp or mentorship. To them, it was another item added to their long list of responsibilities. Through social modeling of innovative behavior and the development of a constant network of communication, I was able to keep the momentum going so that all participants involved in the innovation continued participating so that completion of the innovation was accomplished.

Conclusions and Recommendations

To remain competitive on local, state, and national levels and to achieve future economic and social goals, Imperial and Yuma County need an educated workforce. The primary industries supporting the desert region are technical, STEM-based, and require a highly-skilled and educated workforce. There continue to be vast disparities in terms of numbers of students declared and enrolled in STEM transfer degree programs and the number of students completing STEM bachelor's degrees.

Perceptions regarding post-secondary education start to develop at a young age and

can prevent or enable students' development of post-secondary aspirations. Understanding students' perceptions of barriers are important because they can prevent students from completing a four-year degree. The pilot research provided in the study is the first step in helping educators and community leaders understand what drives and form students' perceived educational barriers and students' perceptions of self and then provide a better understanding of first-generation Hispanic students' value of higher education.

As part of the study, I designed the "STEAM" College Success Program to help college students overcome the perceived barriers intervening with the completion of a bachelor's degree. The program involved both community and industry stakeholders and college students in a unique experience of incorporating both an intensive one-week camp and academic school year of mentorship, STEM education, and college support. Pilot results of the "STEAM" College Success Program indicate the innovation was effective in reducing perceived barriers relating to college success and bachelor's degree completion. The innovation was most effective in reducing students' perceived barriers in the area of self-efficacy and achievement. Below are the conclusions learned from the study.

The first conclusion: A student's perceived barriers to post-secondary success are not just present because a student lacks a single item. Barriers to bachelor's degree completion come in many forms and are due to many circumstances. The barriers identified in the study have similar splits between the three constructs: *Opportunity* construct having the most responses at 41%, the *Achievement* construct was second with 30% of the total barrier responses, and *Awareness* was in a tight third mentioned 29% of the responses. Some barriers and perceptions of barriers can be changed, and some

barriers remain permanent. It then becomes, how do students handle and learn to work with the barrier.

The second conclusion: Academic advisors need to play many roles in supporting students. Academic advisors are vital tools to transfer a student's success. It is not enough for advisors to provide students with a generalized plan of study. Students rely on the guidance provided by academic advisors. Increased personalized and specialized academic and career counseling is important to students. Students want more specialized and personalized academic advising and stressed the importance of being assigned one advisor who understood their ultimate career goals instead of the current method of being assigned advisors at random with no consistency in seeing the same advisor each time. Students want personalized advising based on career goals, challenges, and individualized needs of the student.

STEM students want and need STEM advisors. The science and math prerequisite course rotations and their availability and accessibility to students studying a STEM major is essential. Advisors default to general associate degree recommendation tending to be broad and eliminating the consideration of degree-specific prerequisite courses required by each major. STEM students want advisors that understand and include the prerequisite science and math courses into the student's transfer plan. Making sure STEM students have access to the additional upper-level STEM courses on a consistent rotation improves first-generation Hispanic students' chances to transfer to a university, increasing the opportunity for bachelor's degree completion.

There is a need for increased career counseling. Career counseling is important

for first-generation Hispanic students' post-secondary success. In the current advising models, career advising, academic advising, and disciplinary-specific advising are interchangeable. The study indicated a need for increased advisor training in career counseling and recommend an increase in hands-on experiences for the academic advisors. The experiences could be similar to the one-week intensive career camp the students completed. Increasing the opportunity for academic advisors to increase their industry experiences and career awareness in the STEM fields is a valuable tool that would provide field experiences and thus improve advisors' knowledge regarding STEM careers leading to an increase in advisor's ability to career counsel. The hands-on learning for the advisors might also motivate them to want to learn more about the local jobs available to STEM bachelor completers. Involving more career exploration activities for the college level academic advisors, including the use of local workforce development information and the introduction to local industry professionals, would expand advisors' understanding and knowledge about the world of work available in STEM careers; thus, better preparing them to advise and support first-generation Hispanic students increasing bachelor's degree attainment.

The third conclusion is that earlier and improved program-specific outreach needs to happen. Early student exposure to advising resources and degree requirements is important to a first-generation Hispanic student's college success. Students want and need more and easier access to information about college, specific STEM degree semester by semester plans and career counseling information from academic advisors, and student services. Students indicated the information was not easily accessible and, if

developed, held tightly guarded by college advisors. I recommend the need to improve STEM college outreach efforts working with high school students and new college freshman increasing distribution of early college information regarding course requirements, degree requirements, and develop recommended four-semester to transfer degree plans. Current college outreach models focus on recruitment.

The fourth conclusion, Hispanic FGCS students need extra assistance navigating through the college systems. Expanded student services personnel assists students with added accountability and support. Student participants noted they found programs or supports that addressed the lack of school support barriers and used tutoring, clubs, and other special groups to get the individualized help and support they needed and expressed concern for the students who could not find such support to find solutions to their challenges. It is important to create a campus-wide campaign increasing and identifying faculty and staff who are interested in supporting students afraid to ask for help. The campaign might include training regarding how to approach students, so they do not feel threatened or inadequate about needing extra explanation, advice, or guidance. Students suggested we need to remind faculty and advisors to speak clearly and descriptively, explaining how students get confused by acronyms, college jargon, or assumptions regarding a student's understanding of what they are told or in the giving of direction.

The final conclusion is the importance of money and making money in the student's life. For students of limited means, financial affordability continues to be a barrier to bachelor's degree completion. Supporting Hispanic FGCS in identifying, applying for, and maximizing financial aid and scholarships from all sources is a critical

piece to student success and bachelor completion. Because families require additional support and income from college students to make ends meet, the burden of paying for college is shifted to students, forcing students to work.

Having to work while attending school adds another barrier to bachelor's degree completion. Balancing family, work, and school is difficult and many times, conflicts with schedules and demands of attending college. Depending on family demands, student's work hours, and transportation availability, students are limited in their participation in campus, transfer activities, and opportunities to take part in an internship. However important the goal of completing a bachelor's degree is to first-generation Hispanic students, many are forced to manage competing priorities. In many cases, the priority of the bachelor's completion moves to the bottom of the list.

Conclusion Summary

The "STEAM" College Success Program was developed and implemented to help support first-generation Hispanic students of the desert southwest to overcome their perceptions and challenges involved in the process of bachelor's degree completion. The innovation supported improved systems thinking, considering the interactions between students, community, and industry stakeholders. The partnership objective of the innovation was to ultimately build a diverse pipeline of educated and skilled talent in the career areas of Science, Technology, Engineering, Agriculture, and Math. This was accomplished by actively engaging early college students in activities that improved their access and success in higher education opportunities in the areas of agriculture, food, natural resources, science, engineering, technology, health, and other related disciplines. Collaboratively, team academic, industry partners, and community leaders worked together

to effect change in the student participants of the program aiming to invoke change in a student's perceptions of college, improving college success and bachelor's completion rates for the participants.

Pilot results of the "STEAM" College Success Program indicate the innovation was effective in reducing perceived barriers relating to college success and bachelor's degree completion. The innovation was most effective in reducing students' perceived barriers in the area of self-efficacy and Achievement. The pilot study results were interesting in that I learned increasing *Achievement*, *Opportunity*, and *Awareness* does not always equal an equal amount of change in the reduced perception of barriers: (Increased *Awareness* \neq Increased change in *Awareness* perceived barriers) or (Increased *Opportunity* \neq Increased change in *Opportunity* perceived barriers). Instead, the impacts of innovation look more like (Increase in *Opportunity* = Increased change in *Achievement* perceived barriers) or (Increase in *Awareness* = Increased change in *Achievement* perceived barriers).

For an explanation of the results, I refer to theoretical framework of the study Social Cognitive Career Theory which says, perceived self-efficacy is posted as a pivotal factor in career choice and plays a major role in individual's thought processes and how they shape their academic and career development (Bandura, et al., 2001; Lent et al., 2002). There are many factors, both positive and negative, impacting student success, but it is how an individual interprets these factors that determine the influence on academic and career development (Bandura et al., 2001).

Through the accumulation of innovation experiences, increasing students' Awareness, and Opportunity, students changed how they perceived barriers. The added

new experiences and knowledge increased students' belief in themselves and their abilities of personal success, reducing *Achievement* barriers by increasing students' self-confidence, school and career expectations, and personal goals.

I identify the process as "Intervention Soup." Like soup, individual items are added to the pot, and then only through the process of heat, stirring of ingredients, the cooking process, time, and monitoring and adjusting of the environment, the items blend to create something similar but different in the form of soup. The innovation had a similar effect. Through the "STEAM" College Success Program experience, which included the week intensive "STEAM" camp, ten-month mentorship program, and encouragement and direction from change agent researcher, students were exposed and challenged to new experience opportunities and increased knowledge and awareness. The improved change in students' perceptions relating to barriers to college was measured and identified in the students' improvement in self-efficacy or how they were able to see themselves achieve their goals.



Figure 86. Innovation Soup: Increasing Achievement Through the Innovation Experience.

The “STEAM” College Success Program pilot study is the first step to increasing bachelor’s degree attainment relating to students’ decision to continue their post-secondary education. Although the results of the study reveal significant improvement in reducing students’ perceived barriers, continued research is needed to validate the innovation model works at a larger scale. Reducing students’ perceived barriers regarding college and bachelor’s degree completion is required, so as a community we can inspire and support local students in a manner that reduces barriers and increases bachelor’s degree completion rates in Yuma and Imperial Counties.

One of the participants of the “STEAM” College Success Program summarized the experience the best:

My greatest challenge turned into my greatest support. Participation in the

“STEAM” College Success Program was tough, but so worth it. I met so many awesome people who gave me a strong foundation of what work looks like after college. It motivated me, challenged me, and opened many doors to build relationships that will carry over to areas beyond academia. I see myself working in industry and know I can do anything I set my mind to (Perceived Barriers Survey, question 9).

By increasing bachelor’s degree attainment and growing our own STEM graduates ready to enter the world of work, students’ and their families’ lives are improved, and the desert border region will develop a world-class local STEM-educated workforce, skilled to meet the increasing job demands of the region.

Limitations of the Study

As with most research studies, the action research study has some limitations that warrant consideration. The limitations include the following: First, small sample size and sampling procedures could create difficulty in identifying generalizations from the data (University of California, 2013). Potentially, the real issue with the analyses may be sample size, which consisted of seven individuals per group.

I developed the action research dissertation as an exploratory research tool to determine the effectiveness of the “STEAM” College Success Program. At the time of its implementation, only seven individuals per group were available. In the future, if other organizations wish to use it, the following analysis may help. The statistic program G*Power was used post-hoc to determine appropriate sample sizes for future analyses. I used it “after the fact” because some of the input information (for example, effect size) was unknown at the beginning of the research.

Input values consisted of effect size, alpha level, power, and the number of groups. An effect size of 0.4 was determined by the previous ANOVA analyses, which yielded effect sizes of 0.627, 0.528, and 0.306. For future research, to accommodate a large effect size, consistent with results from the current results, a minimal value of 0.4 is suggested. In the first two ANOVAs, where there were no violations, the effects sizes are high (0.627, and 0.528). When conditions were questionable, and violations occur (the third ANOVA), the effect size was 0.306. Therefore, a minimal effect size of 0.4 is reasonable. The alpha level, or level of significance, was initially chosen as 0.05 and is a standard accepted for the majority of research. The alpha level is the probability of committing a Type I error or rejecting the null hypothesis when it is true. Power refers to the probability of rejecting the null hypothesis when it is false and is related to a Type II error, where Type II error refers to not rejecting the null hypothesis when it is false. If the probability of committing a Type II error is β , then Power is calculated by $\text{Power} = (1-\beta)$. A Power equal to 0.8 is also a standard accepted for the majority of research, and the best manner to achieve the desired Power is by manipulating sample size. In the figure below showing the G*Power analysis, a total sample size of 66 is recommended, which would ideally be divided among the three groups; that is, each group should contain a minimum of 22 individuals. Also, the larger number of individuals potentially could alter the profiles (variance) of the three groups and reduce the likelihood of a violation of homogeneity of variance in the ANOVAs. See G*Power Analysis below.

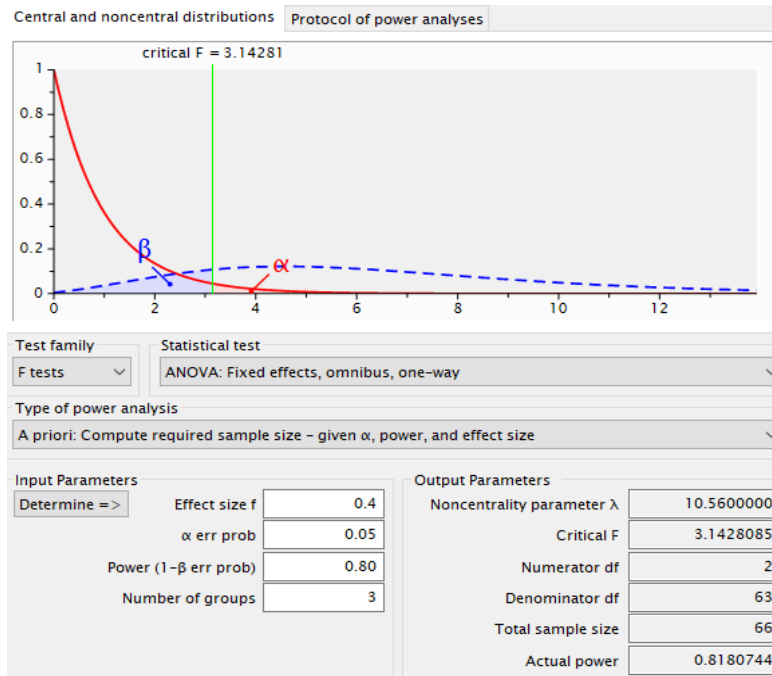


Figure 97. G*Power to Determine Appropriate Sample Size.

Second, I based all prior statistical analyses (paired sample t-tests, ANOVAs, etc.) on parametric statistical tests. Though more powerful, parametric tests require fulfillment of assumptions (adequate sample size, homogeneity of variance, etc.). Non-parametric tests such as Chi-square tests have few assumptions to be concerned with; however, they are less powerful (when compared to parametric tests, it takes a greater deviation from the null hypothesis to reject it). I propose simple analyses using Chi-square tests if parametric assumptions cannot be met. Additionally, the analyses could be used as an initial (overall) screening to detect any substantial effects by the treatment and perhaps direct further (parametric) in-depth analyses. A summary of the Chi-square approach is provided (APPENDIX M).

Third, the specific and unique criterion and homogenous sample selected by the researcher may cause limited participants.

Fourth, an unequal number of survey questions per construct is a limitation. The Perceived Barrier survey used in the study had an unequal number of survey questions: Q2(22), Q3&Q4(20), and Q5(10). This uneven number may have impacted the results of the study.

Fifth, results might not be suggested by every Hispanic transfer student attending a community college with the intent to complete a bachelor's degree.

Sixth, purposeful, criterion, and homogeneous sampling may have caused limits of tight control and randomization for validity purposes.

And seventh, the lack of research surrounding the topic is another limitation of the study.

The referenced limitations did not cause methodological problems for the study. The researcher acquired qualitative and quantitative findings and converged the data accordingly.

Implications for Practice

Action research is an active process that involves the spiraling cycle of reflecting, studying, and planning, acting, collecting the data, reflecting, monitoring, and adjusting, etc. Understanding of each cycle improves the actions leading to new questions and other important areas of study. The cycle of research recommendations for future practice includes questions, suggestions, and items warranted for further consideration for local and extended universities and industry and others interested in border educational research.

General Implications for Practice

Extended and distance campuses are important in supporting Hispanic FGCS and rural border communities. Distance campuses play a significant role in bringing educational opportunities to people not able to leave and attend a state university. Local distance university campus creates expanded educational opportunities for all people, offers a chance to be educated, opens doors to improved jobs and career movement, serve their community, build and increase family income, and overall improves the community.

Career counseling and experiential career learning are essential in recognizing the overt factors career experiences make on student motivation. Given the quantitative and qualitative convergence, the most influential motivational factors are to increase students' career knowledge, career experiences, and the importance of exposure to mentors working in the students' career area of interest.

Increased community college partnerships with university distance campuses increase the opportunity for bachelor's degree completion. The researcher recommends 2+2 seamless articulation and eight-semester shared degree planning guides blurring the lines between institutions. Transfer students need to have detailed eight-semester plans leading to bachelor's degree completion. The local community colleges are the feeders into upper-level university coursework; enrollment and bachelor graduation rates depend on the community college and their relationship with distance campuses. Offering local STEM degree opportunities in fully articulated and mapped out educational plans allows students to transition seamlessly from the community college to the extended distance campus. All college declaring intent to transfer students should be provided an eight-semester plan instead of the usual college four-semester. Identifying the end at the

beginning increases students' commitment to bachelor's completion because they have a clear pathway map to follow, decreasing students' time to graduation.

Implications for Practice Related to the Innovation

Keeping the momentum going is a must. It is difficult enough to get the momentum going, let alone keep it moving. It becomes difficult when the research period extends over several months. It is through deliberate thoughtfulness and continued planning and adjusting that this concept is not left to chance. Most times, we only get one chance, so it is essential to be prepared and make it count. A clearly defined plan is critical. All involved need to be engaged and active, while at the same time preventing burnout. It is easy to get caught up in the innovation events, which include moments of change that we forget to consider, what might happen once the transition takes place, and must be sustained. To be successful, one must identify these items before starting the camp and mentorship program and then moderate the energy that goes into developing and then supporting the change. Moderating the energy is challenging, but incredibly crucial to sustainment.

It is though the planning, responsibility of the innovation becomes shared and lessens the sole responsibility of the implementer/change agent of the innovation. The sharing of the responsibility between the student participants and mentors helps to keep the momentum going and prevents burn out. Because the mentorship program engages the community and industry, the purpose and definition of the future vision need to be driven by public engagement. Accountability between educational, business, and community need to be mutual and transparent. Lastly, students must be involved in future research. By actively engaging college students as a partner in the innovation, students

learn responsibility, accountability, and commitment to their own learning and future career.

Increasing the number of students wanting to participate is critical. As educators, it is easy to look only at the top, the best and brightest of our students, not the bottom. When recruiting students, I found it essential to not just focus on the top students but include students from neglected sectors; i.e., career and technical education students, migrant students, gear-up students, students with children, Veterans, and STEM declared first-generation students. These neglected populations allow for increased market opportunity aiding in the difficult task of finding students interested in participating in a full academic year innovation program. Increasing student diversity of program participants also increases new learning opportunities and experiences for student participants.

Future research needs to be supported by teachers, counselors, and professors. It is important to incorporate teacher/professor career training and mentoring, emphasizing the importance and career opportunities available to students having a STEM bachelor's degree. For, they are better able to advise and mentor students who learn in various ways or are interested in specific STEM career areas. Investing in our teachers, counselors, and professors allows for more autonomy, increased knowledge regarding benefits of participation in the career mentorship program, and expanded partnerships with community and industry.

Expanded industry and agencies' interest in participation is essential to the success and growth of the program. Many might find it challenging to think education, industry,

and the government could work together to make a change. Thinking outside the box and considering the reasons for these beneficial partnerships is an integral part of the “STEAM” College Success Program. It is essential to include many different industry and agency partners. The foundation of the partnerships should consist of constructing effective relationships between government, industry, and education with the goal to work together developing a deeper understanding of each other’s industry and future career needs, and more importantly, to understand how the profound forces of working together can reshape students by expanding opportunities and benefits of completing a bachelor’s degree and the implications for the community. I strongly suggest the center of this be through development and communication of an advisory board. The advisory board needs to be developed so to share in the understanding of what is required to achieve a world-class workforce leading to a shared commitment to increasing bachelor’s degree attainment. It is through the leadership of the advisory board a world-class educational framework can be established, increasing dialogue and partnerships between government, industry, and educators so to support students through the challenges of the college toward world-class workforce development.

Recommendations for Future Research

Recommendations for future research are suggested based on the findings of the action research study. Most specifically, the recommendations are suggested to regional distance universities within rural border communities.

I recommend additional research needs to be conducted for distance university campuses within other geographic areas beyond Yuma and Imperial Counties. As the limitations suggested, results might not be suggestive of every Hispanic student pursuing

a STEM degree. Additional research in various border regions can provide further insight into the extended university student demographics and perceived barriers and motivational factors to bachelor's degree completion.

I also recommend additional research needs to be conducted in the remainder of the regional population. Limited findings were yielded due to the small pilot sample. A scale-up including a larger sample might provide improved data and relevant content for other border distance campus universities and local industry partners.

Lastly, I recommend additional research needs to be conducted exploring how to tie traditional science and math to students' career interest and the methods learned in science and math high school and college classes to career activities integrated and required in STEM fields. Data suggests from the research, students, and teachers many times, miss the opportunity to understand the importance of science and math principals as the foundation for students' career and major selection. Thus, further quantitative and qualitative research can be conducted to examine this concern.

Final Reflections

“There are three methods to gain wisdom. The first is reflection, which is the highest. Second, by imitation, which is the easiest, and third by experience, which is the bitterest.”

Confucius, *On Learning Wisdom*

In my mind, the words above illustrate the research process. Through experiencing the research process, I have gained surprising insights about learning, college students, and myself. Experiencing the research process, from beginning to end, has inspired me the opportunity to infuse a more reflective practice imitated by both

current and past researchers. This reflective practice has increased my purposeful examination within my community of practice, increasing systematic sense-making of post-secondary education challenges and supports local students' experience while working on completing a bachelor's degree.

The principal implication relating to the action research study's findings are the important effects STEM career exploration and mentorship program can have on students' decisions to pursue and complete a bachelor's degree. Work and the identification of a future job or career is the cornerstone and cultural identity used to measure adult success. Educational practitioners and industry partners should take note as both a concern and a motivational factor influencing students. Students want to establish themselves and identify with work and their future career. This desire creates an opportunity for local educational entities to partner with industry and agency, shaping an environment conducive to both Hispanic education and work culture. Using tools already existing like high school and college science and math classes, career and technical education classes, and their associated student clubs and organizations, partnering with industry and agency in a STEM-based career readiness educational campaign could be implemented with limited additional resources.

Through experiencing the research process, I have also learned that all people approach changes differently. If we want to implement change, the focus must be on changing both the heart and the mind simultaneously. I learned through the study, students can agree to the theory of implementing change, but if emotionally, they are not ready to commit to the change, making a permanent change is challenging. Several times

throughout the study, student participants said they believed in something even citing examples of why they believed. But later, they pointed out how the belief was useful and good for others but not necessary for themselves, giving personal exceptions taking place in the students' own lives as reasons. The commitment to make a change is much easier than demonstrating commitment through action. With so many variables impacting students of the desert border regions, the variables affect the local culture, and all associated with bachelor's degree completion. Changing a culture is slow, but with patience and dedication, change is possible. I believe, as a community, we must persist in our efforts to increase educational and career opportunities for all. It is through increased completion of STEM bachelor's degrees that opportunities also increase. And it is through the increased opportunity; a world-class STEM-educated workforce can be created, attracting and creating more opportunities for the desert border region as a whole.

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APPENDIX A

BUDGET NARRATIVE FOR STEAM CAMP

A) PERSONNEL	
Associate Camp Advisors -- Salary & Employee Related Expenses	In-Kind
B) ROOM & BOARD	
Student Participants (8) plus 1 intern & 1 advisor (1 male/1female) in Yuma, AZ	\$2,240
C) TRANSPORTATION	
Vehicle Rental (1 van)	\$665
Gasoline (1 van)	\$150
D) MISCELLANEOUS/STUDENT PARTICIPANT SUPPORT	
Water and Snacks for field trips with regional activities	\$500
Materials and Supplies for impacts and reflections	\$445
TOTAL ALLOCATED BUDGET	\$4,000

APPENDIX B

2018 USDA “STEAM” SUMMER RESIDENTIAL PROGRAM AT UA-YUMA WEEK
PLAN- MONDAY, JULY 30, 2018, TO FRIDAY, AUGUST 3, 2018

Monday, July 30, 2018

- Pick-Up students from Imperial Valley College.
- Check-In to dorms in Yuma, AZ - orientation and greetings.
- Visit Barkley Ag Farms - agronomy, seed-company, grain production, and processing.
- Visit local bank on agriculture lending - the importance of financing to the agricultural business.
- Visit the University of Arizona Yuma Agricultural Center - extension and research to production, student projects overview, expectations and use of technology, drones in agriculture.
- Presentation on leadership, communication, and history of agriculture in Yuma, AZ, and the rural area of the Imperial Valley (California) with its role in the United States during the winter markets.
- “What is a mentor- Hearing their stories.”

Tuesday, July 31, 2018

- Visit Vessey Farms - produce, forage, and cotton farmer.
- Visit the University of California Desert Research Extension Center in Holtville, CA, a.k.a. The Carrot Capital of the World to tour its facility and meet with agriculture industry leaders in the rural area of the Imperial Valley (California).
- Visit USDA-APHIS in the Agriculture Inspection Port about careers in Agro-Security.
- “What is a bachelor’s degree, and why is it important to you?”
- Mentor Time- What supports would I like to get from a mentor?”
- Work on student projects, resume building, and learn about USAJobs.

Wednesday, August 1, 2018

- Visit Desert Springs Farm - examples of the sustainable farm with fish, forage crops, and meat goats.
- Visit Sarah Farms Dairy with a tour of and forage production.
- Visit Insect Rearing Lab, tour, and learn about entomology.
- “FASFA, Scholarships, Internships-Financing your education.”
- “What have you heard about college- perceptions good and bad about college.”
- Mentorship Time- Mentors share their most significant challenges in college and how they overcame these challenges.
- Work on student projects, resume building, and learn about USAJobs.

Thursday, August 2, 2018

- Visit the Campbell Ave. Farm - meats lab, equine center, teaching farm.

- Visit Bioinformatics Lab - the importance of large data computing in agriculture
- Visit Food Safety Lab, Plant Pathology Lab, Mycology Lab - roles of food safety, fungi, and diseases play in agriculture.
- “Meet your Mentor- mentor matching activity.”
- Work on student projects, resume building, and learn about USAJobs.

Friday, August 3, 2018

- Check-Out of dorms
- Debriefing with students and advisors about hands-on learning with labs exploration, educational activities, and regional field trips with regional farmers and ranchers.
- Finish student presentations with impacts and reflections to upload to YouTube.
- Drive-Up with students to Imperial Valley College for presentations and awards program. Mentors, parents, community leaders, teachers, and counselors invited.

APPENDIX C

STEAM SUMMER APPLICATION

Emergency Contact Name		Telephone Number Home: () Mobile/Cell Phone: ()
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APPLICATION of Interest MUST BE RECEIVED via E-MAIL by July 19, 2018, “submit in PDF document format.”

sdsu.usda.hsi@sdsu.edu

If selected to participate in the **2018 USDA “STEAM” Summer Residential Program hosted at UA-Yuma** I promise to abide by the rules and regulations that govern the program, and to make proper use of the educational advantages offered. If for any reason, I violate any part of the Student Contract, I acknowledge that I can be dismissed from the program and sent home immediately.

The hands-on educational learning experiences will be comprised of varied/wide-ranging leadership development, college readiness, career readiness, and regional site visit activities with impacts and reflections that showcase the importance of agriculture throughout Yuma, AZ, and in the Imperial Valley.

I affirm that the information submitted in my application package is true to the best of my knowledge.

Student’s Signature: _____

Date: _____

I am a U.S. citizen: _____ (Student’s Signature)

Student’s Full Name: _____

APPENDIX D
STEAM CAMP RELEASE FORM

STUDENT RELEASE FORM

Student: I, _____ who is enrolled with this agreement, am in excellent health, and may participate in strenuous physical activities associated with the program. I agree to defend, indemnify, and hold harmless USDA and the selected university, its officers, servants, agents, and/or employees, contractors, and insurers from all claims for injuries sustained during my participation in this program.

Permission is hereby granted to the USDA and the selected university to use pictures and video(s) of myself in any promotional materials, as well as to travel on field trips both in and out-of-state.

Permission is granted in the agreement for myself to receive emergency medical treatment if needed, and I certify there are no limits to my participation in the program activities, except as stated in writing and included with a supplemental medical history.

I understand and acknowledge that the program does not offer any medical insurance to protect against injuries, makes no claims to do so, and has no responsibility for any medical expenses incurred. I understand that each participant must assume the risk and any related financial responsibility that could result from participation in any of these activities. I agree to assume any risk and financial responsibility.

I have received a copy of the Student Contract for the **2018 USDA “STEAM” Summer Residential Program hosted at UA-Yuma**, and I have thoroughly reviewed it.

Student’s Signature: _____ **Date:** _____

APPENDIX E

STEAM CAMP STUDENT CONTRACT

STUDENT CONTRACT

Acceptance into the **2018 USDA “STEAM” Summer Residential Program hosted at UA-Yuma** is a privilege, but it also requires students to assume certain responsibilities.

Student: I,

as a participant in the above-mentioned program, do hereby accept the conditions stipulated below:

1. I will participate in and be on time for all sessions and activities unless excused.
2. I will conduct myself respectfully and courteously at all times.
3. I will sleep where assigned and realize that I will be in constant contact with people from varying cultures and ethnic affiliations.
4. I understand that there are guidelines regarding lights-out and bedtime and that there will be a bed check every night.
5. **I will not smoke or use drugs or alcohol during the program, and I understand that by doing this, I will be sent home immediately AT MY EXPENSE.**
6. **I will not engage in fraternization, cohabitation, or co-mingling of any kind during the program. Friendships are encouraged from a platonic standpoint only. Any disregard in this matter or any other infractions may be cause for dismissal from the program and will be alerted of the misconduct.**
7. I understand that I may be held responsible for any damage to equipment or facilities.
8. I understand that all profanity, horseplay, fighting, or inappropriate acts is prohibited.
9. I understand that other than a clock/radio, no electronic equipment (including TVs, portable radios/music players, or computer games) will not be allowed.
10. There will be no aggressive behavior tolerated at any time. This includes fighting, bullying, cyber-bullying, undue persuasion, assault, cursing, and general disregard for myself and the people around me.
11. The student will respect the dormitories and other facilities on and off-campus, at all times.
12. The use of cell phones and other handheld devices is strictly prohibited during visits and presentations. For any such misuse, the instrument will be confiscated until the end of the program.
13. Participants of the program are not allowed to have personal vehicles on campus.
14. Appropriate attire will be required at all times. No

student will be allowed to wear overly provocative or offensive clothing.

15. If there are any discrepancies of any kind, they should be brought to the attention of supervision and handled accordingly. No infractions of any kind should be handled by the students.
16. I will adhere to these and all other rules of the program.

Student's Signature: _____ **Date:**

PICTURE AND VIDEO RELEASE STATEMENT

Student: I fully understand the conditions stipulated above, and hereby give full consent to USDA and the selected university to reproduce my picture and/or video in future promotional material.

Student's Signature: _____ **Date:**

APPENDIX F

STEAM COLLEGE ENRICHMENT APPLICATION SUMMARY

Please Submit via E-Mail (sdsu.usda.hsi@sdsu.edu):

- 1. Unofficial Transcript from Imperial Valley College**
- 2. Résumé with Summary, Education, Experience, et al.**
- 3. ESSAY**

ESSAY

“submit in PDF document format.”

The essay must:

- Be typed in Times New Roman 12-point font size
- Include your name, Major at Imperial Valley College, Freshman or Sophomore in Fall 2018, mobile/cell phone number and telephone number, and your e-mail address in the upper left corner of the first page below your title for the essay.
- Be two (2) pages in length
- Be a minimum of 500 words and a maximum of 1,000 words
- Address the five questions below within your essay:
 - ✓ Why I Want to Attend the *2018 USDA “STEAM” Summer Residential Program hosted at UA-Yuma*
 - ✓ What I Want to Learn
 - ✓ What are My Future Career Goals and How I Plan to Achieve Them
 - ✓ What are My Future Higher Education Goals and How I Plan to Achieve Them
 - ✓ What are Some of My Hobbies and My Interests with STEAM-related fields of study

Include information about your interest in agriculture, food, nutrition, natural resources, conservation, sustainability, rural development and prosperity, social sciences, and/or other related issues.

In particular, please share your interest in the STEAM-related fields of study; Ag Sustainable Plant Systems: Agronomy/Fresh Produce Food Safety Option, Agriculture Technology & Management: Ag Systems Option, Animal Science,

Biosystems Engineering, Civil Engineering, Commerce
(International and Intrastate), Commerce (Local and Regional),
Family Studies & Human Development,
Human Services, Mathematics (Computational Science and
Engineering), Nutritional Science, Organizational
Leadership, Systems Engineering, etc.

APPENDIX G

RATING FORM

2018 USDA “STEAM” SUMMER RESIDENTIAL PROGRAM HOSTED AT
UNIVERSITY OF ARIZONA-YUMA

categories and associated point values	SCORE
Unofficial Transcript & Résumé (1-2 points)	
ESSAY	
<ul style="list-style-type: none"> the application is neat, legible, and well-organized w/student's name, Major, Freshman or Sophomore in the Fall 2018, mobile/cell phone number, and e-mail address on the first page (1-2 points) 	(points)
<ul style="list-style-type: none"> two (2) pages in length – a minimum of 500 words and a maximum of 1,000 words (1-2 points) 	(points)
<u>Questions Addressed</u>	(points)
✓ Why I Want to Attend the 2018 USDA "STEAM" Summer Residential Program hosted at UA-Yuma (1-4 points)	
✓ What I Want to Learn (1-2 points)	(points)
✓ What are My Future <u>Career & Higher Education</u> Goals and How I Plan to Achieve Them (1-2 points)	(points)
✓ What are My Future <u>Career & Higher Education</u> Goals and How I Plan to Achieve Them (1-2 points)	(points)
✓ What are Some of My Hobbies and Interests (1-2 points) with STEAM-related fields of study	
0 Include information about your interest in agriculture, food, nutrition, natural resources, conservation, sustainability, rural development and prosperity, social sciences, and/or other related issues. (1-2 points)	(points)
TOTAL:	

Student's Name:

Imperial Valley College Major:

Please rate the application of interest using the categories and associated point values listed below. The maximum overall score a student can receive is **20 points**. The selected students would be the ones with the highest scores.

Reviewer's Name (printed):

Reviewer's Signature

APPENDIX H

“STEAM” COLLEGE SUCCESS PROGRAM FORM

Title of the research study: *Identifying perceived barriers and supports that influence college success and completion for desert southwest first-general Hispanic students: Making bachelor's degree completion the obvious and attainable next step for more students in the desert border region of Yuma and Imperial Counties.*

Investigator: Tanya Hodges & Dr. Katie Bernstein

Why am I being invited to take part in a research study?

We invite you to take part in a research study because Imperial County has some of the highest college-going culture, but low college completion rates. You are being invited to participate in this study to help us understand why these completion rates are low.

Through this research, we hope to identify barriers that might be preventing students from formulating and pursuing postsecondary aspirations and bachelor's degree completion. We also hope the results from this study will identify college student supports that might help college students through the 4-year educational process and increase bachelor- degree attainment for students in this community.

Why is this research being done?

The purpose of this study is to investigate first-generation Hispanic college students' perceptions and barriers that might influence college bachelor's degree completion in the desert region of Imperial & Yuma Counties, Arizona.

How long will the research last?

The research begins with the "STEAM" Summer Camp and will continue throughout the school academic 2018-2019 year.

How many people will be studied?

Eight people will participate in this research study.

What happens if I say yes, I want to be in this research?

You are free to decide whether you wish to participate in this study. If you choose to participate in this study, you will attend the "STEAM" Summer Camp at no cost, and then receive industry mentorship and college support throughout the 2018-2019 academic school year.

Is there any way being in this study could be bad for me?

No, there is no risk.

Will being in this study help me in any way?

Students in Imperial Counties have limited access and exposure to adults that are educated. The "STEAM" College Success Program will increase student exposure to educated county leaders and current college students, all of which are potential benefits to the participants of this study.

What happens to the information collected for the research?

Any paper copy data will be kept in a secured and locked file, and all audio data will be securely stored on a password-protected computer. Only the PI and Co-PI will have

access to the data. The data will be stored for four years and then deleted from the computer. The audio recording will be deleted from the original recording device upon transfer to the computer. Both PI and Co-PI have CITI training.

What else do I need to know?

I am currently a student at ASU working on my doctorate degree and am completing research is part of the requirements for my doctorate degree.

Who can I talk to?

If you have any questions, you can contact me at tmhodge2@asu.edu. You may also contact my dissertation chair Dr. Katie Bernstein at kbernstein@asu.edu.

This research has been reviewed and approved by the Social Behavioral IRB. You may talk to them at (480) 965-6788 or by email at research.integrity@asu.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

I have read the above information and agree to participate in the “STEAM” College Success Program.

Student Signature: _____

Date: _____

APPENDIX I
SURVEY/QUESTIONNAIRE

Dear Imperial Valley College Student:

My name is Tanya Hodges, and I am a second-year doctoral student in the Mary Lou Fulton Teachers College (MLFTC) at Arizona State University (ASU), and I am also the Regional Academic Coordinator for UA- Yuma. I am conducting a research study to better understand possible factors, barriers, and supports that influence bachelor's degree completion rates in border communities of Yuma and Imperial Valley. I am currently enrolled in a survey research class and asking for your help. I am testing my questionnaire and ask for you to take a couple of minutes of your time to complete.

There are two parts to the questionnaire. Part 1- Participant Questions are four multiple-choice questions regarding those taking the survey. Part 2- Barriers & Supports, includes 30 scaled questions, where you will rank your answer on a 1-7 scale (1 = lowest influence and 7= highest influence). Part 2 also contains one ranking question. For this question, you will rank the top 3 reasons why students in Yuma and Imperial Counties do not complete a bachelor's degree. The information that you submit will only be used by myself to practice my data analysis and to improve my questionnaire. Thank you in advance for taking the time out of your busy schedule to complete.

You should be enrolled in fall 2018 as a full time (12 credits or more) at Imperial Valley College. Participation in this study is voluntary. If you choose not to participate, there will be no penalty whatsoever. Your choice to participate or not participate will not affect your standing at the university or your grades in any way. You must be 18 years of age or older to participate.

The benefit of participation in this test questionnaire is that you will have the opportunity to reflect on factors influencing degree completion in Yuma and Imperial Counties, and you also have the potential to help others to pursue and complete their bachelor's degree. There are no foreseeable risks or discomforts to your participation.

The responses to this questionnaire will be confidential.

If you have any questions concerning this research study, please contact me, Tanya Hodges, at tmhodges2@asu.edu or 928-271-9560, or my research supervisor, Dr. Katie Bernstein at kbernstein@asu.edu or (412) 638-4505.

Thank you,

Tanya M. Hodges, Doctoral Student and Regional Academic Coordinator for UA Yuma.

Name of Student:

Student Questionnaire: Part 1- Participant Questions

Please provide the following information:

	Yes	No
Are you Hispanic?	<input type="radio"/>	<input type="radio"/>
Will you be the first person in your immediate family to complete a bachelor's degree?	<input type="radio"/>	<input type="radio"/>
Did you attend middle school in Yuma or Imperial County?	<input type="radio"/>	<input type="radio"/>
Did you attend high school in Yuma or Imperial County?	<input type="radio"/>	<input type="radio"/>
Does your family support and encourage you to stay in college and complete a bachelor's degree?	<input type="radio"/>	<input type="radio"/>
Do your friends support and encourage you to stay in college and complete a bachelor's degree?	<input type="radio"/>	<input type="radio"/>

What gender do you identify yourself with:

- Male
- Female
- Other

Student Questionnaire: Part 2- College Readiness

Please select the number that best indicates how much you agree with each statement BEGINNING of YEAR compared to END of THE YEAR.

- 1= Decreased greatly
- 2 = Decreased slightly
- 3 = No Change
- 4 = Increased Slightly
- 5= Increased Greatly

	Beginning of 2018-2019 Year					End of 2018-2019 Year				
	1	2	3	4	5	1	2	3	4	5
My ability to can handle change well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am self motivated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have identified a major.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have many connections within local industry.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not afraid to ask for help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I manage my time well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am comfortable living on my own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider myself to be highly resilient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Beginning of 2018-2019 Year					End of 2018-2019 Year				
	1	2	3	4	5	1	2	3	4	5
Completing a bachelors degree is important.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know what I want as a career.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know the steps to get me to my dream career.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I need help I seek it quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel prepared to apply for a college internship.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel comfortable speaking in front of others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important to expose myself to as many educational and industry experiences as I can.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am motivated to complete a bachelors degree.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have applied for scholarships	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have completed the application process and/or have been accepted to my transfer University.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have met with an academic advisor and developed my educational plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am highly resourceful.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am highly innovative.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a good communicator.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Beginning of 2018-2019 Year					End of 2018-2019 Year				
	1	2	3	4	5	1	2	3	4	5

Understanding how the college system works impacts my bachelor's degree completion.



High school preparation for college impacts my bachelor's degree completion.



Requirement to be a full-time student (12 credits or more /semester) impact my bachelor's degree completion.



Needing to work full time (40 hour/week) impact my bachelor's degree completion.



Transportation impact my bachelor's degree completion.



Student Questionnaire: Part 3

Please select the number that best indicates how much you agree with each statement BEGINNING of THE YEAR compared to END of the YEAR.

- 1= Strongly Disagree
- 2 = Somewhat Disagree
- 3= Neither Disagree or Agree
- 4 = Somewhat Agree
- 5 = Strongly Agree

Please rank the items you believe to influence your bachelor's degree completion.

	Beginning of 2018-2019 Year					End of 2018-2019 Year				
	1	2	3	4	5	1	2	3	4	5
<u>Money availability</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>English language proficiency</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Understanding of the benefits of completing college</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Understanding how to complete the online FASFA/scholarship application</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>Understanding the university application process</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Beginning of 2018-2019 Year					End of 2018-2019 Year				
	1	2	3	4	5	1	2	3	4	5

Understanding how the college system works impacts my bachelor's degree completion.



High school preparation for college impacts my bachelor's degree completion.



Requirement to be a full-time student (12 credits or more /semester) impact my bachelor's degree completion.



Needing to work full time (40 hour/week) impact my bachelor's degree completion.



Transportation impact my bachelor's degree completion.




	Beginning of 2018-2019 Year					End of 2018-2019 Year				
	1	2	3	4	5	1	2	3	4	5
<u>My High school counselors/teachers' involvement/lack of involvement</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>A College internship experiences</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>College involvement in student groups/clubs/activities</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>My parents' educational attainment</u> impact my bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>My high school preparation/lack of preparation for college</u> impact my college degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<u>AWC/IVC College classes prepare students for university success</u> impacting bachelor's degree completion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What are your top 3 challenges you face as you work to **complete a bachelor's degree?**

What are the top 3 **supports** you have experienced which helped you complete a bachelor's degree?



What **supports** do you wish you had that would better prepare or help you be successful in completing a bachelors degree?



APPENDIX J
FOCUS GROUP PROTOCOL

- I. Obtain informed consent from the participant.
- II. Provide a copy of informed consent to focus group participants.
- III. Establish rapport by stating a confidentiality disclaimer and encourage the participant's disclosure (see script below).
- IV. The researcher will introduce herself (see script below).
- V. State purpose of the focus group and study (see script below).
- VI. State time expectations (see script below).
- VII. State and set focus group norms (see script below). Following are the group norms:
 - a. Please allow others to share without interruption.
 - b. Please be respectful of all thoughts, beliefs, and ideas shared.
 - c. Please keep all disclosures confidential.
 - d. Please silence cellular phones.
 - e. Ask the group if they want to add any focus group norms.
- VIII. Researcher/facilitator's script: I am Tanya Hodges; I am currently a student within the ASU educational leadership doctoral program. Today, we will conduct a focus group for my research project. This focus group will take approximately one hour. During the focus group, I will not state your name or any other personal identifiers. You will be referred to as your participant number. Thank you for your participation. I will now state the focus group norms and then start asking the focus group questions. The focus group norms are: (1), please state your numeric identifier before sharing; (2) please allow others to share without interruption; (3) please be respectful of all thoughts, beliefs, and ideas shared; (4) please keep all disclosures confidential; and (5) please silence cellular phones. Are there any additional focus group norms anyone in the group would like to add? Thank you, I will now start the focus group questions.
- IX. Researcher/facilitator asks predetermined questions.

APPENDIX K

FOCUS GROUP QUESTIONS FOR STUDENTS

Focus Group Questions for Students:

- 1.** Please describe any personal challenges you experienced this school year as it relates to being able to attend college.
- 2.** Please describe any supports you received this school year and how have they affected or did not affect your ability to be successful in college.
- 3.** Please describe how completing a bachelor's degree would benefit students in your community.
- 4.** Why do you think many students in our community start college but do not complete a bachelor's degree?
- 5.** What do you think are the most influential items that determine if a student is successful in college and completes a bachelor's degree?

APPENDIX L

RECODED PERCEIVED BARRIER SURVEY QUESTIONS

(Recode key 5 to 1, 4 to 2, 3 same, 2 to 4, 1 to 5)

Perceived Barrier Survey Recoded Questions

Question	
Q3_1	Money availability impact my bachelor's degree completion
Q3_2	English language proficiency impact bachelor's degree completion
Q3_7	High school preparation for college impact bachelor's degree completion
Q3_8	Requirement to be a full-time student impact bachelor's degree completion.
Q3_9	Needing to work full-time impact bachelor's degree completion
Q3_10	Transportation impacts bachelor's degree completion
Q4_1	My need to make money impact bachelor's degree completion
Q4_2	I have many non- school responsibilities impacting my bachelor's degree completion.
Q4_4	My fear of failure impact bachelor's degree completion.
Q4_5	Having friends attending college

Q4_7	impacts bachelor's degree completion. Having my own family impacts
Q4_8	bachelor's degree completion. My need to work impacts bachelor's degree completion.
Q4_9	Sometimes I feel overwhelmed impacting my bachelor's degree completion.
Q5_1	My parents' ability to provide information about college impacts my bachelor's degree completion
Q5_4	My parent /family support impacts my bachelor's degree completion.
Q5_5	My high school counselors/teacher's involvement or lack of involvement impact bachelor's degree completion.
Q5_8	My parents' education attainment impacts my bachelor's degree completion.
Q5_9	My high school preparation impacts my bachelor's degree completion

APPENDIX M

NON- PARAMETRIC TEST RQ2B CHI-SQUARED TABLES 64-73

	Treatment Group	Control - IVC	Control - AWC
C1-Achievement			
Number Significant Tests	16	0	2
Number Not Significant Tests	6	22	20
C2-Opportunity			
Number Significant Tests	3	0	0
Number Not Significant Tests	17	20	20
C3-Awareness			
Number Significant Tests	2	0	0
Number Not Significant Tests	8	10	10

Based on the above Table 64, non-parametric Chi-square tests for each construct (*Achievement, Opportunity, Awareness*) were run to determine if group membership (*Treatment, IVC Control, AWC Control*) affected the number of significant tests that resulted based on t-tests applied to difference scores (Difference score = Post score - Pre score) from questions answered by participating individuals. The *Achievement* construct consisted of 22 questions, the *Opportunity* construct consisted of 20 questions, and for the *Awareness* construct consisted of 10 questions. The null hypothesis pertaining to each construct was defined by:

H₀: The number of significant tests has nothing to do with the group an individual belongs to

H₁: The number of significant tests is disproportionally affected by the group an individual belongs to:

Achievement:

For the *Achievement* construct, the Chi-square test of Independent resulted in a rejection of the null hypothesis ($\chi^2 = 34.833$, $df = 2$, $p = 0.000$, Cramer's V = 0.726).

Therefore, the number of significant tests was affected by the group an individual belonged to. Examination of the Crosstabulation table indicates that in the Treatment group, a higher number of significant tests than expected occurred (16 verses 6), and a lower number of non-significant tests than expected occurred (6 verses 16). Because the mean difference scores in the Treatment group for all the t-tests were positive, having a higher number of significant tests than expected also indicates a positive result for the intervention. The effect size of 0.726 indicates a strong relationship between the number of significant tests and the group a participant belongs to, and hence a strong treatment effect corresponding to the intervention for the *Achievement* construct.

Table 65

Outcome * Group Crosstabulation

		Group			Total	
		Treatment	IVC Control	AWC Control		
Outcome	Significant	Count	16	0	2	18
		Expected Count	6.0	6.0	6.0	18.0
	Not Significant	Count	6	22	20	48
		Expected Count	16.0	16.0	16.0	48.0
Total		Count	22	22	22	66
		Expected Count	22.0	22.0	22.0	66.0

Table 66

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	34.833 ^a	2	.000	.000		
Likelihood Ratio	38.160	2	.000	.000		
Fisher's Exact Test	34.077			.000		
Linear-by-Linear Association	22.118 ^b	1	.000	.000	.000	.000
N of Valid Cases	66					

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.00.

b. The standardized statistic is 4.703.

Table 67

Symmetric Measures				
		Value	Approx. Sig.	Exact Sig.
Nominal by	Phi	.726	.000	.000
Nominal	Cramer's V	.726	.000	.000
N of Valid Cases		66		

Opportunity:

For the *Opportunity* construct, the Chi-square test of Independent did not result in a rejection of the null hypothesis. However, because of a violation of an assumption (no more than 20% of expected counts can be one or less), the Fisher's Exact test was used for its calculation ($\chi^2 = 4.329$, $p = 0.100$). Therefore, the number of significant tests was not affected by the group an individual belonged to. Examination of the Crosstabulation table indicates that in all cells, the actual counts are relatively close to the expected counts.

Table 68

Outcome * Group Crosstabulation						
			Group			Total
			Treatment	IVC Control	AWC Control	
Outcome	Significant	Count	3	0	0	3
		Expected Count	1.0	1.0	1.0	3.0
	Not Significant	Count	17	20	20	57
		Expected Count	19.0	19.0	19.0	57.0
Total	Count		20	20	20	60
	Expected Count		20.0	20.0	20.0	60.0

Table 69

Chi-Square Tests						
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.316 ^a	2	.043	.100		
Likelihood Ratio	6.913	2	.032	.100		
Fisher's Exact Test	4.329			.100		
Linear-by-Linear Association	4.658 ^b	1	.031	.067	.033	.033
N of Valid Cases	60					

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.00.

b. The standardized statistic is 2.158.

Table 70

Symmetric Measures				
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	.324	.043	.100
	Cramer's V	.324	.043	.100
N of Valid Cases		60		

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Awareness:

For the *Awareness* construct, the Chi-square test of Independent did not result in a rejection of the null hypothesis. However, because of a violation of an assumption (expected counts in all cells must be one or more), the Fisher's Exact test was used for its calculation ($\chi^2 = 2.909$, $p = 0.310$). Therefore, the number of significant tests was not affected by the group an individual belonged to. Examination of the Crosstabulation table indicates that in all cells, the actual counts are relatively close to the expected counts.

Table 71

Outcome * Group Crosstabulation

			Group			Total
			Treatment	IVC Control	AWC Control	
Outcome	Significant	Count	2	0	0	2
		Expected Count	.7	.7	.7	2.0
	Not Significant	Count	8	10	10	28
		Expected Count	9.3	9.3	9.3	28.0
Total	Count		10	10	10	30
	Expected Count		10.0	10.0	10.0	30.0

Table 72

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	4.286 ^a	2	.117	.310		
Likelihood Ratio	4.688	2	.096	.310		
Fisher's Exact Test	2.909			.310		
Linear-by-Linear Association	3.107 ^b	1	.078	.207	.103	.103
N of Valid Cases	30					

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .67.

b. The standardized statistic is 1.763.

Table 73

Symmetric Measures

		Value	Approx. Sig.	Exact Sig.
Nominal by	Phi	.378	.117	.310
Nominal	Cramer's V	.378	.117	.310
N of Valid Cases		30		

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

APPENDIX N

TABLE 1

SUMMARY OF RESEARCH TO DATE

	RQ's	Procedure/Methods	Findings
Cycle 0 (work conducted in TEL711class) Spring 2017	RQ1. With respect for completing college, what barriers and support systems do students, parents, teachers, and community perceive to be influences of success or failure at college and college retention and completion?	Qualitative Interview Homogeneity Sampling 47 UA Yuma students random draw 5 selected for an interview Interview Open Coding Data Convergence	<u>Capital as barriers:</u> Students identified MON (money) as their most important item influencing success or failure relating to college completion. *Students identified TM (Time) as their second most

	<p>RQ2.What external factors might be affecting four-year completion rates in Yuma County?</p>		<p>important capital item.</p> <p>*The third-choice students identified as most important regarding success and college completion is B JL (Wanting better job and life).</p> <p><u>Behaviors as barriers:</u></p> <p>Students identified SE (self-efficacy) as</p>
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			<p>the number 1</p> <p>barrier to</p> <p>success in</p> <p>college and</p> <p>completion</p> <p>of college.</p> <p>*OW</p> <p>(Overwhelme</p> <p>d) and MT</p> <p>(Managemen</p> <p>t of Time)</p> <p>were also</p> <p>identified by</p> <p>both students</p> <p>and</p> <p>professors as</p> <p>possible</p> <p>barriers to</p> <p>success and</p> <p>completion</p> <p>of college.</p> <p><u>Culture</u></p>
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			<p><u>barriers:</u></p> <p>Students and identified LPS (lack of parent support) number 1 and LTA (can't see long term advantage) number 2.</p> <p>Three barrier students identified WHV (work has more value than school)</p>
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<p>Table 1B. Cycle 1 (conducted in TEL712class Fall 2017</p>	<p>RQ1.What are perceived barriers and supports that Yuma County first- generation Hispanic students believe influence success or failure in college, retention, and completion of bachelor’s degree?</p>	<p>Mixed Methods UA Yuma students Quantitative Survey- FGHS 17 Descriptive statistics Qualitative Interview- FGHS 4 Grounded Theory Hand Coding Focus Group- FGHS 10 Hand Coding Data Convergence through Triangulation</p>	<p>Research Question 1: Top 10 Identified Barriers and Supports: *Self- efficacy of the student. Perception of self and his ability to attend and complete college. *Money availability to pay for the cost of college. *Knowledge of available jobs in region and requirements for employment. *Career Counseling both in course work and majors that are required. Career counseling is to better understand what that career entails and involves the mentorship of industry professions. *Lack of Parent Support *Understanding the long term advantages of staying in school and completing a bachelor’s degree. *Lack of information regarding</p>
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	<p>RQ2.What external factors might be affecting four-year completion rates of first-generation Hispanic students in</p>		<p>college, processes, systems, and vocabulary.</p> <p>*Need mentors that have completed their bachelor’s degree or current college students to share their own personal experiences and guide students in their college-going process.</p> <p>*Understanding time management and juggling of work and family responsibilities.</p> <p>*Value of work- use the student’s work ethics to focus on college completion versus working and then dropping out of school.</p> <p>Research Question 2: These factors were identified in the coding themes; Access, Capital, Behavior, Cultural, Information/Process</p>
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<p>Table 1C. Cycle 2 Spring 2018</p>	<p>Yuma County? RQ1.What are perceived barriers that Yuma County first- generation Hispanic students believe influence success or failure in college, retention, and completion of bachelor's degree? RQ2.What supports do FGHS</p>	<p>Mixed Methods UA Yuma students Quantitative Survey- FGHS 21 Descriptive statistics Qualitative Interview- FGHS 3 Grounded Theory Hand Coding Data Convergence through Triangulation</p>	<p>Research Question 1- Perceived barriers *Lack of money *Available entry-level work *Lack of information *Don't know the advantages of finishing bachelor's *Work has more value than school *Lack of family support *Lack of career goal *Lack of mentors with a bachelor's degree *Lack of time management *Lack of experiences *Lack of career knowledge Research Question 2- Supports *Increased career experiences *Increased career Knowledge *Increased mentorships with</p>
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	<p>Yuma/Imperial influence success or failure in college, retention, and completion of a bachelor's degree?</p>		<p>industry</p> <p>*Increased student activity with others interested in STEM careers.</p> <p>Coding themes; Achievement, Opportunity, & Awareness</p>
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APPENDIX O

TABLE 10

BARRIERS TO COLLEGE COMPLETION SUCCESS

Themes, Categories, and Subcategories	Total References
(1) Opportunity Barriers	114
(a) Human	
(i) Lack of school support	22
(ii) Lack of mentors with a bachelor's degree	15
(b) System	
(i) Lack of school system structure/consistency	17
(ii) Lack of teacher knowledge/school resources	10
(iii) Lack of school preparation before college	7
(c) Resource	
(i) Lack of money availability	20
(ii) Lack of transportation/far distance to school	10
(d) Life Circumstance	
(i) Lack of parent/family support	10
(ii) Lack of parent education	3
(2) Achievement Barriers	85
(a)Human	
(i) Pressure from parents and society	2
(b) Resource	
(i) Value of work over school	10
(c) Self	
(i) Low self-efficacy/lack of initiative	18
(ii) High Anxiety/stress/lack of resiliency	10
(iii) Uncomfortable asking for help	7
(d) Life Circumstance	
(i) Time management work/school/family responsibilities	37
(ii) Limited understanding of advantages of bachelors	2

	(iii) Times it takes to finish a bachelor's degree	1
(3) Awareness Barriers		84
	(a) Life Circumstance	
	(i) Lack of life/career experience	36
	(ii) Lack of parent experience w/higher education	3
	(b) System	
	(i) Lack of career knowledge	25
	(ii) Lack of information college /college systems	10
	(c) Self (i) Uncomfortable with new experiences	10
<hr/>		
(n = 21)		

APPENDIX P

TABLE 49

TREATMENT GROUP1 DIFFERENCES FOR ACHIEVEMENT QUESTIONS Q2(1-
22) PRETEST AND POSTTEST SCORES

Characteristic	Pre		Post		<i>t</i> (6)	<i>diff.</i>	<i>p</i>	<i>r</i> ²
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Q2.1 Ability to handle change	3.14	0.69	4.14	.37	3.24	0.86	.018*	.64
Q2.2 I am self-motivated	3.57	0.97	4.28	.95	1.69	0.71	.140	.32
Q2.3 I have an identified major	3.71	1.49	4.85	.37	2.06	1.14	.084	.41
Q2.4 Many connections w/ industry	1.2	0.75	3.85	.69	6.97	2.57	.000**	.89
Q2.5 I am not afraid to ask for help	2.85	1.06	4.14	.89	2.71	1.28	.035*	.55
Q2.6 Manage my time well	3.14	0.69	4.14	.69	4.58	1.0	.004**	.78

Q2.7 I feel								
comfortable	3.14	1.67	4.28	.75	2.49	1.14	.047*	.51
live on my								
own								
Q2.8 I am								
highly resilient	3.85	1.21	4.57	.53	1.98	0.71	.094	.39
Q2.9								
Completing a	4.28	1.11	4.85	.78	1.33	0.57	.231	.22
bachelor's								
degree is								
important								
Q2.10 I know								
my career	2.57	0.97	4.57	.53	5.29	2.0	.002**	.82
Q2.11 Know								
steps to get me	2.71	0.76	4.57	.78	5.46	1.85	.002**	.83
to dream								
career								
Q2.12 I seek								
help quickly	3.0	0.58	4.57	.53	4.42	1.57	.005**	.75
Q2.13 I am								
prepared to	3.85	0.90	4.71	.48	2.12	2.71	.078	.42

apply for an internship									
Q2.14 Feel comfortable speaking in public	2.57	0.53	4.42	.53	7.12	1.85	.000**	.89	
Q2.15 It is important to expose myself to educational and industry experiences	2.57	0.98	4.71	.48	6.30	2.14	.001**	.87	
Q2.16 I am motivated to complete a bachelor's degree	4.0	1.41	4.85	.38	1.55	0.85	.172	.28	
Q2.17 I have applied for scholarships	1.85	1.21	4.57	.53	5.73	2.71	.001**	.85	
Q2.18 I have completed a	1.71	1.11	4.85	.37	6.84	3.14	.000**	.89	

transfer									
application									
Q2.19 I have									
met with an	2.28	1.38	4.85	.37	5.30	2.57	.002**	.83	
academic									
advisor									
Q2.20 I am									
highly	3.42	0.97	4.42	.53	3.24	1.0	.018*	.64	
resourceful									
Q2.21 I am									
highly	3.42	0.79	4.28	.75	3.28	0.85	.017*	.64	
innovative									
Q2.22 I am a									
good	2.85	1.1	4.42	.53	5.28	1.57	.002**	.82	
communicator									

*Note. * p<0.05 **p<0.01 df=6*

APPENDIX Q

TABLE 51

TREATMENT GROUP 1 DIFFERENCES FOR OPPORTUNITY Q3(1-10) &Q4(1-10)
QUESTIONS PRETEST AND POSTTEST SCORES

Characteristic	Pre		Post		<i>t</i> (6)	<i>diff</i>	<i>p</i>	<i>r</i> ²
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Q3.1 Money availability impacts bachelor's completion	2.0	1.00	2.28	1.11	1.5	-0.28	.172	-
Q3.2 English proficiency impacts bachelor's completion	4.0	1.73	4.0	1.73	-	0.0	-	-
Q3.3 Understanding the benefits of completing college impacts bachelor's completion	3.0	1.41	4.28	1.11	2.7	1.28	.035*	.55
Q3.4 Understanding how to complete FASFA & scholarships impact bachelor's completion	3.0	1.29	3.71	1.5	2.5	0.71	.047*	.51
Q3.5 Understanding the university application process impact bachelor's completion	3.42	1.51	4.0	1.15	1.3	0.57	.231	-
Q3.6 Understanding the college system impacts bachelor's completion	3.7	.951	4.14	1.21	.812	1.0	.448	-

Q3.7 High school preparation for college impacts bachelor's completion	2.57	1.72	2.42	1.51	.258	-0.14	.805	-
Q3.8 Requirements to be a full-time student impacts bachelor's degree completion	3.71	1.25	3.71	1.25	.000	0.0	1.0	-
Q3.9 Needing to work full-time impacts bachelor's degree completion	3.14	1.57	2.71	1.70	1.00	-.428	.356	-
Q3.10 Transportation impact bachelor's degree completion	3.71	1.38	3.85	1.46	-.186	0.14	.859	-
Q4.1 My need to make money impacts bachelor's completion	3.42	1.51	3.85	1.57	-2.12	0.57	.078	-
Q4.2 Having many non-school responsibilities impact bachelor's completion	2.57	1.13	2.57	1.13	-	0.0	-	-
Q4.3 Personal motivation impacts bachelor's completion	3.71	1.25	3.57	1.39	-.191	1.28	.85	-

Q4.4 Fear of failure impacts bachelor's completion	4.28	1.25	3.71	1.38	1.330	.57	.231	-
Q4.5 Having friends attending college impacts bachelor's completion	3.0	1.52	3.14	1.67	-1.00	.14	.356	-
Q4.6 Knowing people with a degree impacts bachelor's completion	2.85	1.46	3.0	1.6	1.00	.14	.356	-
Q4.7 Having children impacts bachelor's completion	2.28	1.70	2.28	1.70	-	0.0	-	-
Q4.8 Needing to work impacts bachelor's completion	3.0	1.53	3.42	1.39	-.626	0.85	.555	-
Q4.9 Feeling overwhelmed impacts bachelor's completion	3.28	1.49	4.28	.756	-1.87	1.0	.111	-
Q4.10 Understanding what is expected in school and assignments impacts bachelor's completion	3.57	.786	4.71	.488	3.36	1.14	.015*	.65

Note. * $p < .05$, $df=6$

APPENDIX R

TABLE 52

TREATMENT GROUP1 DIFFERENCES FOR AWARENESS Q5(1-10) QUESTIONS
PRETEST AND POSTTEST SCORES

Characteristic	Pre		Post		<i>t</i> (6)	<i>diff</i>	<i>p</i>	<i>r</i> ²
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Q5.1 Parents ability to provide information impacts bachelor's completion	3.7	1.11	3.7	1.38	.000	0.0	1.0	-
Q5.2 Knowing someone impacts bachelor's completion	2.42	.976	3.14	1.67	1.98	0.71	.094	-
Q5.3 Relationships with professors impacts bachelor's completion	3.57	.787	4.28	.756	1.69	0.71	.140	-
Q5.4 My parents & family support impact bachelor's completion	2.14	.690	1.42	.534	-1.98	0.71	.094	-
Q5.5 High school counselors & teachers impact bachelor's degree completion	3.85	1.21	3.85	1.21	-	0.0	-	-
Q5.6 Importance of college internship impacts	3.28	1.25	4.86	.378	3.27	1.57	.017*	.64

bachelor's completion Q5.7	3.0	1.15	4.29	.756	3.57	1.28	.012*	.68
Importance of involvement in school groups & clubs impact bachelor's completion Q5.8	3.71	1.38	3.57	1.62	-.548	0.16	.604	-
Parents educational attainment impacts bachelor's degree completion. Q5.9	2.71	1.11	2.28	.951	-2.12	0.42	.078	-
High school preparation impacts bachelor's degree completion Q5.10	4.42	.787	4.43	.787	.000	0.0	1.00	-
AWC / IVC course work impact bachelor's degree completion								

Note. * $p < .05$, $df=6$

APPENDIX S

IRB



Date: August 09, 2018
Principal Investigator: Tanya M Hodges
Protocol Number: 1808841756
Protocol Title: identifying perceived barriers and supports that influence college success and completion for desert southwest first-generation Hispanic students: Making bachelor's degree completion the obvious and attainable next step for more students in the desert border region of Yuma and Imperial Counties.

Level of Review: Administrative Review
Determination: Approved
IRB of Record: ASU
Investigator at Site: Katie Bernstein
IRB of Record Protocol Number: HRP-503a

Documents Reviewed Concurrently:
Data Collection Tools: *Instruments 0724.docx*
HSPP Forms/Correspondence: *Hodges IRB 8.2.2018.pdf*
Informed Consent/PHI Forms: *Consent Forms IRB 0729.docx*
Other: *Supporting materials 0724.docx*
Other Approvals and Authorizations: *COI Certification Complete for 1808841756.msg*
Recruitment Material: *Recruitment Material 0724.docx*
Regulatory Documentation: *IRB Hodges IRB 7.29.18.docx*

Regulatory Determinations/Comments:

- ASU Designated IRB of Record: When an institution is designated IRB of record, the UA IRB will not review the project. The University of Arizona agrees that it will rely on the review, approval, and continuing oversight of the institution's IRB pursuant to the terms of the Institutional Review Board Authorization Agreement.

From: research.integrity@asu.edu [<mailto:research.integrity@asu.edu>]
Sent: Monday, August 20, 2018 8:16 AM
To: Tanyam.Hodges@asu.edu
Subject: STUDY00008551 has been approved

Template: IRB_T_Post-Review_Approved

Notification of Approval

To: Tanya M Hodges
Link: [STUDY00008551](#)
P.I.: [Katherine Bernstein](#)
Title: Identifying perceived barriers and supports that influence college success and completion for desert southwest first-generation Hispanic students
Description: This submission has been approved. You can access the correspondence letter using the following link:

[Correspondence for STUDY00008551.pdf\(0.01\)](#)

To review additional details, click the link above to access the project workspace.